From: Tateiwa, Kenji
Sent: 16 Jan 2015 07:32:12 -0500
To: Tateiwa, Kenji
Subject: Correction [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST
Importance: Normal

Nuclear Sector Colleagues,

There was a typo in my notice that I sent out last night regarding the start time of today's call.
It is at **3 pm EST as usual** (not at 2 pm).

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 15, 2015 8:41 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST

Nuclear Sector Colleagues,

Happy New Year!
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 16, 2015 at 2 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) passcode [redacted]

[Major topics]
1. **Working-level Meeting of Decommissioning & Contaminated Water Issues Team (12/25/2014)**
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf
(English translation as of 11/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141127_01-e.pdf

1-3. Shortening the Length of Circulating Water Cooling System Loop
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_08-j.pdf

1-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

1-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_11-j.pdf

1-8. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (12/26/2014)
(only in Japanese)
2-1. Status of Filling Up Underground Seawater Piping Trenches
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_01.pdf

2-2. Measures to Achieve Incremental Effective Dose Limit at Site Boundary
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_03.pdf

2-3. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_05.pdf

2-4. Leakage of ALPS-Treated Water from J6 Tank Farm
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_06.pdf

3. IAEA to Review Fukushima Daiichi Decommissioning and Kashiwazaki Kariwa Operational Safety (1/7/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247076_6844.html

4. Figures and Video Clips Describing Various Water Management Measures
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

5. Overview of Fukushima Daiichi Accident and Lessons Learned (33 MB)
http://www.tepco.co.jp/en/decommision/accident/images/outline01.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037

tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, December 22, 2014 7:59 PM
Subject: [TEPCO Weekly Fukushima Update Call] TUE, Dec. 23 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
TUE, Dec. 23, 2014 at 3 pm Eastern Standard Time
(**No call next two weeks**. Next call will be on **Fri, Jan. 16, 2015** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (12/19/2014)
(only in Japanese)
1-1. Removal of Cs and Sr from Seawater, etc.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_03-j.pdf

1-2. Unit 1 Reactor Building Refueling Floor Inspection Results
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_05-j.pdf

1-3. Applicability of Plastic Scintillation Fiber (PSF) to Detect Minor Leakage from Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_07-j.pdf

1-4. Leakage of ALPS-Treated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_08-j.pdf

1-5. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_09-j.pdf

2. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool (12/22/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

2-1. Video Clip Summarizing Path to Success (6 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w220b15k&catid=61795

2-2. Video Message from Mr. Hirose, TEPCO's President (5 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w785h9cj&catid=61783

2-3. Explanation Slides (only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141222_04-j.pdf

Happy holidays to you all!

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 11, 2014 10:07 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 12 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 12th, 2014 at 3 pm Eastern Standard Time
(**No call next week**. Next call will be on **TUE, Dec. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Overview of Measures to Treat Contaminated Water
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

2. Explanation on Subdrain and Groundwater Drain Systems to the Fishermen's Association of Iwaki City (12/10/2014)
(only in Japanese)
2-1. Confirmation of Stable Performance in Removing Radionuclides from Subdrain and Groundwater Drain
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_06-j.pdf

2-2. Basic Concept of Operating the Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_07-j.pdf

2-3. Detection of High Concentration of Radioactivity from Subdrain Pits # 18/19 and Measures Taken
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_09-j.pdf

3. Approval by NRA on Design Modification to add Sr Removal Capability to SARRY (Cs Removal) System (12/11/2014)
(only in Japanese; 8.8 MB, 372 pages)
http://www.tepco.co.jp/cc/press/betu14_j/images/141211j0101.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji

To: Tateiwa, Kenji
Sent: Thursday, December 04, 2014 9:35 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 5th, 2014 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Dec. 12** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. Contaminated Water Countermeasures Committee (11/13/2014)
(only in Japanese)
1-1. Status of Contaminated Water Countermeasures and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_03-j.pdf

1-2. Recent Topics at 1F
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_04-j.pdf

1-3. Task Force on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_06-j.pdf

1-4. Demonstration Test for High-performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_07-j.pdf

1-5. Task Force on Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_08-j.pdf

1-6. Study on Shallow Ground Disposal of Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_09-j.pdf

1-7. Status of Contaminated Water Treatment Technology Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_10-j.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (11/25/2014)
(only in Japanese)
2-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_03-j.pdf

2-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_04-j.pdf

2-3. Procedure for Closure of Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_05-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (11/27/2014)
(only in Japanese)

3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_05-j.pdf

3-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_07-j.pdf

3-4. Environmental Radion Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_08-j.pdf

3-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_10-j.pdf

3-6. 3D Laser Scanning in Unit 1 Torus Room
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_11-j.pdf

3-7. Solid Radioactive Waste Treatment and Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_12-j.pdf

3-8. Progress on Emergency Safety Enhancement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_14-j.pdf

4. Introduction of ICP-MS Method Allowing Quicker Measurement of Sr-90 in Water
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141127_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, November 24, 2014 10:51 AM
Subject: NO CALL THIS WEEK [TEPCO Weekly Fukushima Update Call] Next on Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Due to unavoidable change in schedule, I will have to **cancel the call planned for tomorrow (Tue, Nov. 25**.)
Next call will be on **Fri, Dec. 5th** at 3 PM.

Apologies for any inconvenience this may cause you.
Feel free to contact me should you have any questions.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, November 12, 2014 7:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Nov. 13 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, Nov. 13, 2014 at 3 pm Eastern Standard Time
(**No call next week.** Next call will be on **TUE, Nov. 25** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6)

[Major topics]
1. Unit 1 Reactor Building Cover Roof Panel Removal (11/10/2014)
http://photo.tepco.co.jp/en/date/2014/201411-e/141110-01e.html

2. TEPCO's Statement on Detection of Trace Amounts of Cs-134 Off U.S. West Coast (11/11/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243939_5892.html

2.1 Woods Hole Oceanographic Institution's Press Release
http://www.whoi.edu/news-release/Fukushima-detection

2.2 Discussion Board on the New REDDIT Journal of Science

http://www.reddit.com/r/science/comments/2lusz5/science_ama_series_im_ken_buesseler_an/?limit=500

3. Radioactivity in Seawater Near Fukushima Daiichi (11/12/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

3.1 Inside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/intake_canal_map-e.pdf

3.2 Outside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/seawater_map-e.pdf

4. Summary Status of Decommissioning Roadmap--English Translation (9/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140925_01-e.pdf

5. Large-Scale Emergency Drill at Kashiwazaki Kariwa NPS (11/11/2014)
(only in Japanese)

http://www.tepco.co.jp/nu/kk-np/info/tohoku/2014/pdf/26110702.pdf

(photos)
http://photo.tepco.co.jp/en/date/2014/201411-e/141111-01e.html

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 3 Sep 2015 16:15:30 +0900
To: Nicholson, Thomas;Gilbertson, Anders;Burton, Thomas;Marksberry, Don;Bernardo, Robert;andrew.Szilagyi@em.doe.gov;kamel.saidi@nist.gov;'Jacoff, Adam S.';judd@nuvisioneng.com;'Buckingham, Rob';Parrott, Jack;Abu-Eid, Boby;'原 貴'
Subject: [External_Sender] ANS D&RS and IEEE ICRA

Tom and all,

I was invited to speak at the last ANS Decommissioning and Remote Systems (D&RS) Conference held in June 2014 and gave a presentation on the use of robotics at Fukushima Daiichi.

I also gave a presentation at the IEEE International Conference on Robotics and Automation (ICRA) "Symposium on Robotic Solutions Toward Nuclear Decommission" back in May 2012.
http://www.icra2012.org/program/events.php

You may want to reach out to both professional organizations.
(Jim Byrne and Sue Aggarwal are key personnel for the ANS D&RS and I know both of them.)

All the best,
Kenji

Kenji Tateiwa
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company, Inc.
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
office: +81 3 6373 4751
(b)(6) [redacted]
tateiwa.kenji@tepco.co.jp

From: Nicholson, Thomas [mailto:Thomas.Nicholson@nrc.gov]
Sent: Wednesday, September 2, 2015 3:14 AM
To: Gilbertson, Anders; Burton, Thomas; Marksberry, Don; Bernardo, Robert; andrew.Szilagyi@em.doe.gov; kamel.saidi@nist.gov; 'Jacoff, Adam S.'; judd@nuvisioneng.com; 'Buckingham, Rob'; Parrott, Jack; Abu-Eid, Boby; Tateiwa, Kenji; 原 貴
Subject: FW: Workshop Prospectus in ADAMS

Workshop committee members:

I am forwarding information I just received from Jack Parrott, NRS/NMSS concerning a related conference on robotics and remote systems scheduled during the ANS meeting July 31 – August 1, 2016.

We can discuss it at our September 9, 2015 @ 9:00 a.m. EDST at NIST.

Thanks ..... Tom

From: Parrott, Jack
Sent: Tuesday, September 01, 2015 12:25 PM
To: Nicholson, Thomas
Subject: RE: Workshop Prospectus in ADAMS

Tom,

FYI -

ANS has a Division of Robotics and Remote Systems –

ANS is having a Decommissioning and Remote Systems conference in 2016 –

See attached.

Jack

Jack D. Parrott
Senior Project Manager
US Nuclear Regulatory Commission
301-415-6634

From: Nicholson, Thomas
Sent: Thursday, August 27, 2015 10:44 AM
To: Wessels, Steven <Steven.Wessels@nrc.gov>
Cc: Aird, Thomas <Thomas.Aird@nrc.gov>; Gilbertson, Anders <Anders.Gilbertson@nrc.gov>; Sangimino, Donna-Marie <Donna-Marie.Sangimino@nrc.gov>; Holonich, Joseph <Joseph.Holonich@nrc.gov>; Rini, Brett <Brett.Rini@nrc.gov>; Parrott, Jack <Jack.Parrott@nrc.gov>; Abu-Eid, Boby <Boby.Abu-Eid@nrc.gov>; Stahl, Eric <Eric.Stahl@nrc.gov>; Fehst, Geraldine <Geraldine.Fehst@nrc.gov>; Bernardo, Robert <Robert.Bernardo@nrc.gov>; Coyne, Kevin <Kevin.Coyne@nrc.gov>; Correia, Richard <Richard.Correia@nrc.gov>; Burton, Thomas <Thomas.Burton@nrc.gov>
Subject: Workshop Prospectus in ADAMS

Steven:

As we discussed, I am forwarding to you the attached prospectus. It will go public on Friday, August 28th. It is now in ADAMS at ML15238B814, and is publically available.

Thanks ..... Tom

****

Thomas J. Nicholson, Senior Technical Advisor
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Mail Stop TWFN 10-A12
11555 Rockville Pike
Rockville, MD 20852
Tel: (301) 415-2471
Fax: (301) 415-6671
E-mail: Thomas.Nicholson@nrc.gov
****

From: Tateiwa, Kenji
Sent: 12 Sep 2015 18:16:13 +0900
To: Nicholson, Thomas
Cc: 'Jacoff, Adam S.';kamel.saidi@nist.gov;philip.mattson@hq.dhs.gov;andrew.Szilagyi@em.doe.gov;judd@nuvisioneng.com;Gilbertson, Anders;Marksberry, Don;Parrott, Jack;Bernardo, Robert;Burton, Thomas;'Buckingham, Rob';'Zeng, Zhao Chang';Abu-Eid, Boby;Coyne, Kevin;Correia, Richard;Sangimino, Donna-Marie;Rini, Brett;West, Steven;Flory, Shirley;Holonich, Joseph;'ITO SHINTARO';'TOYOTA TAKASHI';arahata.taichiro@tepco.co.jp;kondo.yuichi@tepco.co.jp;'原□貴';'村野□兼司';'傳□康貴';'山本□正之'
Subject: [External_Sender] [NIST Robotics Workshop] TEPCO Presenters

Tom,

Good talking to you and the team during the teleconference on Sept. 9.

Please find below names of presenters from TEPCO and tentative title of their presentations.

Taichiro ARAHATA (first name / last name)

Engineer, Research Planning Group

Fukushima Daiichi D&D Engineering Company

"Deployment of Robotics at Fukushima Daiichi Nuclear Power Station"

Yuichi KONDO

Engineer, Fuel Group

Fukushima Daiichi D&D Engineering Company

"Challenges and Future Needs for Robotics at Fukushima Daiichi Nuclear Power Station"

All the best,

Kenji

Kenji Tateiwa

Safety Engineering Group Manager

Fukushima Daiichi D&D Engineering Company

Tokyo Electric Power Company, Inc.

1-1-3 Uchisaiwai-cho, Chiyoda-ku

Tokyo, Japan

office: +81-3-6373-4751

(b)(6) [redacted]

tateiwa.kenji@tepco.co.jp

-----Original Appointment-----
From: Nicholson, Thomas [mailto:Thomas.Nicholson@nrc.gov]
Sent: Friday, September 11, 2015 7:36 AM
To: 'Jacoff, Adam S.'; kamel.saidi@nist.gov; Tateiwa, Kenji; 原　貴; philip.mattson@hq.dhs.gov; andrew.Szilagyi@em.doe.gov; judd@nuvisioneng.com; Gilbertson, Anders; Marksberry, Don; Parrott, Jack; Bernardo, Robert; Burton, Thomas; Buckingham, Rob; Zeng, Zhao Chang; Abu-Eid, Boby; Coyne, Kevin; Correia, Richard; Sangimino, Donna-Marie; Rini, Brett; West, Steven; Flory, Shirley; Holonich, Joseph
Subject: Organizational Meeting at NIST on September 9, 2015 @9:00 a.m. at the Robot Test Facility building
When: 2015年10月1日木曜日 9:00-12:00 (UTC-05:00) 東部標準時 (米国およびカナダ)
Where: NIST Robot Test Facility, Gaithersburg, MD

Adam, Andy, Laurie, Kenji, Takashi, Phil, Charles, Anders, Don, Jack, Robert, Tom, and Rob:

Our next organizational meeting is scheduled for **Thursday, October 1st @9:00 a.m. EDST** at the NIST Robot Test Facility, building 207 (please see attached NIST directions).

The meeting will focus on further development of our draft workshop program with tentative agenda.

We will discuss potential presenters and panelists for the sessions. Please see the attached **revised draft workshop program and agenda** that we developed on Wednesday, September 9th.

For those planning to attend the subject meeting in person, **you need to send Kam Saidi, NIST your name, organization and citizenship** for him to pre-registered for the security access by **September 28th** .

To participate in the meeting remotely, please call:

(b)(6) **U.S. callers: 1-888-677-0358 with** [redacted]

(b)(6) **International callers: 1-210-234-7539 with** [redacted]

To facilitate communications to those outside of our committee, I placed the workshop prospectus in our electronic retrievable library called ADAMS.

The link to the workshop prospectus is in the hypertext Workshop Prospectus .

Anders Gilbertson and I are preparing a two-page summary of the prospectus for posting on the NIST events web site.

Also attached is a directory of our organizing committee. Please review and edit where necessary.

Thanks ..... Tom

****

Thomas J. Nicholson, Senior Technical Advisor

U.S. Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

Mail Stop TWFN 10-A12

11555 Rockville Pike

Rockville, MD 20852

Tel: (301) 415-2471

Fax: (301) 415-6671

E-mail: Thomas.Nicholson@nrc.gov

****

<< File: Directory.docx >> << File: Directions to NIST Robot Test Facility (v2013 1).pdf >> << File: WorkshopAgenda.draft 2.docx >> << File: WorkshopProspectus.final.Aug 20-2015.docx >>

From: Tateiwa, Kenji
Sent: 31 Jul 2015 22:47:05 +0900
To: tateiwa.kenji@tepco.co.jp
Subject: [External_Sender] Please reply to sign up [TEPCO Fukushima Update Call] Mon, Aug. 3, 2015 at 9am EDT/10pm JST
Attachments: Fukushima Update Call.pdf

Friends and Colleagues,

I hope this email finds you well.

A month has passed since I made the transition from TEPCO's Washington DC office to the Tokyo HQ as Safety Engineering Group Manager of Fukushima Daiichi D&D Engineering Company.

I intend to resume the "Fukushima Update Call" that I had been hosting on a weekly-basis since early 2012 to update interested professionals (from the industry, government sector, academia, etc.) on the latest situation at Fukushima Daiichi.

I will be sending out email notification to participants prior to the call with links to the most important topics that I will verbally cover during the call.
I endeavor to host future calls on a monthly basis, with a target duration of about 30 minutes, including Q&A.
(Attached, FYI, is an email that I sent out last month from DC.)

Please reply to this email if you and/or your colleagues would like to be included in the distribution list for future calls.

Feel free to join the call whenever you find topics of interest to you.
I would also be happy to answer any questions separate from the call.

[Date/time]
Mon, August 3, 2015 at **9 am U.S. Eastern Daylight Time**
(Next call: Mon, Aug. 31 at 9 am EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number (New York): 718-354-1184

(b)(6) [redacted]

Please let me know if any of you would like to join the call from other countries.

[Major topics]
1. Contaminated Water Treatment Committee (7/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_03-j.pdf

1-2. Progress of Contaminated Water Treatment and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_04-j.pdf

1-3. Frozen Soil Wall Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_05-j.pdf

1-4. High-Performance ALPS Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_06-j.pdf

1-5. Tritiated Water Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_07-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (7/30/2015)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap (file size: 11 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_05-j.pdf
(English translation as of 6/25/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150625_01-e.pdf

2-3. Contaminated Water Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_06-j.pdf

2-4. Spent Fuel Pool Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_07-j.pdf

2-5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_08-j.pdf

2-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_09-j.pdf

2-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_10-j.pdf

2-8. Environmental Radiation Issues (file size: 15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_11-j.pdf

2-9. Work Environment Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_12-j.pdf

2-10. Summary of 1st Decommissioning R&D Collaboration Council (file size: 28 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_15-j.pdf

3. Completion of Removal of Highly-Contaminated Water from Seawater Piping Trenches (7/30/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1256382_6844.html

4. 160-page Presentation on Fukushima Accident (6/15/2015@Harvard University)
https://drive.google.com/file/d/0B3xzjqQbkug9aU9tX0FJS2pPenM/view?usp=sharing

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,
Kenji

Kenji Tateiwa
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company, Inc.
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
office: +81-3-6373-4751
(b)(6) [redacted]
tateiwa.kenji@tepco.co.jp

Tateiwa, Kenji

差出人: Tateiwa, Kenji
送信日時: 2015年6月19日金曜日 11:35
宛先: Tateiwa, Kenji
件名: Last Call from DC [TEPCO Weekly Fukushima Update Call] Fri, June 19, 2015 at 2pm EDT

Nuclear Industry Colleagues,

Tomorrow will mark the last Weekly Fukushima Update Call that I will conduct from DC.

After spending almost 4 years, I will be departing DC on June 27 and start working at TEPCO's Tokyo HQ on July 1 as Safety Engineering Group Manager of Fukushima Daiichi D&D Engineering Company.

I will endeavor to continue this call from Tokyo, albeit at a less frequent basis.
I will send out a notice for the next call once I settled into my new position.

Thank you for your continued support to TEPCO and for your interest in the progress at Fukushima Daiichi.
I look forward to keeping in touch.

[Date/time]
Fri, **June 19**, 2015 at 2 pm Eastern Daylight Time
(**Date/time of next call to be determined**.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6)

[Major topics]
1. Cabinet-Level Meeting on Decommissioning and Contaminated Water Issues (6/12/2015)
(only in Japanese)
1-1. Outline of Revised Mid-and-Long-Term Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150612_03-j.pdf

1-2. Revised Mid-and-Long-Term Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150612_05-j.pdf

1-3. Revised Schedule for Defueling of Units 1-3 SFPs
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150612_04-j.pdf

2. Summary Progress at Units 1-4 (6/12/2015)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150612_04-j.pdf

3. Transition of Different Types of Contaminated Water Stored in Tank Farms (6/12/2015)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150612_05-j.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs

Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
(b)(6)
tateiwa.kenji@tepco.co.jp
(Email address will remain unchanged after my transition to Tokyo.)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, June 04, 2015 10:18 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 5, 2015 at 2pm EDT

Nuclear Industry Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 5, 2015 at 2 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, June 19** at 2 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (5/22/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/data/000107869.pdf

1-2. Water Collected on Lid of High-Intensity Container Inside a Box Culvert
http://www.nsr.go.jp/data/000108101.pdf

1-3. Groundwater Inflow Mitigation Measures and Water Level Management
http://www.nsr.go.jp/data/000107730.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (5/25/2015)
(only in Japanese)
2-1. Water Contamination Monitoring Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_03-j.pdf

2-2. Status of Unit 1 Reactor Building Cover Dismantling
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_04-j.pdf

2-3. Status Report on Identification of Risk Factors Related to Off-site Radiological Impact
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_07-j.pdf

2-4. Preparation for Disclosure of All Radiological Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_08-j.pdf

2-5. Status Report on Various Issues (146 pages, 19 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_13-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (5/28/2015)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_05-j.pdf
(English translation as of 4/30/2015)

http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150430_01-e.pdf

3-3. Unit 1 Drywell Water Level Measurement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_06-j.pdf

3-4. Contaminated Water Treatment *(file size: 11 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_07-j.pdf

3-5. Environmental Radiation Issues *(file size: 15 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_08-j.pdf

3-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_10-j.pdf

3-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_11-j.pdf

3-8. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_12-j.pdf

3-9. Draft Revision of Mid-to-Long Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_13-j.pdf

4. Leakage of Contaminated Water from Transfer Hose (6/1/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150601_06-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, May 21, 2015 9:13 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 22, 2015 at 2pm EDT

Nuclear Industry Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, May 22, 2015 at 2 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, June 5** at 2 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6)

[Major topics]
1. IAEA Peer Review Mission Report #3 (5/14/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150514_01-e.pdf

"IAEA Issues Report on Fukushima Decommissioning Review" (IAEA Press Release)
https://www.iaea.org/newscenter/pressreleases/iaea-issues-report-fukushima-decommissioning-review

2. Fukushima Nuclear Accident Unresolved Issues Progress Report # 3 (5/20/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1250927_6844.html

(English Summary)
http://www.tepco.co.jp/en/press/corp-com/release/betu15_e/images/150520e0101.pdf

(Japanese Full Report: 503 pages, 27 MB)
http://www.tepco.co.jp/cc/press/betu15_j/images/150520j0102.pdf

3. High-Level Meeting of Decommissioning & Contaminated Water Issues Team (5/21/2015)
(only in Japanese)
3-1. Basic Policy regarding the Mid-and-Long-Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150521_05-j.pdf

3-2. Straw Man for the Mid-and-Long-Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150521_06-j.pdf

3-3. Enhanced Coordination on R&D Activities for Decommissioning and Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150521_03-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, May 07, 2015 9:04 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 8, 2015 at 2pm EDT

Nuclear Industry Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, May 8, 2015 at 2 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, May 22** at 2 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6)

[Major topics]
1. Unit 1 Drywell Internal Investigation by Transforming Robots: Summary of Findings (4/30/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150430_01-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (4/30/2015)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_05-j.pdf
(English translation as of 3/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150326_01-e.pdf

2-3. Contaminated Water Treatment *(file size: 14 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_07-j.pdf

2-4. Environmental Radiation Issues *(file size: 17 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_08-j.pdf

2-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_10-j.pdf

2-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_11-j.pdf

2-7. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_12-j.pdf

2-8. NDF's 2015 Technical Strategy Plan in Preparation for Revising the Mid-to-Long Term Decommissioning Roadmap *(file size: 18 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_14-j.pdf

2-9. Identification of Risk Factors Related to Off-site Radiological Impact
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_15-j.pdf

2-10. Preparation for Disclosing All Radiological Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_16-j.pdf

2-11. Government-Funded Demonstration Testing Results for 5 Contaminated Water Treatment Systems
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_17-j.pdf

3. Test Operation of Brine Circulation for Frozen Soil Wall (4/30/2015)
http://photo.tepco.co.jp/en/date/2015/201504-e/150430-02e.html

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 5 Aug 2015 07:08:03 +0900
To: Bernardo, Robert
Subject: [External_Sender] RE: Fukushima Unit No. 3 Spent Fuel - several distorted assemblies

Bob,

Thank you for your note.
At this moment what you found on our English website is all we have regarding Unit 3 fuels.
I will let you know as soon as I find out additional info.

All the best,
Kenji

Kenji Tateiwa
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company, Inc.
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
office: +81-3-6373-4751
(b)(6) [redacted]
tateiwa.kenji@tepco.co.jp

From: Bernardo, Robert [mailto:Robert.Bernardo@nrc.gov]
Sent: Tuesday, August 4, 2015 10:54 PM
To: tateiwa.kenji@tepco.co.jp
Subject: Fukushima Unit No. 3 Spent Fuel - several distorted assemblies

Good day, Kenji,

Below are links to a handout from the TEPCO English language website. The handout is explaining what was found in the video survey of the unit 3 spent fuel pool after removal of the fuel handling machine. There were several separate pictures, as well.

> Photos of the Investigation Result Inside of the Unit 3 Spent Fuel Pool
>
> Fukushima Daiichi Nuclear Power Station - Investigation results with an underwater camera in Unit3 Spent Fuel Pool

As you can see from the e-mail chain below, there is a fair amount of interest from my management regarding this information. I have shared the information from the website with them.

Please don't go to a lot of difficulty, but if you come across some additional photographs or videos, or any additional information that you can share with us, it would certainly be appreciated. Thank you.

Bob Bernardo

Policy and Support Branch
Japan Lessons-Learned Division
US Nuclear Regulatory Commission
O-13E11; MS O-13F15M
301-415-2621
Robert.Bernardo@nrc.gov

From: Franovich, Mike
Sent: Tuesday, August 04, 2015 8:37 AM
To: Bernardo, Robert
Cc: Johnson, Michael; Dean, Bill; Uhle, Jennifer; Evans, Michele; Davis, Jack; Bowen, Jeremy; Bowman, Gregory; Bailey, Stewart; Stahl, Eric
Subject: Fukushima Unit No. 3 Spent Fuel - several distorted assemblies

Bob,

Can we get the TEPCO photos of the damaged assemblies?

Thx,

Mike Franovich, *Deputy Director*
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
(301) 415-2239 (office)

Japan: Fuel rod casings found damaged by debris

NHK, 2015-08-04
Workers at the crippled Fukushima Daiichi nuclear plant have been preparing to remove hundreds of fuel rod assemblies from a pool of the facility's No. 3 reactor building. The workers have found damaged fuel rod containers after removing a device that had fallen on them during the 2011 disaster. They're now checking whether the damage will affect their plan to remove fuel from the pool. A 20-ton device for moving fuel rods in and out of the pool on the building's top floor was removed on Sunday, more than 4 years after the nuclear accident. High radioactivity prevented workers from carrying out the removal smoothly.

The plant's operator, Tokyo Electric Power Company, checked the condition of 566 fuel rod assemblies in the pool.
Workers found that the metal casings of 4 assemblies had been distorted and have twisted handles. This is evident in images released by the operator. It says the fuel rods appear undamaged, as radiation levels in the pool have shown no irregularities. The utility is checking for other damage and studying how to remove the distorted casings from the pool. Removing fuel rod assemblies from spent fuel pools is an important part of decommissioning work at the plant. More than 1,500 assemblies are still in pools at 3 of the facility's reactor buildings.

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From: Breskovic, Clarence
Sent: Tuesday, August 04, 2015 7:15 AM
To: Breskovic, Clarence
Subject: GNOSIS News 2015-08-04

Contents:

- China wants to build hybrid fusion-fission reactor by 2030
- Egypt, Russia to reportedly sign nuclear agreements
- Japan: Fuel rod casings found damaged by debris
- Japan: NRA approves soil freezing plan
- Junking nuclear power is creating problems for Germany's neighbors
- North Korea’s Development of a Nuclear Weapons Strategy
- Russia signs framework agreement for Vietnam's Ninh Thuan 1
- US-China nuclear agreement passes congressional review
- USA: Final Clean Power Plan Drops Support for Existing Nuclear Plants

From: Takashi Hara
Sent: 5 Dec 2015 06:53:03 +0900
To: Bernardo, Robert
Cc: tateiwa.kenji@tepco.co.jp
Subject: [External_Sender] Re: FW: FYI - WHOI news release: Higher Levels of Fukushima Cesium Detected Offshore

Dear Bob,

Thank you for your email. I received yahoo news related to this from TEPCO headquater. But,your information is more detailed.

I appreciate your support for us.

Takashi Hara

On Fri, 4 Dec 2015 15:09:03 −0000
"Bernardo, Robert" <Robert.Bernardo@nrc.gov> wrote:

> Good day,
> I wanted to make you aware of a press release from the Woods Hole Oceanographic Institute concerning contamination from Fukushima. This is just for your information, I don't believe there is anything you need to do with this other than being aware of it.
>
> You can see more information about the sampling activities on the web site ourradioactiveocean.org<http://ourradioactiveocean.org/>.
>
> Bob Bernardo
>
> Policy and Support Branch
> Japan Lessons-Learned Division
> US Nuclear Regulatory Commission
> O-13E11; MS O-13F15M
> 301-415-2621
> Robert.Bernardo@nrc.gov<mailto:Robert.Bernardo@nrc.gov>
>
>
>
> FOR IMMEDIATE RELEASE
> Media Relations Office
> media@whoi.edu<mailto:media@whoi.edu>
> December 3, 2015
> (508) 289-3340
> Higher Levels of Fukushima Cesium Detected Offshore<http://www.whoi.edu/news-release/fukushima-higher-levels-offshore>
>
> Scientists monitoring the spread of radiation in the ocean from the Fukushima nuclear accident report finding an increased number of sites off the US West Coast showing signs of contamination from Fukushima. This includes the highest detected level to date from a sample collected about 1,600 miles west of San Francisco. The level of radioactive cesium isotopes in the sample, 11 Becquerel's per cubic meter of seawater (about 264 gallons), is 50 percent higher than other samples collected along the West Coast so far, but is still more than 500 times lower than US government safety limits for drinking water, and well below limits of concern for direct exposure while swimming, boating, or other recreational activities.
>
> Ken Buesseler, a marine radiochemist with the Woods Hole Oceanographic Institution (WHOI) and

director of the WHOI Center for Marine and Environmental Radioactivity, was among the first to begin monitoring radiation in the Pacific, organizing a research expedition to the Northwest Pacific near Japan just three months after the accident that started in March 2011. Through a citizen science sampling effort, Our Radioactive Ocean, that he launched in 2014, as well as research funded by the National Science Foundation, Buesseler and his colleagues are using sophisticated sensors to look for minute levels of ocean-borne radioactivity from Fukushima. In 2015, they have added more than 110 new samples in the Pacific to the more than 135 previously collected and posted on the Our Radioactive Ocean web site.
>
> "These new data are important for two reasons," said Buesseler. "First, despite the fact that the levels of contamination off our shores remain well below government-established safety limits for human health or to marine life, the changing values underscore the need to more closely monitor contamination levels across the Pacific. Second, these long-lived radioisotopes will serve as markers for years to come for scientists studying ocean currents and mixing in coastal and offshore waters."
>
> The recent findings reported by Buesseler agree with those reported by scientists who are part of the group Kelp Watch and by the team of Canadian scientists working under the InFORM umbrella. While Buesseler's work focuses on ocean chemistry and does not involve sampling of biological organisms, the InFORM scientists have done sampling of fish and have not seen any Fukushima cesium in fish collected in British Columbia.
>
> Almost any seawater sample from the Pacific will show traces of cesium-137, an isotope of cesium with a 30-year half-life, some of which is left over from nuclear weapons testing carried out in the 1950s to 1970s. The isotope cesium-134 is the "fingerprint" of Fukushima, but, with a 2-year half-life, it decays much quicker than cesium-137. Scientists back calculate traces of cesium-134 to determine how much was actually released from Fukushima in 2011 and add to it an equal amount of cesium-137 that would have been released at the same time.
>
> Working with Japanese colleagues, Buesseler also continues to independently monitor the ongoing leaks from Fukushima Dai-ichi by collecting samples from as close as one kilometer (one-half mile) away from the nuclear power plants. During his most recent trip this October they collected samples of ocean water, marine organisms, seafloor sediment and groundwater along the coast near the reactors. Buesseler says the levels of radioactivity off Fukushima remain elevated ??? some 10 to 100 times higher than off the US West Coast today, and he is working with colleagues at WHOI to try to determine how much radioactive material is still being released to the ocean each day.
>
> "Levels today off Japan are thousands of times lower than during the peak releases in 2011. That said, finding values that are still elevated off Fukushima confirms that there is continued release from the plant," said Buesseler.
>
> Buesseler will present his latest findings on the spread of Fukushima radiation at the American Geophysical Union conference in San Francisco on Dec. 14, 2015.
>
> The Woods Hole Oceanographic Institution is a private, non-profit organization on Cape Cod, Mass., dedicated to marine research, engineering, and higher education. Established in 1930 on a recommendation from the National Academy of Sciences, its primary mission is to understand the ocean and its interaction with the Earth as a whole, and to communicate a basic understanding of the ocean's role in the changing global environment. For more information, please visit www.whoi.edu<http://www.whoi.edu>.

Takashi Hara

Deputy General Manager
TEPCO Washington Office

Phone ; (202)-457-0790 ext.113

(b)(6) [redacted]
Fax ; (202)-457-0810

From: Tateiwa, Kenji
Sent: 8 Dec 2015 07:58:59 +0900
To: Bernardo, Robert
Subject: [External_Sender] RE: FYI - WHOI news release: Higher Levels of Fukushima Cesium Detected Offshore

Bob,

Thank you, this is helpful.

All the best,
Kenji

Kenji Tateiwa
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company, Inc.
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
office: +81-3-6373-4751
(b)(6) [redacted]
tateiwa.kenji@tepco.co.jp

From: Bernardo, Robert [mailto:Robert.Bernardo@nrc.gov]
Sent: Saturday, December 5, 2015 12:09 AM
To: tateiwa.kenji@tepco.co.jp; Hara Takashi (takashi.hara@tepco.co.jp)
Subject: FW: FYI - WHOI news release: Higher Levels of Fukushima Cesium Detected Offshore

Good day,

I wanted to make you aware of a press release from the Woods Hole Oceanographic Institute concerning contamination from Fukushima. This is just for your information, I don't believe there is anything you need to do with this other than being aware of it.

You can see more information about the sampling activities on the web site ourradioactiveocean.org.

Bob Bernardo

Policy and Support Branch
Japan Lessons-Learned Division
US Nuclear Regulatory Commission
O-13E11; MS O-13F15M
301-415-2621
Robert.Bernardo@nrc.gov

FOR IMMEDIATE RELEASE
Media Relations Office
media@whoi.edu
December 3, 2015
(508) 289-3340

Higher Levels of Fukushima Cesium Detected Offshore

Scientists monitoring the spread of radiation in the ocean from the Fukushima nuclear accident report finding an increased number of sites off the US West Coast showing signs of contamination from Fukushima. This includes the highest detected level to date from a sample collected about 1,600 miles west of San Francisco. The level of radioactive cesium isotopes in the sample, 11 Becquerel's per cubic meter of seawater (about 264 gallons), is 50 percent higher than other samples collected along the West Coast so far, but is still more than 500 times lower than US government safety limits for drinking water, and well below limits of concern for direct exposure while swimming, boating, or other recreational activities.

Ken Buesseler, a marine radiochemist with the Woods Hole Oceanographic Institution (WHOI) and director of the WHOI Center for Marine and Environmental Radioactivity, was among the first to begin monitoring radiation in the Pacific, organizing a research expedition to the Northwest Pacific near Japan just three months after the accident that started in March 2011. Through a citizen science sampling effort, Our Radioactive Ocean, that he launched in 2014, as well as research funded by the National Science Foundation, Buesseler and his colleagues are using sophisticated sensors to look for minute levels of ocean-borne radioactivity from Fukushima. In 2015, they have added more than 110 new samples in the Pacific to the more than 135 previously collected and posted on the Our Radioactive Ocean web site.

"These new data are important for two reasons," said Buesseler. "First, despite the fact that the levels of contamination off our shores remain well below government-established safety limits for human health or to marine life, the changing values underscore the need to more closely monitor contamination levels across the Pacific. Second, these long-lived radioisotopes will serve as markers for years to come for scientists studying ocean currents and mixing in coastal and offshore waters."

The recent findings reported by Buesseler agree with those reported by scientists who are part of the group Kelp Watch and by the team of Canadian scientists working under the InFORM umbrella. While Buesseler's work focuses on ocean chemistry and does not involve sampling of biological organisms, the InFORM scientists have done sampling of fish and have not seen any Fukushima cesium in fish collected in British Columbia.

Almost any seawater sample from the Pacific will show traces of cesium-137, an

isotope of cesium with a 30-year half-life, some of which is left over from nuclear weapons testing carried out in the 1950s to 1970s. The isotope cesium-134 is the "fingerprint" of Fukushima, but, with a 2-year half-life, it decays much quicker than cesium-137. Scientists back calculate traces of cesium-134 to determine how much was actually released from Fukushima in 2011 and add to it an equal amount of cesium-137 that would have been released at the same time.

Working with Japanese colleagues, Buesseler also continues to independently monitor the ongoing leaks from Fukushima Dai-ichi by collecting samples from as close as one kilometer (one-half mile) away from the nuclear power plants. During his most recent trip this October they collected samples of ocean water, marine organisms, seafloor sediment and groundwater along the coast near the reactors. Buesseler says the levels of radioactivity off Fukushima remain elevated – some 10 to 100 times higher than off the US West Coast today, and he is working with colleagues at WHOI to try to determine how much radioactive material is still being released to the ocean each day.

"Levels today off Japan are thousands of times lower than during the peak releases in 2011. That said, finding values that are still elevated off Fukushima confirms that there is continued release from the plant," said Buesseler.

Buesseler will present his latest findings on the spread of Fukushima radiation at the American Geophysical Union conference in San Francisco on Dec. 14, 2015.

The Woods Hole Oceanographic Institution is a private, non-profit organization on Cape Cod, Mass., dedicated to marine research, engineering, and higher education. Established in 1930 on a recommendation from the National Academy of Sciences, its primary mission is to understand the ocean and its interaction with the Earth as a whole, and to communicate a basic understanding of the ocean's role in the changing global environment. For more information, please visit www.whoi.edu.

From: Tateiwa, Kenji
Sent: 2 Aug 2015 12:36:56 +0900
To: Bernardo, Robert
Subject: [External_Sender] RE: Please reply to sign up [TEPCO Fukushima Update Call] Mon, Aug. 3, 2015 at 9am EDT/10pm JST

Bob,

Thank you for your quick and positive response to my email.
I appreciate your continued interest in this topic and your support to TEPCO.

All the best,
Kenji

From: Bernardo, Robert [mailto:Robert.Bernardo@nrc.gov]
Sent: Friday, July 31, 2015 11:25 PM
To: 'Tateiwa, Kenji'
Subject: RE: Please reply to sign up [TEPCO Fukushima Update Call] Mon, Aug. 3, 2015 at 9am EDT/10pm JST

Kenji,

It is good to hear from you again. I hope you are well, and that your transition back to Tokyo has been smooth.

I will continue to participate in your phone call. I found them informative and very useful, and I am looking forward to the resumption of the calls.

Thanks for making the extraordinary efforts to continue this phone call. I know this is going above and beyond, and I particularly appreciate that you are making the time (late in the evening for you!) to keep us informed.

I am looking forward to hearing from you on Monday. Thanks, again.

Bob Bernardo

Policy and Support Branch
Japan Lessons-Learned Division
US Nuclear Regulatory Commission
O-13E11; MS O-13F15M
301-415-2621
Robert.Bernardo@nrc.gov

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, July 31, 2015 9:47 AM
To: tateiwa.kenji@tepco.co.jp
Subject: [External_Sender] Please reply to sign up [TEPCO Fukushima Update Call] Mon, Aug. 3, 2015 at 9am EDT/10pm JST

Friends and Colleagues,

I hope this email finds you well.

A month has passed since I made the transition from TEPCO's Washington DC office to the Tokyo HQ as Safety Engineering Group Manager of Fukushima Daiichi D&D Engineering Company.

I intend to resume the "Fukushima Update Call" that I had been hosting on a weekly-basis since early 2012 to update interested professionals (from the industry, government sector, academia, etc.) on the latest situation at Fukushima Daiichi.

I will be sending out email notification to participants prior to the call with links to the most important topics that I will verbally cover during the call.
I endeavor to host future calls on a monthly basis, with a target duration of about 30 minutes, including Q&A.
(Attached, FYI, is an email that I sent out last month from DC.)

Please reply to this email if you and/or your colleagues would like to be included in the distribution list for future calls.

Feel free to join the call whenever you find topics of interest to you.
I would also be happy to answer any questions separate from the call.

[Date/time]
Mon, August 3, 2015 at **9 am U.S. Eastern Daylight Time**
(Next call: Mon, Aug. 31 at 9 am EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number (New York): 718-354-1184
(b)(6) [redacted]
Please let me know if any of you would like to join the call from other countries.

[Major topics]
1. Contaminated Water Treatment Committee (7/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_03-j.pdf

1-2. Progress of Contaminated Water Treatment and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_04-j.pdf

1-3. Frozen Soil Wall Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_05-j.pdf

1-4. High-Performance ALPS Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_06-j.pdf

1-5. Tritiated Water Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_07-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (7/30/2015)
(only in Japanese)

2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap (file size: 11 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_05-j.pdf
(English translation as of 6/25/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150625_01-e.pdf

2-3. Contaminated Water Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_06-j.pdf

2-4. Spent Fuel Pool Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_07-j.pdf

2-5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_08-j.pdf

2-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_09-j.pdf

2-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_10-j.pdf

2-8. Environmental Radiation Issues (file size: 15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_11-j.pdf

2-9. Work Environment Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_12-j.pdf

2-10. Summary of 1st Decommissioning R&D Collaboration Council (file size: 28 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_15-j.pdf

3. Completion of Removal of Highly-Contaminated Water from Seawater Piping Trenches (7/30/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1256382_6844.html

4. 160-page Presentation on Fukushima Accident (6/15/2015@Harvard University)
https://drive.google.com/file/d/0B3xzjqQbkug9aU9tX0FJS2pPenM/view?usp=sharing

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,
Kenji

Kenji Tateiwa
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company, Inc.
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
office: +81-3-6373-4751

(b)(6) [redacted]
tateiwa.kenji@tepco.co.jp

From: Tateiwa, Kenji
Sent: 28 Aug 2015 23:21:53 +0900
To: 'Tateiwa, Kenji'
Subject: [External_Sender] [TEPCO Fukushima Update Call] Mon, Aug. 31, 2015 at 9 am EDT/10 pm JST

Friends and Colleagues,

Greetings from Tokyo.
Please find below information for the next Fukushima Update Call.

[Date/time]
Mon, August 31, 2015 at **9 am U.S. Eastern Daylight Time**
(Next call: **Mon, Oct. 5** at 9 am EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number (New York): 718-354-1184
passcode: (b)(6)
Please let me know if any of you would like to join the call from other countries.

[Major topics]
1. Nuclear Reform Monitoring Committee (8/24/2015)
(English)
http://www.nrmc.jp/en/report/detail/1258279_5233.html
1-1. Current status of Fukushima Daiichi
http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/08/24/E2.pdf

1-2. Overview of Nuclear Safety Reform Plan Progress Report
http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/08/24/E6.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (8/25/2015)
(Japanese)
2-1. Seawater and Ground Water Sampling Results (10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_03-j.pdf

2-2. Unit 1 Reactor Building Cover Dismantling Work
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_04-j.pdf

2-3. Unit 3 SFP Large Rubble Removal Work
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_05-j.pdf
(video clip)
http://photo.tepco.co.jp/en/date/2015/201508-e/150804-01e.html

2-4. Action Plan for Offsite Impact Risks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_06-j.pdf

2-5. Disclosure of All Radiation-related Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_09-j.pdf
(related website)
http://www.tepco.co.jp/decommision/planaction/monitoring2/index-j.html

2-6. Progress on Contaminated Water Issues (15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_13-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (8/27/2015)
(Japanese)

3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap (file size: 9 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_05-j.pdf
(English translation as of 7/30/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150730_01-e.pdf

3-3. Contaminated Water Issues (file size: 23 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_06-j.pdf

3-4. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_07-j.pdf

3-5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_08-j.pdf

3-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_09-j.pdf

3-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_10-j.pdf

3-8. Environmental Radiation Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_11-j.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

*** Let me know if any of your colleagues or friends would like to be added to this distribution list.*

All the best,
Kenji

Kenji Tateiwa
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company, Inc.
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
office: +81-3-6373-4751
(b)(6) [redacted]
tateiwa.kenji@tepco.co.jp

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, July 31, 2015 10:47 PM
To: tateiwa.kenji@tepco.co.jp
Subject: Please reply to sign up [TEPCO Fukushima Update Call] Mon, Aug. 3, 2015 at 9am EDT/10pm JST

Friends and Colleagues,

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(Attached, FYI, is an email that I sent out last month from DC.)

Please reply to this email if you and/or your colleagues would like to be included in the distribution list for future calls.

Feel free to join the call whenever you find topics of interest to you.
I would also be happy to answer any questions separate from the call.

[Date/time]
Mon, August 3, 2015 at **9 am U.S. Eastern Daylight Time**
(Next call: Mon, Aug. 31 at 9 am EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number (New York): 718-354-1184
passcode: (b)(6)
Please let me know if any of you would like to join the call from other countries.

[Major topics]
1. Contaminated Water Treatment Committee (7/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_03-j.pdf

1-2. Progress of Contaminated Water Treatment and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_04-j.pdf

1-3. Frozen Soil Wall Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_05-j.pdf

1-4. High-Performance ALPS Taskforce

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_06-j.pdf

1-5. Tritiated Water Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_07-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (7/30/2015)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap (file size: 11 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_05-j.pdf
(English translation as of 6/25/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150625_01-e.pdf

2-3. Contaminated Water Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_06-j.pdf

2-4. Spent Fuel Pool Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_07-j.pdf

2-5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_08-j.pdf

2-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_09-j.pdf

2-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_10-j.pdf

2-8. Environmental Radiation Issues (file size: 15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_11-j.pdf

2-9. Work Environment Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_12-j.pdf

2-10. Summary of 1st Decommissioning R&D Collaboration Council (file size: 28 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_15-j.pdf

3. Completion of Removal of Highly-Contaminated Water from Seawater Piping Trenches (7/30/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1256382_6844.html

4. 160-page Presentation on Fukushima Accident (6/15/2015@Harvard University)
https://drive.google.com/file/d/0B3xzjqQbkug9aU9tX0FJS2pPenM/view?usp=sharing

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 30 Oct 2015 20:07:09 +0900
To: 'Tateiwa, Kenji'
Subject: [External_Sender] [TEPCO Fukushima Update Call] Mon, Nov. 2, 2015 at 8 am EST/1 pm GMT/10 pm JST

Friends and Colleagues,

Greetings from Tokyo.
Please find below information for the next Fukushima Update Call.

[Date/time]
Mon, Nov. 2, 2015 at **8 am U.S. Eastern Standard Time**
1 pm Greenwich Mean Time
10 pm Japan Standard Time
(Next call: **Mon, Nov. 30** at 8 am EST/1 pm GMT/10 pm JST.)

[call-in information] (Please record your name and organization when joining the call.)
call number
(New York): 718-354-1184
(London) 020-7365-4166
(Tokyo) 03-6328-1974
(b)(6) [redacted]
Please let me know if any of you would like to join the call from other countries.

[Major topics] ***I will be focusing primarily on safety-related topics, but feel free to contact me for any questions.***

Working-level Meeting of Decommissioning & Contaminated Water Issues Team (10/29/2015)
(Japanese)
1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_04-j.pdf

2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_05-j.pdf
(English translation as of 10/1/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d151001_01-e.pdf

3. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_06-j.pdf

4. Preparation for Fuel Removal from Spent Fuel Pools
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_07-j.pdf
(pages 12/29-17/29) Investigation plan for Unit 1 reactor building refueling floor

5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_08-j.pdf
(pages 4/45-16/45) Investigation results inside Unit 1 reactor building TIP room
(pages 17/45-22/45) Investigation results of contamination in front of Unit 2 reactor building X-6 penetration
(pages 23/45-37/45) Investigation results inside Unit 3 drywell

6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_09-j.pdf

7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_10-j.pdf

8. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_11-j.pdf

9. Inspection Results of Units-1/2 Main Exhaust Stack
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_15-j.pdf

10. Opening of the Naraha Remote Technology Development Center
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_13-j.pdf
(English article by JAIF)
http://www.jaif.or.jp/en/jaeas-naraha-remote-technology-development-center-opens-with-prime-minister-attending/

[Reference] TEPCO Decommissioning Website
http://www.tepco.co.jp/en/decommision/index-e.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

*** Let me know if any of your colleagues or friends would like to be added to this distribution list.*

All the best,
Kenji

Kenji Tateiwa
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company, Inc.
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
office: +81-3-6373-4751
(b)(6) [redacted]
tateiwa.kenji@tepco.co.jp

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, October 2, 2015 10:09 PM
To: 'Tateiwa, Kenji'
Subject: [TEPCO Fukushima Update Call] Mon, Oct. 5, 2015 at 9 am EDT/2 pm BST/10 pm JST

Friends and Colleagues,

Greetings from Tokyo.
Please find below information for the next Fukushima Update Call.

[Date/time]

Mon, Oct. 5, 2015 at **9 am U.S. Eastern Daylight Time**
2 pm British Summer Time
10 pm Japan Standard Time
(Next call: **Mon, Nov. 2** at 8 am EST/1 pm GMT/10 pm JST.)

[call-in information] (Please record your name and organization when joining the call.)
call number
(New York): 718-354-1184
(London) 020-7365-4166
(Tokyo) 03-6328-1974
(b)(6)
Please let me know if any of you would like to join the call from other countries.

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (9/28/2015)
(Japanese)
1-1. Seawater and Ground Water Sampling Results (8 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150928_03-j.pdf

1-2. Unit 1 Reactor Building Cover Dismantling Work
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150928_04-j.pdf

1-3. Solid Radioactive Waste Storage
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150928_09-j.pdf

1-4. Progress on Contaminated Water Issues (14 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150928_13-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (10/1/2015)
(Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap (file size: 8 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_05-j.pdf
(English translation as of 8/27/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150827_01-e.pdf

2-3. Contaminated Water Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_06-j.pdf

2-4. Preparation for Fuel Removal from Spent Fuel Pools (15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_07-j.pdf

2-5. Preparation for Fuel Debris Removal (5 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_08-j.pdf

2-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_09-j.pdf

2-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_10-j.pdf

2-8. Environmental Radiation Issues (file size: 17 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_11-j.pdf

3. "A Study of the Fukushima Daiichi Nuclear Accident Process"
English translation of a book written by Dr. Michio Ishikawa, a world-renowned nuclear safety expert.
Although TEPCO does not necessarily agree with all of his hypotheses in this book, we believe it provides valuable insights.
http://www.springer.com/us/book/9784431555421

[Reference] TEPCO Decommissioning Website
http://www.tepco.co.jp/en/decommision/index-e.html

* *If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881
** *Let me know if any of your colleagues or friends would like to be added to this distribution list.*

All the best,
Kenji

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, August 28, 2015 11:22 PM
To: 'Tateiwa, Kenji'
Subject: [TEPCO Fukushima Update Call] Mon, Aug. 31, 2015 at 9 am EDT/10 pm JST

Friends and Colleagues,

Greetings from Tokyo.
Please find below information for the next Fukushima Update Call.

[Date/time]
Mon, August 31, 2015 at **9 am U.S. Eastern Daylight Time**
(Next call: **Mon, Oct. 5** at 9 am EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number (New York): 718-354-1184
passcode: (b)(6)
Please let me know if any of you would like to join the call from other countries.

[Major topics]
1. Nuclear Reform Monitoring Committee (8/24/2015)
(English)
http://www.nrmc.jp/en/report/detail/1258279_5233.html
1-1. Current status of Fukushima Daiichi
http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/08/24/E2.pdf

1-2. Overview of Nuclear Safety Reform Plan Progress Report
http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/08/24/E6.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (8/25/2015)
(Japanese)

2-1. Seawater and Ground Water Sampling Results (10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_03-j.pdf

2-2. Unit 1 Reactor Building Cover Dismantling Work
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_04-j.pdf

2-3. Unit 3 SFP Large Rubble Removal Work
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_05-j.pdf
(video clip)
http://photo.tepco.co.jp/en/date/2015/201508-e/150804-01e.html

2-4. Action Plan for Offsite Impact Risks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_06-j.pdf

2-5. Disclosure of All Radiation-related Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_09-j.pdf
(related website)
http://www.tepco.co.jp/decommision/planaction/monitoring2/index-j.html

2-6. Progress on Contaminated Water Issues (15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_13-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (8/27/2015)
(Japanese)

3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap (file size: 9 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_05-j.pdf
(English translation as of 7/30/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150730_01-e.pdf

3-3. Contaminated Water Issues (file size: 23 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_06-j.pdf

3-4. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_07-j.pdf

3-5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_08-j.pdf

3-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_09-j.pdf

3-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_10-j.pdf

3-8. Environmental Radiation Issues (file size: 10 MB)

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_11-j.pdf

All the best,
Kenji

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, July 31, 2015 10:47 PM
To: tateiwa.kenji@tepco.co.jp
Subject: Please reply to sign up [TEPCO Fukushima Update Call] Mon, Aug. 3, 2015 at 9am EDT/10pm JST

Friends and Colleagues,

I hope this email finds you well.

A month has passed since I made the transition from TEPCO's Washington DC office to the Tokyo HQ as Safety Engineering Group Manager of Fukushima Daiichi D&D Engineering Company.

I intend to resume the "Fukushima Update Call" that I had been hosting on a weekly-basis since early 2012 to update interested professionals (from the industry, government sector, academia, etc.) on the latest situation at Fukushima Daiichi.

I will be sending out email notification to participants prior to the call with links to the most important topics that I will verbally cover during the call.
I endeavor to host future calls on a monthly basis, with a target duration of about 30 minutes, including Q&A.
(Attached, FYI, is an email that I sent out last month from DC.)

Please reply to this email if you and/or your colleagues would like to be included in the distribution list for future calls.

Feel free to join the call whenever you find topics of interest to you.
I would also be happy to answer any questions separate from the call.

[Date/time]
Mon, August 3, 2015 at **9 am U.S. Eastern Daylight Time**
(Next call: Mon, Aug. 31 at 9 am EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number (New York): 718-354-1184
passcode: (b)(6)
Please let me know if any of you would like to join the call from other countries.

[Major topics]
1. Contaminated Water Treatment Committee (7/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_03-j.pdf

1-2. Progress of Contaminated Water Treatment and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_04-j.pdf

1-3. Frozen Soil Wall Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_05-j.pdf

1-4. High-Performance ALPS Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_06-j.pdf

1-5. Tritiated Water Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_07-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (7/30/2015)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap (file size: 11 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_05-j.pdf
(English translation as of 6/25/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150625_01-e.pdf

2-3. Contaminated Water Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_06-j.pdf

2-4. Spent Fuel Pool Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_07-j.pdf

2-5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_08-j.pdf

2-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_09-j.pdf

2-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_10-j.pdf

2-8. Environmental Radiation Issues (file size: 15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_11-j.pdf

2-9. Work Environment Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_12-j.pdf

2-10. Summary of 1st Decommissioning R&D Collaboration Council (file size: 28 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_15-j.pdf

3. Completion of Removal of Highly-Contaminated Water from Seawater Piping Trenches (7/30/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1256382_6844.html

4. 160-page Presentation on Fukushima Accident (6/15/2015@Harvard University)
https://drive.google.com/file/d/0B3xzjqQbkug9aU9tX0FJS2pPenM/view?usp=sharing

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 27 Nov 2015 23:44:08 +0900
To: 'Tateiwa, Kenji'
Subject: [External_Sender] [TEPCO Fukushima Update Call] Mon, Nov. 30, 2015 at 8 am EST/1 pm GMT/10 pm JST

Friends and Colleagues,

Greetings from Tokyo.
Please find below information for the next Fukushima Update Call.

[Date/time]
Mon, Nov. 30, 2015 at **8 am U.S. Eastern Standard Time**
1 pm Greenwich Mean Time
10 pm Japan Standard Time
(Next call: **Mon, Jan. 4, 2016** at 8 am EST/1 pm GMT/10 pm JST.)

[call-in information] (Please record your name and organization when joining the call.)
call number
(New York): 718-354-1184
(London) 020-7365-4166
(Tokyo) 03-6328-1974
(b)(6) [redacted]
Please let me know if any of you would like to join the call from other countries.

[Major topics] ***I will be focusing primarily on safety-related topics, but feel free to contact me for any questions.***
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (11/26/2015)
(Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151126_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151126_05-j.pdf
(English translation as of 10/29/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d151029_01-e.pdf

1-3. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151126_06-j.pdf

1-4. Preparation for Fuel Removal from Spent Fuel Pools
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151126_07-j.pdf
(pages 10-27/57) Unit 2 reactor building upper part dismantling plan
(pages 28-43/57) Unit 3 refueling floor gamma spectroscopy results

1-5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151126_08-j.pdf
(pages 3-10/19)Unit 3 PCV equipment hatch investigation plan by a compact robot
(pages 11-19/19) Unit 2 PCV internal investigation preparation status (decontamination near X-6 penetration)

1-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151126_09-j.pdf

1-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151126_10-j.pdf
(pages 3-6/6)Unit 3 PCV permanent instrumentation installation plan

1-8. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151126_11-j.pdf

2. Unit 3 PCV equipment hatch investigation results by a compact robot (11/27/2015)
(Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_151127_08-j.pdf
[Video clip]
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=mzmm5d4k&catid=61699

[Reference] TEPCO Decommissioning Website
http://www.tepco.co.jp/en/decommision/index-e.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

*** Let me know if any of your colleagues or friends would like to be added to this distribution list.*

All the best,
Kenji

Kenji Tateiwa
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company, Inc.
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
office: +81-3-6373-4751
(b)(6) [redacted]
tateiwa.kenji@tepco.co.jp

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, October 30, 2015 8:07 PM
To: 'Tateiwa, Kenji'
Subject: [TEPCO Fukushima Update Call] Mon, Nov. 2, 2015 at 8 am EST/1 pm GMT/10 pm JST

Friends and Colleagues,

Greetings from Tokyo.
Please find below information for the next Fukushima Update Call.

[Date/time]
Mon, Nov. 2, 2015 at 8 am U.S. Eastern Standard Time
1 pm Greenwich Mean Time

10 pm Japan Standard Time
(Next call: **Mon, Nov. 30** at 8 am EST/1 pm GMT/10 pm JST.)

[call-in information] (Please record your name and organization when joining the call.)
call number
(New York): 718-354-1184
(London) 020-7365-4166
(Tokyo) 03-6328-1974
(b)(6) [redacted]
Please let me know if any of you would like to join the call from other countries.

[Major topics] ***I will be focusing primarily on safety-related topics, but feel free to contact me for any questions.***

Working-level Meeting of Decommissioning & Contaminated Water Issues Team (10/29/2015)
(Japanese)
1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_04-j.pdf

2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_05-j.pdf
(English translation as of 10/1/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d151001_01-e.pdf

3. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_06-j.pdf

4. Preparation for Fuel Removal from Spent Fuel Pools
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_07-j.pdf
(pages 12/29-17/29) Investigation plan for Unit 1 reactor building refueling floor

5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_08-j.pdf
(pages 4/45-16/45) Investigation results inside Unit 1 reactor building TIP room
(pages 17/45-22/45) Investigation results of contamination in front of Unit 2 reactor building X-6 penetration
(pages 23/45-37/45) Investigation results inside Unit 3 drywell

6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_09-j.pdf

7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_10-j.pdf

8. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_11-j.pdf

9. Inspection Results of Units-1/2 Main Exhaust Stack
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_15-j.pdf

10. Opening of the Naraha Remote Technology Development Center

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151029_13-j.pdf
(English article by JAIF)
http://www.jaif.or.jp/en/jaeas-naraha-remote-technology-development-center-opens-with-prime-minister-attending/

[Reference] TEPCO Decommissioning Website
http://www.tepco.co.jp/en/decommision/index-e.html

All the best,
Kenji

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, October 2, 2015 10:09 PM
To: 'Tateiwa, Kenji'
Subject: [TEPCO Fukushima Update Call] Mon, Oct. 5, 2015 at 9 am EDT/2 pm BST/10 pm JST

Friends and Colleagues,

Greetings from Tokyo.
Please find below information for the next Fukushima Update Call.

[Date/time]
Mon, Oct. 5, 2015 at 9 am U.S. Eastern Daylight Time
2 pm British Summer Time
10 pm Japan Standard Time
(Next call: **Mon, Nov. 2** at 8 am EST/1 pm GMT/10 pm JST.)

[call-in information] (Please record your name and organization when joining the call.)
call number
(New York): 718-354-1184
(London) 020-7365-4166
(Tokyo) 03-6328-1974
(b)(6) [redacted]
Please let me know if any of you would like to join the call from other countries.

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (9/28/2015)
(Japanese)
1-1. Seawater and Ground Water Sampling Results (8 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150928_03-j.pdf

1-2. Unit 1 Reactor Building Cover Dismantling Work
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150928_04-j.pdf

1-3. Solid Radioactive Waste Storage
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150928_09-j.pdf

1-4. Progress on Contaminated Water Issues (14 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150928_13-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (10/1/2015)
(Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap (file size: 8 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_05-j.pdf
(English translation as of 8/27/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150827_01-e.pdf

2-3. Contaminated Water Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_06-j.pdf

2-4. Preparation for Fuel Removal from Spent Fuel Pools (15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_07-j.pdf

2-5. Preparation for Fuel Debris Removal (5 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_08-j.pdf

2-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_09-j.pdf

2-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_10-j.pdf

2-8. Environmental Radiation Issues (file size: 17 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_11-j.pdf

3. "A Study of the Fukushima Daiichi Nuclear Accident Process"
English translation of a book written by Dr. Michio Ishikawa, a world-renowned nuclear safety expert.
Although TEPCO does not necessarily agree with all of his hypotheses in this book, we believe it provides valuable insights.
http://www.springer.com/us/book/9784431555421

[Reference] TEPCO Decommissioning Website
http://www.tepco.co.jp/en/decommision/index-e.html

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*** Let me know if any of your colleagues or friends would like to be added to this distribution list.*

All the best,
Kenji

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, August 28, 2015 11:22 PM
To: 'Tateiwa, Kenji'
Subject: [TEPCO Fukushima Update Call] Mon, Aug. 31, 2015 at 9 am EDT/10 pm JST

Friends and Colleagues,

Greetings from Tokyo.
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(Next call: **Mon, Oct. 5** at 9 am EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number (New York): 718-354-1184

(b)(6)

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[Major topics]
1. Nuclear Reform Monitoring Committee (8/24/2015)
(English)
http://www.nrmc.jp/en/report/detail/1258279_5233.html
1-1. Current status of Fukushima Daiichi
http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/08/24/E2.pdf

1-2. Overview of Nuclear Safety Reform Plan Progress Report
http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/08/24/E6.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (8/25/2015)
(Japanese)
2-1. Seawater and Ground Water Sampling Results (10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_03-j.pdf

2-2. Unit 1 Reactor Building Cover Dismantling Work
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_04-j.pdf

2-3. Unit 3 SFP Large Rubble Removal Work
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_05-j.pdf
(video clip)
http://photo.tepco.co.jp/en/date/2015/201508-e/150804-01e.html

2-4. Action Plan for Offsite Impact Risks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_06-j.pdf

2-5. Disclosure of All Radiation-related Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_09-j.pdf
(related website)
http://www.tepco.co.jp/decommision/planaction/monitoring2/index-j.html

2-6. Progress on Contaminated Water Issues (15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_13-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (8/27/2015)
(Japanese)
3-1. Plant Status

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap (file size: 9 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_05-j.pdf
(English translation as of 7/30/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150730_01-e.pdf

3-3. Contaminated Water Issues (file size: 23 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_06-j.pdf

3-4. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_07-j.pdf

3-5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_08-j.pdf

3-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_09-j.pdf

3-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_10-j.pdf

3-8. Environmental Radiation Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_11-j.pdf

All the best,
Kenji

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, July 31, 2015 10:47 PM
To: tateiwa.kenji@tepco.co.jp
Subject: Please reply to sign up [TEPCO Fukushima Update Call] Mon, Aug. 3, 2015 at 9am EDT/10pm JST

Friends and Colleagues,

I hope this email finds you well.

A month has passed since I made the transition from TEPCO's Washington DC office to the Tokyo HQ as Safety Engineering Group Manager of Fukushima Daiichi D&D Engineering Company.

I intend to resume the "Fukushima Update Call" that I had been hosting on a weekly-basis since early 2012 to update interested professionals (from the industry, government sector, academia, etc.) on the latest situation at Fukushima Daiichi.

I will be sending out email notification to participants prior to the call with links to the most important topics that I will verbally cover during the call.
I endeavor to host future calls on a monthly basis, with a target duration of about 30 minutes, including Q&A.
(Attached, FYI, is an email that I sent out last month from DC.)

Please reply to this email if you and/or your colleagues would like to be included in the distribution list for future calls.

Feel free to join the call whenever you find topics of interest to you.
I would also be happy to answer any questions separate from the call.

[Date/time]
Mon, August 3, 2015 at **9 am U.S. Eastern Daylight Time**
(Next call: Mon, Aug. 31 at 9 am EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number (New York): 718-354-1184

(b)(6) [redacted]

Please let me know if any of you would like to join the call from other countries.

[Major topics]
1. Contaminated Water Treatment Committee (7/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_03-j.pdf

1-2. Progress of Contaminated Water Treatment and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_04-j.pdf

1-3. Frozen Soil Wall Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_05-j.pdf

1-4. High-Performance ALPS Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_06-j.pdf

1-5. Tritiated Water Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_07-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (7/30/2015)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap (file size: 11 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_05-j.pdf
(English translation as of 6/25/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150625_01-e.pdf

2-3. Contaminated Water Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_06-j.pdf

2-4. Spent Fuel Pool Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_07-j.pdf

2-5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_08-j.pdf

2-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_09-j.pdf

2-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_10-j.pdf

2-8. Environmental Radiation Issues (file size: 15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_11-j.pdf

2-9. Work Environment Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_12-j.pdf

2-10. Summary of 1st Decommissioning R&D Collaboration Council (file size: 28 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_15-j.pdf

3. Completion of Removal of Highly-Contaminated Water from Seawater Piping Trenches (7/30/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1256382_6844.html

4. 160-page Presentation on Fukushima Accident (6/15/2015@Harvard University)
https://drive.google.com/file/d/0B3xzjqQbkug9aU9tX0FJS2pPenM/view?usp=sharing

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 2 Oct 2015 22:08:33 +0900
To: 'Tateiwa, Kenji'
Subject: [External_Sender] [TEPCO Fukushima Update Call] Mon, Oct. 5, 2015 at 9 am EDT/2 pm BST/10 pm JST

Friends and Colleagues,

Greetings from Tokyo.
Please find below information for the next Fukushima Update Call.

[Date/time]
Mon, Oct. 5, 2015 at **9 am U.S. Eastern Daylight Time**
2 pm British Summer Time
10 pm Japan Standard Time
(Next call: **Mon, Nov. 2** at 8 am EST/1 pm GMT/10 pm JST.)

[call-in information] (Please record your name and organization when joining the call.)
call number
(New York): 718-354-1184
(London) 020-7365-4166
(Tokyo) 03-6328-1974
(b)(6) [redacted]
Please let me know if any of you would like to join the call from other countries.

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (9/28/2015)
(Japanese)
1-1. Seawater and Ground Water Sampling Results (8 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150928_03-j.pdf

1-2. Unit 1 Reactor Building Cover Dismantling Work
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150928_04-j.pdf

1-3. Solid Radioactive Waste Storage
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150928_09-j.pdf

1-4. Progress on Contaminated Water Issues (14 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150928_13-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (10/1/2015)
(Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap (file size: 8 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_05-j.pdf
(English translation as of 8/27/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150827_01-e.pdf

2-3. Contaminated Water Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_06-j.pdf

2-4. Preparation for Fuel Removal from Spent Fuel Pools (15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_07-j.pdf

2-5. Preparation for Fuel Debris Removal (5 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_08-j.pdf

2-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_09-j.pdf

2-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_10-j.pdf

2-8. Environmental Radiation Issues (file size: 17 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d151001_11-j.pdf

3. "A Study of the Fukushima Daiichi Nuclear Accident Process"
English translation of a book written by Dr. Michio Ishikawa, a world-renowned nuclear safety expert.
Although TEPCO does not necessarily agree with all of his hypotheses in this book, we believe it provides valuable insights.
http://www.springer.com/us/book/9784431555421

[Reference] TEPCO Decommissioning Website
http://www.tepco.co.jp/en/decommision/index-e.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881
*** Let me know if any of your colleagues or friends would like to be added to this distribution list.*

All the best,
Kenji

Kenji Tateiwa
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company, Inc.
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
office: +81-3-6373-4751
(b)(6) [redacted]
tateiwa.kenji@tepco.co.jp

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, August 28, 2015 11:22 PM
To: 'Tateiwa, Kenji'
Subject: [TEPCO Fukushima Update Call] Mon, Aug. 31, 2015 at 9 am EDT/10 pm JST

Friends and Colleagues,

Greetings from Tokyo.
Please find below information for the next Fukushima Update Call.

[Date/time]
Mon, August 31, 2015 at **9 am U.S. Eastern Daylight Time**
(Next call: **Mon, Oct. 5** at 9 am EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number (New York): 718-354-1184

(b)(6) [redacted]

Please let me know if any of you would like to join the call from other countries.

[Major topics]
1. Nuclear Reform Monitoring Committee (8/24/2015)
(English)
http://www.nrmc.jp/en/report/detail/1258279_5233.html
1-1. Current status of Fukushima Daiichi
http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/08/24/E2.pdf

1-2. Overview of Nuclear Safety Reform Plan Progress Report
http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/08/24/E6.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (8/25/2015)
(Japanese)
2-1. Seawater and Ground Water Sampling Results (10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_03-j.pdf

2-2. Unit 1 Reactor Building Cover Dismantling Work
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_04-j.pdf

2-3. Unit 3 SFP Large Rubble Removal Work
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_05-j.pdf
(video clip)
http://photo.tepco.co.jp/en/date/2015/201508-e/150804-01e.html

2-4. Action Plan for Offsite Impact Risks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_06-j.pdf

2-5. Disclosure of All Radiation-related Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_09-j.pdf
(related website)
http://www.tepco.co.jp/decommision/planaction/monitoring2/index-j.html

2-6. Progress on Contaminated Water Issues (15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150825_13-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (8/27/2015)
(Japanese)
3-1. Plant Status

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap (file size: 9 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_05-j.pdf
(English translation as of 7/30/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150730_01-e.pdf

3-3. Contaminated Water Issues (file size: 23 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_06-j.pdf

3-4. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_07-j.pdf

3-5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_08-j.pdf

3-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_09-j.pdf

3-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_10-j.pdf

3-8. Environmental Radiation Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150827_11-j.pdf

All the best,
Kenji

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, July 31, 2015 10:47 PM
To: tateiwa.kenji@tepco.co.jp
Subject: Please reply to sign up [TEPCO Fukushima Update Call] Mon, Aug. 3, 2015 at 9am EDT/10pm JST

Friends and Colleagues,

I hope this email finds you well.

A month has passed since I made the transition from TEPCO's Washington DC office to the Tokyo HQ as Safety Engineering Group Manager of Fukushima Daiichi D&D Engineering Company.

I intend to resume the "Fukushima Update Call" that I had been hosting on a weekly-basis since early 2012 to update interested professionals (from the industry, government sector, academia, etc.) on the latest situation at Fukushima Daiichi.

I will be sending out email notification to participants prior to the call with links to the most important topics that I will verbally cover during the call.
I endeavor to host future calls on a monthly basis, with a target duration of about 30 minutes, including Q&A.
(Attached, FYI, is an email that I sent out last month from DC.)

Please reply to this email if you and/or your colleagues would like to be included in the distribution list for future calls.

Feel free to join the call whenever you find topics of interest to you.
I would also be happy to answer any questions separate from the call.

[Date/time]
Mon, August 3, 2015 at **9 am U.S. Eastern Daylight Time**
(Next call: Mon, Aug. 31 at 9 am EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number (New York): 718-354-1184

(b)(6) [redacted]

Please let me know if any of you would like to join the call from other countries.

[Major topics]
1. Contaminated Water Treatment Committee (7/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_03-j.pdf

1-2. Progress of Contaminated Water Treatment and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_04-j.pdf

1-3. Frozen Soil Wall Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_05-j.pdf

1-4. High-Performance ALPS Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_06-j.pdf

1-5. Tritiated Water Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_07-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (7/30/2015)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap (file size: 11 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_05-j.pdf
(English translation as of 6/25/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150625_01-e.pdf

2-3. Contaminated Water Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_06-j.pdf

2-4. Spent Fuel Pool Issues (file size: 10 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_07-j.pdf

2-5. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_08-j.pdf

2-6. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_09-j.pdf

2-7. Circulating Water Core Cooling System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_10-j.pdf

2-8. Environmental Radiation Issues (file size: 15 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_11-j.pdf

2-9. Work Environment Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_12-j.pdf

2-10. Summary of 1st Decommissioning R&D Collaboration Council (file size: 28 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_15-j.pdf

3. Completion of Removal of Highly-Contaminated Water from Seawater Piping Trenches (7/30/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1256382_6844.html

4. 160-page Presentation on Fukushima Accident (6/15/2015@Harvard University)
https://drive.google.com/file/d/0B3xzjqQbkug9aU9tX0FJS2pPenM/view?usp=sharing

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 3 Jul 2015 07:37:14 +0900
To: Nicholson, Thomas
Cc: Marksberry, Don;Aird, David;West, Steven;Parrott, Jack;Ford, William;Bernardo, Robert
Subject: [External_Sender] Thank you: [Transition from DC to Tokyo] New Role in Decommissioning Safety

Tom and NRC friends,

Hello from muggy Tokyo (even inside the office!)

Thank you for your very kind note.
Apologies for my belated reply—I started working at TEPCO's HQ on Wed, July 1 and am still catching up with the hundreds of emails.

It has been a true pleasure and honor having had the opportunity to work with you and your colleagues at the NRC.
As I will be in charge of overall safety of Fukushima Daiichi decommissioning, I am sure there will be more opportunities for us to collaborate and to learn from each other in the future.

I plan to join the teleconferece on the robotics workshop next week.
I tested the international number (1-210-234-7539) in your notification email, but got an automatic message saying the number is currently not in use. Could you check if there is a valid international number?
If not, no worries, I will call the U.S. number.

All the best,
Kenji

Kenji Tateiwa
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
office: +81-3-6373-4751
(b)(6) [redacted]
tateiwa.kenji@tepco.co.jp

From: Nicholson, Thomas [mailto:Thomas.Nicholson@nrc.gov]
Sent: Saturday, June 27, 2015 9:56 AM
To: Tateiwa, Kenji
Cc: Marksberry, Don; Aird, David; West, Steven; Parrott, Jack; Ford, William; Bernardo, Robert
Subject: RE: [Transition from DC to Tokyo] New Role in Decommissioning Safety

Kenji:

It was one year ago that you presented an unforgettable research seminar on tackling water issues at Fukushima Daiichi to the NRC Chair, NRC Commissioner, senior NRC management

and technical staff, EPA assistant administrator, White House senior technical advisor, and EPA and DOE staff in the NRC auditorium.

Earlier that year you presented at our 2014 RIC session on remediation of ground-water systems.

I am indebted to you for your ability and dedication to provide an ongoing open exchange of information on Fukushima Daiichi remediation activities over the past 3 years. We have learned a great deal from you, and are very appreciative.

Your ability to understand the difficult issues and ongoing clean-up activities at Fukushima, and to communicate it to us in clear and simple terminology is remarkable.

I hope you will continue to help us in developing the "Workshop on the Use of Robotics at Nuclear Facilities" scheduled for December 1-3, 2015 at NIST.

Thanks so very much ..... Tom

(Postscript: Please notice below my new telephone and fax numbers, and address. We moved from Church Street, Rockville, MD to NRC Headquarters Campus last week.)

****

Thomas J. Nicholson, Senior Technical Advisor
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Mail Stop TWFN 10-A12
11555 Rockville Pike
Rockville, MD 20852
Tel: (301) 415-2471
Fax: (301) 415-6671
E-mail: Thomas.Nicholson@nrc.gov

****

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, June 26, 2015 7:55 PM
To: tateiwa.kenji@tepco.co.jp
Subject: [External_Sender] [Transition from DC to Tokyo] New Role in Decommissioning Safety

Dear Friends and Colleagues,

Today will be my last day working out of the Washington DC Office of TEPCO.

After spending 4 productive years in DC, I will be departing the U.S. on Sat, June 27 and start working at TEPCO's Tokyo HQ on July 1 as Safety Engineering Group Manager of Fukushima Daiichi Decontamination & Decommissioning Engineering Company.

Thank you for your continued support to TEPCO after the Fukushima Daiichi accident in March 2011.
We could not have made it thus far without all your support.

For your information, you can find my latest interview on the online Nuclear Plant Journal describing the current status of Fukushima Daiichi.
http://digitaleditions.nuclearplantjournal.com/MJ15/#32

Feel free to contact me should you have any questions related to Fukushima.
I look forward to keeping in touch.

All the best,
Kenji

p.s.
Please forgive my slow response in emails for the next few weeks while I make my transition back to Japan.

Kenji Tateiwa
email: tateiwa.kenji@tepco.co.jp
LinkedIn: https://www.linkedin.com/in/ktateiwa

----------]
(From Sep. 2011 to June 2015)
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office

(From July 2015)
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
tel: +81-3-6373-4751

From: Tateiwa, Kenji
Sent: 26 Jun 2015 19:55:20 -0400
To: tateiwa.kenji@tepco.co.jp
Subject: [External_Sender] [Transition from DC to Tokyo] New Role in Decommissioning Safety

Dear Friends and Colleagues,

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After spending 4 productive years in DC, I will be departing the U.S. on Sat, June 27 and start working at TEPCO's Tokyo HQ on July 1 as Safety Engineering Group Manager of Fukushima Daiichi Decontamination & Decommissioning Engineering Company.

Thank you for your continued support to TEPCO after the Fukushima Daiichi accident in March 2011.
We could not have made it thus far without all your support.

For your information, you can find my latest interview on the online Nuclear Plant Journal describing the current status of Fukushima Daiichi.
http://digitaleditions.nuclearplantjournal.com/MJ15/#32

Feel free to contact me should you have any questions related to Fukushima.
I look forward to keeping in touch.

All the best,
Kenji

p.s.
Please forgive my slow response in emails for the next few weeks while I make my transition back to Japan.

Kenji Tateiwa
email: tateiwa.kenji@tepco.co.jp
LinkedIn: https://www.linkedin.com/in/ktateiwa

----------]
(From Sep. 2011 to June 2015)
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office

(From July 2015)
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
tel: +81-3-6373-4751

From: Bernardo, Robert
Sent: 21 Aug 2014 13:12:28 +0000
To: 'tateiwa.kenji@tepco.co.jp'
Subject: Frozen Soil wall and trench ice wall differences

Good morning, Kenji,

My name is Bob Bernardo, and I work for the US NRC. I work with Chuck Norton, and I am tasked with monitoring developments at Fukushima. You may have heard my name on the last few weekly phone calls.

There has been a fair amount of press coverage over the last couple of days related to the "frozen Soil wall" and the "trench ice wall", a couple of examples are below. I wanted to take a moment to make you aware of this, since I think the press is still getting this confused.

TEPCO Concedes Failure Of Ice Wall At Fukushima Plant. CleanTechnica (8/20, Dechert, 12K) reports, "Less than a week ago, Naohiro Masuda, the Tokyo Electric Power Company's Chief Decommissioning Officer, spoke about development of the 'ice wall' around the four ruined reactor units at the Fukushima I power station." Different "story on Tuesday, August 19" as "TEPCO officials told Japanese nuclear regulators that the section of ice wall between the unit #2 turbine building and the cable tunnel—-estimated to hold 5-6,000 tons of highly radioactive water—-was not working." As "we reported on June 6, workers from a TEPCO subcontractor, Kajioma Corp., had been tasked to install 1,500 thin tubes of refrigerant at -30° C a meter (3 ft) apart and up to 30 meters (100 ft) underground." The "soil thus frozen would create an impervious wall about two meters thick (over 6 ft) around the wrecked reactors."

TEPCO Concedes Failure Of "Ice Plug" For Tunnel. The Telegraph (UK) (8/21, Ryall, 3.23M) reports, "The operator of Japan's crippled Fukushima nuclear plant has conceded defeat in its effort to create a frozen plug in a tunnel to stop water flowing into the No. 2 reactor building and becoming contaminated with radiation." TEPCO engineers have been working since early June to inject "more than 400 tons of ice and dry ice into the tunnel in an effort to freeze a section of the passage solid." Halting the "flow of water through the tunnel, which was originally used to run cables into the reactor's turbine building, would have made it possible to pump highly radioactive water out to be treated." But now, TEPCO says it will "experiment with cement and other sealant materials in an effort to stop the water moving through the tunnel, as well as installing a filter to try to slow the flow of water."

Concerns Persist On TEPCO Plan For Ice Wall Around Damaged Fukushima Reactors. In a lengthy report on its website, Vice (8/20, Magdaleno, 448K) reports on TEPCO's announcement last month that it would proceed with its plan to "construct an 'ice wall'" around the plant's failed reactors, suggesting that "it seemed like a step backwards." In June, "the utility company in charge of decommissioning the plant" indicated that its "initial attempt at installing a similar structure had flopped." The pipes were "apparently unable to freeze the ground, despite being filled with a -22°F chemical solution." Dr. Dale Klein, former NRC Chairman is concerned that there's "little technical understanding of how the natural water sources surrounding the plant might

respond." Klein said, "As the water comes down the mountains towards the ocean, it's not clear to me that [TEPCO] really know how it is going to move around that frozen barrier." He added, "It's such a complicated site and problem, and I don't know if they fully understand that yet."

I've put together some information based on my understanding of the issues, mostly based on what you have shared in the weekly phone call briefings. I'm going to share this with my management to make sure they understand the difference. Could you take a quick look and make sure I'm accurate in my understanding? thanks

There has been a lot of public confusion about the efforts that TEPCO is making toward freezing the trench ice wall (Ice Plug in article below) and the "frozen soil wall" that will surround the site. Many people think that they are both the same and the difficulties with the trench ice wall show that TEPCO won't be successful installing the "frozen soil wall". TEPCO has produced a You-Tube video to try and clarify the differences.
https://www.youtube.com/watch?v=C6YSOrfS1Kc.

The video describes the difference between the trench ice wall freezing efforts and the frozen soil wall. The difficulties encountered in freezing the contaminated water in the trench have not caused any delays nor impacts in the development of the "frozen soil wall." Drilling and installation of freezer pipes for the frozen soil is proceeding as planned.

Here's some information that helps in the understanding:

Frozen Soil Wall:
In June, 2014, construction began on the "frozen soil wall," a system designed to freeze the soil around the entire perimeter of Units 1-4. The frozen soil was will block groundwater from entering the reactor building basements and dramatically reducing the accumulation of contaminated water from its current level of 400 tons per day. This, in turn, will reduce the need for more storage tanks and will also free up capacity in the water treatment systems to clean water that is already being stored. Drilling and installation of the freezer pipes and monitoring equipment is in progress. TEPCO expects to begin freezing operations in March, 2015. To learn more, see the linked video:
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=kyt26951&catid=61795

Trench Ice Plug:
A significant contamination control effort is underway to remove water from the underground piping tunnels, or trenches, between the turbine buildings and the intake structures. The water entered the trenches during the inundation from the tsunami, and then became highly contaminated as a result of the accident. The water in the trench is not being released into the ocean now. However, if another tsunami were to strike the site, the contaminated water could be washed out of the trenches into the ocean. To remove the water, the trenches must be isolated from the turbine buildings. TEPCO intends to create an Ice Wall at the turbine building end of the trenches to isolate the trench. Once the trench is isolated, the contaminated water can be pumped out and the trench decontaminated.
TEPCO began the freezing operation in May on the trench ice wall. Since that time, the efforts to freeze the wall have not been completely successful. They have been

installing more freeze pipes and adding dry ice to the trench water to try to freeze the water, as well as adding packing material to minimize the flow of water. These efforts have made some progress, but the trench wall has not yet completely frozen. Detailed material on the additional measures to try to complete the trench ice wall can be found at http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140723_03-e.pdf

TEPCO met with JNRA on August 19 to talk about where they are and where they think they are going with the trench wall. TEPCO now says it will be difficult to halt the flow of water with an ice blockade alone, so it has decided to augment the ice wall with filler material such as cement or grout. NRA experts agreed to make a decision on whether to approve the plan after they assess the effectiveness of using filler material in tests to be conducted by TEPCO. TEPCO is being very cautious to avoid displacing any of the water in the trench. Any contaminated water displaced from the trench could enter the ocean and wash additional contamination into the port at Fukushima.

Bob Bernardo

Policy and Support Branch
Japan Lessons-Learned Division
US Nuclear Regulatory Commission
O-13E11; MS O-13F15M
301-415-2621
Robert.Bernardo@nrc.gov

From: Tateiwa, Kenji
Sent: 17 Aug 2012 15:40:05 -0400
To: Norton, Charles
Cc: Witt, Kevin
Subject: Fuel racks [TEPCO Weekly Fukushima Update Call] Fri, Aug. 17 at 3pm EDT
Importance: Normal

Chuck,

Thank you for joining the update calls and I appreciate the kudos.
Please find below information regarding fuel racks used at Fukushima Daiichi.

[1F-1]
30 racks that hold 20 fuel bundles each; made of aluminum (with no boron)
10 racks that hold 30 fuel bundles each; made of aluminum (with 1.3 weight-% natural boron)

[1F-2]
41 racks that hold 20 fuel bundles each; made of anti-corrosive aluminum (with no boron)
14 racks that hold 30 fuel bundles each; made of aluminum (with 1.3 weight-% natural boron)

[1F-3]
40 racks that hold 20 fuel bundles each; made of anti-corrosive aluminum (with no boron)
14 racks that hold 30 fuel bundles each; made of aluminum (with 1.3 weight-% natural boron)

[1F-4]
53 racks that hold 30 fuel bundles each; made of SUS 304 (stainless steel)

Please let me know if you have further questions.

All the best,
Kenji

----- Original Message -----
From: Norton, Charles
To: Tateiwa, Kenji
Cc: Witt, Kevin
Sent: Friday, August 17, 2012 3:23 PM
Subject: RE: Update [TEPCO Weekly Fukushima Update Call] Fri, Aug. 17 at 3pm EDT

Kenji,

We would like to know if TEPCO used low or high density fuel racks to maintain the Fukushima spent fuel pools sub-critical. Low density racks do not require boron or any poison integrated into the racks to main sub-criticality.

You provide good information and have excellent presentation on your weekly updates We really appreciate you doing this.

Thank you,

Chuck Norton
USNRC JLD

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, August 17, 2012 8:47 AM
To: Tateiwa, Kenji
Subject: Update [TEPCO Weekly Fukushima Update Call] Fri, Aug. 17 at 3pm EDT

Colleagues of nuclear-related U.S. Government agencies and National Laboratories,

Please find below information for today's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 17 at 3 pm EDT
(I would like to make Fridays the default day for the call hereafter; apologies for the inconvenience this may cause you.)

[call-in information](Please record your name and company name when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. Attempt to Investigate Unit 1 Reactor Building Refueling Floor by Balloon Probe (Aug. 8)
http://www.tepco.co.jp/en/nu/fukushima-np/images/handouts_120808_02-e.pdf

2. Reliability Enhancement of Second Cesium Adsorption Facility (SARRY) (Aug. 9)
http://www.tepco.co.jp/en/nu/fukushima-np/images/handouts_120809_09-e.pdf

3. Unit 4 Primary Containment Vessel Head Lowered to the Ground (Aug. 10)
http://www.tepco.co.jp/en/nu/fukushima-np/images/handouts_120810_01-e.pdf

4. Water Leakage in Unit 4 Turbine Building (Aug. 14)
http://www.tepco.co.jp/en/nu/fukushima-np/images/handouts_120814_02-e.pdf

5. Unit 5 ECCS Suction Strainer to be Inspected (from Aug. 20)

Please let me know if there are any other specific topics that you would like me to cover.

[TEPCO Public Information in English]
Press Releases
http://www.tepco.co.jp/en/press/corp-com/release/index-e.html

Photos and Video Footages
http://photo.tepco.co.jp/en/index-e.html

Press Conference Handouts
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/index-e.html

Rebuttals against Media Misinformation and Rumors
http://www.tepco.co.jp/en/nu/fukushima-np/info/index-e.html

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company

Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116

(b)(6)

From: Witt, Kevin
Sent: 23 May 2014 10:06:08 -0400
To: Bernardo, Robert
Subject: FW: 1F
Attachments: [TEPCO Weekly Fukushima Update Call] Fri, May 23 at 3pm EDT

Hey Bob, FYI, thought you may be interested in the latest update of Fukushima. Sorry for the duplication if you already got it.

-Kevin

From: Norton, Charles
Sent: Friday, May 23, 2014 7:12 AM
To: Marksberry, Don; Lee, Richard; Salay, Michael; Esmaili, Hossein; Helton, Donald; Nakanishi, Tony; Witt, Kevin; Lane, John; Mitman, Jeffrey; Notafrancesco, Allen; Basu, Sudhamay; Randy Gauntt; Siu, Nathan; Jimenez, Manuel; Reckley, William; Arndt, Steven; Collins, Timothy; Laur, Steven; Orders, William; Williams, Vince; Huffert, Anthony; Fuller, Edward; Pires, Jose; Fuhrmann, Mark; Nosek, Andrew; Skillman, Gordon; Nicholson, Thomas; Aird, David; Tadesse, Rebecca
Subject: RE: 1F

All,

I'll be forwarding the Friday TEPCO call agenda and TEPCO information bulletins While Don Marksberry is on leave.

Chuck Norton
NRR/JLD/PSB

From: Marksberry, Don
Sent: Friday, May 09, 2014 7:12 AM
To: Lee, Richard; Salay, Michael; Esmaili, Hossein; Helton, Donald; Norton, Charles; Nakanishi, Tony; Witt, Kevin; Lane, John; Mitman, Jeffrey; Notafrancesco, Allen; Basu, Sudhamay; Randy Gauntt; Siu, Nathan; Jimenez, Manuel; Reckley, William; Arndt, Steven; Collins, Timothy; Laur, Steven; Orders, William; Williams, Vince; Huffert, Anthony; Fuller, Edward; Pires, Jose; Fuhrmann, Mark; Nosek, Andrew; Skillman, Gordon; Nicholson, Thomas; Aird, David; Tadesse, Rebecca
Subject: 1F

From: Tateiwa, Kenji
Sent: 22 May 2014 20:18:56 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 23 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **May 23**, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Thu, May 29** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (5/19/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140519_03-j.pdf
(page 3/79) Status of Units 2/3 Seawater Piping Trench, Facing Work, and Sea-Side Impermeable Wall Installation
(page 11/79) Groundwater Bypass Analysis Results
(page 20/79) Gradual Increase in Gross-beta and Tritium Concentration in Seawater Near Units 1-4 Intake Structures
(page 29/79) Heavy Rain Likely Caused Temporary Spike in Cs-137 Concentration in Seawater
(page 36/79) Status of ALPS
(page 43/79) Location of Water Leakage from Unit 3 Containment Vessel Identified
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=cju2qef7&catid=61785
(page 48/79) Inadvertent Transfer of Contaminated Water to Incinerator Building
(page 75/79) Augmented Field Management by TEPCO Personnel

1-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140519_04-j.pdf
(page 4/47) Doubling the Tank Weirs
(page 11/47) New Tanks Installation
(page 20/47) Treatment of Rainwater Accumulated in Weirs
(page 28/47) Roof Installation Over Tank Farms
(page 35/47) Discharge Route of Rainwater Ditch
(page 41/47) Groundwater Ingress Reduction Effect at HTI Building

1-3. Progress Status of Frozen-Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140519_05-j.pdf
(photos)
http://photo.tepco.co.jp/en/date/2014/201405-e/140521-01e.html
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=m7ge19ib&catid=61699

2. Bypassed Groundwater Released to the Sea (5/21/2014)

http://www.tepco.co.jp/en/press/corp-com/release/2014/1236566_5892.html
(photos and video clips)
http://photo.tepco.co.jp/en/date/2014/201405-e/140521-02e.html

3. 50+% Fuel Bundles Safely Transferred from Unit 4 Spent Fuel Pool (5/19/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

4. Visit to Fukushima by Caroline Kennedy, US Ambassador to Japan (5/14/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236413_5892.html

5. Rebuttal on Asahi Shimbun (and NY Times) Article Unfairly Criticizing Fukushima Workers (5/22/2014)
(The text below should be posted on the following website shortly.)
http://www.tepco.co.jp/en/press/corp-com/release/index_ho-e.html
****

Tokyo, May 22, 2014 - Tokyo Electric Power Company (TEPCO) released a statement in response to The Asahi Shimbun's article on May 20, ***"90% of TEPCO workers defied orders, fled Fukushima plant in 2011"***, asserting that the company does not consider the temporary evacuation of employees in the aftermath of the accident in March 2011 to be inobservance of Yoshida's instructions.

TEPCO's stance towards The Asahi Shimbun's article
http://ajw.asahi.com/article/0311disaster/fukushima/AJ201405200031 is as follows.

-Our recognition is that the former Fukushima Daiichi site superintendent Yoshida's instruction was that the employees evacuate to low dose areas inside the site, and if no suitable area exists, to Fukushima Daini.
-Therefore, we do not consider the temporary evacuation of employees to Fukushima Daini to be inobservance of Yoshida's instructions.

President Hirose was called to the Diet on May 21, and was questioned by one of the assembly members about the facts at the time of the accident. His statement is as below.

-As I confirmed via the related persons, the former site superintendent's instruction meant "If there were no areas inside the Fukushima Daiichi site where the radiation dose is low, consider Fukushima Daini as an evacuation destination."

-Looking back at that time, our recognition is that Yoshida's instruction was not given upon knowing the exact radiation levels inside Fukushima Daiichi, but instead, he meant "Evacuate temporarily to anywhere safe". As a consequence, they were at least able to evacuate temporarily in a safe manner.

-In fact, the necessary workforce stayed at Fukushima Daiichi to respond to the accident, and even some of those who temporarily evacuated to Fukushima Daini came back to Fukushima Daiichi after a few hours' break, and continued to work. I do not consider the evacuation to be inobservance of the site superintendent's instruction, and neither do I believe there was any delay in accident response at Fukushima Daiichi due to the temporary evacuation of 90% of site workers to Fukushima Daini. Our investigation report does not even discuss the destination of the temporary evacuation, which indicates that it was not the main issue then.

-Presently, as is well known, workers at Fukushima Daiichi are struggling to improve the situation there. A considerable number of workers who stayed at Fukushima in the aftermath of the accident still continue to work at the site, where the working environment remains severe. Considering the sentiments of those workers, my regret is that the coverage saying "90% of workers defied orders" would negatively affect their morale.

-Our workers need to maintain a strong sense of mission and responsibility to continue their work without becoming demoralized.

-Here on, my determination as president is to make sure that does not happen and to enable them to work free of impediment towards the challenging decommissioning operation at Fukushima Daiichi.
****

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)
(Let me know if there is a need to call in from outside the U.S. I will check the availability of call-in numbers in other countries.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
(b)(6) [redacted]

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, May 08, 2014 10:02 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 9 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for today's Weekly Fukushima Update Call.

[Date/time]
Fri, May 9, 2014 at 3 pm Eastern Daylight Time
(**No call next week.**Next call will be on **Fri, May 23** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. **Contaminated Water Committee (4/28/2014)**
(only in Japanese)
1-1. Preventive and Multi-layered Additional Measures
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_03-j.pdf

1-2. Status Report of Land-side Impermeable Wall (Frozen Soil Wall) Task Force
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_04-j.pdf

1-3. Status Report of ALPS Task Force
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_05-j.pdf

1-4. Issues List of Tritium Task Force
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_06-j.pdf

1-5. Status of Contaminated Water Countermeasures
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_07-j.pdf

1-6. Additional Measures to Stop Groundwater Ingress
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_08-j.pdf

1-7. Mitigating Risk due to Implementation of "Facing"
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_09-j.pdf

1-8. Addition and Replacement Plan of Contaminated Water Storage Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_10-j.pdf

1-9. Additional Public Offering of Projects for FY2013
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_11-j.pdf

1-10. Application Status of Technology Offered Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_12-j.pdf

1-11. Recent Issues at 1F and Actions Taken
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_13-j.pdf

2. Dose Rate and Gamma Camera Investigation Plan for Units 1-3 Reactor Buildings Upper Floors (4/28/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140428_06-j.pdf

3. Gamma Camera Investigation Plan for Units 1-3 Reactor Buildings First Floor (5/8/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140508_07-j.pdf

4. Visual Inspection Results of Unit 4 Fuels (5/1/2014)
http://photo.tepco.co.jp/en/date/2014/201405-e/140501-01e.html

5. IRID Workshop for R&D on Innovative Approach for Fuel Debris Retrieval (4/25/2014)
http://irid.or.jp/fd/?page_id=352

5-1. Current status at Fukushima Daiichi Nuclear Power Station
http://irid.or.jp/debris/S1-1E.pdf

5-2. Status of R&D for Fuel Debris Retrieval
http://irid.or.jp/debris/S1-2E.pdf

5-3. Innovative Approach for Fuel Debris Retrieval, Results of Request for Information (RFI)
http://irid.or.jp/debris/S2-1E.pdf

5-4. Project Scheme for Decommissioning and Contaminated Water Management and RFP Schedule
http://irid.or.jp/debris/S2-2E.pdf

6. Cooperation Statement with Sellafield Ltd. (5/2/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236097_5892.html
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140502_01-e.pdf

7. Nuclear Safety Reform Plan Progress Report (FY2013 Q4) (5/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236098_5892.html

7-1. Overview
http://www.tepco.co.jp/en/press/corp-com/release/betu14_e/images/140501e0101.pdf

7-2. Attachment-1 (only in Japanese: 16.4 MB)
http://www.tepco.co.jp/cc/press/betu14_j/images/140501j0102.pdf

7-3. Attachment-2 (only in Japanese: 881 KB)
http://www.tepco.co.jp/cc/press/betu14_j/images/140501j0103.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Friday, April 25, 2014 12:12 AM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, April 25 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for today's Weekly Fukushima Update Call.

[Date/time]
Fri, April 25, 2014 at 3 pm Eastern Daylight Time
(**No call next week.**Next call will be on **Fri, May 9** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. J-NRA Contaminated Water Working Group (4/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140411_04-j.pdf
(page 4/153) Groundwater contamination monitoring data

(page 16/153) Seawater contamination monitoring data
(page 31/153) Groundwater flow simulation results
(page 106/153) Options of installing roof on tank farms
(page 135/153) Correction of beta-rich specimen due to "counting loss effect"

2 Working-level Meeting of Decommissioning & Contaminated Water Issues Team (4/24/2014)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140424_04-j.pdf
(page 6/8) Weekly trend of contaminated water storage status

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140424_06-j.pdf
(page 2/19) Unit 4 spent fuel pool: 726/1533 fuel bundles transferred
(page 7/19) Seawater contamination inside the port
(page 8/19) Seawater contamination outside the port
(page 15/19) Unit 1 status
(page 16/19) Unit 2 status
(page 17/19) Unit 3 status
(page 18/19) Circulating cooling water system and groundwater control system

(English translation of Decommissioning Roadmap as of 3/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140327_01-e.pdf

2-3. Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140424_07-j.pdf
(page 9/325) Small-scale frozen soil wall
(page 11/325) Status of ALPS
(page 42/325) Status of groundwater bypass system
(page 61/325) Testing Sr-capture performance of apatite and zeolite
(page 76/325) Inadvertent transfer of contaminated water to a radwaste building
(page 93/325) Slightly contaminated water leakage from a temporary storage plastic tank
(page 104/325) Tank storage capacity expansion plan
(page 120/325) Revision of subdrain system restoration plan
(page 136/325) Onsite dose reduction measures
(page 222/325) Unit 3 SPF rubble removal status
(page 268/325) Unit 3 MSIV room inspection
(page 282/325) Suppression chamber inspection plan
(page 300/325) Remote decontamination technology development

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, April 10, 2014 9:27 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, April 11 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, April 11, 2014 at 3 pm Eastern Daylight Time
(**No call next week.**Next call will be on **Fri, April 25** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (4/7/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140407_03-j.pdf
(page 12/64) Contaminated water treatment in Units 2/3 seawater piping trench
(page 34/64) Radioactivity in groundwater bypass wells
(page 40/64) Status of ALPS

1-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140407_04-j.pdf
(page 4/59) Addition of second layer of wier around tank farms
(page 8/59) Installation of additional tanks
(page 24/59) Groundwater/tritium migration simulation near Unit 1 intake structure
(page 40/59) Water-proofing measures at HTI building
(page 45/59) Installation of subdrain water processing system

1-3. Mid-to-long Term Plan for Solid Waste Storage
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140407_05-j.pdf

2. Fukushima Prefecture Safety Monitoring Council on Decommissioning (4/9/2014)
(only in Japanese)
2-1. Status of ALPS
http://www.tepco.co.jp/news/2014/images/140409a.pdf

2-2. Status of Groundwater Bypass System
http://www.tepco.co.jp/news/2014/images/140409b.pdf

3. Groundwater Bypass System to Commence Operation (4/9/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1235426_5892.html
3-1. Photos
http://photo.tepco.co.jp/en/date/2014/201404-e/140409-01e.html

3-2. Video Clip
http://photo.tepco.co.jp/en/date/2014/201404-e/140404-01e.html

4. Establishment of the Fukushima Daiich Decontamination & Decommissioning Engineering Company (4/4/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1235345_5892.html
4-1. Overview of D&D Engineering Company
http://www.tepco.co.jp/en/decommision/team/images/FukushimaDaiichiDandD_01.pdf

4-2. Action Plan of D&D Engineering Company
http://www.tepco.co.jp/en/decommision/team/images/FukushimaDaiichiDandD_02.pdf

4-3. Video Message from Naohiro Masuda, Chief Decommissioning Officer
http://www.tepco.co.jp/en/news/library/archive-e.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Friday, April 04, 2014 1:37 AM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, April 4 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **April 4**, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, April 11** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. NRA Special Nuclear Facility Oversight & Evaluation Group (3/31/2014)
(only in Japanese)
1-1. Overview of ALPS System and Issues
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0019_05.pdf

1-2. Overview of Sub-drain System
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0019_06.pdf

1-3. Overview of Frozen Soil Wall System
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0019_08.pdf

2. Development of the "FY2014 TEPCO Group Action Plan" (3/31/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1235151_5892.html

"FY2014 TEPCO Group Action Plan"
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu14_j/images/140331j0201.pdf
(page 6/26) Cooperation in developing the "Innovation Coast"
(page 7/26) Tackling contaminated water issues
(page 8/26) Consistently achieving decommissioning roadmap targets
(page 9/26) Enhancing equipment reliability at Fukushima Daiichi
(page 10/26) Nuclear safety at TEPCO
(page 11/26) Safety measures at Kashiwazaki Kariwa

3. Contract worker dies in on-site excavation work accident (2/28/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1235120_5892.html

Reference material
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140328_08-e.pdf

4. TEPCO's Response to Fukushima Fishermen's Assotiation's Requests Related to Groundwater Bypass System (4/4/2014)
(only in Japanese)
http://www.tepco.co.jp/news/2014/images/140404a.pdf

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 16 Jan 2015 07:33:39 -0500
To: Bernardo, Robert
Subject: Fw: Correction [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST
Importance: Normal

Bob,

Thanks for the catch!

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Friday, January 16, 2015 7:32 AM
Subject: Correction [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST

Nuclear Sector Colleagues,

There was a typo in my notice that I sent out last night regarding the start time of today's call.
It is at **3 pm EST as usual** (not at 2 pm).

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 15, 2015 8:41 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST

Nuclear Sector Colleagues,

Happy New Year!
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 16, 2015 at 2 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (12/25/2014)

(only in Japanese)

1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf
(English translation as of 11/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141127_01-e.pdf

1-3. Shortening the Length of Circulating Water Cooling System Loop
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_08-j.pdf

1-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

1-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_11-j.pdf

1-8. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (12/26/2014)
(only in Japanese)

2-1. Status of Filling Up Underground Seawater Piping Trenches
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_01.pdf

2-2. Measures to Achieve Incremental Effective Dose Limit at Site Boundary
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_03.pdf

2-3. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_05.pdf

2-4. Leakage of ALPS-Treated Water from J6 Tank Farm
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_06.pdf

3. IAEA to Review Fukushima Daiichi Decommissioning and Kashiwazaki Kariwa Operational Safety (1/7/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247076_6844.html

4. Figures and Video Clips Describing Various Water Management Measures
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

5. Overview of Fukushima Daiichi Accident and Lessons Learned (33 MB)
http://www.tepco.co.jp/en/decommision/accident/images/outline01.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
(b)(6) [redacted]

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, December 22, 2014 7:59 PM
Subject: [TEPCO Weekly Fukushima Update Call] TUE, Dec. 23 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
TUE, Dec. 23, 2014 at 3 pm Eastern Standard Time
(**No call next two weeks**. Next call will be on **Fri, Jan. 16, 2015** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]
(b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (12/19/2014)
(only in Japanese)
1-1. Removal of Cs and Sr from Seawater, etc.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_03-j.pdf

1-2. Unit 1 Reactor Building Refueling Floor Inspection Results
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_05-j.pdf

1-3. Applicability of Plastic Scintillation Fiber (PSF) to Detect Minor Leakage from Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_07-j.pdf

1-4. Leakage of ALPS-Treated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_08-j.pdf

1-5. Response to Various Issues

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_09-j.pdf

2. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool (12/22/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

2-1. Video Clip Summarizing Path to Success (6 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w220b15k&catid=61795

2-2. Video Message from Mr. Hirose, TEPCO's President (5 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w785h9cj&catid=61783

2-3. Explanation Slides (only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141222_04-j.pdf

Happy holidays to you all!

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 11, 2014 10:07 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 12 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 12th, 2014 at 3 pm Eastern Standard Time
(**No call next week**. Next call will be on **TUE, Dec. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. Overview of Measures to Treat Contaminated Water
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

2. Explanation on Subdrain and Groundwater Drain Systems to the Fishermen's Association of Iwaki City (12/10/2014)
(only in Japanese)
2-1. Confirmation of Stable Performance in Removing Radionuclides from Subdrain and Groundwater Drain
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_06-j.pdf

2-2. Basic Concept of Operating the Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_07-j.pdf

2-3. Detection of High Concentration of Radioactivity from Subdrain Pits # 18/19 and Measures Taken
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_09-j.pdf

3. Approval by NRA on Design Modification to add Sr Removal Capability to SARRY (Cs Removal) System (12/11/2014)
(only in Japanese; 8.8 MB, 372 pages)
http://www.tepco.co.jp/cc/press/betu14_j/images/141211j0101.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 04, 2014 9:35 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 5th, 2014 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Dec. 12** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. Contaminated Water Countermeasures Committee (11/13/2014)
(only in Japanese)
1-1. Status of Contaminated Water Countermeasures and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_03-j.pdf

1-2. Recent Topics at 1F
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_04-j.pdf

1-3. Task Force on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_06-j.pdf

1-4. Demonstration Test for High-performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_07-j.pdf

1-5. Task Force on Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_08-j.pdf

1-6. Study on Shallow Ground Disposal of Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_09-j.pdf

1-7. Status of Contaminated Water Treatment Technology Demonstration Testing

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_10-j.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (11/25/2014)
(only in Japanese)
2-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_03-j.pdf

2-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_04-j.pdf

2-3. Procedure for Closure of Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_05-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (11/27/2014)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_05-j.pdf

3-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_07-j.pdf

3-4. Environmental Radion Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_08-j.pdf

3-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_10-j.pdf

3-6. 3D Laser Scanning in Unit 1 Torus Room
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_11-j.pdf

3-7. Solid Radioactive Waste Treatment and Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_12-j.pdf

3-8. Progress on Emergency Safety Enhancement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_14-j.pdf

4. Introduction of ICP-MS Method Allowing Quicker Measurement of Sr-90 in Water
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141127_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, November 24, 2014 10:51 AM

Subject: NO CALL THIS WEEK [TEPCO Weekly Fukushima Update Call] Next on Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Due to unavoidable change in schedule, I will have to **cancel the call planned for tomorrow (Tue, Nov. 25**.)
Next call will be on **Fri, Dec. 5th** at 3 PM.

Apologies for any inconvenience this may cause you.
Feel free to contact me should you have any questions.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, November 12, 2014 7:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Nov. 13 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, Nov. 13, 2014 at 3 pm Eastern Standard Time
(**No call next week.** Next call will be on **TUE, Nov. 25** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. Unit 1 Reactor Building Cover Roof Panel Removal (11/10/2014)
http://photo.tepco.co.jp/en/date/2014/201411-e/141110-01e.html

2. TEPCO's Statement on Detection of Trace Amounts of Cs-134 Off U.S. West Coast (11/11/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243939_5892.html

2.1 Woods Hole Oceanographic Institution's Press Release
http://www.whoi.edu/news-release/Fukushima-detection

2.2 Discussion Board on the New REDDIT Journal of Science

http://www.reddit.com/r/science/comments/2lusz5/science_ama_series_im_ken_buesseler_an/?limit=500

3. Radioactivity in Seawater Near Fukushima Daiichi (11/12/2014)

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

3.1 Inside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/intake_canal_map-e.pdf

3.2 Outside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/seawater_map-e.pdf

4. Summary Status of Decommissioning Roadmap--English Translation (9/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140925_01-e.pdf

5. Large-Scale Emergency Drill at Kashiwazaki Kariwa NPS (11/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/kk-np/info/tohoku/2014/pdf/26110702.pdf

(photos)
http://photo.tepco.co.jp/en/date/2014/201411-e/141111-01e.html

All the best,
Kenji

From: Marksberry, Don
Sent: 16 Dec 2015 16:44:23 -0500
To: Kauffman, Lisa
Subject: FW: FOIA request
Attachments: [TEPCO Weekly Fukushima Update Call] Fri, Sept....(6).pdf

Lisa,

FYI. Chuck Norton suggested that I sent this to you. Don

From: Marksberry, Don
Sent: Wednesday, December 16, 2015 4:24 PM
To: Lee, Richard <Richard.Lee@nrc.gov>; Salay, Michael <Michael.Salay@nrc.gov>; Esmaili, Hossein <Hossein.Esmaili@nrc.gov>; Helton, Donald <Donald.Helton@nrc.gov>; Norton, Charles <Charles.Norton@nrc.gov>; Nakanishi, Tony <Tony.Nakanishi@nrc.gov>; Witt, Kevin <Kevin.Witt@nrc.gov>; Lane, John <John.Lane@nrc.gov>; Mitman, Jeffrey <Jeffrey.Mitman@nrc.gov>; Notafrancesco, Allen <Allen.Notafrancesco@nrc.gov>; Basu, Sudhamay <Sudhamay.Basu@nrc.gov>; Siu, Nathan <Nathan.Siu@nrc.gov>; Jimenez, Manuel <Manuel.Jimenez@nrc.gov>; Reckley, William <William.Reckley@nrc.gov>; Arndt, Steven <Steven.Arndt@nrc.gov>; Orders, William <William.Orders@nrc.gov>; Bernardo, Robert <Robert.Bernardo@nrc.gov>; Huffert, Anthony <Anthony.Huffert@nrc.gov>; Fuller, Edward <Edward.Fuller@nrc.gov>; Pires, Jose <Jose.Pires@nrc.gov>; Fuhrmann, Mark <Mark.Fuhrmann@nrc.gov>; Nosek, Andrew <Andrew.Nosek@nrc.gov>; Nicholson, Thomas <Thomas.Nicholson@nrc.gov>; Aird, David <David.Aird@nrc.gov>; Tadesse, Rebecca <Rebecca.Tadesse@nrc.gov>; Jolicoeur, John <John.Jolicoeur@nrc.gov>; Bernhard, Rudolph <Rudolph.Bernhard@nrc.gov>; Kanney, Joseph <Joseph.Kanney@nrc.gov>
Cc: Coyne, Kevin <Kevin.Coyne@nrc.gov>; Salley, MarkHenry <MarkHenry.Salley@nrc.gov>; Peters, Sean <Sean.Peters@nrc.gov>; Ott, William <William.Ott@nrc.gov>; Stutzke, Martin <Martin.Stutzke@nrc.gov>; Siu, Nathan <Nathan.Siu@nrc.gov>; Correia, Richard <Richard.Correia@nrc.gov>; Nicholson, Thomas <Thomas.Nicholson@nrc.gov>; Barnes, Valerie <Valerie.Barnes@nrc.gov>; Nakoski, John <John.Nakoski@nrc.gov>; West, Steven <Steven.West@nrc.gov>; Lund, Louise <Louise.Lund@nrc.gov>
Subject: FOIA request

All

Regarding the FOIA request on communications and documents between Kenji Tateiwa and NRC, I have assembled the complete collection of TEPCO Weekly Fukushima Update Call notices (see attached example) sent out by Kenji. My collection period (e-mail date) is 02/12/2012 through 11/27/2015 (last call). This collection contains over 100 e-mails totaling 800+ pages. Each e-mail notice contains about 5 older e-mail notices. Although you may have to submit your duplicates (ask your FOIA coordinator), at least you can indicate that your e-mails are duplicates to my set and you did not redact cell phone numbers (exemption 6) and teleconference bridge passcodes (exemption 2), which are on about every page.

Don

From: Tateiwa, Kenji
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 20 at 3pm EDT
Date: Thursday, September 19, 2013 11:19:11 PM

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 20, 2013 at 3 pm Eastern Time
(No call next week. Next call will be on **Fri, Oct. 4th** at 3 pm)
[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. Video Tour of Fukushima Daiichi NPS (9/17/2013)
http://photo.tepco.co.jp/en/date/2013/201309-e/130917-03e.html

2. Broken Beam found in Units 1&2 Main Exhaust Stack (9/18/2013)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130918_13-j.pdf

3. Sixth NRA Working Group Meeting on Contaminated Water Issues (9/12/2013)
(only in Japanese)
3-1. Investigation Status on Leakage from Partially-treated Water Tank
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0006_05r.pdf

3-2. Investigation Status on Groundwater Contamination Near Bank Protection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0006_06.pdf

4. Sixth Gov't-TEPCO Meeting on Contaminated Water Issues (9/13/2013)
(only in Japanese)
4-1. Framework for Worldwide Technology Solicitation Through IRID
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_04-j.pdf

4-2. Examples of Technologies Subject to Solicitation Through IRID
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_05-j.pdf

(Website of International Research Institute for Nuclear Decommissioning)
http://www.irid.or.jp/en/index.html

4-3. Fundamental Countermeasures for Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_07-j.pdf

4-4. Investigation Status on Leakage from Partially-treated Water Tank
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_08-j.pdf

4-5. Investigation Status on Groundwater Contamination Near Bank Protection
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_09-j.pdf

4-6. METI Minister Motegi's Presentation on Basic Policy for Decommissioning and Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_13-j.pdf

5. History of Studies Related to Implementation of Underground Barrier (9/13/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130913_06-j.pdf

6. Overview of Contaminated Water Issues and Countermeasures (9/13/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130913_01-e.pdf

7. Accumulated Rainwater Discharged from Dam Surrounding Partially-treated Contaminated Water Tanks (9/17/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/water/13091701-e.html

8. Radioactivity in Water Samples from Various Locations of Water Treatment System (9/18/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/water_130918-e.pdf

9. H4 Area Tank #5 being Dismantled (9/19/21013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130919_04-j.pdf

10. Prime Minister Abe Visits Fukushima Daiichi (9/19/2013)
(only in Japanese)
http://photo.tepco.co.jp/date/2013/201309-j/130719-02j.html

11. Response to Prime Minister's Requests Regarding Actions Related to Contaminated Water Issues (9/19/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230730_5130.html

12. No Abnormality Found at Fukushima Daiichi Due to M 5.8 Earthquake (9/20/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230749_5130.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
(b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Friday, September 13, 2013 9:35 PM
Subject: Follow-up [TEPCO Weekly Fukushima Update Call] Fri, Sept. 13 at 3pm EDT

Nuclear Sector Colleagues,

Please find below major points that we discussed today during the call (for those material available only in Japanese):

1. Development and Demonstration of Suppression Chamber Water Level Measurement Robot (9/12/2013)
- The robots utilize ultrasonic probe to measure the water level of the suppression chamber from outside the torus shell.
- Demonstration at Unit 5 is ongoing followed by demonstration at Unit 2 next week.

2. Preparation to Dismantle Unit 1 Reactor Building Cover (9/12/2013)
- The cover will have to dismantle to remove rubble from the refueling floor.
- Exhaust system of the Unit 1 reactor building cover will be stopped on Sept. 17th in preparation of dismantling the cover from around March 2014.
- Conservative estimate of incremental dose rate due to removal of the cover is only 5E-5 micro-Sievert per hour at a location 5 km away from Unit 1.

8. Current Status on Contaminated Water Issues (9/9/2013)
(page 11/45) Partially-treated contaminated water that leaked from H 4 Area Tank #5 may have flowed through the above ground draining trench to the sea; however, only minimal amount of Cs-137 was detected from the seawater near the discharge of the trench and gross-beta was below detectable level.
(pages 22/45 to 25/45) Results of sea water contamination survey conducted by NRA showed minimal to no Cs-134/137, tritium and gross-beta at locations within 20-km radius of 1F.

9. Investigation of Partially-Treated Contaminated Water Leakage from H4 Area Tank (9/12/2013)
(pages 3 to 38) Inspection of H 4 Area Tank #5 and integrity assessment of steel tanks.
(page 53) Samples taken from groundwater observation holes E-1 and E-2 showed high concentration of tritium and gross-beta. Tritium concentration in E-1 is rapidly increasing.
(pages 61-64) Samples taken from groundwater of the Bypass System showed no gross-beta and there has been no significant increase in tritium concentration.

10. Status of Groundwater Contamination Near Bank Protection and Countermeasures (9/12/2013)
(page 4) Maximum concentration of tritium and gross-beta from various sampling points.
(page 13) No gross-beta has been detected from seawater inside the port of 1F other than in the immediate vicinity of Units1-4 intake structures.
(page 24-27) Highly contaminated water accumulated in Unit 2 branching trench has been transferred and the trench was filled with concrete and mortar. However, water seems to have backflowed from the turbine building into the trench.

On topic 5, there was a question on what kind of level gauge will be use to monitor the water level of flange-type tanks.
We will be installing a level gauge on top of the tank and fix it with a flange bolt; the gauge will emit radar towards the water surface and measure the level based on the speed of the wave and time of reflection.

Have a great weekend.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 12, 2013 9:04 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 13 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]

Fri, Sept. 13, 2013 at 3 pm Eastern Time
(Next call will be on **Fri, Sept. 20** at 3 pm)

[Major topics]
1. Development and Demonstration of Suppression Chamber Water Level Measurement Robot (9/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130912_11-j.pdf

2. Preparation to Dismantle Unit 1 Reactor Building Cover (9/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130912_08-j.pdf

3. English Website on Contaminated Water Issues and Countermeasures
http://www.tepco.co.jp/en/nu/fukushima-np/water/index-e.html

4. TEPCO President Mr. Hirose's Video Message on Contaminated Water Issues (9/5/2013)
http://tepco.webcdn.stream.ne.jp/www11/tepco/download/130905_01e.wmv

5. Installation of Water Level Monitoring System in Tank Farms (9/6/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130906_09-e.pdf

6. Gross-beta and Tritium Detected from Groundwater Near Leakage from H4 Area Tank (9/11/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/south_discharge_130911-3-e.pdf

7. Radioactivity in H4 Area #5 Tank (9/12/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/south_discharge_130912-2-e.pdf

8. Current Status on Contaminated Water Issues (9/9/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l130909_04-j.pdf

9. Investigation of Partially-Treated Contaminated Water Leakage from H4 Area Tank (9/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130912_05-j.pdf

10. Status of Groundwater Contamination Near Bank Protection and Countermeasures (9/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130912_06-j.pdf

11. Mr. Lake Barrett to Advise TEPCO on Contaminated Water Issues (9/10/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230443_5130.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,
Kenji
----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Saturday, September 07, 2013 1:27 PM
Subject: Follow-up [TEPCO Weekly Fukushima Update Call] Fri, Sept. 6 at 3pm EDT

Nuclear Sector Colleagues,

Pleaese find below answers to questions that I received related to the call on Sept. 6th.

(Q-1) What are the composition of contaminated water in the underground trenches near the port?
(A-1) Sampling results as of 7/31/2013 were as follows:

Unit 2 seawater piping trench vertical shaft C (depth 1m)
Cs-134: 1.1E+8 Bq/liter
Cs-137: 2.3E+8 Bq/liter
Gross beta: 3.3E+8 Bq/liter
Tritium: 2.4E+6 Bq/liter

Unit 3 seawater piping trench vertical shaft B (depth 1m)
Cs-134: 1.3E+7 Bq/liter
Cs-137: 2.6E+7 Bq/liter
Gross beta: 3.2E+7 Bq/liter
Tritium: 3.6E+5 Bq/liter

(reference: trench water analysis results (Japanese))
http://www.tepco.co.jp/nu/fukushima-np/f1/smp/2013/images/trench0203_130802-j.pdf

(Q-2) How is the number of thermometers in the primary containment regulated?
(A-2) In page 758/3230 of the "Implementation Plan for Specific Reactor Facility", which is a Tech. Spec.-equivalent licensing document for Fukushima Daiichi NPS, it is stipulated as follows:

"Multiple thermometers shall be installed in the RPV and PCV in the circumferential direction and vertical direction."
"Thermometers deemed disfunctional shall be excluded."
"Installation of new thermometers shall be planned and implemented in anticipation of thermometers becoming disfunctional."

(reference: Implementation Plan for Specific Reactor Facility (Japanese))
http://www.tepco.co.jp/cc/press/betu13_j/images/130812j0201.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 05, 2013 11:54 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 6 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 6, 2013 at 3 pm Eastern Time
(Next call will be on **Fri, Sept. 13** at 3 pm)

[Major topics]
1. Monthly Reliability Report on Thermometers Installed in Units 1-3 PCV (9/2/2013)
(attachment is only in Japanese)

http://www.tepco.co.jp/en/press/corp-com/release/2013/1230239_5130.html

2. Jib Mast of a Large Crane Used at Unit 3 Bent (9/5/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130905_06-j.pdf

3. Groundwater Inflow Location Identified at Unit 1 Turbine Building and HTI Building (9/4/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130904_07-e.pdf

Video Clip (Turbine Building)
http://www.tepco.co.jp/en/news/library/movie-01e.html?bcpid=59368209002&bclid=347242463002&bctid=590448354002

Video Clip (HTI Building)
http://www.tepco.co.jp/en/news/library/movie-01e.html?bcpid=59368209002&bclid=347242463002&bctid=590448355002

4. Highly Contaminated Water Storage and Treatment Status (9/4/2013)
http://www.tepco.co.jp/en/press/corp-com/release/betu13_e/images/130904e0301.pdf

5. Contaminated Groundwater Issues Near the Port
5-1. Status on Contaminated Groundwater Issues and Estimate of Sr/Cs Leakage into Sea (8/30/2013)
(only in Japanese)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0005_01.pdf

5-2. Latest and Highest Results of Groundwater Contamination Near the Port (9/4/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/2tb-east_13090403-e.pdf

6. Partially-Treated Contaminated Water Leakage from Tanks
6-1. Status on Partially-Treated Contaminated Water Leakage from H4 Area Tank (8/30/2013)
(only in Japanese)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0005_02.pdf

6-2. The 1,800 mSv/h Dose Rate Observed Near Tank was Mostly Beta-Radiation (9/1/2013)
http://www.tepco.co.jp/en/announcements/2013/1230191_5502.html

6-3. H3, 4, 5 Area Tank Patrol Results (9/2/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130902_04-e.pdf

6-4. H3 Area Tank Patrol Results (9/2/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130902_05-e.pdf

6-5. Video Clip of Tank Patrol (9/4/2013)
http://photo.tepco.co.jp/en/date/2013/201309-e/130904-01e.html

6-6. Contamination Survey Results Related to H4 Area Tank Leakage (9/5/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/south_discharge_130905-1-e.pdf

6-7. Possible Groundwater Contamination Due to H4 Area Tank Leakage (9/5/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230333_5130.html

6-8. Effective Shielding of Beta-Radiation at H3 Area Tank (9/5/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130905_01-j.pdf

7. Presentations on Contaminated Water Issues to the Local Fisheries Association (9/3/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130903_04-j.pdf
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130903_03-j.pdf
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130903_01-j.pdf
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130903_02-j.pdf

8. Government Announces "Basic Policy on Contaminated Water Issues" (9/3/2013)
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20130904_01a.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Friday, August 30, 2013 12:40 AM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 30 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.
(Pardon my harsh voice due to sore throat, in advance.)

[Date/time]
Fri, Aug. 30, 2013 at 3 pm Eastern Time
(Next call will be on **Fri, Sept. 6** at 3 pm)

[Major topics]
1. Status on Contaminated Groundwater Issues and Estimate of Sr/Cs Leakage into Sea (8/27/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130827_05-j.pdf

2. Establishment of "Contaminated Water and Tank Task Force" and Risk Mitigation Actions (8/26/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130826_07-j.pdf

3. Status on Partially-Treated Contaminated Water Leakage from H4 Area Tank (8/27/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130827_04-j.pdf

4-1. NRA Revises INES Scale to 3 for H4 Area Tank Water Leakage Event (8/28/2013)
(only in Japanese)
http://www.nsr.go.jp/activity/bousai/trouble/20130828-1.html

4-2. IAEA's Comments Regarding Applicability of INES to This Event
http://www.nsr.go.jp/activity/bousai/trouble/data/20130828-1.pdf

5-1. Cs Concentration in Fish within 20-km Radius of 1F (8/28/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130828_06-j.pdf

5-2. Cs Concentration in Fish and Seawater within 20-km Radius of 1F (8/28/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130828_04-j.pdf

6. Seventh Working-level Meeting of Gov't-TEPCO-Industry Council on Promotion of 1F Decommissioning (8/29/2013)
(only in Japanese)
6-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130829_04-j.pdf

6-2. Summary Status of Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130829_05-j.pdf

6-3. Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130829_06-j.pdf

6-4. Establishment of International Research Institute for Nuclear Decommissioning (IRID)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130829_08-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Friday, August 23, 2013 4:00 AM
Subject: [TEPCO Weekly Fukushima Update Call] Email only for Fri, Aug. 23

Nuclear Sector Colleagues,

There will be **no call this week** due to my business trip to California.
(Next call will be on **Fri. Aug. 30** at 3 pm Eastern Time.)

However, please find below latest information on Fukushima and do feel free to contact me should you have any questions.

[Major topics]
1. Preliminary Estimation of Amount of Tritium, Cesium and Strontium Released to the Sea (8/21/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130821_07-e.pdf

2. Status and Countermeasures on Contaminated Groundwater Issues: Presented to the NRA Working Group (8/21/2013)
(only in Japanese; 78 pages/10 MB file)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130821_10-j.pdf
- Includes detailed assumptions and methodologies applied to estimate the amount of tritium, Cs, Sr released to the sea.

3. Summary Status and Countermeasures on Contaminated Groundwater Issues: Presented to the Local Fisheries Association (8/22/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130822_02-j.pdf
- Explains both immediate and fundamental measures to prevent contaminated water from entering into the sea.

http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130822_03-j.pdf
- Explains concept of groundwater bypass system and very low or not detectable amount of radioactivity found in the groundwater.

4. Contaminated Water Leakage from H4 Area Tank (8/21/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130821_01-e.pdf

5. Contaminated Water Leakage from H4 Area Tank: Detailed Material Presented to the NRA Working Group (8/21/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130821_12-j.pdf
- Estimated amount of leakage: 300 cubic meters.
- The tank contains RO concentrated water (treated to remove much of Cs but before removing Sr and other beta-nuclides.)
- The tank is "Flange Type" made of bolt-fastened steel.
- Distance from the tank to the sea: about 500 meters.

6. Inspection Results of All Bolt-Fastened "Flange Type" Tanks (8/22/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130822_02-e.pdf

7. Sampling Results Along Potential Leakage Paths of Contaminated Water from H4 Area Tank (8/23/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/south_discharge_130823-1e.pdf

8. Discussion at the NRA Commission Meeting Regarding INES Scale of H4 Area Tank Water Leakage (8/21/2013)
(only in Japanese)
http://www.nsr.go.jp/committee/kisei/data/0019_08r.pdf
- NRA considers this event should ordinarily be scaled as "Level 3" based on the amount of estimated radioactivity leakage and lack of defense in depth.
- However, given the unique situation at Fukushima Daiichi, NRA will consult with the IAEA on how to apply the INES scale to this event.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, August 15, 2013 10:17 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 16 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 16, 2013 at 3 pm Eastern Time
(No call next week. Next call will be on **Fri, Aug. 30** at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]

1. Investigation Results Inside of Unit 2 PCV (8/12/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130812_06-e.pdf
(video clip)
http://www.tepco.co.jp/en/news/library/movie-01e.html?
bcpid=59368209002&bclid=347242463002&bctid=571344891002

2. Investigation Results Inside of Unit 4 Reactor Well, Reactor Pressure Vessel and Spent Fuel Pool (8/9/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130809_07-e.pdf
(video clip)
http://www.tepco.co.jp/en/news/library/movie-01e.html?
bcpid=59368209002&bclid=347242463002&bctid=569537891002

3-1. Summary Status and Countermeasures on Contaminated Groundwater Issues (8/8/2013)
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20130808_01.pdf

3-2. Status and Countermeasures on Contaminated Groundwater Issues (7/22/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130722_07-e.pdf

3-3. Status and Countermeasures on Contaminated Groundwater Issues (8/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130812_03-j.pdf

4. Approval of Implementation Plan for Specific Reactor Facility (A Comprehensive Licensing Document for 1F) (8/14/2013)
(press release)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1229740_5130.html
(presentation: only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130814_10-j.pdf
(Implementatin Plan: only in Japanese; 146 MB)
http://www.tepco.co.jp/cc/press/betu13_j/images/130812j0201.pdf
(appendix: only in Japanese; 24.7 MB)
http://www.tepco.co.jp/cc/press/betu13_j/images/130812j0202.pdf

All the best,
Kenji
----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, August 01, 2013 11:27 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 2 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 2, 2013 at 3 pm Eastern Time
(No call next week. Next call will be on **Fri, Aug. 16** at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]

1-1. Hydrogen Gas Purge Test for Unit 2 Suppression Chamber (7/19/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130719_05-e.pdf

1-2. Test Results for Hydrogen Gas Purge Test for Unit 2 Suppression Chamber (7/26/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130726_07-j.pdf

2. Investigation Results of Unit 2 Reactor Building PCV Penetration Vicinity (7/24/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130724_08-e.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/movie-01j.html?
bcpid=45149870002&bclid=347241149002&bctid=552615674002

3. Unsuccessful Attempt to Investigate Inside Unit 2 RPV Via TIP Guide Tube (7/25/2013)
(only in Japanese)
http://www.meti.go.jp/earthquake/nuclear/pdf/130725/130725_01h.pdf

4-1. Re-attempt to Investigate Inside Unit 2 PCV (7/25/2013)
http://www.meti.go.jp/earthquake/nuclear/pdf/130725/130725_01mm.pdf

4-2. Preparatory Investigation Inside Unit 2 PCV (7/31/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130731_09-j.pdf

5-1. Infrared Thermography Images of Unit 3 Reactor Building Refueling Floor (7/24/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130724_06-e.pdf

5-2. Ambient Dose Measured Near Shield Plug of Unit 3 Reactor Building Refueling Floor (7/24/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130724_05-e.pdf

5-3. Investigation on Steam Observed at Unit 3 Reactor Building Refueling Floor (7/25/2013)
(only in Japanese)
http://www.meti.go.jp/earthquake/nuclear/pdf/130725/130725_01e.pdf

6. Removal of Rubble Utilizing Robots in Unit 3 Reactor Building (7/26/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130726_05-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/movie-01j.html?
bcpid=45149870002&bclid=347241149002&bctid=554496408002

7-1. Completion of Outer Wall and Roof Panel of Unit 4 Defueling Structure (7/22/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130722_05-e.pdf

7-2. Installation of Unit 4 Fuel Handling Machine (7/25/2013)
(only in Japanese)
http://www.meti.go.jp/earthquake/nuclear/pdf/130725/130725_01gg.pdf

8. Clarification on Difference in Estimated Thyroid Equivalent Dose between WHO and TEPCO Data (7/22/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130722_06-j.pdf

9. ALPS Tank Leakage due to Corrosion and Countermeasures (7/25/2013)

(only in Japanese)
http://www.meti.go.jp/earthquake/nuclear/pdf/130725/130725_01n.pdf

10. Groundwater Contamination Issue Near the Sea and Countermeasures (7/25/2013)
(only in Japanese)
http://www.meti.go.jp/earthquake/nuclear/pdf/130725/130725_01x.pdf

11. Issues Related to Public Announcement of Contaminated Water Leakage into 1F Port (7/26/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1229317_5130.html

12. Radioactivity of Fish Within 20-km Radius of 1F (7/26/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130726_04-j.pdf

13. Nuclear Safety Reform Plan Progress Report (7/26/2013)
http://www.tepco.co.jp/en/press/corp-com/release/betu13_e/images/130726e0402.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, July 18, 2013 11:21 AM
Subject: Additional topic [TEPCO Weekly Fukushima Update Call] Thu, July 18 at 3pm EDT

Nuclear Sector Colleagues,

I will also explain the following topic that just came out last night.

0. Steam Observed on Unit 3 Reactor Building Refueling Floor between Reactor Well and D/S Pit (7/18/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130718_03-j.pdf
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130718_02-j.pdf

No abnormal change in plant parameter (reactor coolant flow, RPV/PCV temperature, PCV pressure, radiation monitor, etc.) has been ovserved at this moment.

All the best,
Kenji

> ----- Original Message -----
> **From:** Tateiwa, Kenji
> **To:** Tateiwa, Kenji
> **Sent:** Wednesday, July 17, 2013 9:38 PM
> **Subject:** [TEPCO Weekly Fukushima Update Call] Thu, July 18 at 3pm EDT
>
> Nuclear Sector Colleagues,
>
> Please find below information for tomorrow's Weekly Fukushima Update Call.
>
> **[Date/time]**
> **Thu, July 18**, 2013 at 3 pm Eastern Time

(No call next week. Next call will be on Fri, Aug. 2 at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. Unit 2 TIP Guide Tube Borescope Investigation (7/8~11/2013)
(only in Japanese)
1-1. Day 1 (7/8)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130708_05-j.pdf
1-2. Day 2 (7/9)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130709_04-j.pdf
1-3. Day 3 (7/10)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130710_09-j.pdf
1-4. Day 4 (7/11)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130711_01-j.pdf
(video clip for day 4)
http://www.tepco.co.jp/tepconews/library/movie-01j.html?bcpid=45149870002&bclid=347241149002&bctid=542252254002

2. Radioactivity in Fish Caught Near 1F (7/17/2013)
2-1. Inside Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/fish01_130717-e.pdf
2-2. Within 20 km Radius of 1F (Outside Port of 1F)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/fish02_130717-e.pdf

3. Measures Taken to Prevent Fish from Leaving Port of 1F (7/12/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130712_02-e.pdf

4. Video Clip on Chemical Injection for Ground Improvement at Bank Protection between Units 1 and 2 (7/17/2013)
http://www.tepco.co.jp/en/news/library/movie-01e.html?bcpid=59368209002&bclid=347242463002&bctid=546505066002

5. Basic Design of Filtered Containment Venting System for Kashiwazaki Kariwa Units 6/7 (7/17/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130717_03-j.pdf

All the best,
Kenji

> ----- Original Message -----
> **From:** Tateiwa, Kenji
> **To:** Tateiwa, Kenji
> **Sent:** Thursday, July 11, 2013 9:53 PM
> **Subject:** [TEPCO Weekly Fukushima Update Call] Fri, July 12 at 3pm EDT
>
> Nuclear Sector Colleagues,
>
> Please find below information for tomorrow's Weekly Fukushima Update Call.
>
> **[Date/time]**
> **Fri, July 12**, 2013 at 3 pm Eastern Time

(Next call will be on Thu, July 18 at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6)

[Major topics]

1. Fifth Meeting of Gov't-TEPCO-Industry Council on Promotion of 1F Decommissioning (6/27/2013)

1-1. Mid-to-Long-Term Roadmap towards Decommissioning of 1F (summary)
http://www.meti.go.jp/english/press/2013/pdf/0627_01a.pdf

1-2. Mid-to-Long-Term Roadmap towards Decommissioning of 1F (full document)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t130627_04-j.pdf

1-3. Status of Establishing International Technology Development Partnership
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t130627_10-j.pdf

2. Core Injection Via Condensate Storage Tank Begins for Units 1-3 (7/5/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130705_02-j.pdf

3. Radioactive Materials Found in Naraha Town During Off-site Decontamination Work (7/8/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130708_05-e.pdf

4. Ground Improvement of Bank Protection by Chemical Injection (7/9/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130709_03-e.pdf

5. Sampling Results of Ground Water Near Bank Protection, etc. (7/10/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/2tb-east_13071003-e.pdf

6. Sampling Results of Unit 3 Trench Vertical Shaft A (7/11/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130711_04-j.pdf

7. Mr. Masao Yoshida, Former 1F Site Superintendent, Passed Away at Age 58 (7/9/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1228822_5130.html

All the best,
Kenji

> ----- Original Message -----
> **From:** Tateiwa, Kenji
> **To:** Tateiwa, Kenji
> **Sent:** Wednesday, June 19, 2013 9:40 PM
> **Subject:** [TEPCO Weekly Fukushima Update Call] Thu, June 20 at 3pm EDT
>
> Colleagues of nuclear-related U.S. government agencies, national labs and academia,
>
> Please find below information for tomorrow's Weekly Fukushima Update Call.
>
> **[Date/time]**

Thu, June 20, 2013 at 3 pm Eastern Time
(No call for the next 2 weeks. Next call will be on Fri, July 12 at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. High Concentration of Tritium Detected in Ground Water Near the Ocean (6/19/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130619_03-e.pdf

2. Inspection Results of Unit 2 Reactor Building 1st Floor High Elevation Area (6/19/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130619_06-j.pdf

3. NRA Concurs with TEPCO's Argument that Water Leakage Witnessed at Unit 1 R/B 4th Floor Was Due to Sloshing; Not Breach of Pressure Boundary (6/17/2013)
(only in Japanese)
http://www.nsr.go.jp/committee/yuushikisya/jiko_bunseki/data/0002_02.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, June 13, 2013 9:14 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 14 at 3pm EDT

Colleagues of nuclear-related U.S. government agencies, national labs and academia,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 14. 2013 at 3 pm Eastern Time
(Next call will be on **Thu**, June 20 at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. Third Meeting of Contaminated Water Treatment Committee (5/30/2013)
(only in Japanese)

1-1. Countermeasures to Mitigate Ground Water Ingress
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130530_03-j.pdf

1-2. Various Topics
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130530_05-j.pdf

2. Fourth Working-level Meeting of Gov't-TEPCO-Industry Council on Promotion of 1F Decommissioning (6/10/2013)
(only in Japanese)

2-1. Discussion Paper on Revising the Mid-to-Long Term Roadmap Towards Decommissioning
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t130610_04-j.pdf

2-2. Major Schedules in the Discussion Paper
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t130610_06-j.pdf

3. Briefing Material on Contaminated Water Treatment and Ground Water Bypass for the Local Fisheries Cooperative (6/13/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130613_03-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, June 06, 2013 8:50 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 7 at 3pm EDT

Colleagues of nuclear-related U.S. government agencies, national labs and academia,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 7, 2013 at 3 pm Eastern Time
(Next call will be on Fri, June 14 at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6)

[Major topics]
1. Unit 4 Reactor Building and Spent Fuel Pool Integrity (5th) Inspection Results (5/29/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130529_10-e.pdf

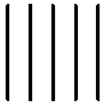
2. Completion of Steel Frame of Unit 4 Fuel Removal Structure (5/29/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130529_08-e.pdf

3. Small Leakage from G6 Area Above-Ground Tank (6/5/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130605_07-e.pdf

4. Third Working-level Meeting of Gov't-TEPCO-Industry Council on Promotion of 1F Decommissioning (5/30/2013)
(only in Japanese)
4-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130530_03-j.pdf

4-2. Summary Status of Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130530_04-j.pdf

4-3. Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130530_05-j.pdf



All the best,
Kenji

From: Bernardo, Robert
Sent: 4 Dec 2015 15:09:03 +0000
To: tateiwa.kenji@tepco.co.jp;Hara Takashi (takashi.hara@tepco.co.jp)
Subject: FW: FYI - WHOI news release: Higher Levels of Fukushima Cesium Detected Offshore

Good day,

I wanted to make you aware of a press release from the Woods Hole Oceanographic Institute concerning contamination from Fukushima. This is just for your information, I don't believe there is anything you need to do with this other than being aware of it.

You can see more information about the sampling activities on the web site ourradioactiveocean.org.

Bob Bernardo

Policy and Support Branch
Japan Lessons-Learned Division
US Nuclear Regulatory Commission
O-13E11; MS O-13F15M
301-415-2621
Robert.Bernardo@nrc.gov

FOR IMMEDIATE RELEASE
Media Relations Office
media@whoi.edu
December 3, 2015
(508) 289-3340

Higher Levels of Fukushima Cesium Detected Offshore

Scientists monitoring the spread of radiation in the ocean from the Fukushima nuclear accident report finding an increased number of sites off the US West Coast showing signs of contamination from Fukushima. This includes the highest detected level to date from a sample collected about 1,600 miles west of San Francisco. The level of radioactive cesium isotopes in the sample, 11 Becquerel's per cubic meter of seawater (about 264 gallons), is 50 percent higher than other samples collected along the West Coast so far, but is still more than 500 times lower than US government safety limits for drinking water, and well below limits of concern for direct exposure while swimming, boating, or other recreational activities.

Ken Buesseler, a marine radiochemist with the Woods Hole Oceanographic Institution (WHOI) and director of the WHOI Center for Marine and Environmental Radioactivity, was among the first to begin monitoring radiation in the Pacific, organizing a research expedition to the Northwest Pacific near Japan just three months after the accident that started in March 2011. Through a citizen science sampling effort, Our Radioactive Ocean, that he launched in 2014, as well as research funded by the National Science Foundation, Buesseler and his colleagues are using sophisticated sensors to look for minute levels of ocean-borne radioactivity from Fukushima. In 2015, they have added more than 110 new samples in the Pacific to the more than 135 previously collected and posted on the Our Radioactive Ocean web site.

"These new data are important for two reasons," said Buesseler. "First, despite the fact that the levels of contamination off our shores remain well below government-established safety limits for human health or to marine life, the changing values underscore the need to more closely monitor contamination levels across the Pacific. Second, these long-lived radioisotopes will serve as markers for years to come for scientists studying ocean currents and mixing in coastal and offshore waters."

The recent findings reported by Buesseler agree with those reported by scientists who are part of the group Kelp Watch and by the team of Canadian scientists working under the InFORM umbrella. While Buesseler's work focuses on ocean chemistry and does not involve sampling of biological organisms, the InFORM scientists have done sampling of fish and have not seen any Fukushima cesium in fish collected in British Columbia.

Almost any seawater sample from the Pacific will show traces of cesium-137, an isotope of cesium with a 30-year half-life, some of which is left over from nuclear weapons testing carried out in the 1950s to 1970s. The isotope cesium-134 is the "fingerprint" of Fukushima, but, with a 2-year half-life, it decays much quicker than cesium-137. Scientists back calculate traces of cesium-134 to determine how much was actually released from Fukushima in 2011 and add to it an equal amount of cesium-137 that would have been released at the same time.

Working with Japanese colleagues, Buesseler also continues to independently monitor the ongoing leaks from Fukushima Dai-ichi by collecting samples from as close as one kilometer (one-half mile) away from the nuclear power plants. During his most recent trip this October they collected samples of ocean water, marine organisms, seafloor sediment and groundwater along the coast near the reactors. Buesseler says the levels of radioactivity off Fukushima remain elevated – some 10 to 100 times higher than off the US West Coast today, and he is working with colleagues at WHOI to try to determine how much radioactive material is still being released to the ocean each day.

"Levels today off Japan are thousands of times lower than during the peak releases in 2011. That said, finding values that are still elevated off Fukushima confirms that there is continued release from the plant," said Buesseler.

Buesseler will present his latest findings on the spread of Fukushima radiation at the American Geophysical Union conference in San Francisco on Dec. 14, 2015.

The Woods Hole Oceanographic Institution is a private, non-profit organization on Cape Cod, Mass., dedicated to marine research, engineering, and higher education. Established in 1930 on a recommendation from the National Academy of Sciences, its primary mission is to understand the ocean and its interaction with the Earth as a whole, and to communicate a basic understanding of the ocean's role in the changing global environment. For more information, please visit www.whoi.edu.

From: Marksberry, Don
Sent: 2 Feb 2015 06:48:05 -0500
To: Lee, Richard;Salay, Michael;Esmaili, Hossein;Helton, Donald;Norton, Charles;Nakanishi, Tony;Witt, Kevin;Lane, John;Mitman, Jeffrey;Notafrancesco, Allen;Basu, Sudhamay;Randy Gauntt;Siu, Nathan;Jimenez, Manuel;Reckley, William;Arndt, Steven;Laur, Steven;Orders, William;Bernardo, Robert;Williams, Vince;Huffert, Anthony;Fuller, Edward;Pires, Jose;Fuhrmann, Mark;Nosek, Andrew;Skillman, Gordon;Nicholson, Thomas;Aird, David;Tadesse, Rebecca
Subject: FW: [NAS Fukushima Phase 2] TEPCO Presentation (1/29/2015)
Attachments: Fukushima Spent Fuel Issues@NAS_01292015.pdf

FYI

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Thursday, January 29, 2015 8:00 PM
To: Uhle, Jennifer; Witt, Kevin
Cc: Norton, Charles; Marksberry, Don; Nicholson, Thomas; Bernardo, Robert
Subject: [NAS Fukushima Phase 2] TEPCO Presentation (1/29/2015)

Jennifer and Kevin,

It was nice seeing you at the NAS Fukushima Phase 2 meeting this afternoon.

Per Kevin's request, I am sending you a copy of my presentation.
Feel free to share it with your colleagues at NRC or anyone interested in the topic.

Please let me know if you have any questions.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
(b)(6) [redacted]

Spent Fuel and Spent Fuel Storage Facilities at Fukushima Daiichi

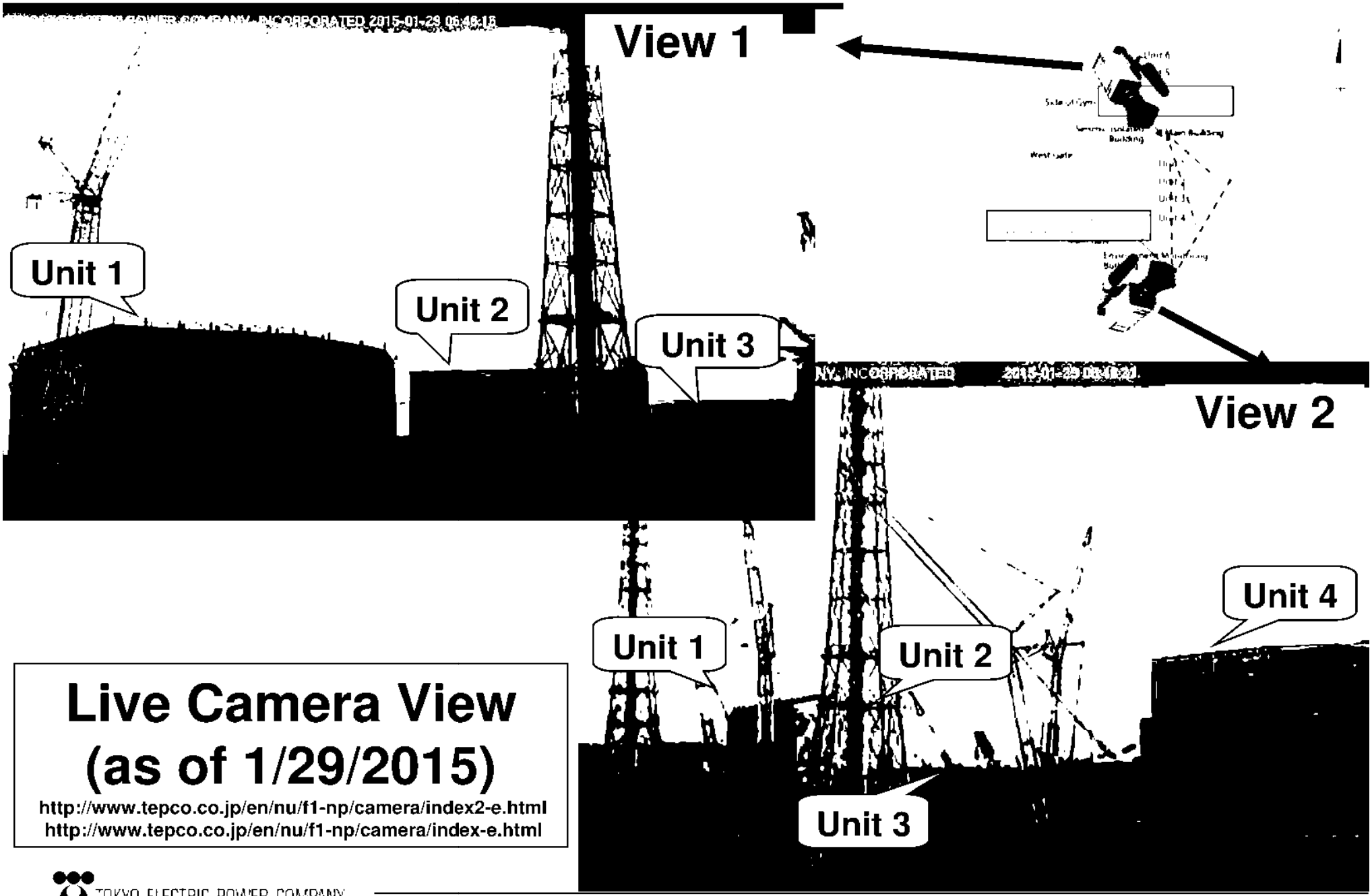
The National Academies "Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants: Phase 2" Meeting #3

Washington, DC
January 29th, 2015

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company, Washington Office
tateiwa.kenji@tepco.co.jp

TEPCO

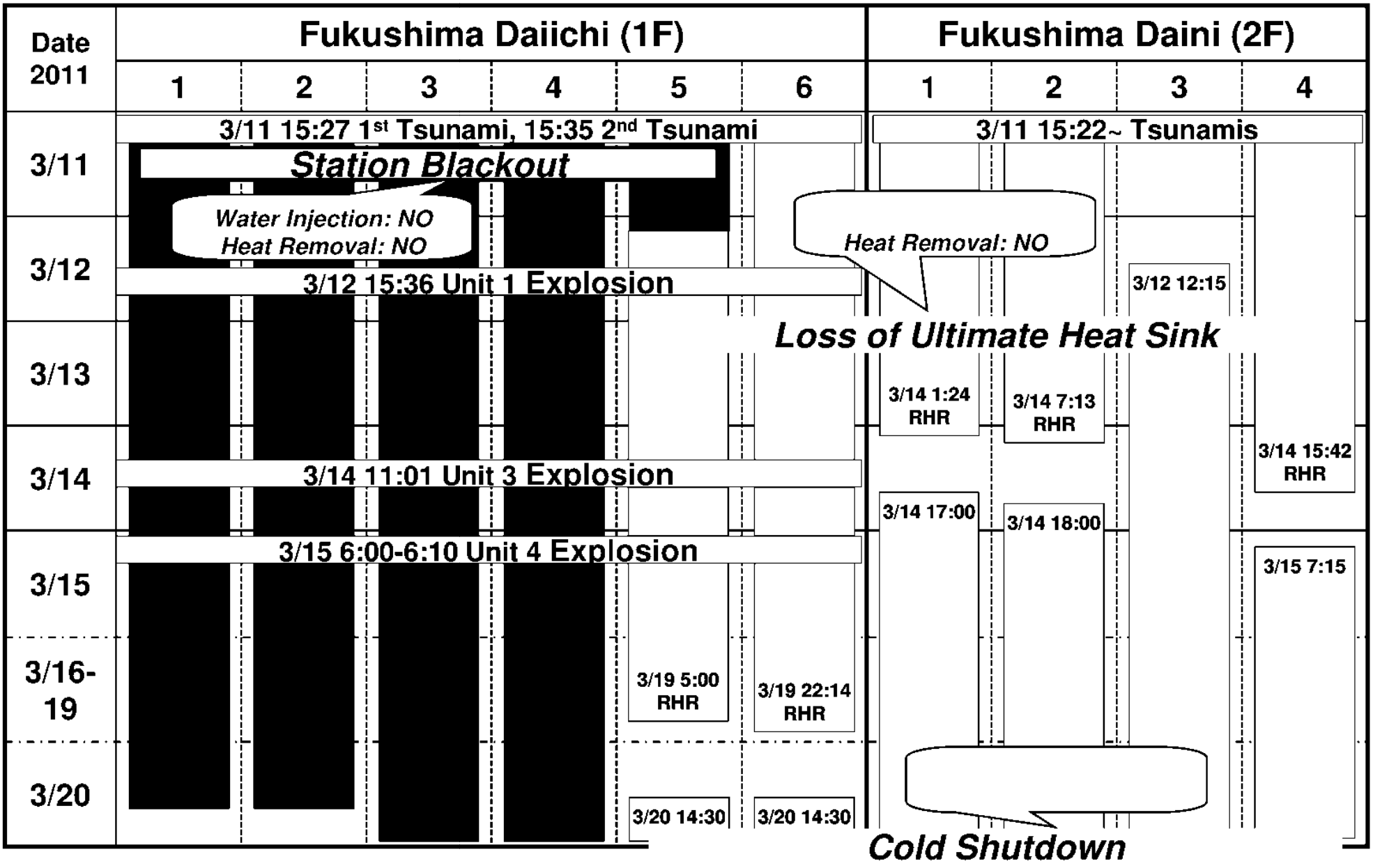
Current Status of Fukushima Daiichi (1F)



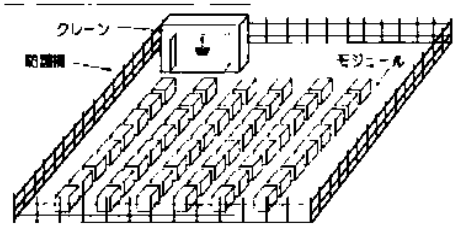
Live Camera View (as of 1/29/2015)

http://www.tepco.co.jp/en/nu/f1-np/camera/index2-e.html
http://www.tepco.co.jp/en/nu/f1-np/camera/index-e.html

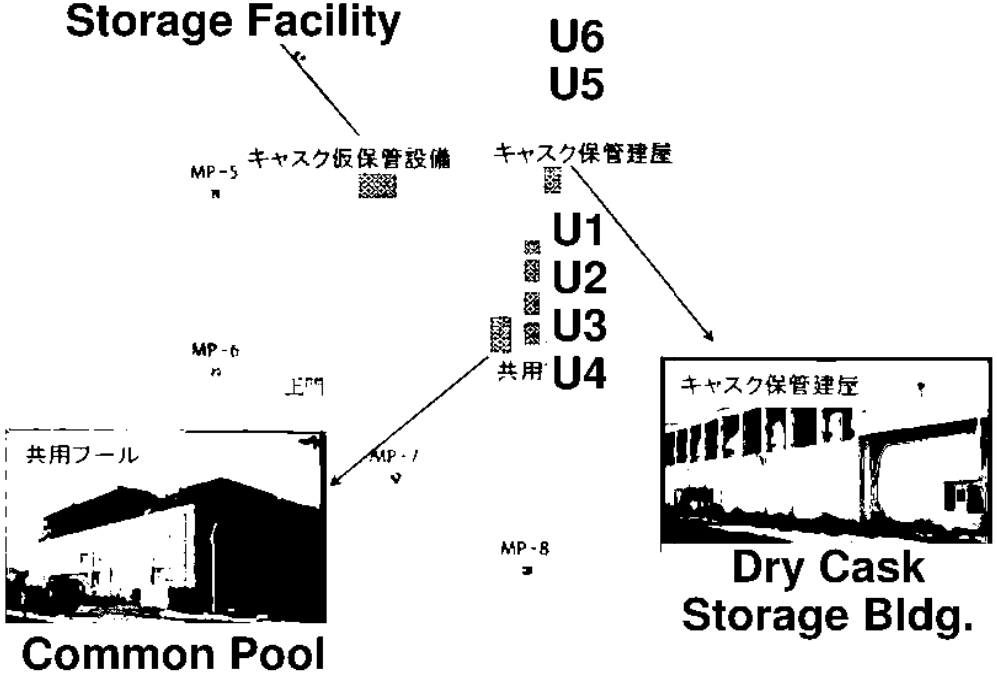
Overview of the 10-Unit Simultaneous Accidents



Spent Fuel Storage Facilities: Overview



Temporary Dry Cask Storage Facility



Dry Cask Storage Bldg.

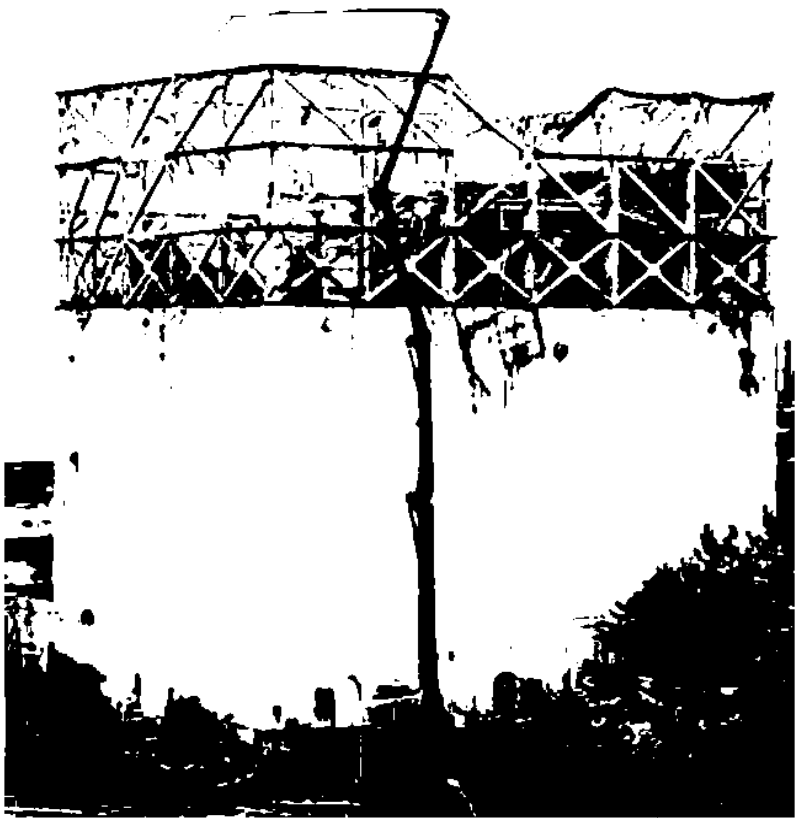
Common Pool

Fukushima Daiichi NPS

Unit	As of 3/11/2011			12/22/2014
	Spent Fuels	New Fuels	Decay Heat (MW)	Total # of Fuels
1	292	100	0.18	392
2	587	28	0.62	615
3	514	52	0.54	566
4	1,331	204	2.26	0
5	946	48	1.01	994
6	876	64	0.87	1,884
Common Pool	6,375	0	1.13	6,799
Dry Cask Storage	408	0	-	0
Temp. Dry Cask Storage	-	-	-	2,930

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

Unit 1 Spent Fuel Pool: Water Injection



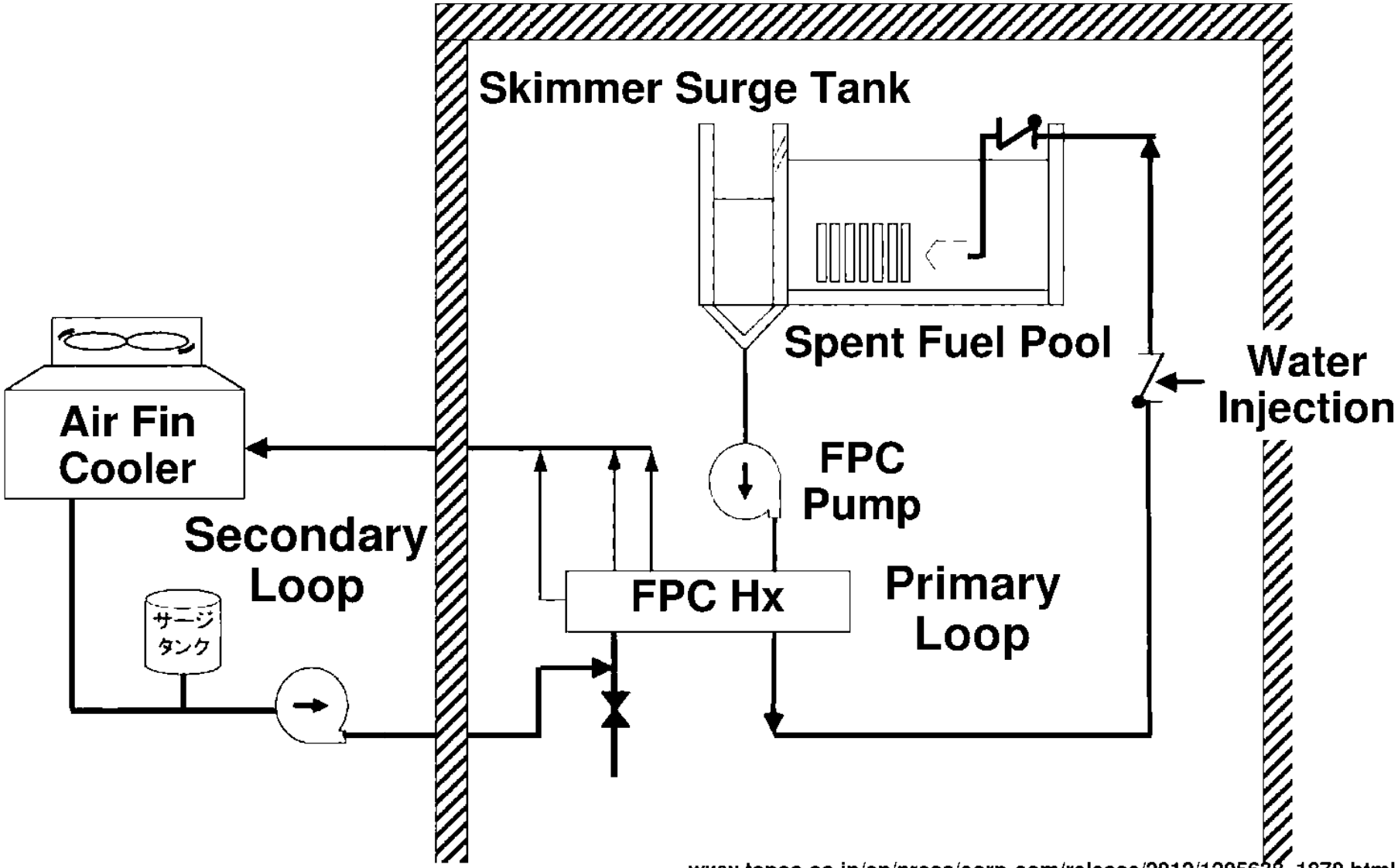
Water Injection into SFP with Concrete Pumper

Date (2011)	Injection Volume (ton)	Source	Injection Method
3/31	90	Fresh Water	Concrete Pumper
5/20	60		
5/22	90		
5/28	5		Fuel Pool Cooling (FPC) System
5/29	168		
6/5	15		
7/5	75		
8/5	75		
8/10	10		
8/10	Closed Cycle Cooling		

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Injected only fresh water (no seawater)

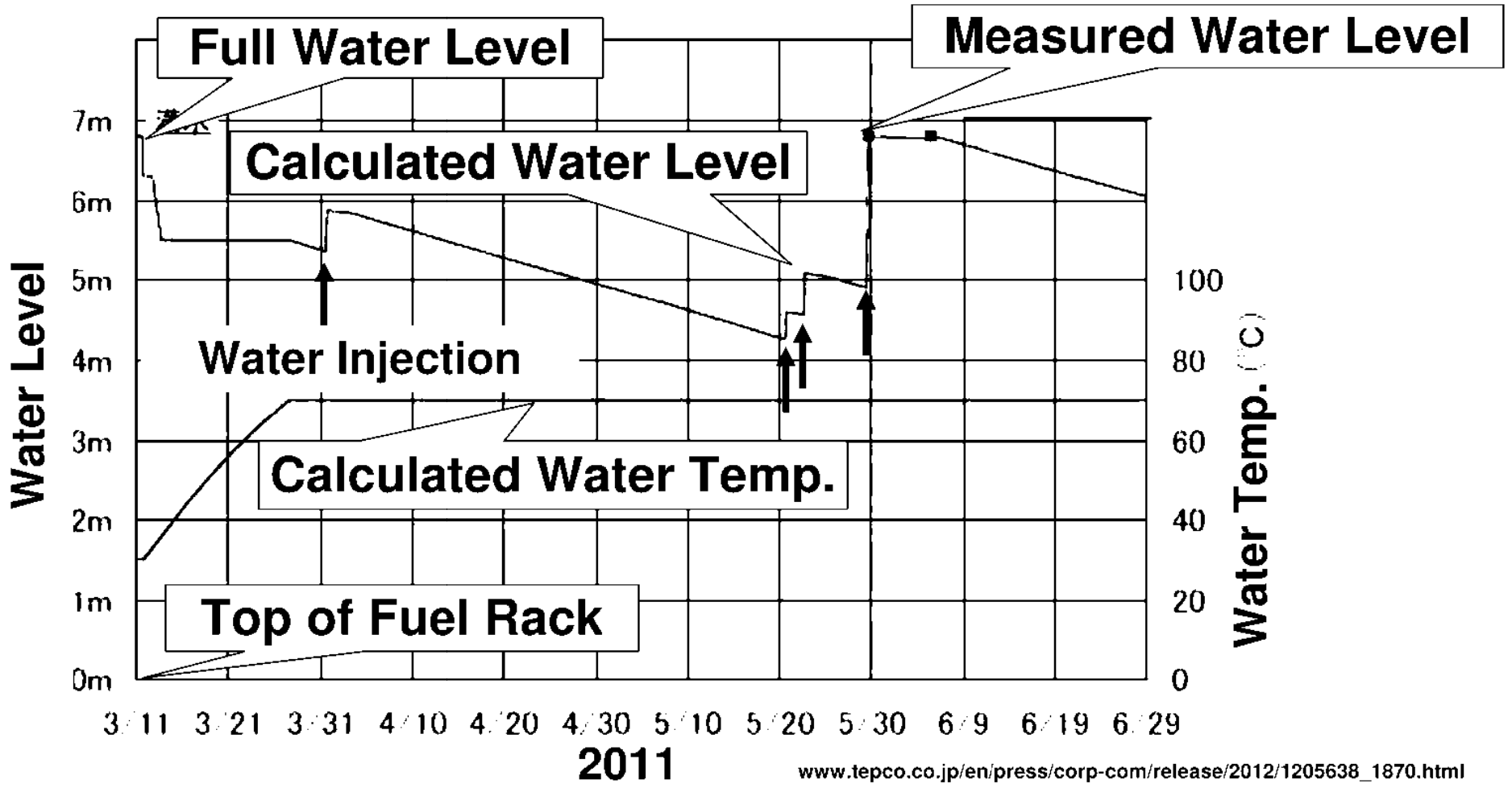
Unit 1 SFP: Closed-Cycle Cooling



www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Stable closed-cycle cooling from 8/10/2011

Unit 1 SFP: Reconstruction of Events



Water level highly unlikely to have dropped close to top of fuel rack

Unit 1 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm^3)			
		Unit 1 Skimmer Surge Tank		*Unit 1 SFP*	*Unit 1 T/B*
		6/22/2011	8/19/2011	*2/11/2011*	*3/26/2011*
Cs-134	2 years	12,000	18,000	*ND*	*1.2E5*
Cs-137	30 years	14,000	23,000	*0.078*	*1.3E5*
I-131	8 days	68	ND	*ND*	*1.5E5*

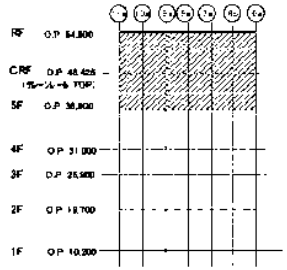
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

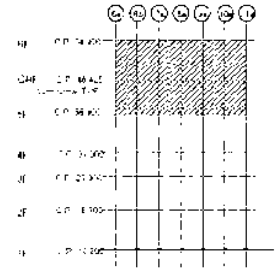
	6/22/2011	7/17/2012
Chloride (ppm)	4.4	5.0

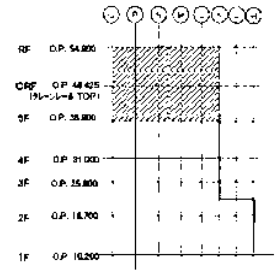
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

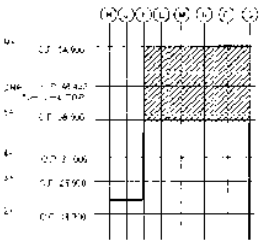
- I-131 most likely to have originated from reactor, not SFP (all fuels >1 year after shutdown)
- Injection of hydrazine for microbes prevention

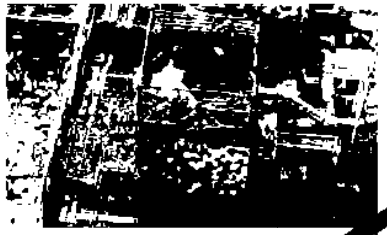
Unit 1 SFP: Structural Integrity Assessment



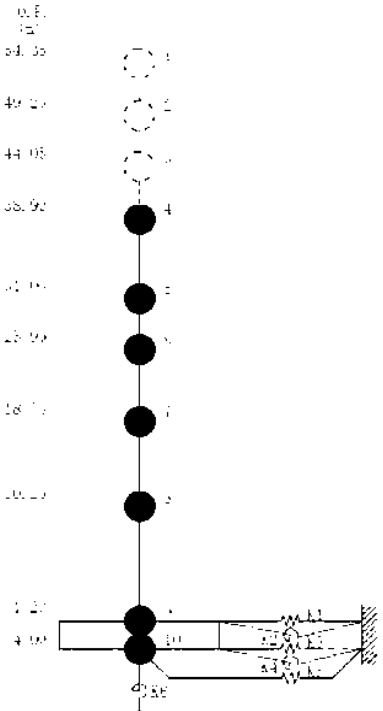








Structural Damage Assessment



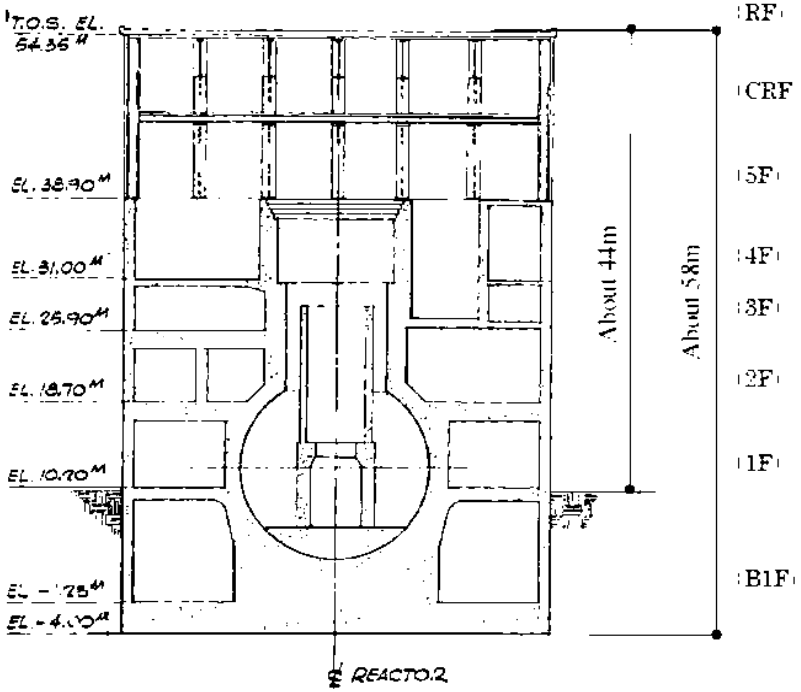


Figure Analysis Model for Seismic Response of the Reactor Building of Unit [illegible]tion)

Seismic Response Model Incorporating Damaged Condition

http://www.tepco.co.jp/en/press/corp-com/release/11052801-e.html

Shear strain from design-basis earthquake confirmed to be within safety limit (5/28/2011)

Unit 1 SFP: Condition of Refueling Floor

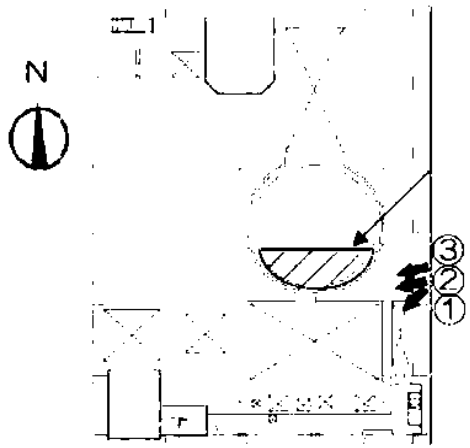
Fuel Handling Machine

Rubble

Reactor Well Cover

Fuel Handling Machine

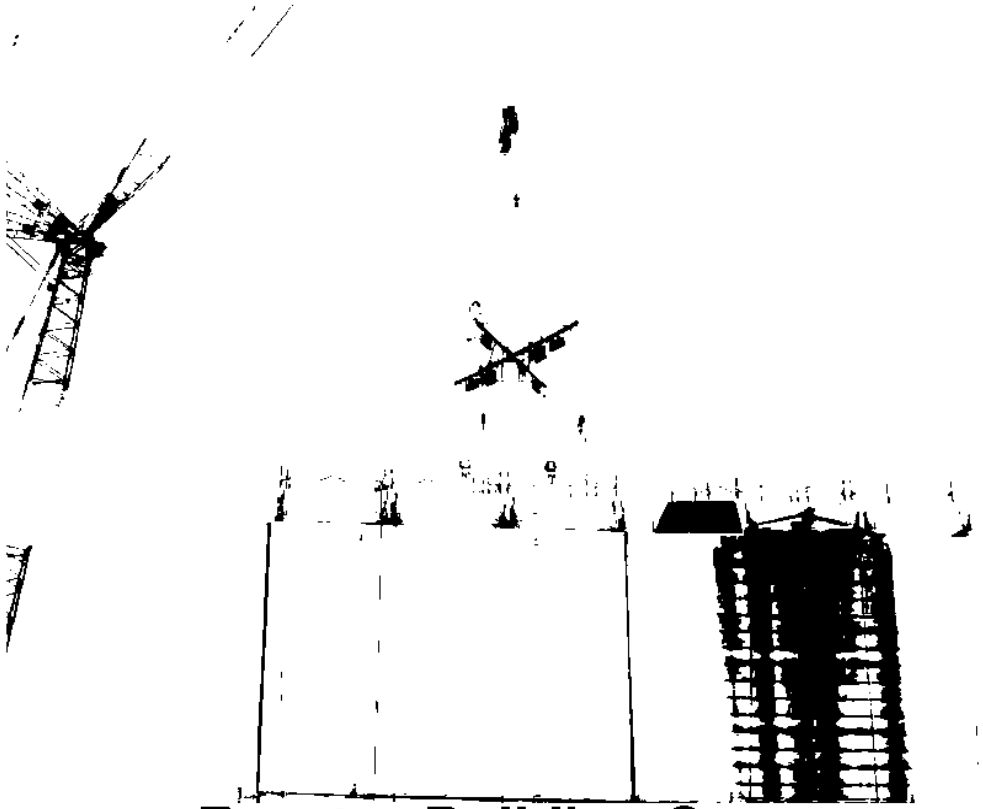
Spent Fuel Pool Surface



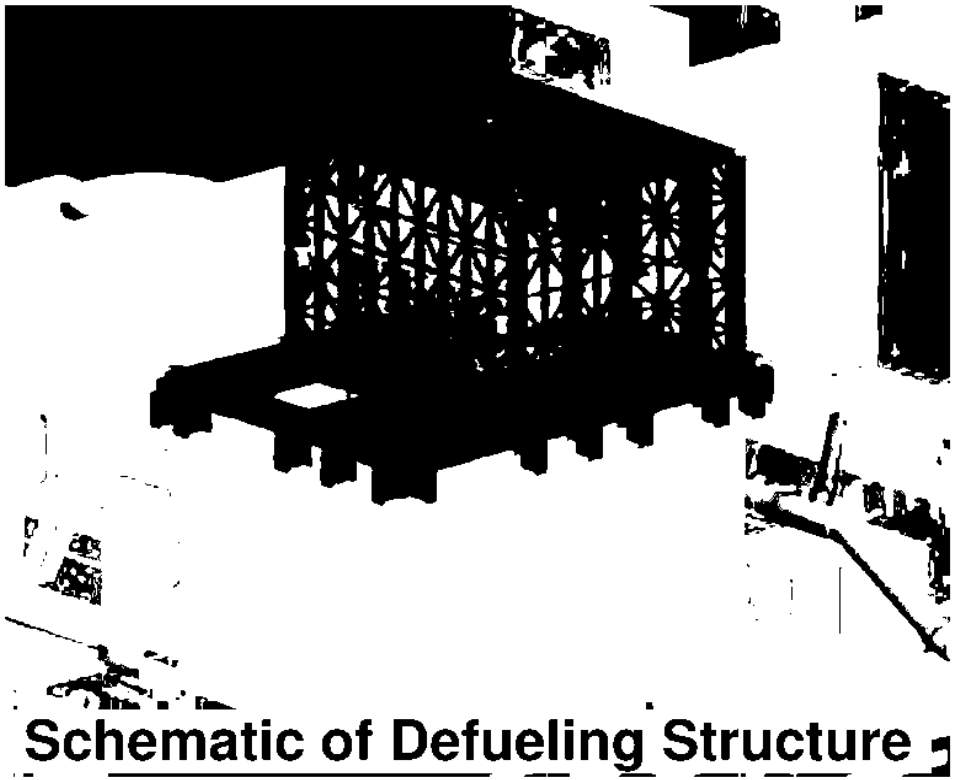
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

Fuel handling machine and overhead crane do not seem to have dropped into SFP (Nov. 2014)

Unit 1 SFP: Next Step



Reactor Building Cover
(12/4/2014)



Schematic of Defueling Structure

Reactor building cover to be dismantled to prepare for defueling

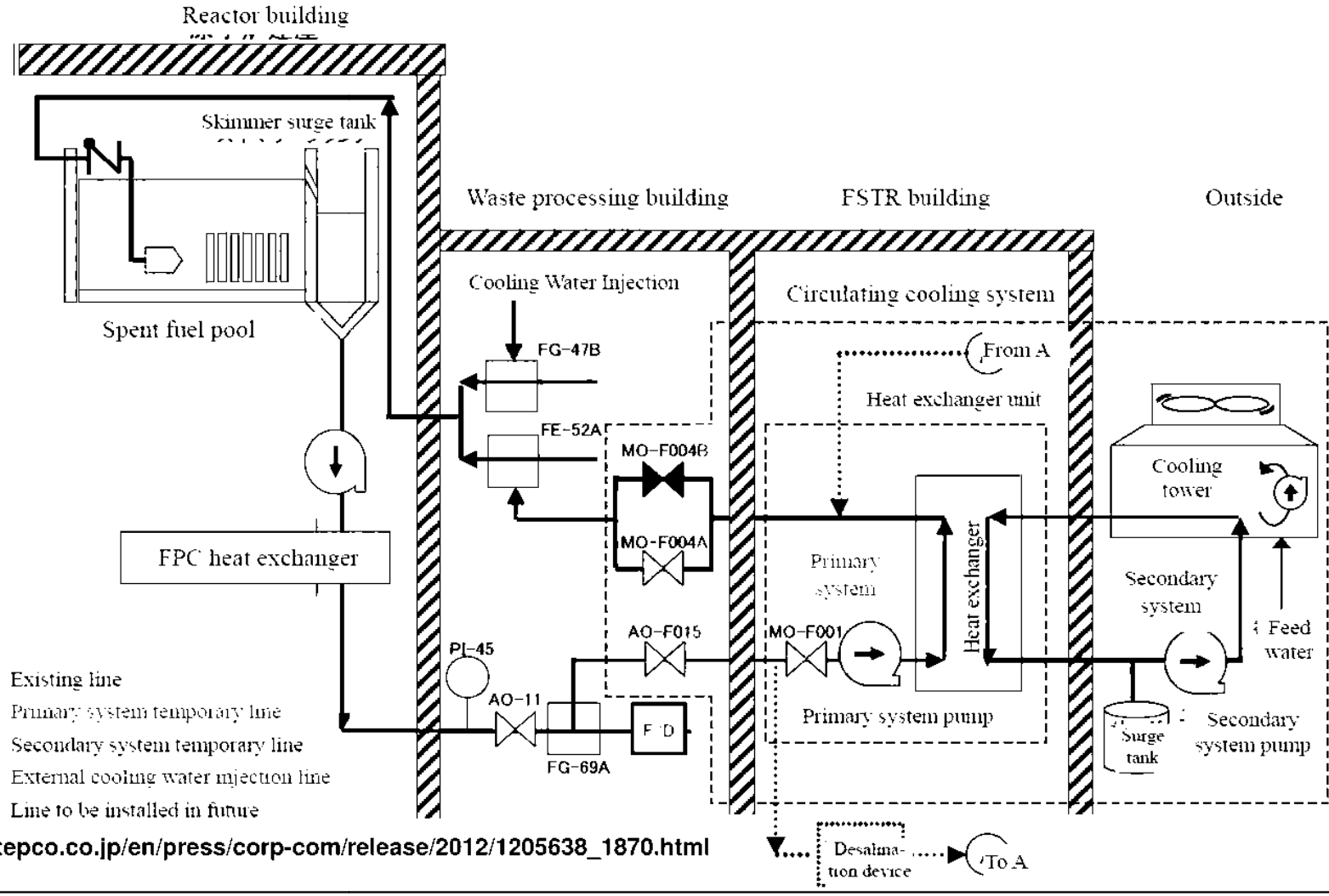
Unit 2 Spent Fuel Pool: Water Injection

Date (2011)	Injection Volume (ton)	Source	Injection Method
3/20	40	Seawater	Fuel Pool Cooling System
3/22	18		
3/25	30		
3/29	15-30	Fresh Water	
3/30	<20		
4/1	70		
4/4	70		
4/7	36		
4/10	60		
4/13	60		
4/16	45		
4/19	47		
4/22	50		
4/25	38		
4/28	43		
5/2	55		
5/6	58		
5/10	56		
5/14	56		
5/18	53		
5/22	56		
5/26	53		
5/30	53		
5/31	Closed Cycle Cooling		

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

FPC system utilized for water injection

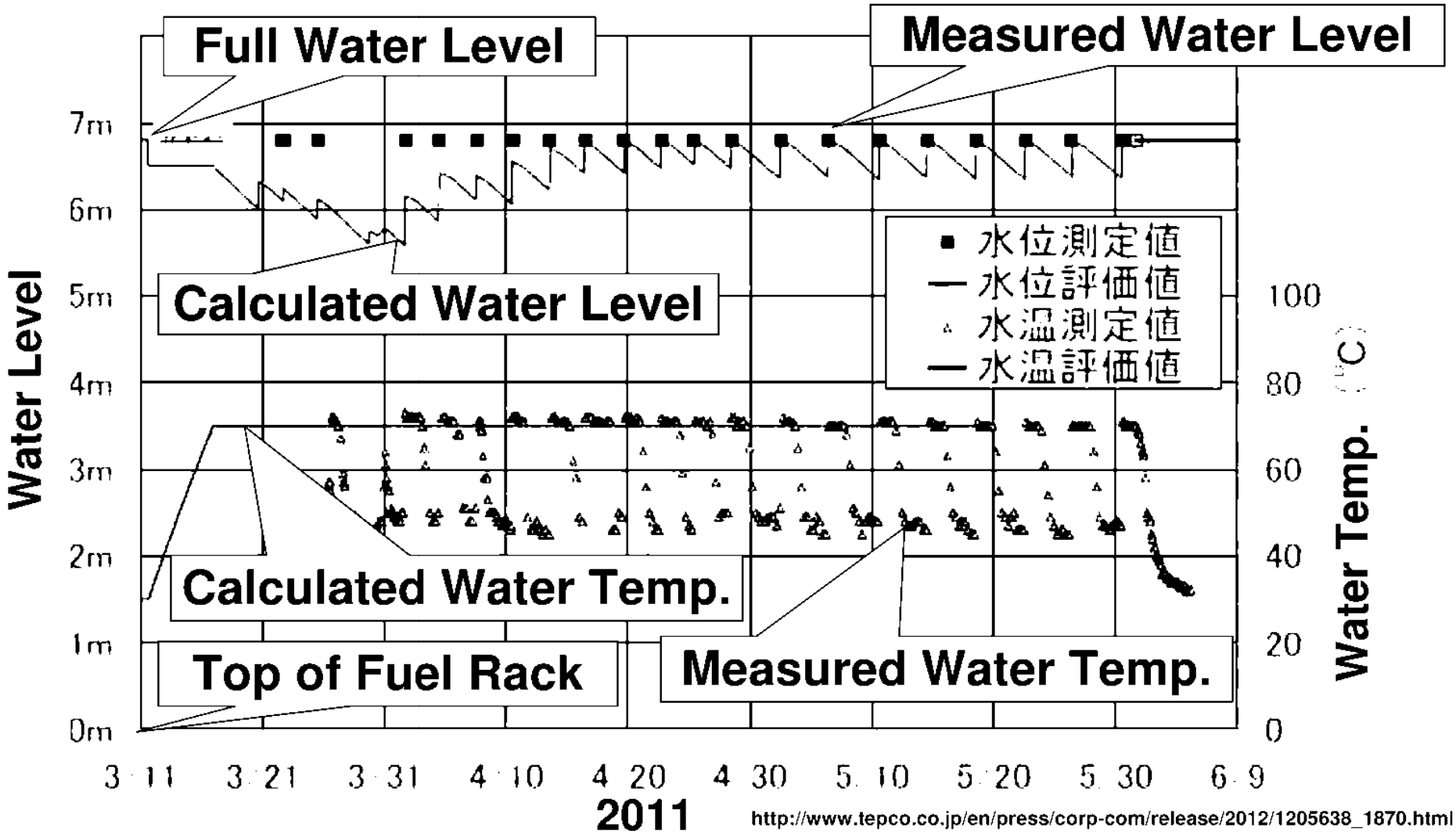
Unit 2 SFP: Closed-Cycle Cooling



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

- **Stable closed-cycle cooling from 5/31/2011**
- **Injection of hydrazine for anti-corrosion and microbe prevention**

Unit 2 SFP: Reconstruction of Events



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Water level highly unlikely to have dropped close to top of fuel rack

Unit 2 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm^3)			
		Unit 2 Skimmer Surge Tank		*Unit 2 SFP*	*Unit 2 T/B*
		4/16/2011	*8/19/2011*	*2/10/2011*	*3/27/2011*
Cs-134	2 years	160,000	110,000	*ND*	*3.1E6*
Cs-137	30 years	150,000	110,000	*0.28*	*3.0E6*
I-131	8 days	4,100	ND	*ND*	*1.3E7*

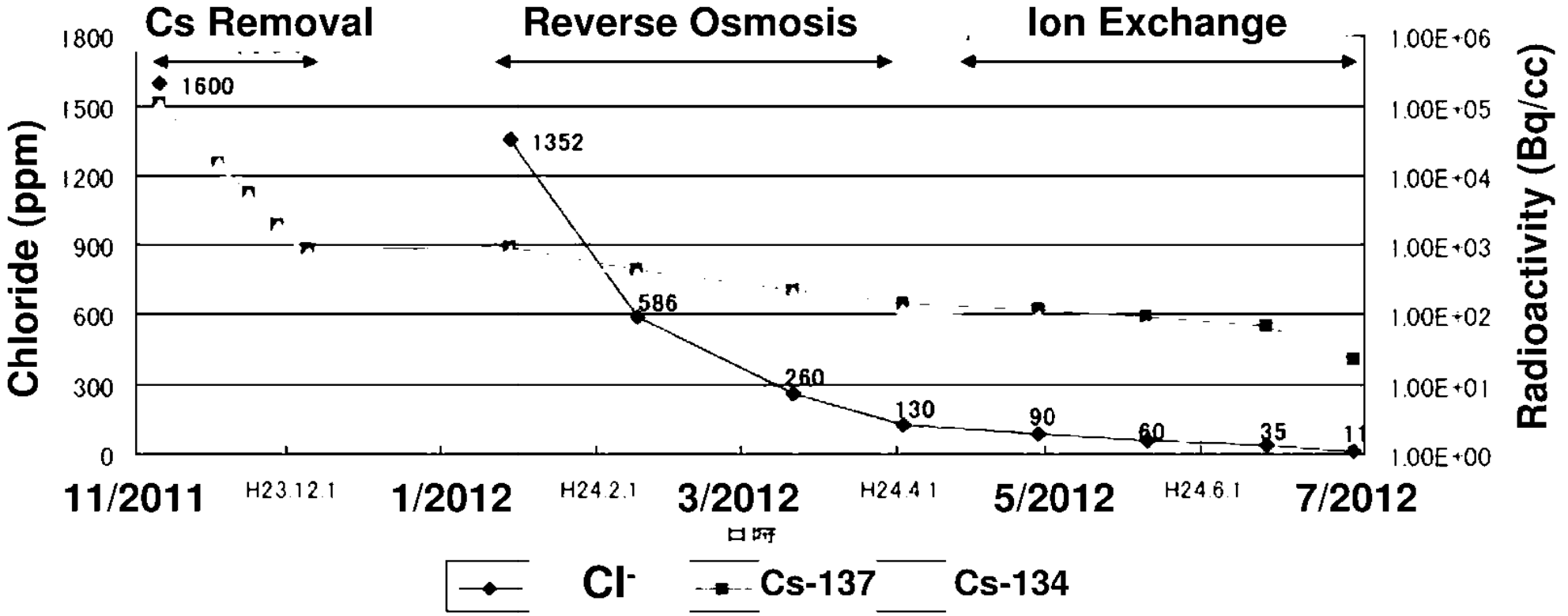
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

	4/16/2011	11/15/2011	4/2/2012	8/30/2012
Chloride (ppm)	1100	1600	130	14

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

I-131 most likely to have originated from reactor, not spent fuel (all fuels >7 months after shutdown)

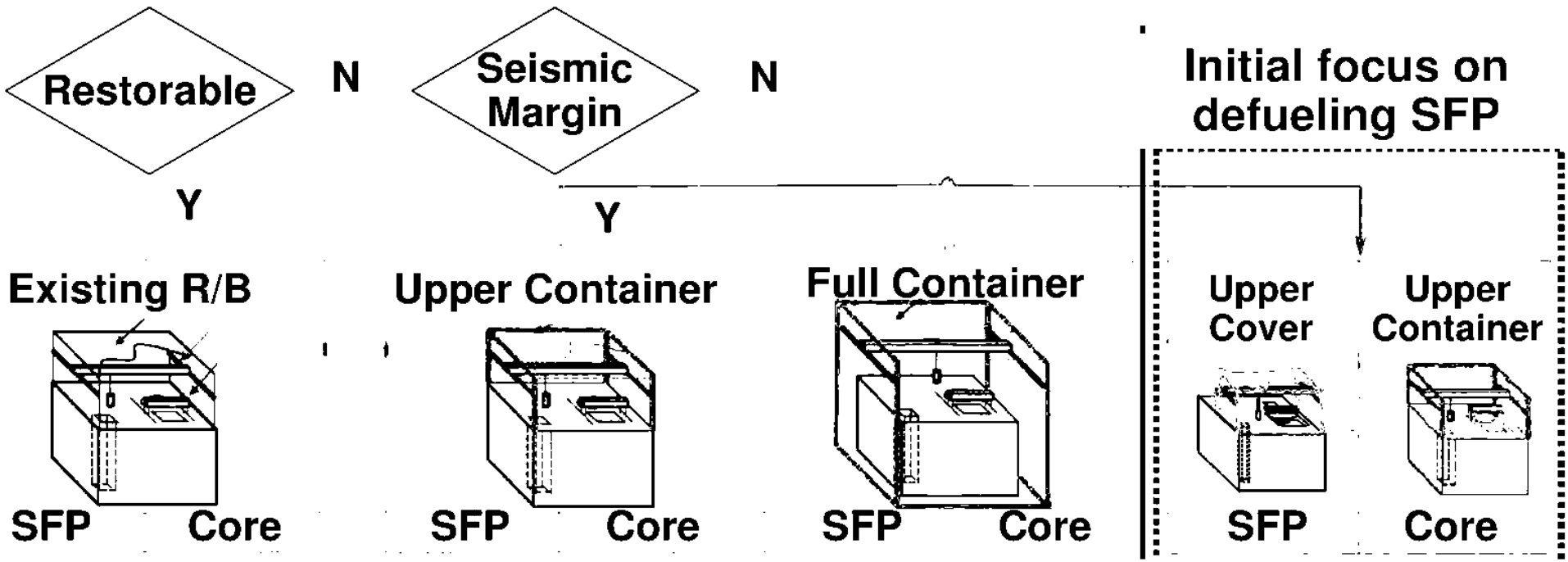
Unit 2 SFP: Water Chemistry (cont'd)



http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m121022_05-j.pdf

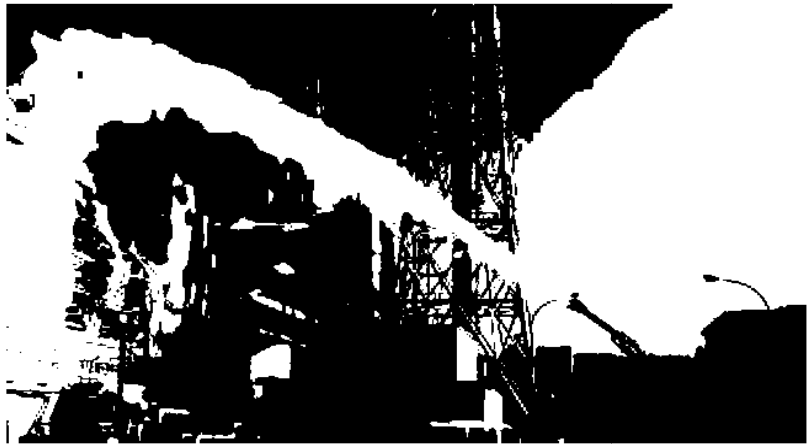
Water quality steadily improved

Unit 2 SFP: Next Step



Defueling strategy to be determined after path for core debris retrieval becomes clearer

Unit 3 Spent Fuel Pool: Water Injection



http://www.mod.go.jp/gsdf/crf/pa/saigaihaken/touhokutihoujisin/kakogazou/kako-jv-touhoku/march/23.3.30_2/jv-touhoku.html

Japan Self Defense Force

http://www.tfd.metro.tokyo.jp/hp-kouhouka/kts/kts_03/kts04.html

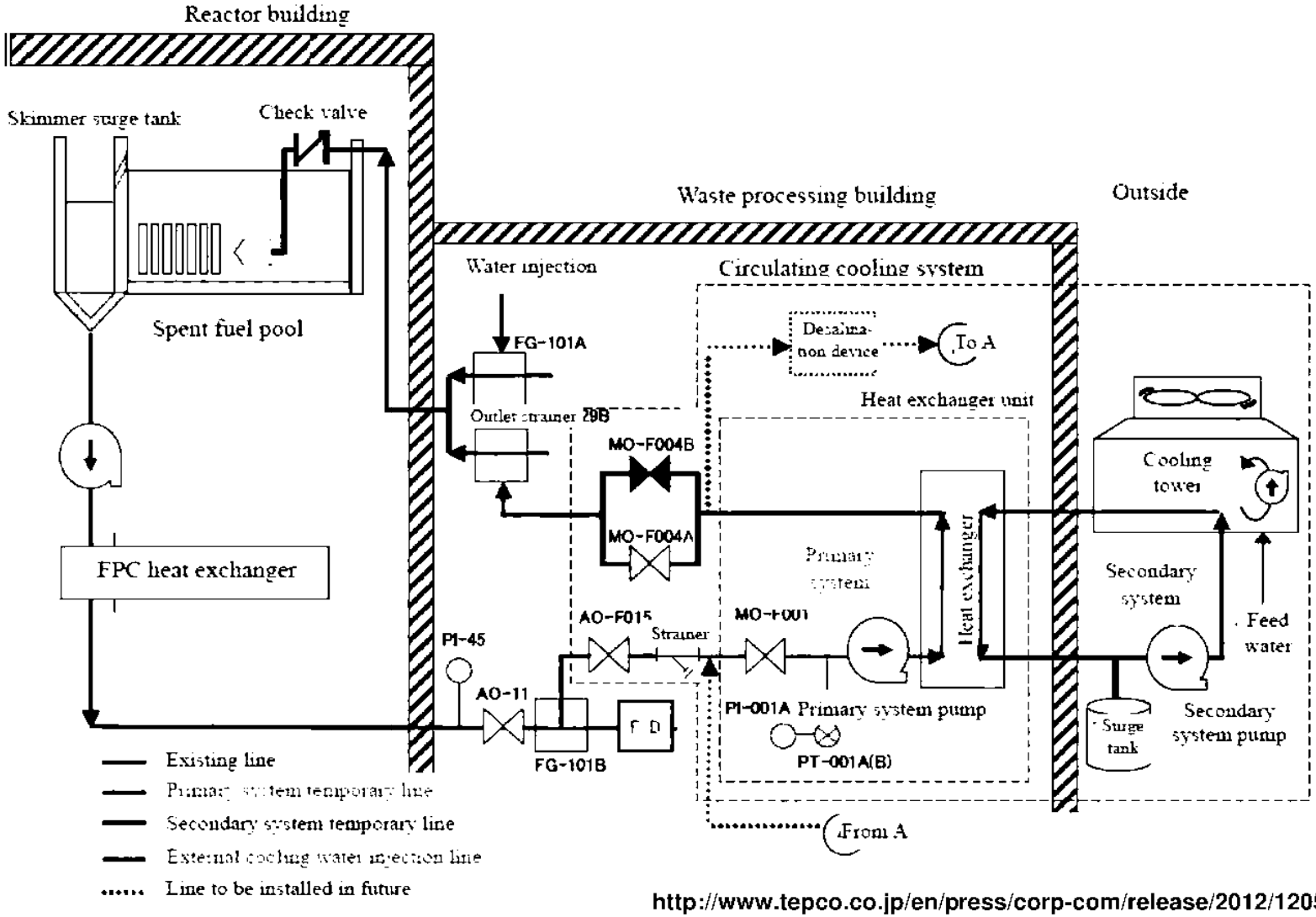
Tokyo Fire Department

Various attempts to inject water

Date (2011)	Injection Volume (ton)	Source	Injection Method
3/17	30	Seawater	Helicopter
3/17	44		
3/17	30	Fresh Water	Water Cannon
3/18	40		
3/18	2		
3/19	60	Seawater	Fire Truck
3/19	2430		
3/20	1137		
3/22	150		
3/23	35		FPC
3/24	120		
3/25	450		Fire Truck
3/27	100		
3/29	100	Fresh Water	Concrete Pumper
3/31	105		
4/2	75		
4/4	70		FPC
4/7	70		
4/8	75		
4/10	80		
4/12	35		
4/14	25		
4/18	30		
4/22	50		
4/26	47.5		
5/8	60		
5/9	80		
5/16	106		
5/24	100		
5/28	50		
6/1	40		
6/5	60		
6/9	55		
6/13	42		
6/17	49		
6/26	45	w/ Boron	
6/27	60		
6/29	30	Fresh Water	
6/30	Closed Cycle Cooling		

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

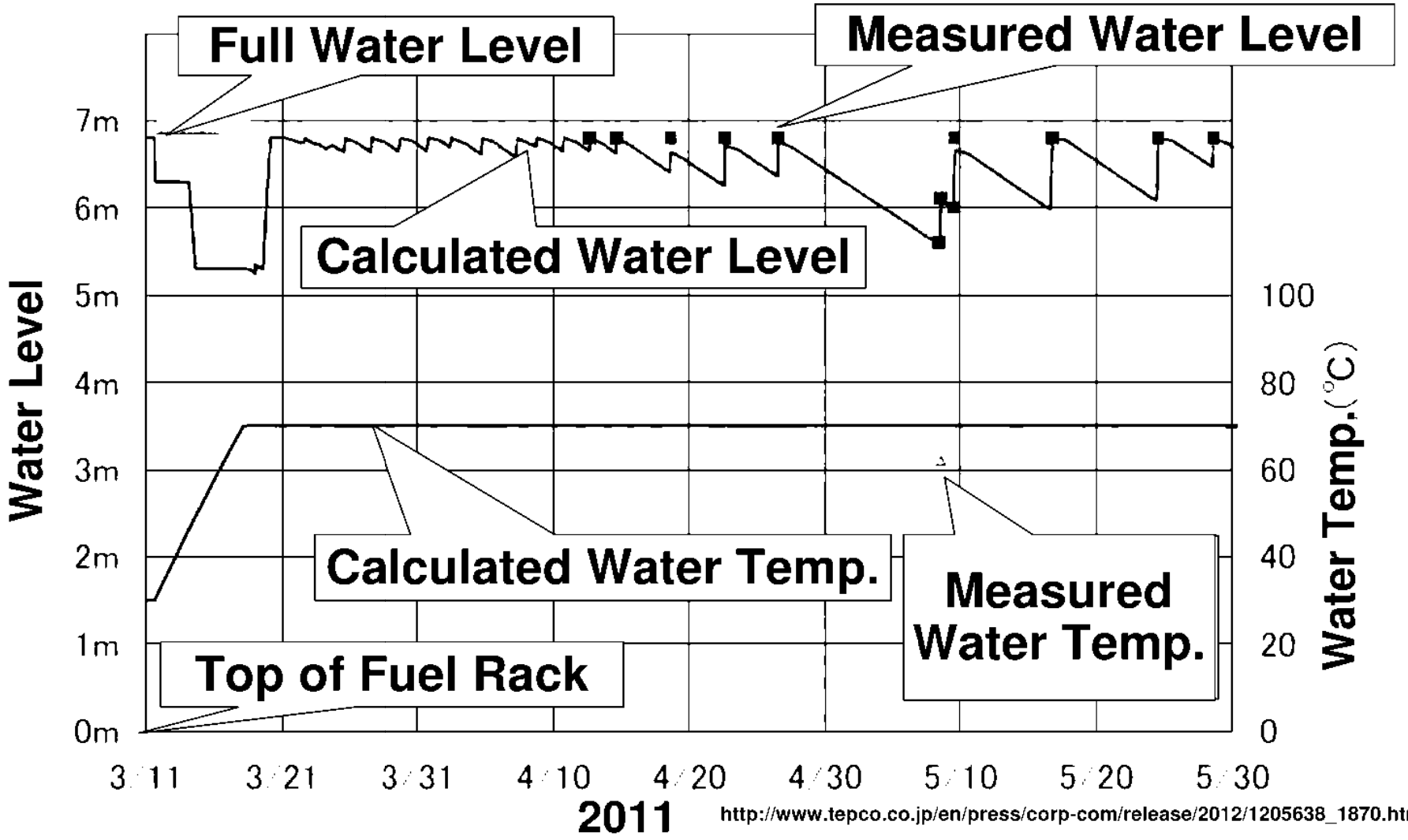
Unit 3 SFP: Closed-Cycle Cooling



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Stable closed-cycle cooling from 6/30/2011

Unit 3 SFP: Reconstruction of Events



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Water level highly unlikely to have dropped close to top of fuel rack

Unit 3 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm^3)				
		Unit 3 SFP			*Unit 3 SFP*	*Unit 3 T/B*
		5/8/2011	7/7/2011	8/19/2011	*3/2/2011*	*4/22/2011*
Cs-134	2 years	140,000	94,000	74,000	*ND*	*1,500,000*
Cs-136	13 days	1,600	ND	ND	*ND*	*44,000*
Cs-137	30 years	150,000	110,000	87,000	*ND*	*1,600,000*
I-131	8 days	11,000	ND	ND	*ND*	*660,000*

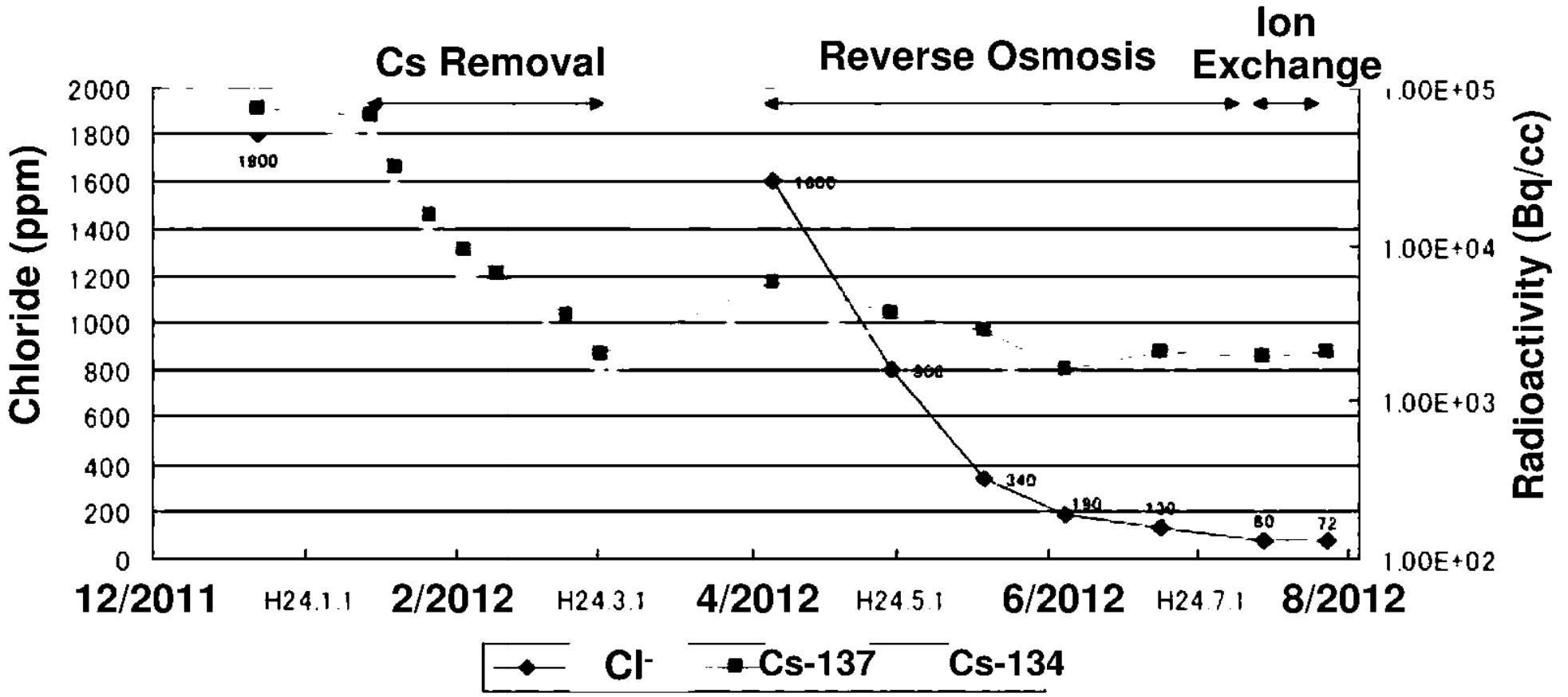
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

	5/8/2011	4/5/2012	6/23/2012	8/30/2012
Chloride (ppm)	2400	1600	130	73

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

- I-131 and Cs-136 most likely to have originated from reactor, not SFP (all fuels >10 months after shutdown)
- Injection of boric acid to neutralize alkalinity from concrete rubble
- Injection of hydrazine for anti-corrosion and microbe prevention

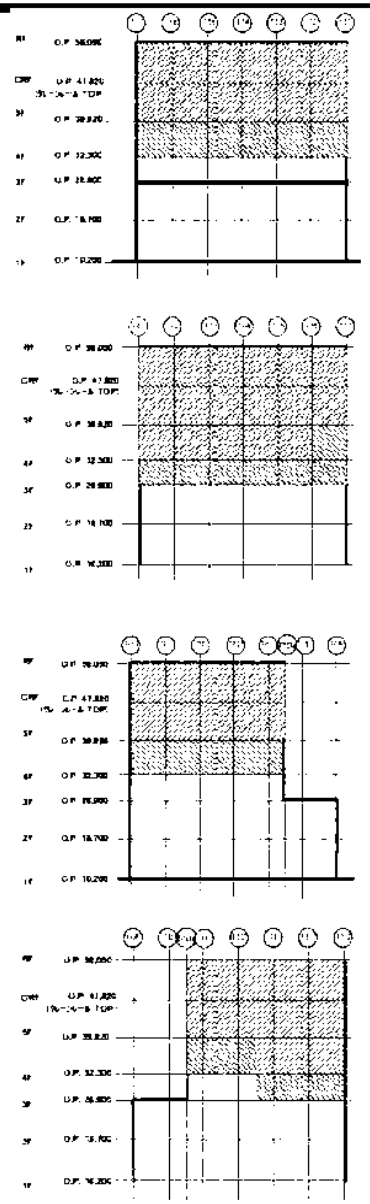
Unit 3 SFP: Water Chemistry (cont'd)

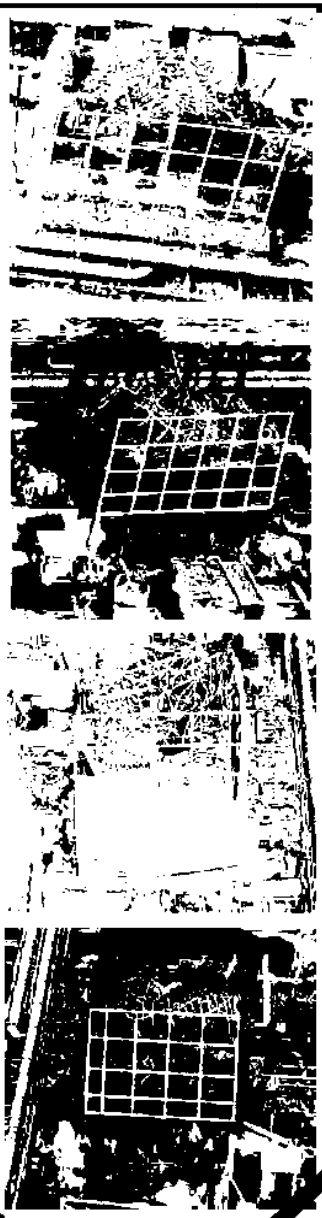


http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m121022_05-j.pdf

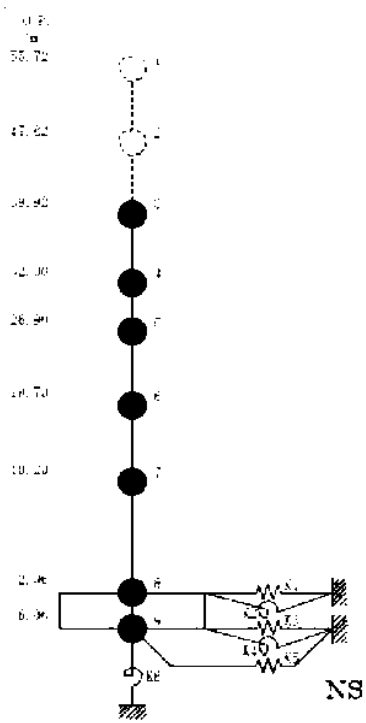
Water quality steadily improved

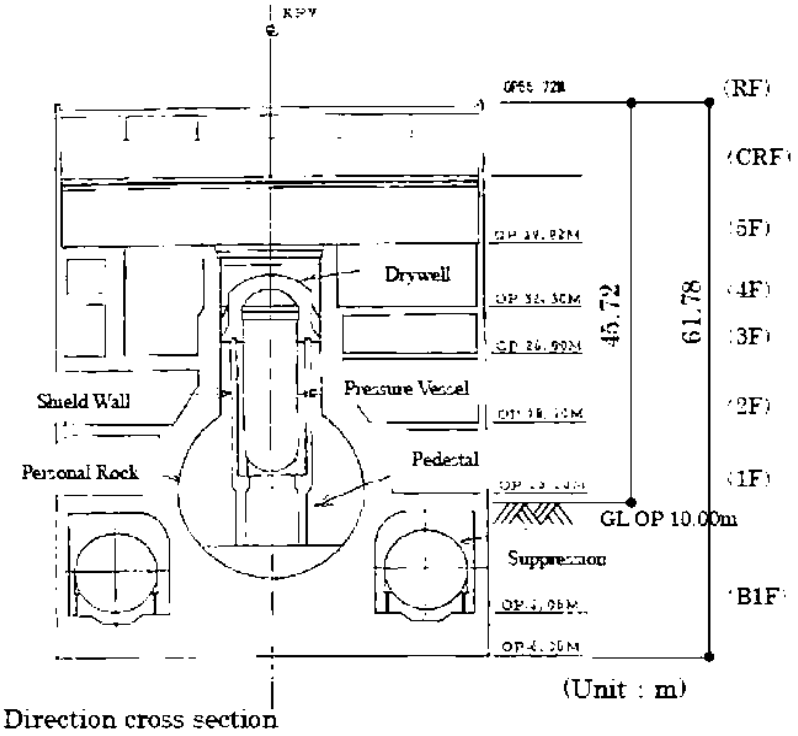
Unit 3 SFP: Structural Integrity Assessment





Structural Damage Assessment





NS Direction cross section

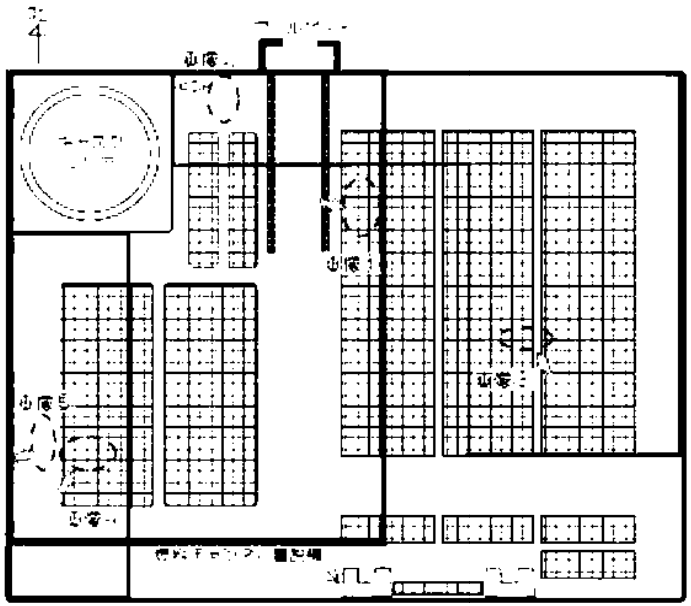
Seismic Response Model Incorporating Damaged Condition

http://www.tepco.co.jp/en/press/corp-com/release/11071307-e.html

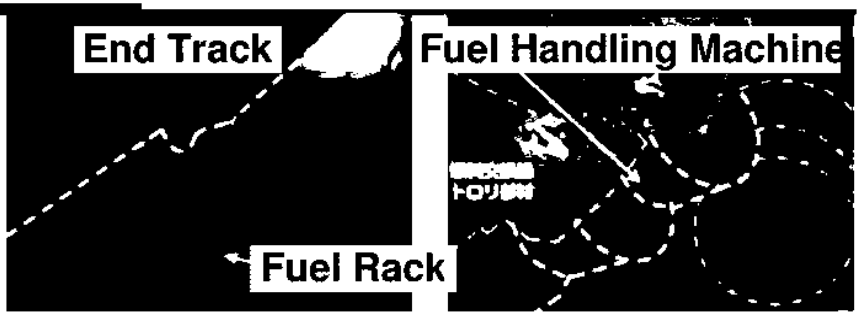
Shear strain from design-basis earthquake confirmed to be within safety limit (7/13/2011)

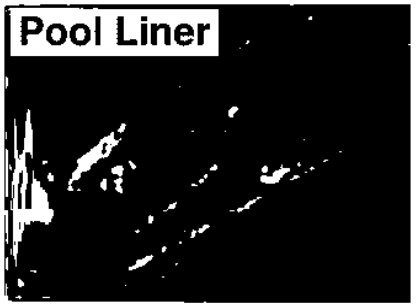
TOKYO ELECTRIC POWER COMPANY

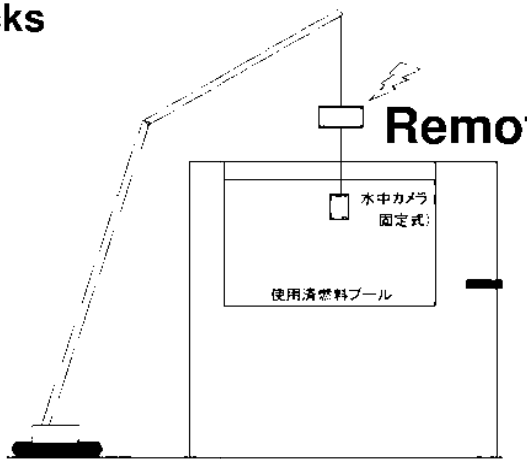
Unit 3 SFP: Rubble Removal

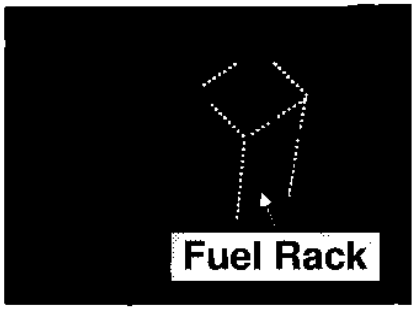


Fuel Racks
Oct. 11
Oct. 12





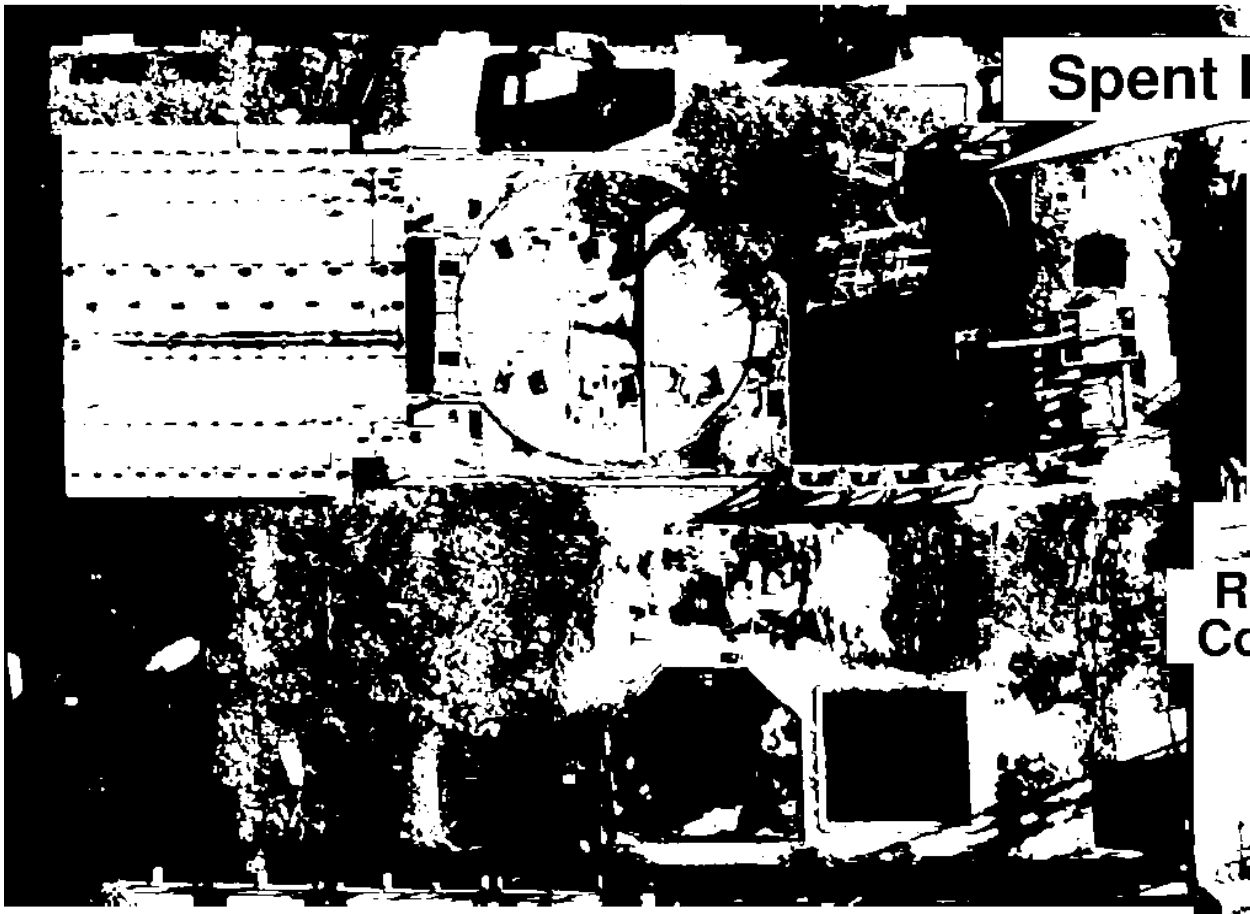




http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m121022_05-j.pdf

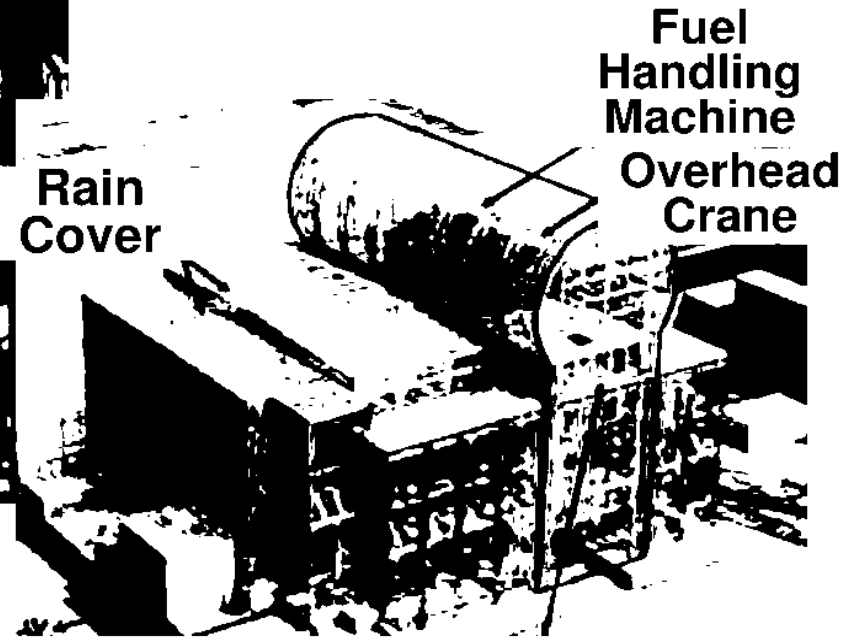
Information on rubble in SFP obtained by remote-controlled underwater camera (Oct. 2012)

Unit 3 SFP: Next Step



Refueling Floor (Dec. 2014)

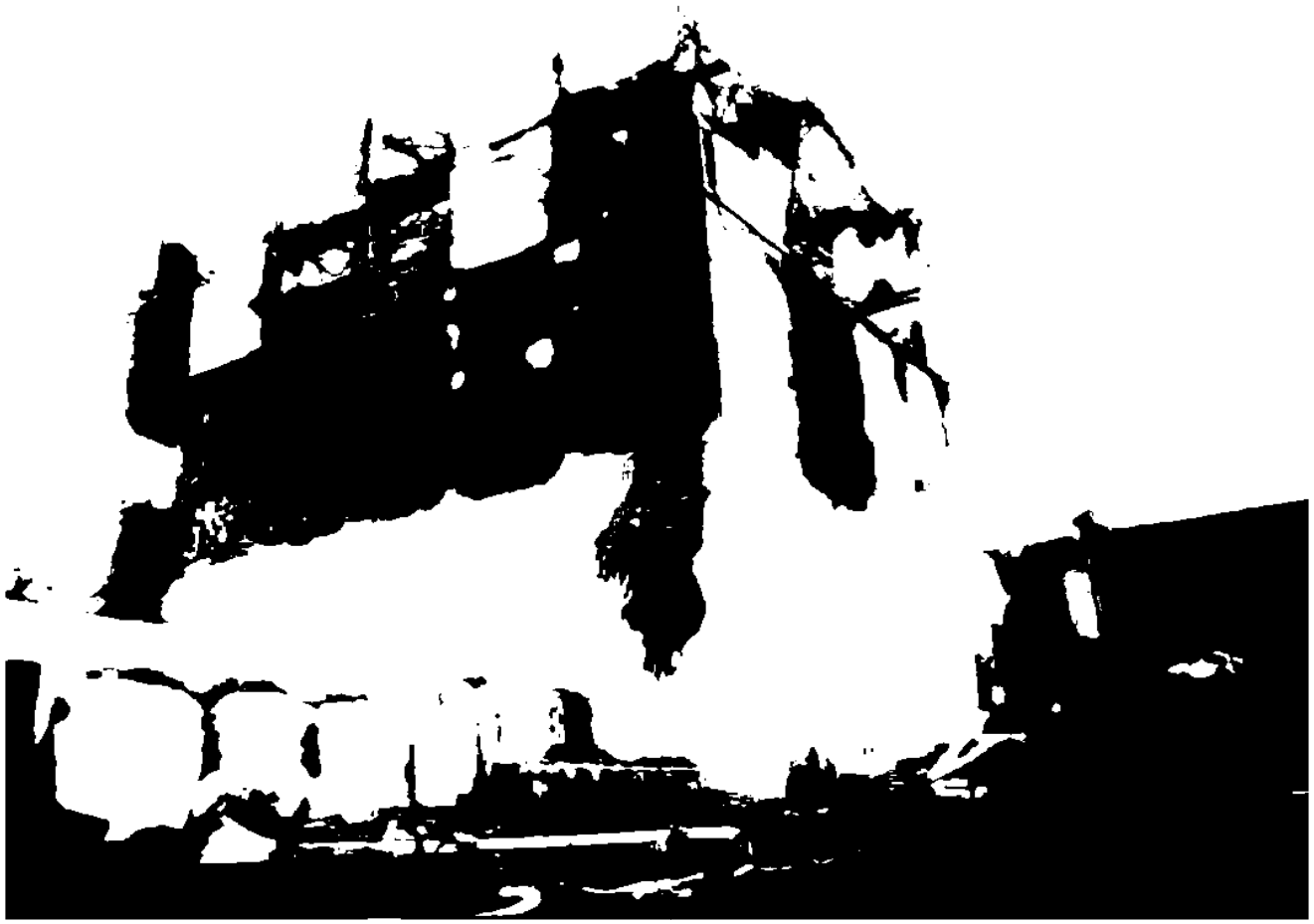
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_10-j.pdf



Schematic of Defueling Structure

Removing rubble from SFP in preparation for defueling

Unit 4 Spent Fuel Pool: Water Injection



Water Injection with Concrete Pumper (3/22/2011)

3/20, water cannon, fresh water, 80 ton

7/31, Closed Cycle Cooling, fresh water

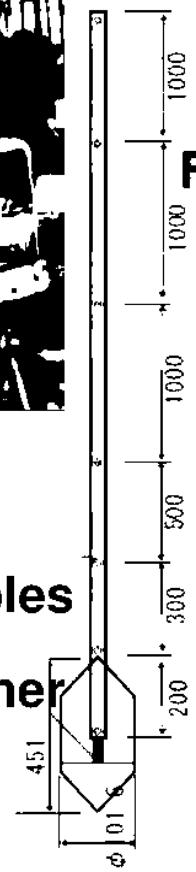
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Injection of seawater and fresh water from Mach 20 using water cannons, concrete pumpers, etc. until July 31, 2011

Unit 4 SFP: Water Level/Temp. Measurement

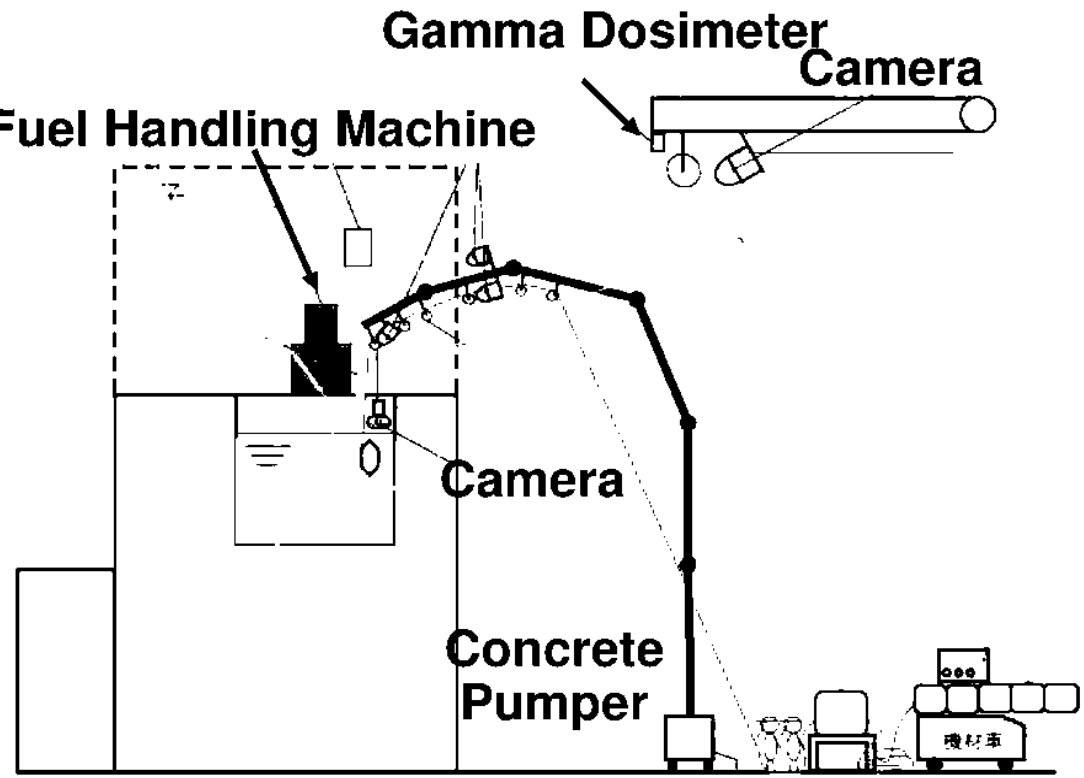
Collecting Water Samples
(4/15/2011)

http://photo.tepco.co.jp/date/2011/201104-j/110415-01j.html



Thermocouples

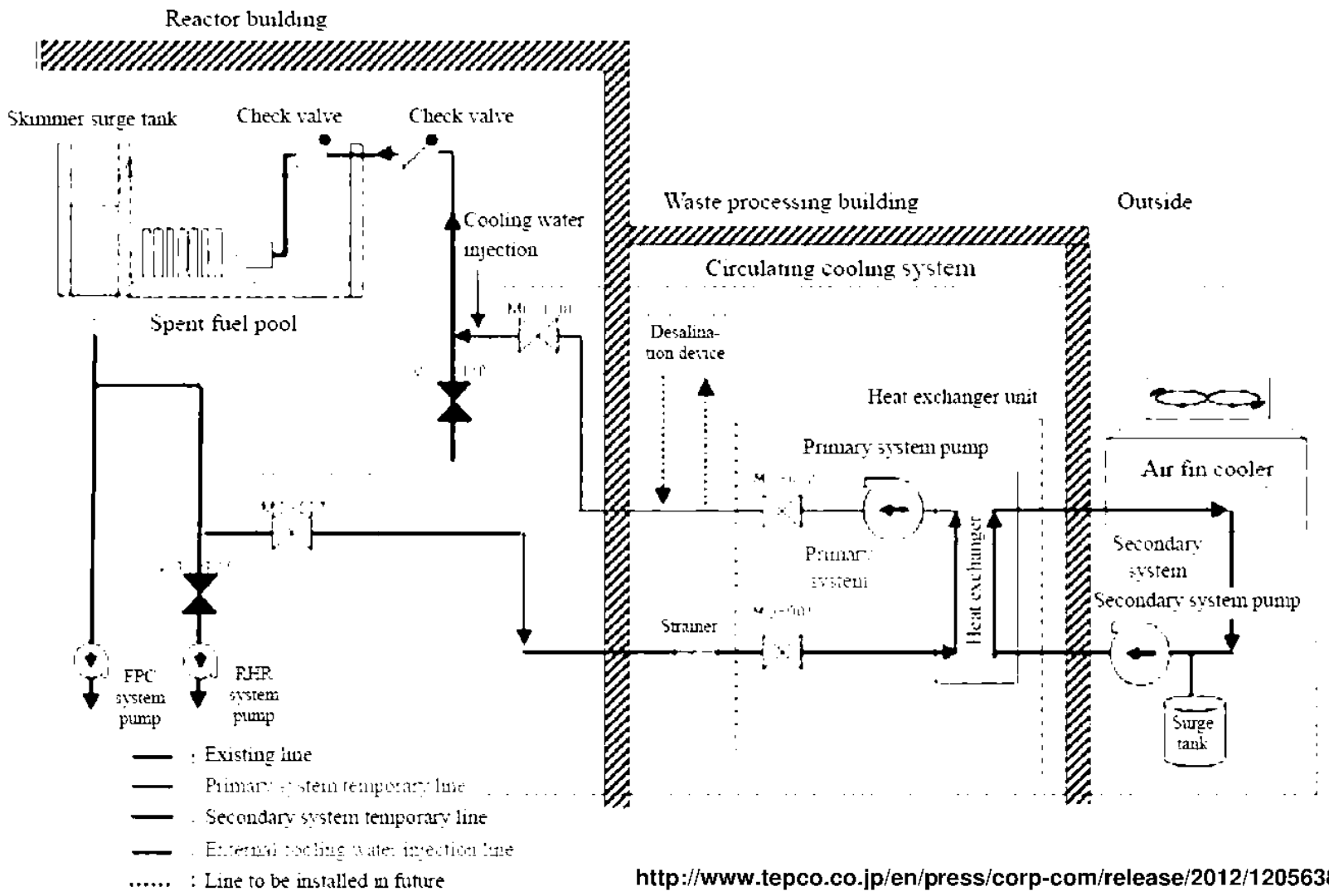
Sampling Container



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Concrete pumper used to measure SFP water level/temperature and collect water samples

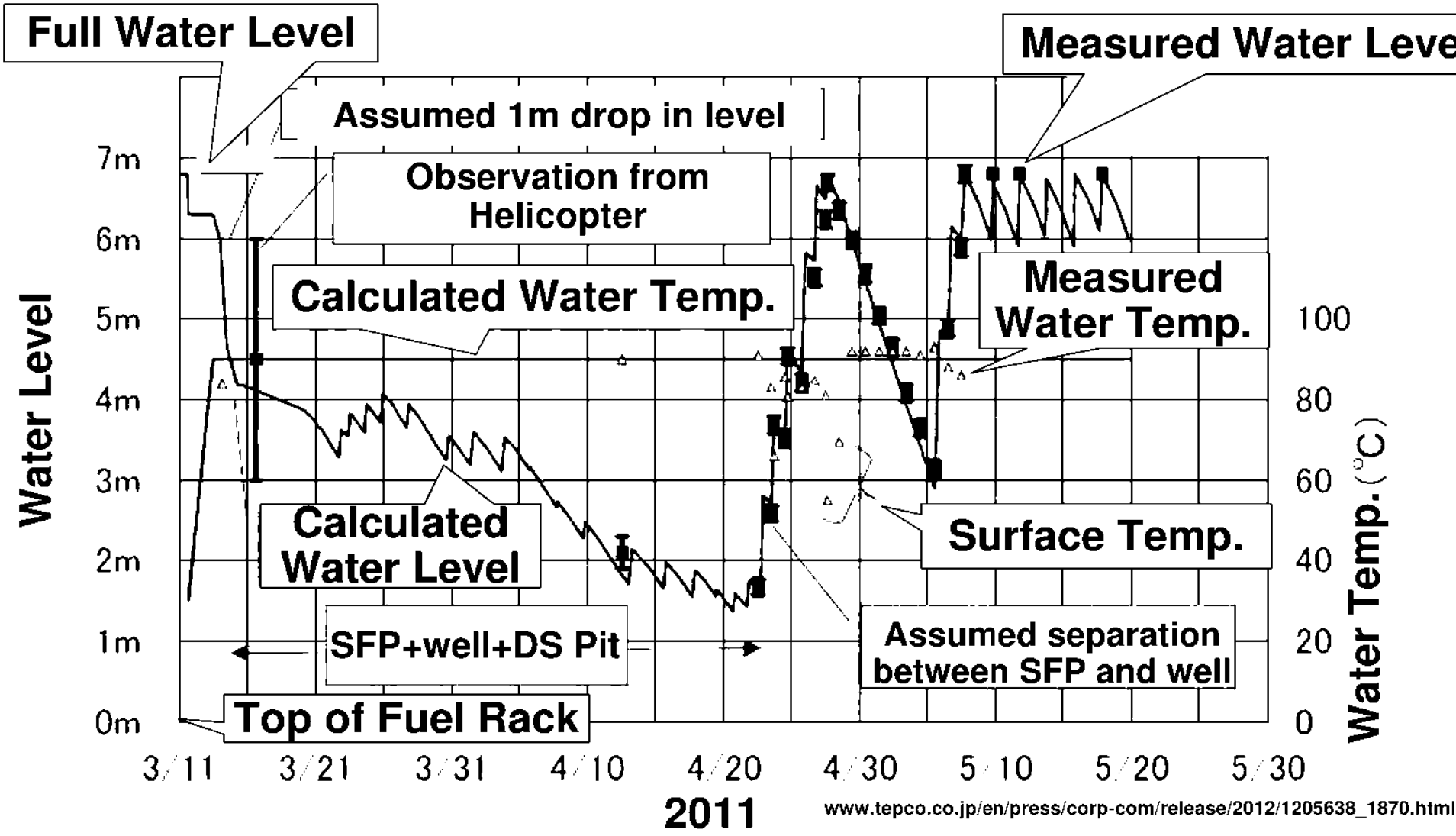
Unit 4 SFP: Closed-Cycle Cooling



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

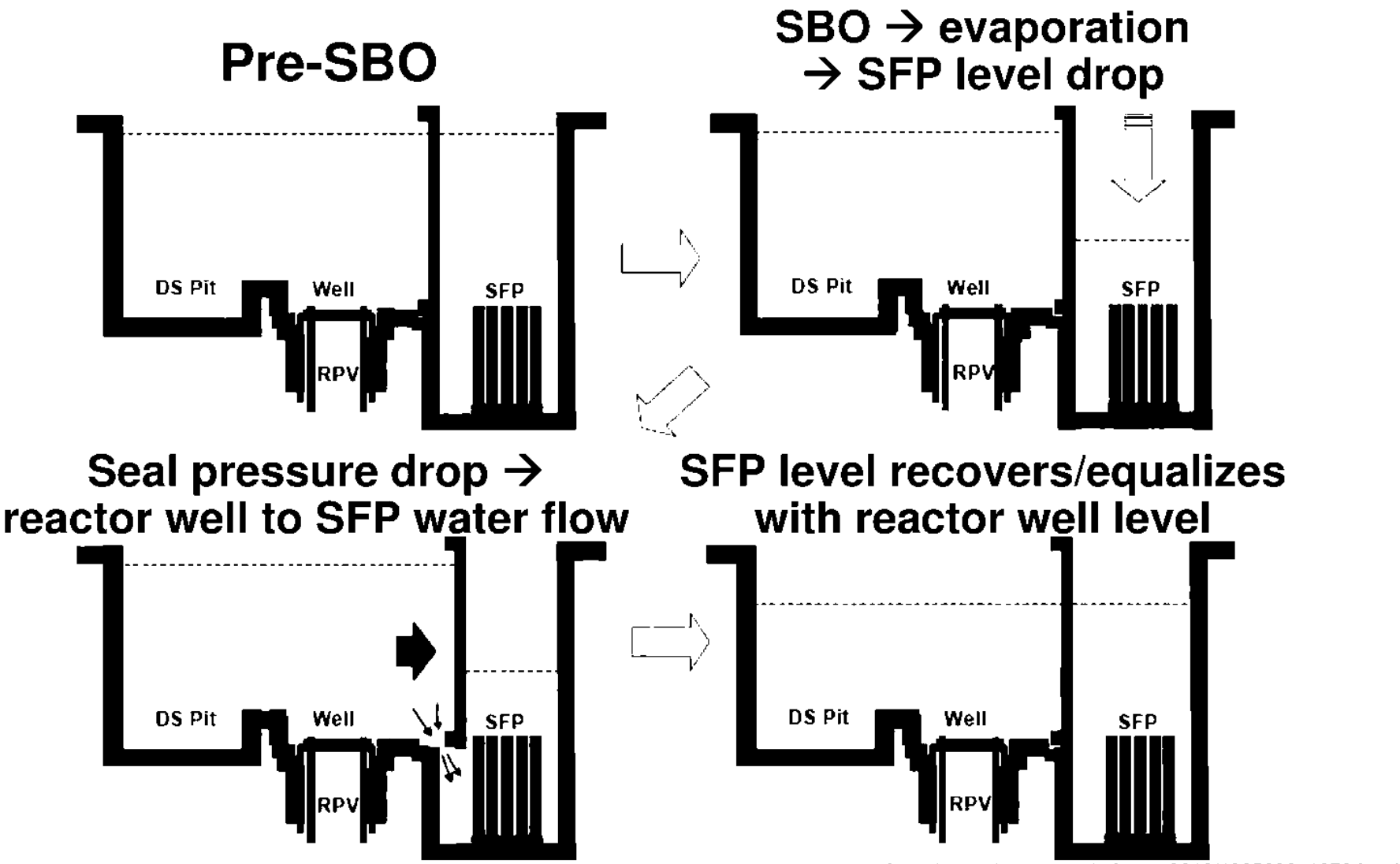
Stable closed-cycle cooling from 7/31/2011

Unit 4 SFP: Reconstruction of Events



Lowest water level at top of fuel rack +1.5 m at around April 20, 2011

Unit 4 SFP: Reconstruction of Events (cont'd)



www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Water from reactor well flowed into SFP during the event

Unit 4 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm^3)					
		Unit 4 SFP				*Unit 4 SFP*	*Unit 4 T/B*
		4/12/2011	4/28/2011	5/7/2011	8/20/2011	*3/4/2011*	*3/24/2011*
Cs-134	2 years	88	49	56	44	*ND*	*31*
Cs-137	30 years	93	55	67	61	*0.13*	*32*
I-131	8 days	220	27	16	ND	*ND*	*360*

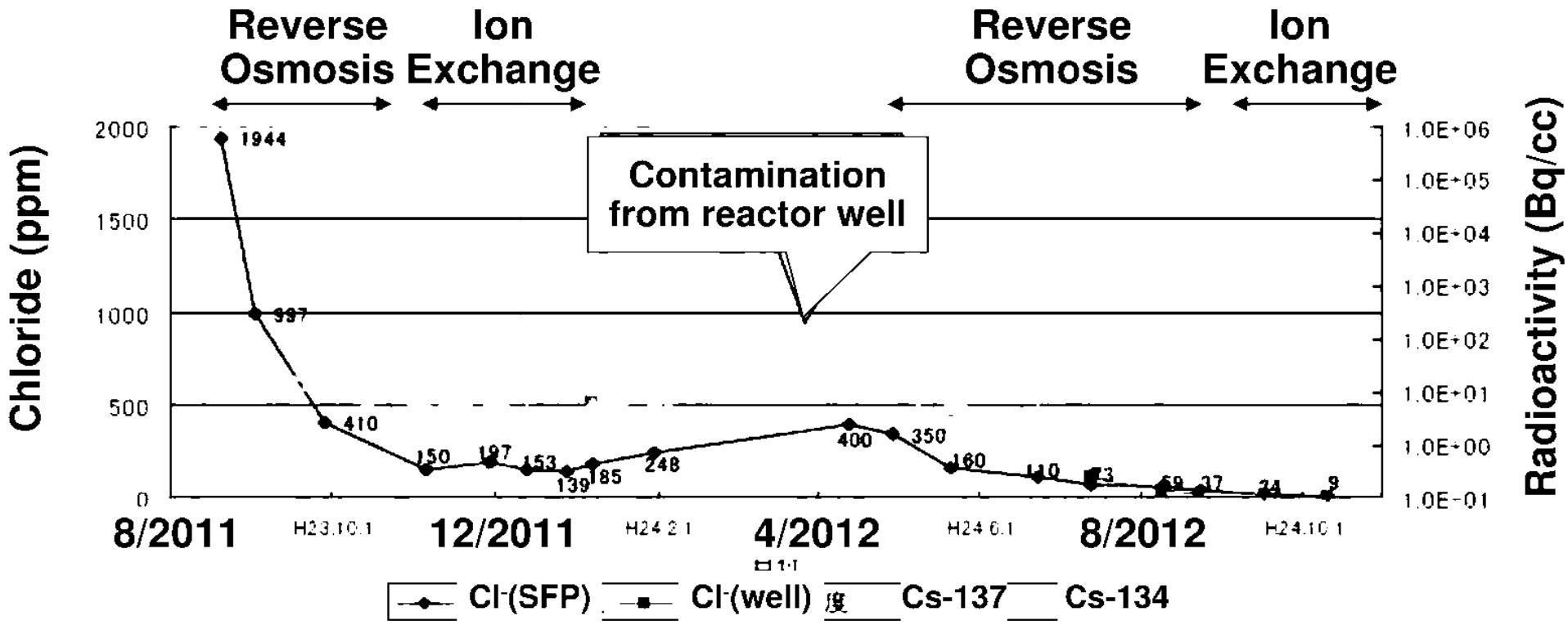
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

	4/12/2011	8/20/2011	11/29/2011	9/16/2012
Chloride (ppm)	6000	1944	197	24

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

- I-131 most likely to have originated from other reactors, not SFP (all fuels >4 months after shutdown)
- Injection of hydrazine for anti-corrosion and microbe prevention

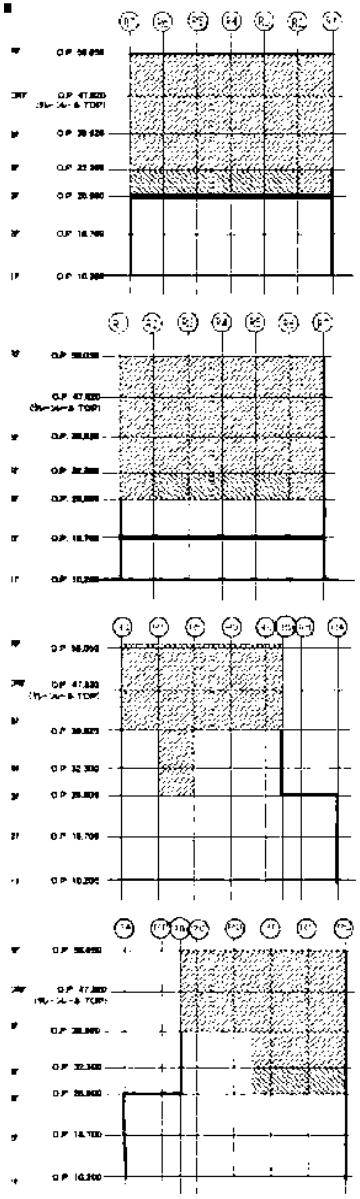
Unit 4 SFP: Water Chemistry (cont'd)

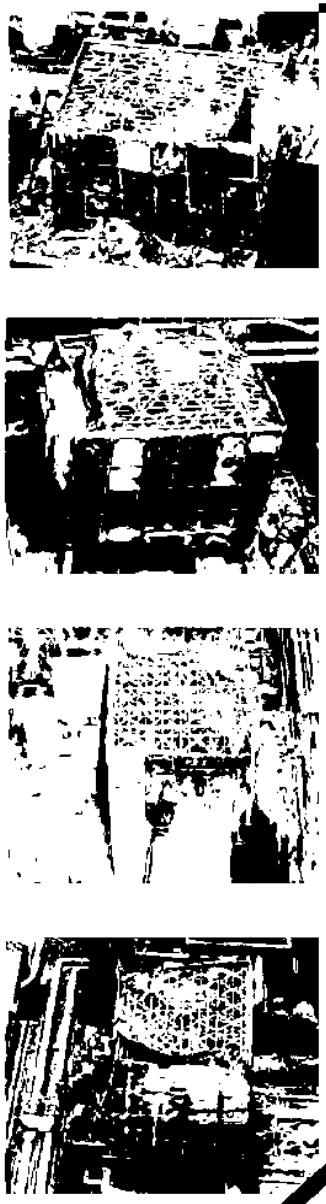


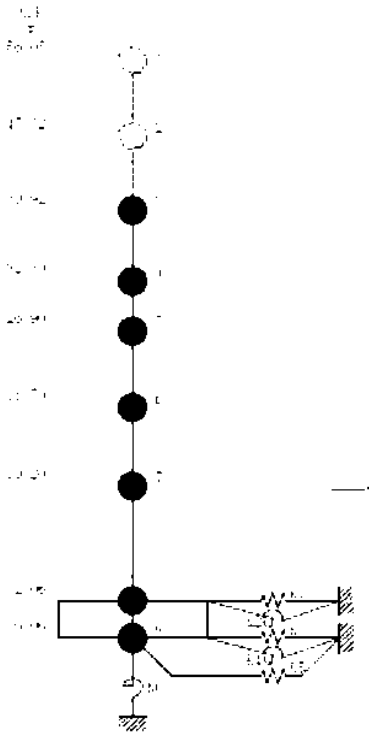
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m121022_05-j.pdf

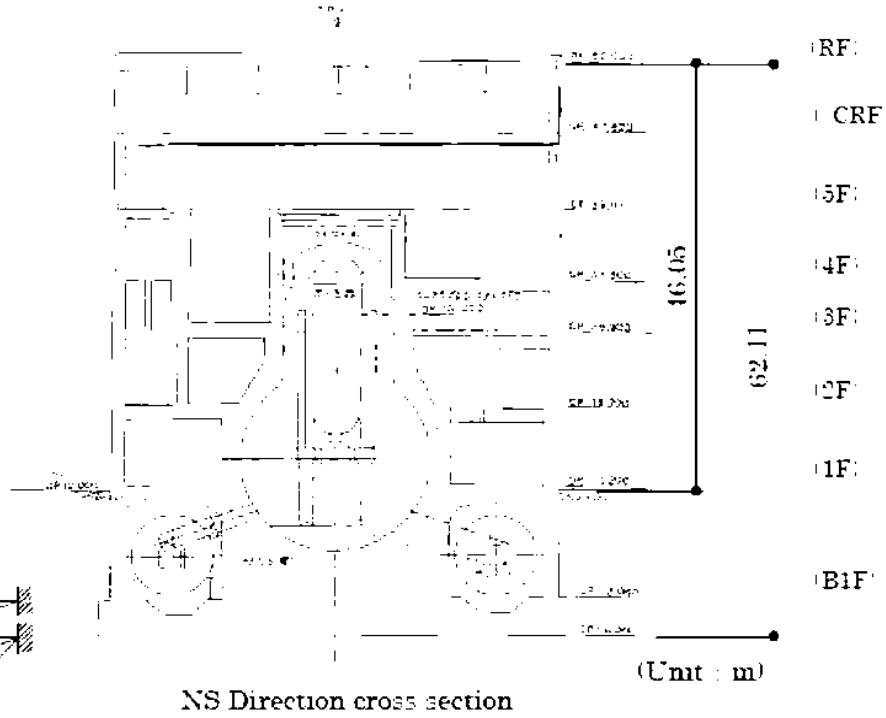
Water quality steadily improved

Unit 4 SFP: Structural Integrity Assessment









NS Direction cross section

Seismic Response Model Incorporating Damaged Condition

http://www.tepco.co.jp/en/press/corp-com/release/11052801-e.html

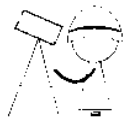
Shear strain from design-basis earthquake confirmed to be within safety limit (5/28/2011)

Structural Damage Assessment

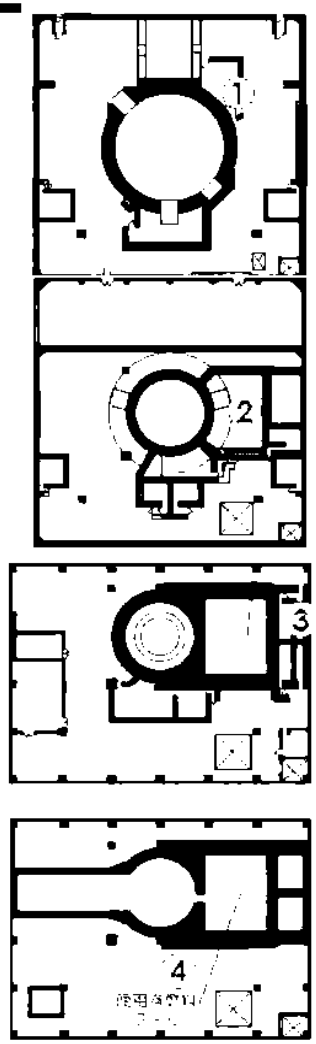
TOKYO ELECTRIC POWER COMPANY

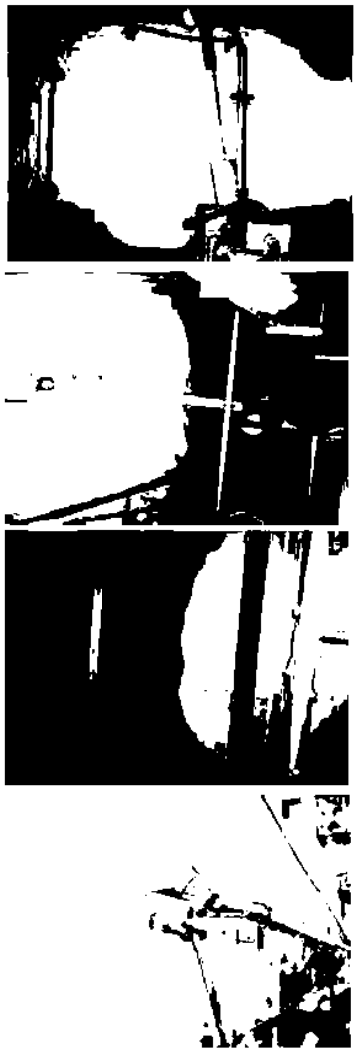
Unit 4 SFP: Structural Integrity Assessment (cont'd)

Optical Measurement
Confirmed No Tilting



Schmidt Hammer Testing
Confirmed Concrete Strength





R/B 1st Floor

R/B 2nd Floor

R/B 3rd Floor

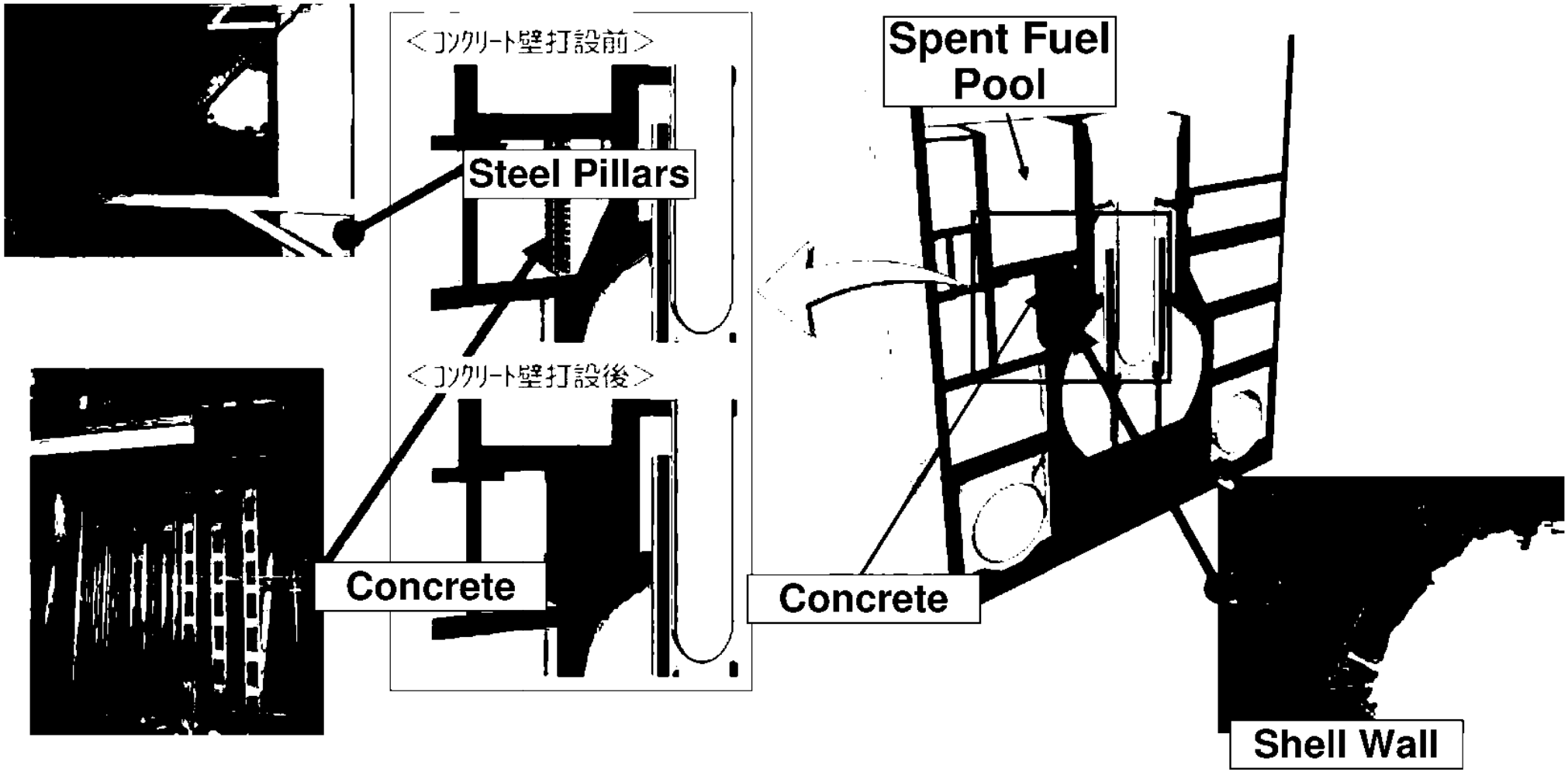
R/B 4th Floor

No Cracks found in SFP Outer Walls

http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120525_07-j.pdf

Quarterly structural integrity inspection found no issues (since 5/25/2012)

Unit 4 SFP: Structural Integrity Reinforcement



http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120516_07-j.pdf

Additional seismic margin by 20% (7/30/2011)

Unit 4 SFP: Progress To Date

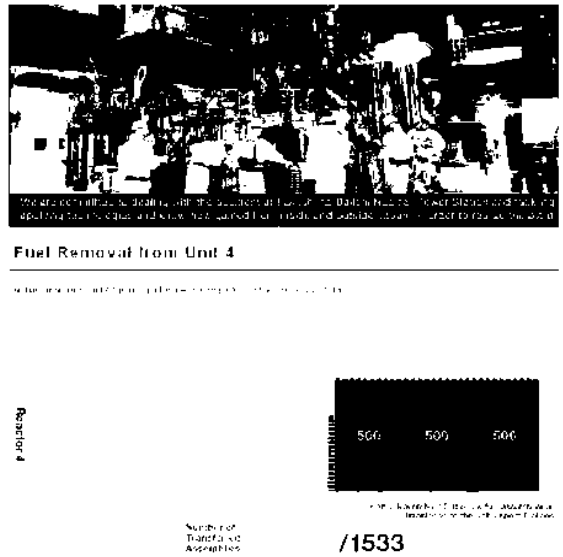
Pre-work Condition
(9/22/2011)

Drywell Head Removal
(8/10/2012)

Defueling Structure
Construction (1/14/2013)

Completion of Defueling
Structure (7/20/2013)

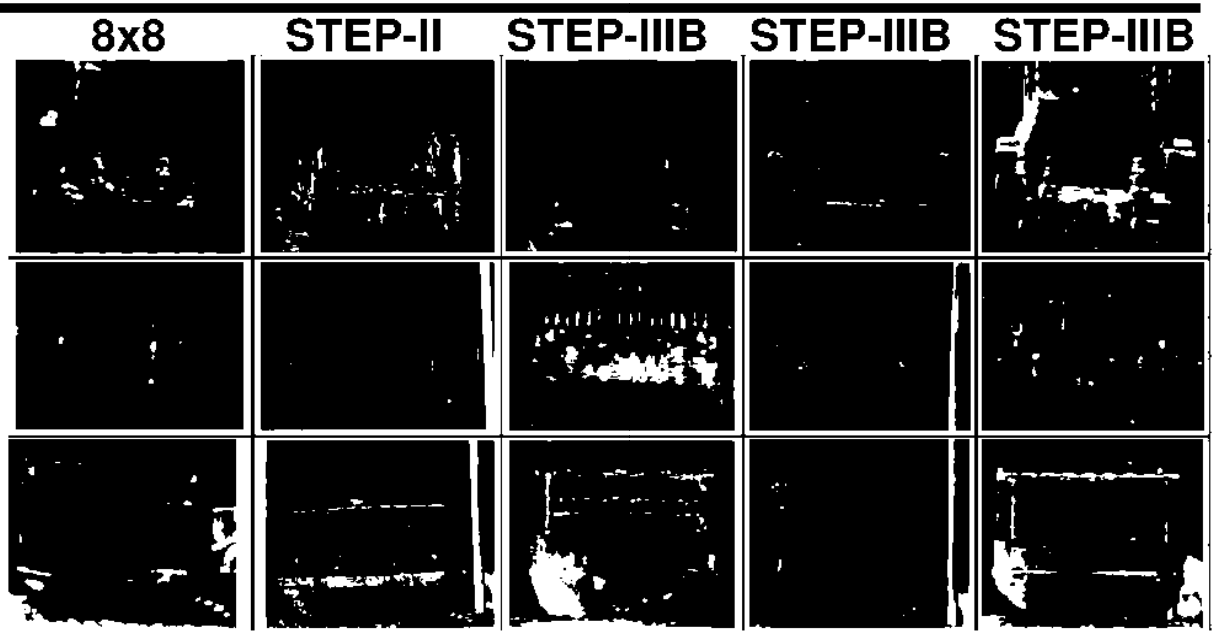
Beginning of Defueling
(11/18/2013)



http://www.tepco.co.jp/en/decommision/index-e.html

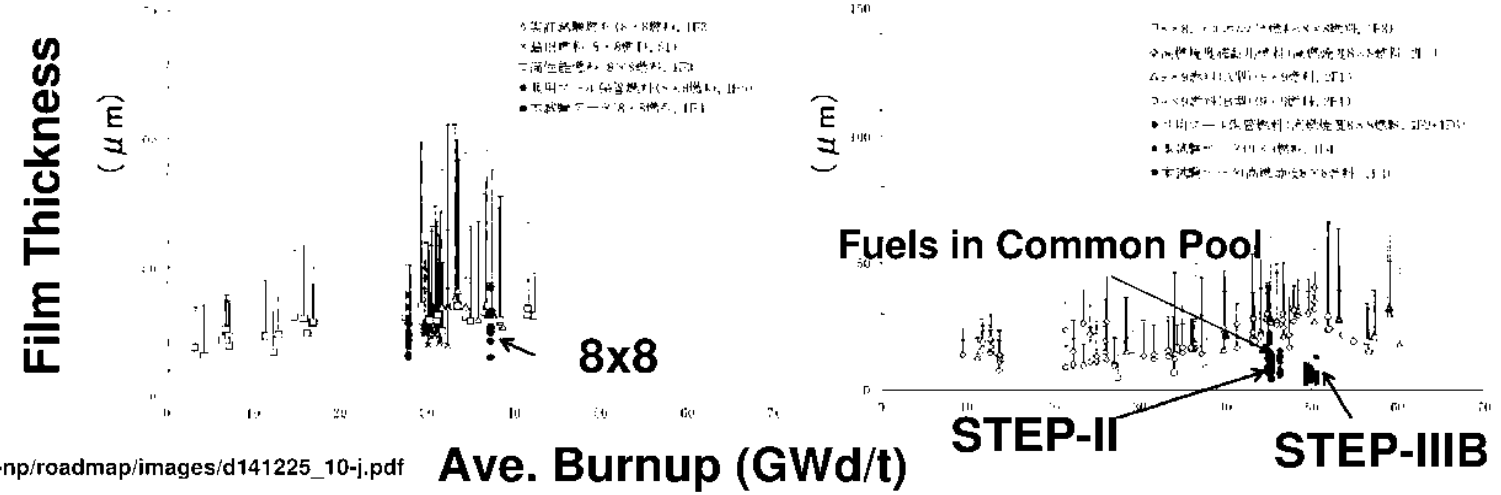
Successful removal of all fuels from SFP (12/22/2014)

Unit 4 SFP: Inspection of Spent Fuels



Visual Inspection

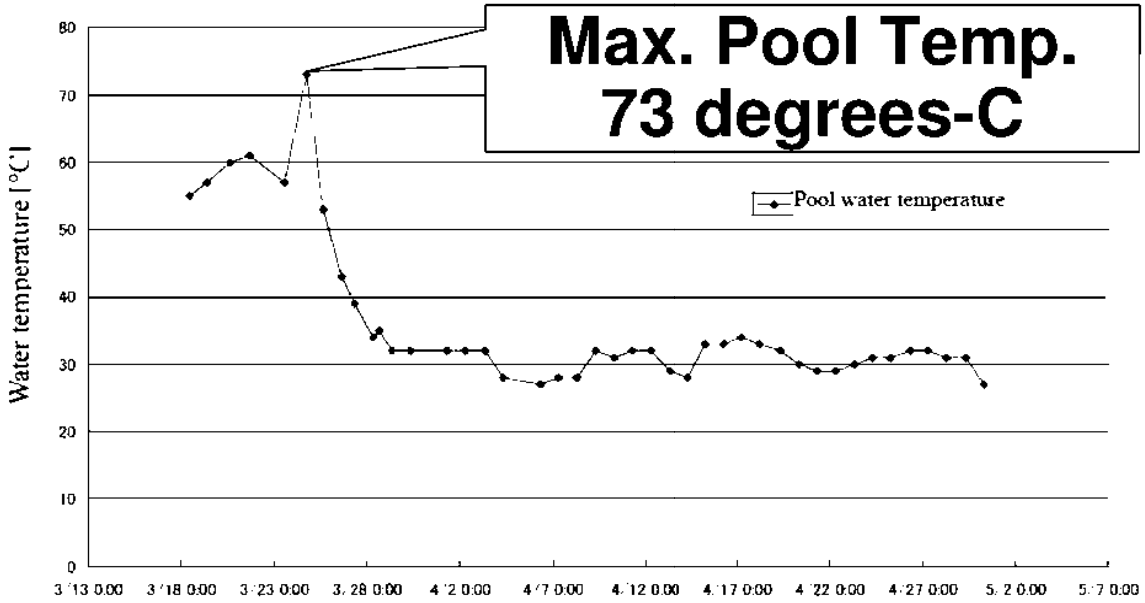
Oxidization Film Thickness Measurement

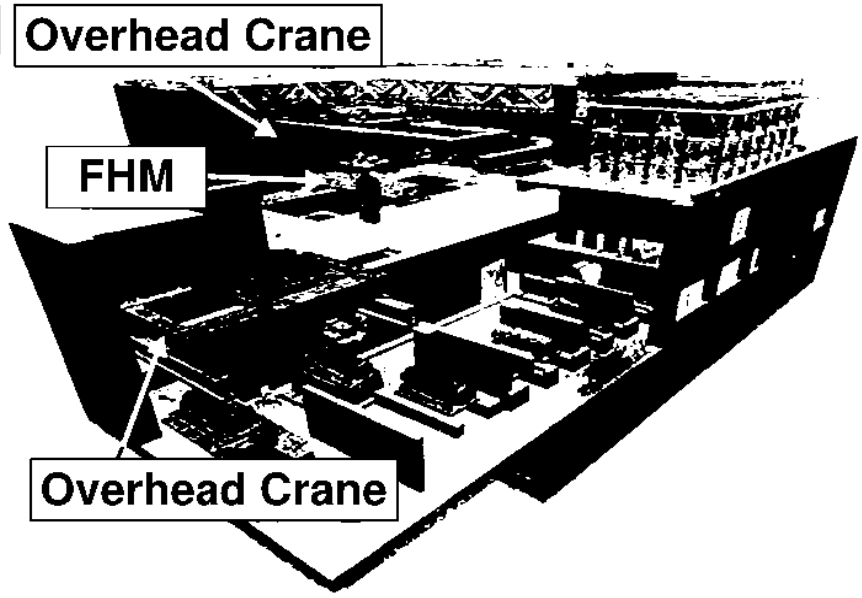


http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

Inspection of five spent fuels from Unit 4 SFP showed no abnormalities (Nov. 2014)

Common Pool



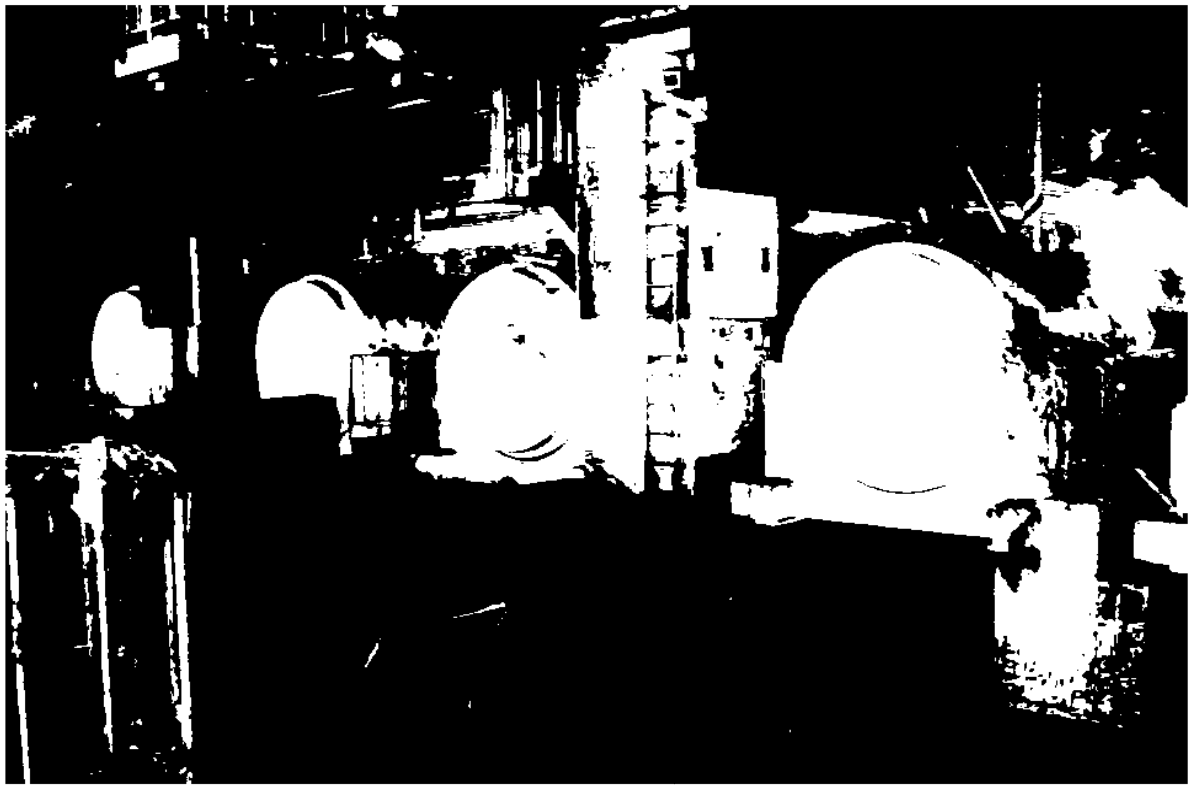


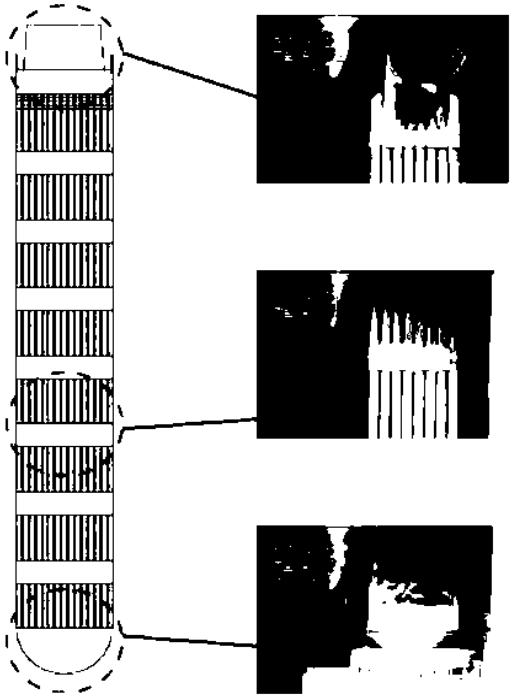
- 3/18/2011: Confirmed pool water level
- 3/24/2011: Pool cooling restored

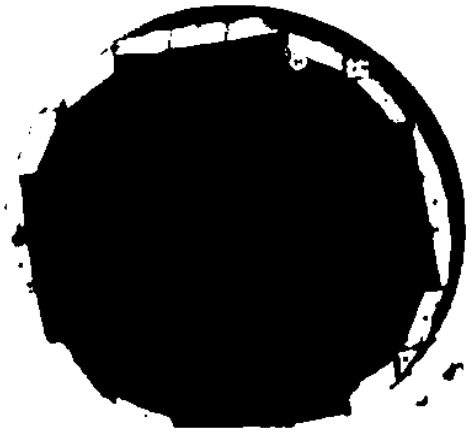
Radio Nuclide	Half Life	Concentration (Bq/cm³)	
		Common Pool	
		5/13/2011	*2/10/2011*
Cs-134	2 years	0.17	*ND*
Cs-137	30 years	1.2	*ND*
I-131	8 days	ND	*ND*

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Dry Cask Storage Facility





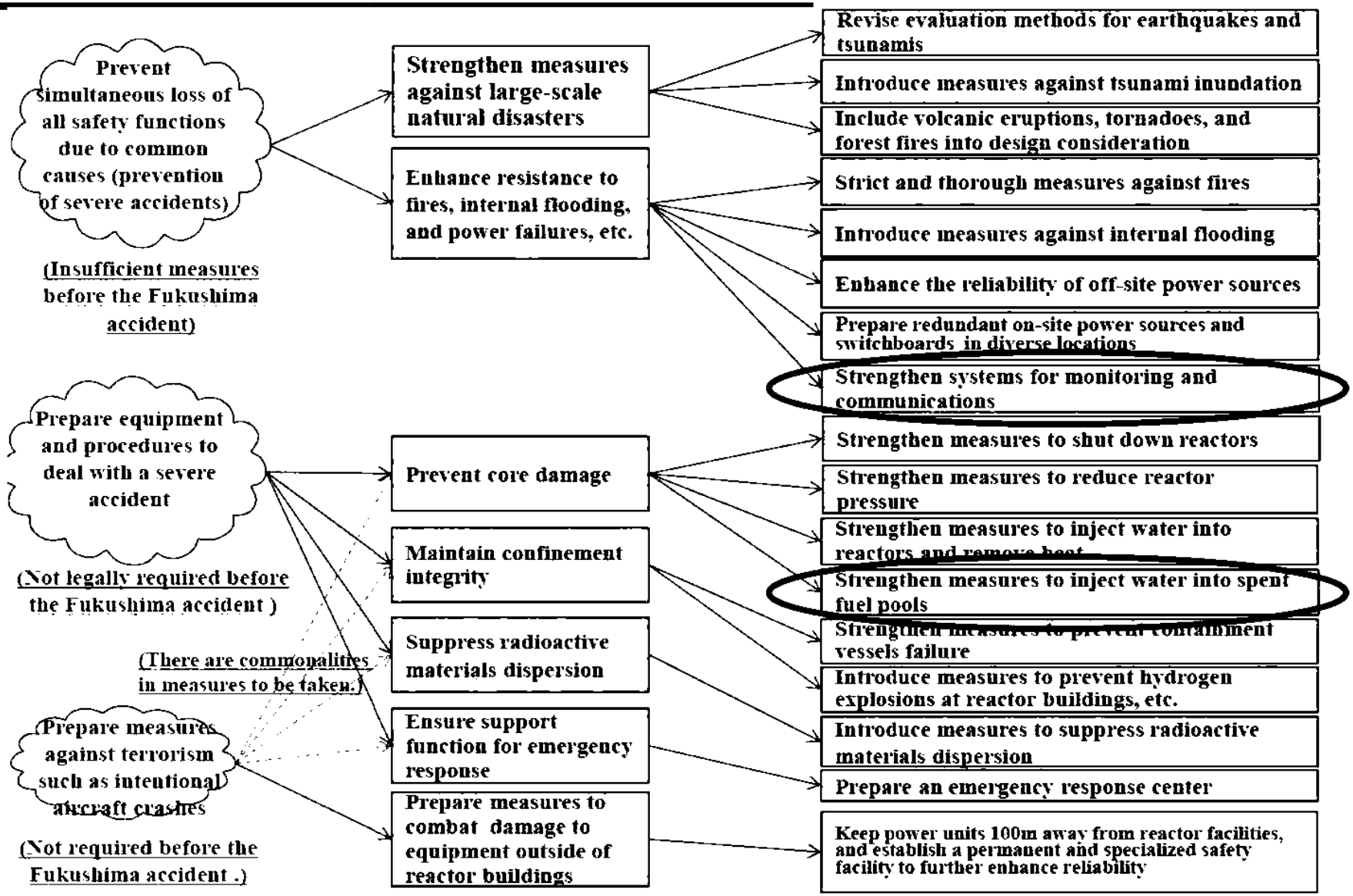


No Damage of Fuel Bundles or Basket

Inspection results of all 9 dry casks showed no abnormalities (5/30/2013)

http://www.meti.go.jp/earthquake/nuclear/pdf/130530/130530_03gg.pdf

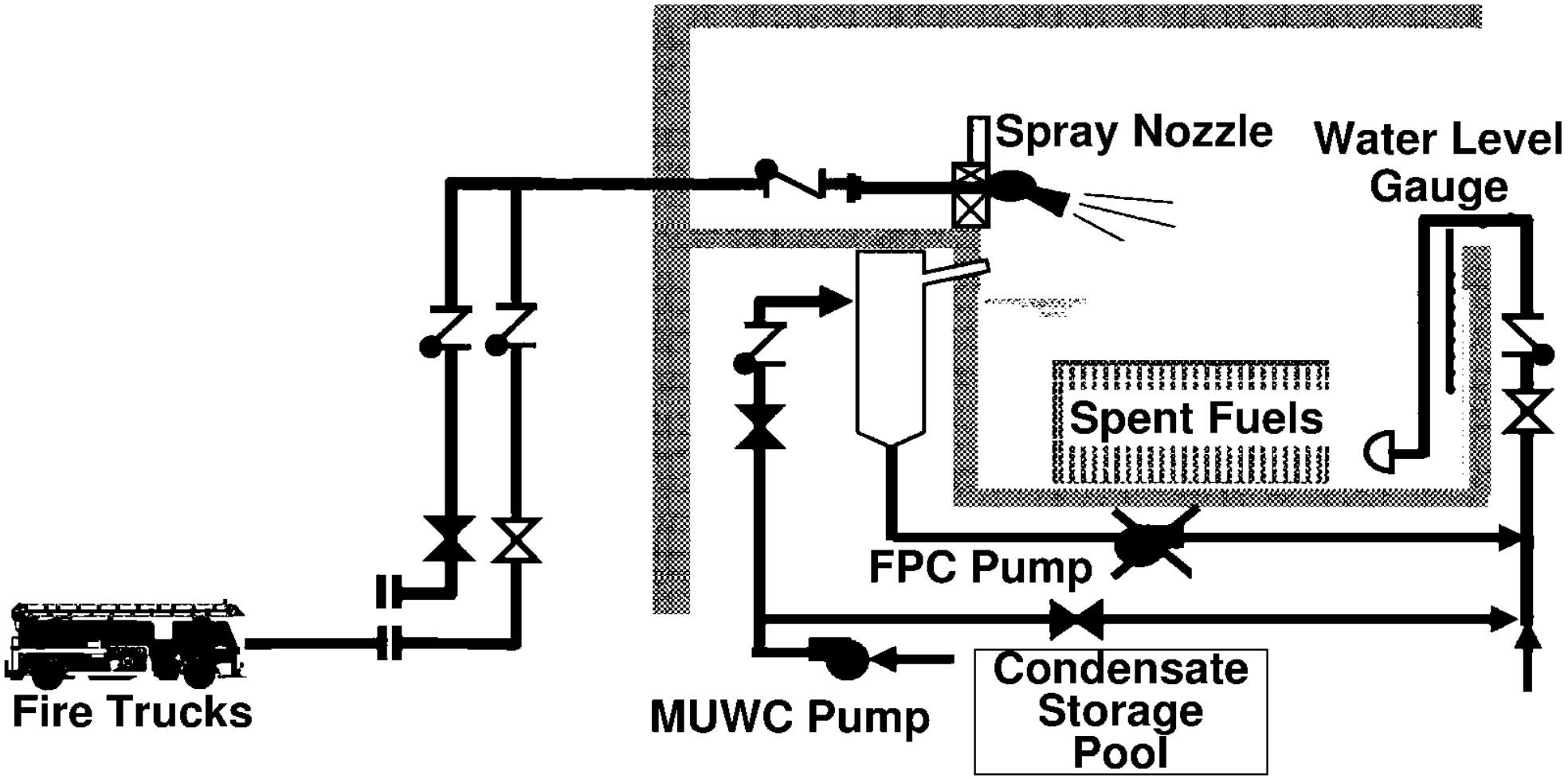
New Regulatory Requirements



http://www.nsr.go.jp/english/e_news/data/13/0912.pdf

Japan Nuclear Regulation Authority enacted new regulatory requirements effective July 2013

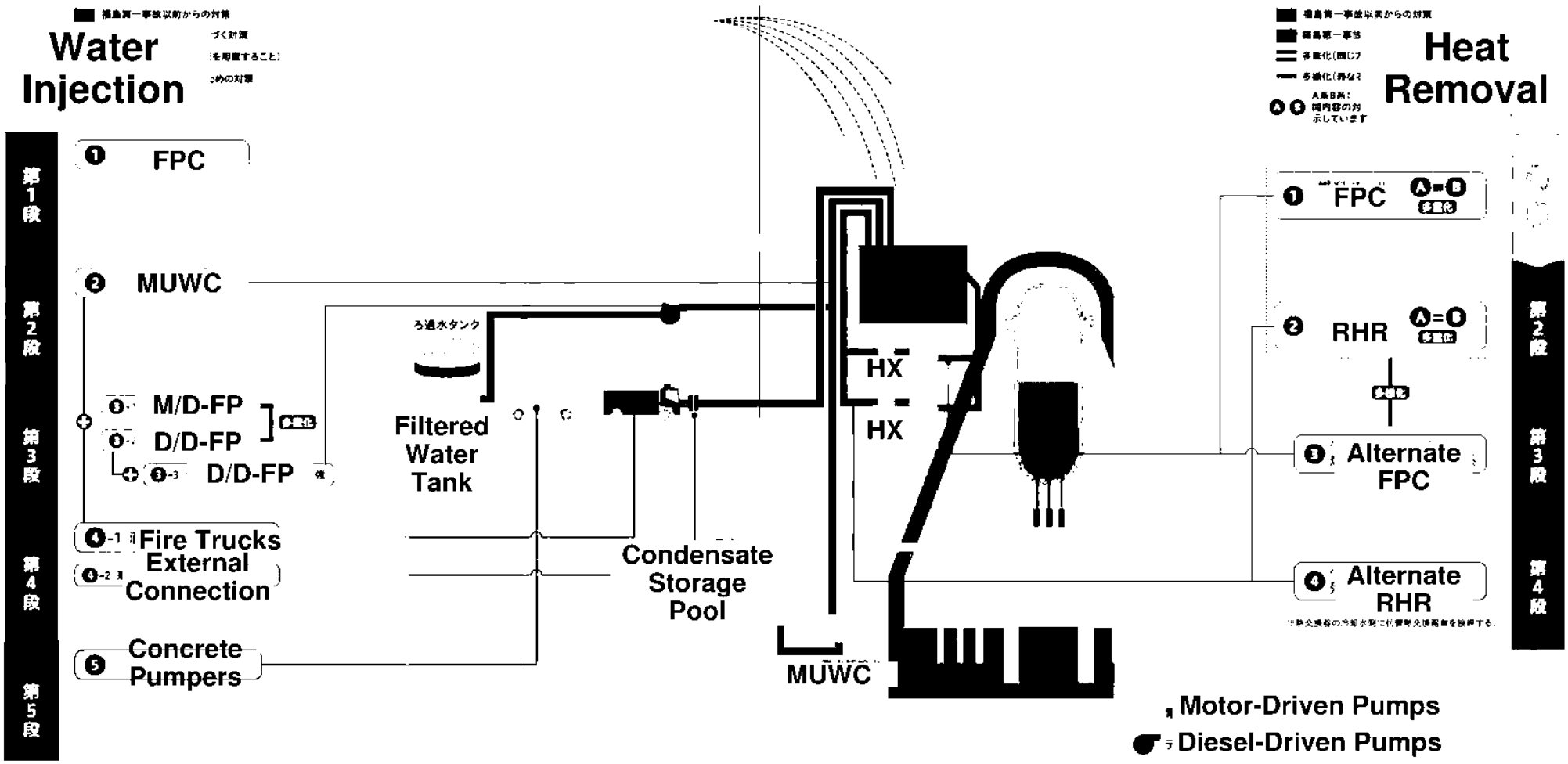
Safety Enhancements at Kashiwazaki Kariwa NPS



www.nsr.go.jp/activity/regulation/tekigousei/shinsa/data/kk67/mendan/20131015_01shiryo_01.pdf

Fixed and flexible alternate injection systems with multiple backup power and water sources

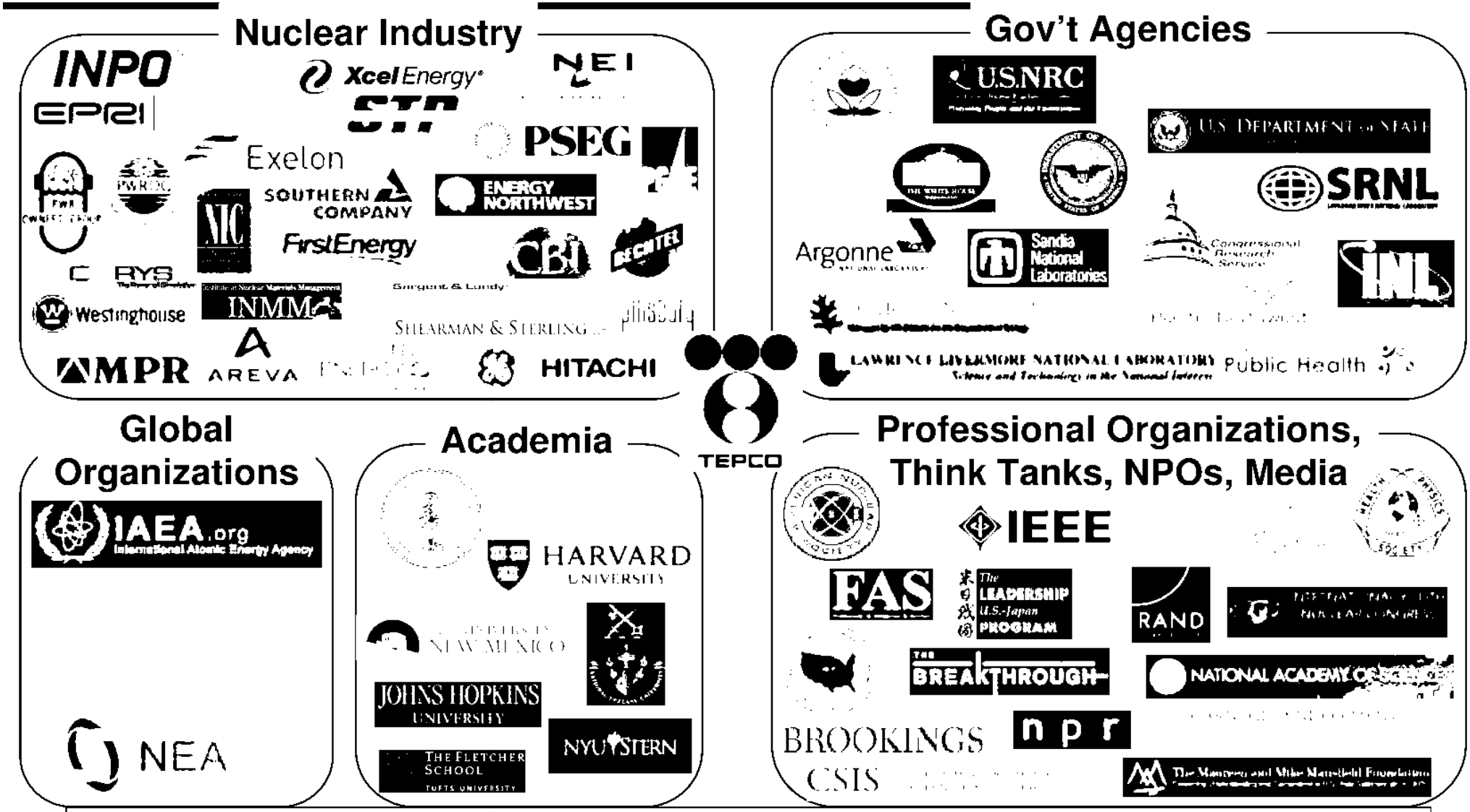
Safety Enhancements at Kashiwazaki Kariwa NPS (cont'd)



http://www.tepco.co.jp/en/nu/kk-np/safety/index-e.html

Multiple layers of defense
(only showing safety measures related to SFP)

TEPCO's Post-Accident Activities in the U.S.



Committed to sharing lessons learned; making nuclear power plants safer; carrying out decommissioning safely

→ Hosting Weekly Update Teleconferences

References

- **TEPCO Website on Decommissioning Status**
  http://www.tepco.co.jp/en/decommision/index-e.html

- **TEPCO Internal Investigation Committee Report (6/20/2012)**
  http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html
  - ✓ **Main Body**
    http://www.tepco.co.jp/en/press/corp-com/release/betu12_e/images/120620e0104.pdf
  - ✓ **Attachment**
    http://www.tepco.co.jp/en/press/corp-com/release/betu12_e/images/120620e0106.pdf

- **IRID Symposium (7/18/2014)**
  http://www.irid.or.jp/en/reports/symposium/
  - **Current Status of Fukushima Daiichi**
    http://irid.or.jp/wp-content/uploads/2014/07/Sympo_Masuda_E.pdf
  - **R&D Projects Related to Fuel Debris Retrieval**
    http://irid.or.jp/wp-content/uploads/2014/07/Sympo_SSuzuki_E.pdf

From: Marksberry, Don
Sent: 8 Aug 2014 06:17:36 -0400
To: Lee, Richard;Salay, Michael;Esmaili, Hossein;Helton, Donald;Norton, Charles;Nakanishi, Tony;Witt, Kevin;Lane, John;Mitman, Jeffrey;Notafrancesco, Allen;Basu, Sudhamay;Randy Gauntt;Siu, Nathan;Jimenez, Manuel;Reckley, William;Arndt, Steven;Laur, Steven;Orders, William;Bernardo, Robert;Williams, Vince;Huffert, Anthony;Fuller, Edward;Pires, Jose;Fuhrmann, Mark;Nosek, Andrew;Skillman, Gordon;Nicholson, Thomas;Aird, David;Tadesse, Rebecca
Subject: FW: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 8 at 3pm EDT

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Thursday, August 07, 2014 5:17 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 8 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 8, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 15** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. Plan Towards a Full-Scale Operation of the Multi-Nuclide Removal Facility (ALPS) (7/31/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140731_01-e.pdf

2. Unit 1 Reactor Building Cover to be Dismantled (8/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239910_5892.html
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140801_01-e.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (7/31/2014)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_04-j.pdf
(page 6/8) Contaminated water storage volume trend.

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_05-j.pdf
(page 9/21) Seawater sampling results (inside the port)
(page 10/21) Seawater sampling results (outside the port)

3.3 Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_06-j.pdf
(page 3/300) Unit 1 RPV nitrogen purging from jet pump sensing line

(page 27/300) Construction status of frozen soil wall
(page 28/300) Status of ice barrier at Unit 2 seawater piping trench
(page 75/300) Estimated reduction of groundwater ingress by waterproofing HTI building
(page 121/300) Covering sea-bottom soil inside the port
(page 197/300) Unit 4 reactor building periodic integrity inspection results (9th)
(page 225/300) IRID development of PCV repair and waterproofing technologies
(page 260/300) IRID development of PCV internal investigation technologies
(page 272/300) IRID development of RPV internal investigation technologies
(page 282/300) IRID development of core debris criticality control technologies

4. Regulatory Approval for Subdrain Processing Facility and Verification Facility of Advanced ALPS (8/7/2014)
(only in Japanese)
http://www.tepco.co.jp/cc/press/2014/1240299_5851.html

5. Nuclear Safety Reform Plan FY2014-Q1 Progress Report (8/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239901_5892.html
(video message by Dr. Dale Klein, Chairman of TEPCO's Nuclear Reform Monitoring Committee)
http://www.nrmc.jp/en/report/detail/1239770_5233.html

6. Fukushima Nuclear Accident Unresolved Issues Progress Report # 2 (8/6/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1240140_5892.html
(English Summary)
http://www.tepco.co.jp/en/press/corp-com/release/betu14_e/images/140806e0101.pdf
(Japanese Full Report: 23 MB)
http://www.tepco.co.jp/cc/press/betu14_j/images/140806j0102.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
(b)(6) [redacted]

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, July 30, 2014 8:46 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, July 31 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, **July 31**, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 8** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. **Unit 2 Torus Room Wall Survey (7/29/2014)**
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140728_05-e.pdf
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=c24iaxhc&catid=61785

2. NRA Special Facilities Monitoring and Evaluation Committee (7/23/2014)
(only in Japanese)
2.1 Progress Status on Freezing of Units 2/3 Seawater Piping Trench Connection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_01.pdf

2.2 Unit 1 Reactor Building Dust Inhibition Measures During Cover Dismantling and Rubble Removal
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_02.pdf

2.3 Replacement of Fuel Rack in Common Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_03_01.pdf

2.4 Fuel Removal Plan for Unit 3 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_03_02.pdf

3. Contaminated Water Treatment Committee (7/25/2014)
(only in Japanese)
3.1 Risk Reduction Owing to Contaminated Water Measures
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_03-j.pdf

3.2 Status and Effectiveness of Groundwater Bypass
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_04-j.pdf

3.3 Tritium Concentration Increase in # 12 Groundwater Bypass Well
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_05-j.pdf

3.4 Task Force Studies on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_07-j.pdf

3.5 Test Results and Demonstration Status of Advanced Multi-Nuclide Removal System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_08-j.pdf

3.6 Tritium Task Force Discussions
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_09-j.pdf

4. National Academy Sciences Fukushima Lessons Learned Report (7/24/2014)
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=18294
(TEPCO's Statement on the NAS Report)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239621_5892.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, July 17, 2014 11:43 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, July 18 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, July 18, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **THU, July 31** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6)

[Major topics]
1. Progress Status of Ice Boundary between Units 2/3 Seawater Piping Trenches and Turbine Buildings (7/7/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140707_05-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=rbudts0u&catid=61699

2. Investigation Result of Unit 3 Reactor Building North-West Corner (7/11/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140711_06-j.pdf

3. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (7/14/2014)
(only in Japanese)
3-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_03-j.pdf

3-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_04-j.pdf

3-3. Interim Testing Report on Use of Plastic Scintillation Fiber for Contaminated Water Leakage Detection
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_05-j.pdf

4. No Impact due to M 6.8 Earthquake Near Fukushima (7/12/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1238987_5892.html

5. International Research Institute for Nuclear Decommissioning (IRID) Activities
5-1. RFP for Conceptual Study of Innovative Approach for Fuel Debris Retrieval and Feasibility Study of Essential technologies (7/17/2014)
http://irid.or.jp/fd/?page_id=544

5-2. IRID Annual Symposium 2014 (7/18/2014)
http://irid.or.jp/en/symposium/

All the best,

Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, July 02, 2014 10:04 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, July 3 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, July 3, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, July 18** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (6/27/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_05-j.pdf

1-3. Insertion of Thermometer and Water Level Gauge inside Unit 2 Drywell
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_06-j.pdf

1-4. Status of ALPS, Sr-Immobilization, Groundwater Bypass, Subdrain System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_07-j.pdf

1-5. Status of Groundwater and Seawater Contamination
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_08-j.pdf

1-6. Dismantling of Unit 1 Reactor Building Cover, Decontamination of Unit 3 Reactor Building Refueling Floor, Change in Unit 4 SFP Fuel Transfer Plan
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_10-j.pdf

1-7. Investigation and R&D in Preparation for Fuel Debris Retrieval
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_11-j.pdf

1-8. Radioactive Waste Storage
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_12-j.pdf

1-9. Candidate Site for Construction of Radioactive Material Analysis and Research Facility
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_13-j.pdf

1-10. MEXT's Plan for Establishing International Joint R&D Center for Decommissioning
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_14-j.pdf

1-11. Request for Proposal (RFP) for Innovative Approach for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_17-j.pdf
(See following site for English information on this RFP.)
http://en.dccc-program.jp/2014/07/02/?p=186

2. Final Investigation Report on H4 #5 Tank Leakage of RO-Concentrated Water (6/30/2014)
(only in Japanese)
2-1. Full Report
http://www.tepco.co.jp/cc/press/betu14_j/images/140630j0401.pdf

2-2. Estimated Leakage of Sr-90 and Recovery Rate
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140630_06-j.pdf

3. "How the Other Fukushima Plant Survived" Harvard Business Review Article on 2F Available for Free
http://hbr.org/2014/07/how-the-other-fukushima-plant-survived/ar/1

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, June 26, 2014 7:58 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 27 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 27, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **THU, July 3** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (6/16/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140616_03-j.pdf

1-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140616_04-j.pdf

2. Unit 1 Torus Room Wall Survey Results (6/13/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140613_09-e.pdf

3. Unit 2 Torus Room Wall to be Surveyed by Robots (6/24/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140624_08-e.pdf

4. Decontamination inside Unit 3 Reactor Building to Begin Using Remote-operated Equipment (6/20/2014)

http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140620_06-e.pdf

5. Revision of Plan to Transfer Fuels from Unit 4 SFP (6/18/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140618_08-e.pdf

6. All 3 Trains of ALPS Back Online (6/26/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1238403_5892.html

7. "How the Other Fukushima Plant Survived" (July-August/2014)
Success story of accident response at Fukushima Daini featured in Harvard Business Review.
http://hbr.org/product/how-the-other-fukushima-plant-survived/an/R1407K-HCB-ENG

8. "'Fukushima 50' Worker Shares Personal Lessons From 2011 Accident" (6/24/2014)
Interview of Shiro Takahira, one of the Fukushima 50, by NEI.
http://www.nei.org/News-Media/News/News-Archives/Fukushima-50-Worker-Shares-Personal-Lessons-From-2

All the best,
Kenji

From: Marksberry, Don
Sent: 15 Aug 2014 06:18:28 -0400
To: Lee, Richard;Salay, Michael;Esmaili, Hossein;Helton, Donald;Norton, Charles;Nakanishi, Tony;Witt, Kevin;Lane, John;Mitman, Jeffrey;Notafrancesco, Allen;Basu, Sudhamay;Randy Gauntt;Siu, Nathan;Jimenez, Manuel;Reckley, William;Arndt, Steven;Laur, Steven;Orders, William;Bernardo, Robert;Williams, Vince;Huffert, Anthony;Fuller, Edward;Pires, Jose;Fuhrmann, Mark;Nosek, Andrew;Skillman, Gordon;Nicholson, Thomas;Aird, David;Tadesse, Rebecca
Subject: FW: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 15 at 3pm EDT

FYI

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Thursday, August 14, 2014 6:44 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 15 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 15, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 22** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. Verification Testing of Subdrain Water Treatment Facility (8/11/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140811_04-e.pdf

2. Measures to Reduce Seawater Contamination (8/11/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140811_03-e.pdf

3. Difference between Ice Barrier of Trench and Frozen Soil Wall (8/5/2014)
(video clip)
https://www.youtube.com/watch?v=C6YSOrfS1Kc

4. Retiring Areva Water Treatment Facility (8/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140811_07-j.pdf

5. Construction Plan for Additional Solid Waste Storage Warehouse (8/13/2014)
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu14_j/images/140813j0209.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
(b)(6) [redacted]

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, August 07, 2014 5:16 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 8 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 8, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 15** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. Plan Towards a Full-Scale Operation of the Multi-Nuclide Removal Facility (ALPS) (7/31/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140731_01-e.pdf

2. Unit 1 Reactor Building Cover to be Dismantled (8/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239910_5892.html
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140801_01-e.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (7/31/2014)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_04-j.pdf
(page 6/8) Contaminated water storage volume trend.

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_05-j.pdf
(page 9/21) Seawater sampling results (inside the port)
(page 10/21) Seawater sampling results (outside the port)

3.3 Status of Individual Projects

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_06-j.pdf
(page 3/300) Unit 1 RPV nitrogen purging from jet pump sensing line
(page 27/300) Construction status of frozen soil wall
(page 28/300) Status of ice barrier at Unit 2 seawater piping trench
(page 75/300) Estimated reduction of groundwater ingress by waterproofing HTI building
(page 121/300) Covering sea-bottom soil inside the port
(page 197/300) Unit 4 reactor building periodic integrity inspection results (9th)
(page 225/300) IRID development of PCV repair and waterproofing technologies
(page 260/300) IRID development of PCV internal investigation technologies
(page 272/300) IRID development of RPV internal investigation technologies
(page 282/300) IRID development of core debris criticality control technologies

4. Regulatory Approval for Subdrain Processing Facility and Verification Facility of Advanced ALPS (8/7/2014)
(only in Japanese)
http://www.tepco.co.jp/cc/press/2014/1240299_5851.html

5. Nuclear Safety Reform Plan FY2014-Q1 Progress Report (8/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239901_5892.html
(video message by Dr. Dale Klein, Chairman of TEPCO's Nuclear Reform Monitoring Committee)
http://www.nrmc.jp/en/report/detail/1239770_5233.html

6. Fukushima Nuclear Accident Unresolved Issues Progress Report # 2 (8/6/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1240140_5892.html
(English Summary)
http://www.tepco.co.jp/en/press/corp-com/release/betu14_e/images/140806e0101.pdf
(Japanese Full Report: 23 MB)
http://www.tepco.co.jp/cc/press/betu14_j/images/140806j0102.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, July 30, 2014 8:46 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, July 31 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, July 31, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 8** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. Unit 2 Torus Room Wall Survey (7/29/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140728_05-e.pdf

(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=c24iaxhc&catid=61785

2. NRA Special Facilities Monitoring and Evaluation Committee (7/23/2014)
(only in Japanese)
2.1 Progress Status on Freezing of Units 2/3 Seawater Piping Trench Connection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_01.pdf

2.2 Unit 1 Reactor Building Dust Inhibition Measures During Cover Dismantling and Rubble Removal
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_02.pdf

2.3 Replacement of Fuel Rack in Common Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_03_01.pdf

2.4 Fuel Removal Plan for Unit 3 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_03_02.pdf

3. Contaminated Water Treatment Committee (7/25/2014)
(only in Japanese)
3.1 Risk Reduction Owing to Contaminated Water Measures
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_03-j.pdf

3.2 Status and Effectiveness of Groundwater Bypass
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_04-j.pdf

3.3 Tritium Concentration Increase in # 12 Groundwater Bypass Well
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_05-j.pdf

3.4 Task Force Studies on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_07-j.pdf

3.5 Test Results and Demonstration Status of Advanced Multi-Nuclide Removal System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_08-j.pdf

3.6 Tritium Task Force Discussions
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_09-j.pdf

4. National Academy Sciences Fukushima Lessons Learned Report (7/24/2014)
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=18294
(TEPCO's Statement on the NAS Report)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239621_5892.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, July 17, 2014 11:43 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, July 18 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, July 18, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **THU, July 31** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. Progress Status of Ice Boundary between Units 2/3 Seawater Piping Trenches and Turbine Buildings (7/7/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140707_05-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=rbudts0u&catid=61699

2. Investigation Result of Unit 3 Reactor Building North-West Corner (7/11/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140711_06-j.pdf

3. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (7/14/2014)
(only in Japanese)
3-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_03-j.pdf

3-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_04-j.pdf

3-3. Interim Testing Report on Use of Plastic Scintillation Fiber for Contaminated Water Leakage Detection
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_05-j.pdf

4. No Impact due to M 6.8 Earthquake Near Fukushima (7/12/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1238987_5892.html

5. International Research Institute for Nuclear Decommissioning (IRID) Activities
5-1. RFP for Conceptual Study of Innovative Approach for Fuel Debris Retrieval and Feasibility Study of Essential technologies (7/17/2014)
http://irid.or.jp/fd/?page_id=544

5-2. IRID Annual Symposium 2014 (7/18/2014)
http://irid.or.jp/en/symposium/

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji

Sent: Wednesday, July 02, 2014 10:04 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, July 3 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, July 3, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, July 18** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (6/27/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_05-j.pdf

1-3. Insertion of Thermometer and Water Level Gauge inside Unit 2 Drywell
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_06-j.pdf

1-4. Status of ALPS, Sr-Immobilization, Groundwater Bypass, Subdrain System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_07-j.pdf

1-5. Status of Groundwater and Seawater Contamination
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_08-j.pdf

1-6. Dismantling of Unit 1 Reactor Building Cover, Decontamination of Unit 3 Reactor Building Refueling Floor, Change in Unit 4 SFP Fuel Transfer Plan
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_10-j.pdf

1-7. Investigation and R&D in Preparation for Fuel Debris Retrieval
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_11-j.pdf

1-8. Radioactive Waste Storage
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_12-j.pdf

1-9. Candidate Site for Construction of Radioactive Material Analysis and Research Facility
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_13-j.pdf

1-10. MEXT's Plan for Establishing International Joint R&D Center for Decommissioning
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_14-j.pdf

1-11. Request for Proposal (RFP) for Innovative Approach for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_17-j.pdf
(See following site for English information on this RFP.)
http://en.dccc-program.jp/2014/07/02/?p=186

2. Final Investigation Report on H4 #5 Tank Leakage of RO-Concentrated Water (6/30/2014)
(only in Japanese)
2-1. Full Report
http://www.tepco.co.jp/cc/press/betu14_j/images/140630j0401.pdf

2-2. Estimated Leakage of Sr-90 and Recovery Rate
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140630_06-j.pdf

3. "How the Other Fukushima Plant Survived" Harvard Business Review Article on 2F Available for Free
http://hbr.org/2014/07/how-the-other-fukushima-plant-survived/ar/1

All the best,
Kenji

From: Marksberry, Don
Sent: 18 Jul 2014 05:46:20 -0400
To: Lee, Richard;Salay, Michael;Esmaili, Hossein;Helton, Donald;Norton, Charles;Nakanishi, Tony;Witt, Kevin;Lane, John;Mitman, Jeffrey;Notafrancesco, Allen;Basu, Sudhamay;Randy Gauntt;Siu, Nathan;Jimenez, Manuel;Reckley, William;Arndt, Steven;Laur, Steven;Orders, William;Bernardo, Robert;Williams, Vince;Huffert, Anthony;Fuller, Edward;Pires, Jose;Fuhrmann, Mark;Nosek, Andrew;Skillman, Gordon;Nicholson, Thomas;Aird, David;Tadesse, Rebecca
Subject: FW: [TEPCO Weekly Fukushima Update Call] Fri, July 18 at 3pm EDT

Today's call.

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Thursday, July 17, 2014 11:43 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, July 18 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **July 18**, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **THU, July 31** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. Progress Status of Ice Boundary between Units 2/3 Seawater Piping Trenches and Turbine Buildings (7/7/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140707_05-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=rbudts0u&catid=61699

2. Investigation Result of Unit 3 Reactor Building North-West Corner (7/11/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140711_06-j.pdf

3. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (7/14/2014)
(only in Japanese)
3-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_03-j.pdf

3-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_04-j.pdf

3-3. Interim Testing Report on Use of Plastic Scintillation Fiber for Contaminated Water Leakage Detection
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_05-j.pdf

4. No Impact due to M 6.8 Earthquake Near Fukushima (7/12/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1238987_5892.html

5. International Research Institute for Nuclear Decommissioning (IRID) Activities
5-1. RFP for Conceptual Study of Innovative Approach for Fuel Debris Retrieval and Feasibility Study of Essential technologies (7/17/2014)
http://irid.or.jp/fd/?page_id=544

5-2. IRID Annual Symposium 2014 (7/18/2014)
http://irid.or.jp/en/symposium/

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)
(Let me know if there is a need to call in from outside the U.S. I will check the availability of call-in numbers in other countries.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
(b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, July 02, 2014 10:04 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, July 3 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, July 3, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, July 18** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (6/27/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_05-j.pdf

1-3. Insertion of Thermometer and Water Level Gauge inside Unit 2 Drywell
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_06-j.pdf

1-4. Status of ALPS, Sr-Immobilization, Groundwater Bypass, Subdrain System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_07-j.pdf

1-5. Status of Groundwater and Seawater Contamination
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_08-j.pdf

1-6. Dismantling of Unit 1 Reactor Building Cover, Decontamination of Unit 3 Reactor Building Refueling Floor, Change in Unit 4 SFP Fuel Transfer Plan
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_10-j.pdf

1-7. Investigation and R&D in Preparation for Fuel Debris Retrieval
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_11-j.pdf

1-8. Radioactive Waste Storage
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_12-j.pdf

1-9. Candidate Site for Construction of Radioactive Material Analysis and Research Facility
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_13-j.pdf

1-10. MEXT's Plan for Establishing International Joint R&D Center for Decommissioning
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_14-j.pdf

1-11. Request for Proposal (RFP) for Innovative Approach for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_17-j.pdf
(See following site for English information on this RFP.)
http://en.dccc-program.jp/2014/07/02/?p=186

2. Final Investigation Report on H4 #5 Tank Leakage of RO-Concentrated Water (6/30/2014)
(only in Japanese)
2-1. Full Report
http://www.tepco.co.jp/cc/press/betu14_j/images/140630j0401.pdf

2-2. Estimated Leakage of Sr-90 and Recovery Rate
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140630_06-j.pdf

3. "How the Other Fukushima Plant Survived" Harvard Business Review Article on 2F Available for Free
http://hbr.org/2014/07/how-the-other-fukushima-plant-survived/ar/1

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, June 26, 2014 7:58 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 27 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 27, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **THU, July 3** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (6/16/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140616_03-j.pdf

1-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140616_04-j.pdf

2. Unit 1 Torus Room Wall Survey Results (6/13/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140613_09-e.pdf

3. Unit 2 Torus Room Wall to be Surveyed by Robots (6/24/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140624_08-e.pdf

4. Decontamination inside Unit 3 Reactor Building to Begin Using Remote-operated Equipment (6/20/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140620_06-e.pdf

5. Revision of Plan to Transfer Fuels from Unit 4 SFP (6/18/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140618_08-e.pdf

6. All 3 Trains of ALPS Back Online (6/26/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1238403_5892.html

7. "How the Other Fukushima Plant Survived" (July-August/2014)
Success story of accident response at Fukushima Daini featured in Harvard Business Review.
http://hbr.org/product/how-the-other-fukushima-plant-survived/an/R1407K-HCB-ENG

8. "'Fukushima 50' Worker Shares Personal Lessons From 2011 Accident" (6/24/2014)
Interview of Shiro Takahira, one of the Fukushima 50, by NEI.
http://www.nei.org/News-Media/News/News-Archives/Fukushima-50-Worker-Shares-Personal-Lessons-From-2

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, June 12, 2014 9:24 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 13 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 13, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, June 27** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (5/29/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140529_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140529_05-j.pdf

1-3. Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140529_06-j.pdf
(page 3/347) Shortening the length of circulating-water cooling system
(page 43/347) Addition of mobile Sr removal system and Sr removal capability to SARRY
(page 186/347) Status of Unit 3 SFP rubble removal
(page 195/347) Installation of new fuel racks in common fuel pool
(page 201/347) Long-term integrity evaluation of fuels removed from SFP
(page 214/347) Study on processing methods for damaged fuels (if any) removed from SFP
(page 225/347) Unit 3 MSIV room investigation results
(page 235/347) Upper S/C investigation equipment testing results
(page 252/347) Gamma camera investigation of reactor buildings
(page 276/347) Improvement of severe accident analysis codes (MAAP and SAMPSON)
(page 300/347) Integrity evaluation of RPV and PCV
(page 314/347) Test results of vent pipe water proofing
(page 326/347) Development of upper PCV and S/C repair technology
(page 339/347) R&D on processing and disposal of solid waste

2-1. Start of Frozen-Soil Wall Construction (5/30/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140530_12-e.pdf

2-2. Start of Frozen-Soil Wall Construction (6/2/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140602_06-e.pdf

3. Leakage of Contaminated Rainwater from 4,000-ton Notch Tank Farm (6/4/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140604_11-j.pdf

4. NRA Special Facilities Monitoring and Evaluation Committee (6/6/2014)
(only in Japanese)
4-1. Considerations on Buried Material During Construction of Frozen-Soil Wall (1/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-1.pdf

4-2. Considerations on Buried Material During Construction of Frozen-Soil Wall (2/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-2.pdf

4-3. Considerations on Buried Material During Construction of Frozen-Soil Wall (3/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-3.pdf

4-4. Considerations on Buried Material During Construction of Frozen-Soil Wall (4/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-4.pdf

4-5. Level Management of Groundwater and Contaminated Water Inside Buildings
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_02.pdf

4-6. Groundwater Monitoring and Emegency Response
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_03.pdf

4-7. Status of ALPS
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_04.pdf

5. Factory-made Welded Tanks Carried into Daiichi Site (6/12/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140611_08-e.pdf

6. Rebuttal on NY Times Article Unfairly Criticizing Fukushima Workers (5/22/2014)
Re "Credibility questions on Fukushima" (May 22):
http://www.nytimes.com/2014/06/02/opinion/fukushima-and-nuclear-safety.html?partner=rssnyt&emc=rss&_r=2

As president of the company that owns the Fukushima Daiichi nuclear plant, I am accustomed to criticism.
But I cannot be silent when our workers are unfairly maligned.
In face of the March 11, 2011, earthquake and tsunami crisis, our workers risked their lives and fought to control the plant even while many of their families were suffering the effects of the tsunami, including the destruction of their homes and, in some cases, the loss of family members' lives. On March 15, when the situation seemed to get worse, we instructed necessary workers to remain and the rest to seek shelter in low-radiation areas. Some took shelter at our nearby Fukushima Daini plant. Our post-accident investigation showed workers evacuated in a safe and orderly way and returned when they were instructed to. Therefore, I do not consider the evacuation to be an inobservance of the site superintendent's instruction. Nor do I believe there was any delay in accident response at Fukushima Daiichi due to the temporary evacuation of some workers.
Certainly nothing justifies the sensational headlines that unfairly suggest workers "fled" in some disorganized, dishonorable way. To the contrary, they stayed on the job and risked their lives to bring the plant under control.

Naomi Hirose, Tokyo
The writer is president and C.E.O. of Tokyo Electric Power Company.
****

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, May 28, 2014 6:14 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, May 29 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for **tomorrow's** Weekly Fukushima Update Call.

[Date/time]
Thu, **May 29**, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, June 13** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. Leakage Confirmed from Expansion Joint Cover of Vacuum Breaker Line of Unit 1 Suppression Chamber (5/26/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140527_06-j.pdf
(page 2/8) Remote-operated boat identified leakage locations in Nov. 2013
(page 3/8) Robot sent in to investigate upper part of S/C
(page 4-5/8) Leakage found from both ends of expansion joint cover of the vacuum breaker line
(page 6/8) No leakage found in vacuum breaker, torus hatch, SHC system piping and AC system piping
(page 7/8) No significant damage observed in northern half of S/C upper part
(page 8/8) Southern half of S/C upper part to be investigated on May 27

2. NRA Special Facilities Monitoring and Evaluation Committee (5/26/2014)
(only in Japanese)
2-1. Groundwater Flow Analysis Pre-and-Post Construction of Frozen-Soil Wall
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0022_01.pdf
(page 2/29) Input parameter
(page 3/29) Groundwater contour and flow direction (pre-construction)
(page 4/29) Groundwater contour and flow direction (post-construction)
(page 5/29) Unit 1 groundwater flow direction (pre-construction)
(page 6/29) Unit 1 groundwater flow direction (post-construction)
(page 7/29) Unit 2 groundwater flow direction (pre-construction)
(page 8/29) Unit 2 groundwater flow direction (post-construction)
(page 9/29) Unit 3 groundwater flow direction (pre-construction)
(page 10/29) Unit 3 groundwater flow direction (post-construction)
(page 11/29) Unit 4 groundwater flow direction (pre-construction)
(page 12/29) Unit 4 groundwater flow direction (post-construction)
(page 13-29/29) Reference material

2-2. Evaluation of Impact to Foundation Ground of Reactor Buildings and Turbine Buildings due to Construction of Frozen-Soil Wall
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0022_02.pdf
(page 2/83) Questions from NRA and answers from TEPCO/Kajima
(page 3/83) Evaluation methodology
(page 4-38/83) Assessment of subsidence of foundation ground
(page 39-40/83) Evaluation of impact of subsidence of foundation ground
(page 41-46/83) Bearing capacity of foundation ground
(page 47-83/83) Reference material

3. Status of Fukushima Daini
(only in Japanese)
3-1. Status Report as of May (5/26/2014)
http://www.tepco.co.jp/nu/f2-np/handouts/j140526a-j.pdf

3-2. Completion of Opening Reactor Pressure Vessel of Fukushima Daini Unit 1 (5/28/2014)
http://www.tepco.co.jp/nu/f2-np/handouts/j140528a-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, May 22, 2014 8:18 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 23 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, May 23, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Thu, May 29** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (5/19/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140519_03-j.pdf
(page 3/79) Status of Units 2/3 Seawater Piping Trench, Facing Work, and Sea-Side Impermeable Wall Installation
(page 11/79) Groundwater Bypass Analysis Results
(page 20/79) Gradual Increase in Gross-beta and Tritium Concentration in Seawater Near Units 1-4 Intake Structures
(page 29/79) Heavy Rain Likely Caused Temporary Spike in Cs-137 Concentration in Seawater
(page 36/79) Status of ALPS
(page 43/79) Location of Water Leakage from Unit 3 Containment Vessel Identified
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=cju2qef7&catid=61785
(page 48/79) Inadvertent Transfer of Contaminated Water to Incinerator Building
(page 75/79) Augmented Field Management by TEPCO Personnel

1-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140519_04-j.pdf
(page 4/47) Doubling the Tank Weirs
(page 11/47) New Tanks Installation
(page 20/47) Treatment of Rainwater Accumulated in Weirs
(page 28/47) Roof Installation Over Tank Farms
(page 35/47) Discharge Route of Rainwater Ditch
(page 41/47) Groundwater Ingress Reduction Effect at HTI Building

1-3. Progress Status of Frozen-Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140519_05-j.pdf

(photos)
http://photo.tepco.co.jp/en/date/2014/201405-e/140521-01e.html
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=m7ge19ib&catid=61699

2. Bypassed Groundwater Released to the Sea (5/21/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236566_5892.html
(photos and video clips)
http://photo.tepco.co.jp/en/date/2014/201405-e/140521-02e.html

3. 50+% Fuel Bundles Safely Transferred from Unit 4 Spent Fuel Pool (5/19/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

4. Visit to Fukushima by Caroline Kennedy, US Ambassador to Japan (5/14/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236413_5892.html

5. Rebuttal on Asahi Shimbun (and NY Times) Article Unfairly Criticizing Fukushima Workers (5/22/2014)
(The text below should be posted on the following website shortly.)
http://www.tepco.co.jp/en/press/corp-com/release/index_ho-e.html
****

Tokyo, May 22, 2014 - Tokyo Electric Power Company (TEPCO) released a statement in response to The Asahi Shimbun's article on May 20, ***"90% of TEPCO workers defied orders, fled Fukushima plant in 2011"***, asserting that the company does not consider the temporary evacuation of employees in the aftermath of the accident in March 2011 to be inobservance of Yoshida's instructions.

TEPCO's stance towards The Asahi Shimbun's article http://ajw.asahi.com/article/0311disaster/fukushima/AJ201405200031 is as follows.

-Our recognition is that the former Fukushima Daiichi site superintendent Yoshida's instruction was that the employees evacuate to low dose areas inside the site, and if no suitable area exists, to Fukushima Daini.
-Therefore, we do not consider the temporary evacuation of employees to Fukushima Daini to be inobservance of Yoshida's instructions.

President Hirose was called to the Diet on May 21, and was questioned by one of the assembly members about the facts at the time of the accident. His statement is as below.

-As I confirmed via the related persons, the former site superintendent's instruction meant "If there were no areas inside the Fukushima Daiichi site where the radiation dose is low, consider Fukushima Daini as an evacuation destination."

-Looking back at that time, our recognition is that Yoshida's instruction was not given upon knowing the exact radiation levels inside Fukushima Daiichi, but instead, he meant "Evacuate temporarily to anywhere safe". As a consequence, they were at least able to evacuate temporarily in a safe manner.

-In fact, the necessary workforce stayed at Fukushima Daiichi to respond to the accident, and even some of those who temporarily evacuated to Fukushima Daini came back to Fukushima Daiichi after a few hours' break, and continued to work. I do not consider the evacuation to be inobservance of the site superintendent's instruction, and neither do I believe there was any delay in accident response at Fukushima Daiichi due to the temporary evacuation of 90% of site workers to Fukushima Daini. Our investigation report

does not even discuss the destination of the temporary evacuation, which indicates that it was not the main issue then.

-Presently, as is well known, workers at Fukushima Daiichi are struggling to improve the situation there. A considerable number of workers who stayed at Fukushima in the aftermath of the accident still continue to work at the site, where the working environment remains severe. Considering the sentiments of those workers, my regret is that the coverage saying "90% of workers defied orders" would negatively affect their morale.

-Our workers need to maintain a strong sense of mission and responsibility to continue their work without becoming demoralized.

-Here on, my determination as president is to make sure that does not happen and to enable them to work free of impediment towards the challenging decommissioning operation at Fukushima Daiichi.
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All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, May 08, 2014 10:02 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 9 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for today's Weekly Fukushima Update Call.

[Date/time]
Fri, May 9, 2014 at 3 pm Eastern Daylight Time
(**No call next week.** Next call will be on **Fri, May 23** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. Contaminated Water Committee (4/28/2014)
(only in Japanese)
1-1. Preventive and Multi-layered Additional Measures
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_03-j.pdf

1-2. Status Report of Land-side Impermeable Wall (Frozen Soil Wall) Task Force
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_04-j.pdf

1-3. Status Report of ALPS Task Force
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_05-j.pdf

1-4. Issues List of Tritium Task Force
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_06-j.pdf

1-5. Status of Contaminated Water Countermeasures

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_07-j.pdf

1-6. Additional Measures to Stop Groundwater Ingress
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_08-j.pdf

1-7. Mitigating Risk due to Implementation of "Facing"
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_09-j.pdf

1-8. Addition and Replacement Plan of Contaminated Water Storage Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_10-j.pdf

1-9. Additional Public Offering of Projects for FY2013
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_11-j.pdf

1-10. Application Status of Technology Offered Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_12-j.pdf

1-11. Recent Issues at 1F and Actions Taken
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_13-j.pdf

2. Dose Rate and Gamma Camera Investigation Plan for Units 1-3 Reactor Buildings Upper Floors (4/28/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140428_06-j.pdf

3. Gamma Camera Investigation Plan for Units 1-3 Reactor Buildings First Floor (5/8/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140508_07-j.pdf

4. Visual Inspection Results of Unit 4 Fuels (5/1/2014)
http://photo.tepco.co.jp/en/date/2014/201405-e/140501-01e.html

5. IRID Workshop for R&D on Innovative Approach for Fuel Debris Retrieval (4/25/2014)
http://irid.or.jp/fd/?page_id=352

5-1. Current status at Fukushima Daiichi Nuclear Power Station
http://irid.or.jp/debris/S1-1E.pdf

5-2. Status of R&D for Fuel Debris Retrieval
http://irid.or.jp/debris/S1-2E.pdf

5-3. Innovative Approach for Fuel Debris Retrieval, Results of Request for Information (RFI)
http://irid.or.jp/debris/S2-1E.pdf

5-4. Project Scheme for Decommissioning and Contaminated Water Management and RFP Schedule
http://irid.or.jp/debris/S2-2E.pdf

6. Cooperation Statement with Sellafield Ltd. (5/2/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236097_5892.html

http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140502_01-e.pdf

7. Nuclear Safety Reform Plan Progress Report (FY2013 Q4) (5/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236098_5892.html

7-1. Overview
http://www.tepco.co.jp/en/press/corp-com/release/betu14_e/images/140501e0101.pdf

7-2. Attachment-1 (only in Japanese: 16.4 MB)
http://www.tepco.co.jp/cc/press/betu14_j/images/140501j0102.pdf

7-3. Attachment-2 (only in Japanese: 881 KB)
http://www.tepco.co.jp/cc/press/betu14_j/images/140501j0103.pdf

All the best,
Kenji

From: Norton, Charles
Sent: 2 Jul 2014 13:55:19 -0400
To: Bernardo, Robert
Subject: FW: [TEPCO Weekly Fukushima Update Call] Fri, June 27 at 3pm EDT

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Thursday, June 26, 2014 7:58 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 27 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 27, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **THU, July 3** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (6/16/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140616_03-j.pdf

1-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140616_04-j.pdf

2. Unit 1 Torus Room Wall Survey Results (6/13/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140613_09-e.pdf

3. Unit 2 Torus Room Wall to be Surveyed by Robots (6/24/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140624_08-e.pdf

4. Decontamination inside Unit 3 Reactor Building to Begin Using Remote-operated Equipment (6/20/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140620_06-e.pdf

5. Revision of Plan to Transfer Fuels from Unit 4 SFP (6/18/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140618_08-e.pdf

6. All 3 Trains of ALPS Back Online (6/26/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1238403_5892.html

7. "How the Other Fukushima Plant Survived" (July-August/2014)
Success story of accident response at Fukushima Daini featured in Harvard Business Review.
http://hbr.org/product/how-the-other-fukushima-plant-survived/an/R1407K-HCB-ENG

8. "'Fukushima 50' Worker Shares Personal Lessons From 2011 Accident" (6/24/2014)
Interview of Shiro Takahira, one of the Fukushima 50, by NEI.
http://www.nei.org/News-Media/News/News-Archives/Fukushima-50-Worker-Shares-Personal-Lessons-From-2

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)
(Let me know if there is a need to call in from outside the U.S. I will check the availability of call-in numbers in other countries.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
(b)(6) [redacted]

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, June 12, 2014 9:24 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 13 at 3pm EDT

Nuclear Sector Colleagues,
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 13, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, June 27** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
(b)(6) [redacted]

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (5/29/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140529_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140529_05-j.pdf

1-3. Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140529_06-j.pdf
(page 3/347) Shortening the length of circulating-water cooling system
(page 43/347) Addition of mobile Sr removal system and Sr removal capability to SARRY
(page 186/347) Status of Unit 3 SFP rubble removal

(page 195/347) Installation of new fuel racks in common fuel pool
(page 201/347) Long-term integrity evaluation of fuels removed from SFP
(page 214/347) Study on processing methods for damaged fuels (if any) removed from SFP
(page 225/347) Unit 3 MSIV room investigation results
(page 235/347) Upper S/C investigation equipment testing results
(page 252/347) Gamma camera investigation of reactor buildings
(page 276/347) Improvement of severe accident analysis codes (MAAP and SAMPSON)
(page 300/347) Integrity evaluation of RPV and PCV
(page 314/347) Test results of vent pipe water proofing
(page 326/347) Development of upper PCV and S/C repair technology
(page 339/347) R&D on processing and disposal of solid waste

2-1. Start of Frozen-Soil Wall Construction (5/30/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140530_12-e.pdf

2-2. Start of Frozen-Soil Wall Construction (6/2/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140602_06-e.pdf

3. Leakage of Contaminated Rainwater from 4,000-ton Notch Tank Farm (6/4/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140604_11-j.pdf

4. NRA Special Facilities Monitoring and Evaluation Committee (6/6/2014)
(only in Japanese)
4-1. Considerations on Buried Material During Construction of Frozen-Soil Wall (1/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-1.pdf

4-2. Considerations on Buried Material During Construction of Frozen-Soil Wall (2/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-2.pdf

4-3. Considerations on Buried Material During Construction of Frozen-Soil Wall (3/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-3.pdf

4-4. Considerations on Buried Material During Construction of Frozen-Soil Wall (4/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-4.pdf

4-5. Level Management of Groundwater and Contaminated Water Inside Buildings
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_02.pdf

4-6. Groundwater Monitoring and Emegency Response
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_03.pdf

4-7. Status of ALPS
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_04.pdf

5. Factory-made Welded Tanks Carried into Daiichi Site (6/12/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140611_08-e.pdf

6. Rebuttal on NY Times Article Unfairly Criticizing Fukushima Workers (5/22/2014)
Re "Credibility questions on Fukushima" (May 22):
http://www.nytimes.com/2014/06/02/opinion/fukushima-and-nuclear-safety.html?partner=rssnyt&emc=rss&_r=2

As president of the company that owns the Fukushima Daiichi nuclear plant, I am accustomed to criticism.
But I cannot be silent when our workers are unfairly maligned.

In face of the March 11, 2011, earthquake and tsunami crisis, our workers risked their lives and fought to control the plant even while many of their families were suffering the effects of the tsunami, including the destruction of their homes and, in some cases, the loss of family members' lives. On March 15, when the situation seemed to get worse, we instructed necessary workers to remain and the rest to seek shelter in low-radiation areas. Some took shelter at our nearby Fukushima Daini plant. Our post-accident investigation showed workers evacuated in a safe and orderly way and returned when they were instructed to. Therefore, I do not consider the evacuation to be an inobservance of the site superintendent's instruction. Nor do I believe there was any delay in accident response at Fukushima Daiichi due to the temporary evacuation of some workers.
Certainly nothing justifies the sensational headlines that unfairly suggest workers "fled" in some disorganized, disonorable way. To the contrary, they stayed on the job and risked their lives to bring the plant under control.

Naomi Hirose, Tokyo
The writer is president and C.E.O. of Tokyo Electric Power Company.
****

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, May 28, 2014 6:14 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, May 29 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for **tomorrow's** Weekly Fukushima Update Call.

[Date/time]
Thu, May 29, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, June 13** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. Leakage Confirmed from Expansion Joint Cover of Vacuum Breaker Line of Unit 1 Suppression Chamber (5/26/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140527_06-j.pdf
(page 2/8) Remote-operated boat identified leakage locations in Nov. 2013
(page 3/8) Robot sent in to investigate upper part of S/C
(page 4-5/8) Leakage found from both ends of expansion joint cover of the vacuum breaker line
(page 6/8) No leakage found in vacuum breaker, torus hatch, SHC system piping and AC system piping
(page 7/8) No significant damage observed in northern half of S/C upper part
(page 8/8) Southern half of S/C upper part to be investigated on May 27

2. NRA Special Facilities Monitoring and Evaluation Committee (5/26/2014)
(only in Japanese)
2-1. Groundwater Flow Analysis Pre-and-Post Construction of Frozen-Soil Wall
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0022_01.pdf
(page 2/29) Input parameter

(page 3/29) Groundwater contour and flow direction (pre-construction)
(page 4/29) Groundwater contour and flow direction (post-construction)
(page 5/29) Unit 1 groundwater flow direction (pre-construction)
(page 6/29) Unit 1 groundwater flow direction (post-construction)
(page 7/29) Unit 2 groundwater flow direction (pre-construction)
(page 8/29) Unit 2 groundwater flow direction (post-construction)
(page 9/29) Unit 3 groundwater flow direction (pre-construction)
(page 10/29) Unit 3 groundwater flow direction (post-construction)
(page 11/29) Unit 4 groundwater flow direction (pre-construction)
(page 12/29) Unit 4 groundwater flow direction (post-construction)
(page 13-29/29) Reference material

2-2. Evaluation of Impact to Foundation Ground of Reactor Buildings and Turbine Buildings due to Construction of Frozen-Soil Wall
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0022_02.pdf
(page 2/83) Questions from NRA and answers from TEPCO/Kajima
(page 3/83) Evaluation methodology
(page 4-38/83) Assessment of subsidence of foundation ground
(page 39-40/83) Evaluation of impact of subsidence of foundation ground
(page 41-46/83) Bearing capacity of foundation ground
(page 47-83/83) Reference material

3. Status of Fukushima Daini
(only in Japanese)
3-1. Status Report as of May (5/26/2014)
http://www.tepco.co.jp/nu/f2-np/handouts/j140526a-j.pdf

3-2. Completion of Opening Reactor Pressure Vessel of Fukushima Daini Unit 1 (5/28/2014)
http://www.tepco.co.jp/nu/f2-np/handouts/j140528a-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, May 22, 2014 8:18 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 23 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, May 23, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Thu, May 29** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (5/19/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140519_03-j.pdf
(page 3/79) Status of Units 2/3 Seawater Piping Trench, Facing Work, and Sea-Side Impermeable Wall Installation
(page 11/79) Groundwater Bypass Analysis Results
(page 20/79) Gradual Increase in Gross-beta and Tritium Concentration in Seawater Near Units 1-4 Intake Structures
(page 29/79) Heavy Rain Likely Caused Temporary Spike in Cs-137 Concentration in Seawater
(page 36/79) Status of ALPS
(page 43/79) Location of Water Leakage from Unit 3 Containment Vessel Identified
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=cju2qef7&catid=61785
(page 48/79) Inadvertent Transfer of Contaminated Water to Incinerator Building
(page 75/79) Augmented Field Management by TEPCO Personnel

1-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140519_04-j.pdf
(page 4/47) Doubling the Tank Weirs
(page 11/47) New Tanks Installation
(page 20/47) Treatment of Rainwater Accumulated in Weirs
(page 28/47) Roof Installation Over Tank Farms
(page 35/47) Discharge Route of Rainwater Ditch
(page 41/47) Groundwater Ingress Reduction Effect at HTI Building

1-3. Progress Status of Frozen-Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140519_05-j.pdf
(photos)
http://photo.tepco.co.jp/en/date/2014/201405-e/140521-01e.html
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=m7ge19ib&catid=61699

2. Bypassed Groundwater Released to the Sea (5/21/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236566_5892.html
(photos and video clips)
http://photo.tepco.co.jp/en/date/2014/201405-e/140521-02e.html

3. 50+% Fuel Bundles Safely Transferred from Unit 4 Spent Fuel Pool (5/19/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

4. Visit to Fukushima by Caroline Kennedy, US Ambassador to Japan (5/14/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236413_5892.html

5. Rebuttal on Asahi Shimbun (and NY Times) Article Unfairly Criticizing Fukushima Workers (5/22/2014)
(The text below should be posted on the following website shortly.)
http://www.tepco.co.jp/en/press/corp-com/release/index_ho-e.html
****
Tokyo, May 22, 2014 - Tokyo Electric Power Company (TEPCO) released a statement in response to The Asahi Shimbun's article on May 20, ***"90% of TEPCO workers defied orders, fled Fukushima plant in 2011"***, asserting that the company does not consider the temporary evacuation of employees in the aftermath of the accident in March 2011 to be inobservance of Yoshida's instructions.

TEPCO's stance towards The Asahi Shimbun's article http://ajw.asahi.com/article/0311disaster/fukushima/AJ201405200031 is as follows.

-Our recognition is that the former Fukushima Daiichi site superintendent Yoshida's instruction was that the employees evacuate to low dose areas inside the site, and if no suitable area exists, to Fukushima Daini.
-Therefore, we do not consider the temporary evacuation of employees to Fukushima Daini to be inobservance of Yoshida's instructions.

President Hirose was called to the Diet on May 21, and was questioned by one of the assembly members about the facts at the time of the accident. His statement is as below.

-As I confirmed via the related persons, the former site superintendent's instruction meant "If there were no areas inside the Fukushima Daiichi site where the radiation dose is low, consider Fukushima Daini as an evacuation destination."

-Looking back at that time, our recognition is that Yoshida's instruction was not given upon knowing the exact radiation levels inside Fukushima Daiichi, but instead, he meant "Evacuate temporarily to anywhere safe". As a consequence, they were at least able to evacuate temporarily in a safe manner.

-In fact, the necessary workforce stayed at Fukushima Daiichi to respond to the accident, and even some of those who temporarily evacuated to Fukushima Daini came back to Fukushima Daiichi after a few hours' break, and continued to work. I do not consider the evacuation to be inobservance of the site superintendent's instruction, and neither do I believe there was any delay in accident response at Fukushima Daiichi due to the temporary evacuation of 90% of site workers to Fukushima Daini. Our investigation report does not even discuss the destination of the temporary evacuation, which indicates that it was not the main issue then.

-Presently, as is well known, workers at Fukushima Daiichi are struggling to improve the situation there. A considerable number of workers who stayed at Fukushima in the aftermath of the accident still continue to work at the site, where the working environment remains severe. Considering the sentiments of those workers, my regret is that the coverage saying "90% of workers defied orders" would negatively affect their morale.

-Our workers need to maintain a strong sense of mission and responsibility to continue their work without becoming demoralized.

-Here on, my determination as president is to make sure that does not happen and to enable them to work free of impediment towards the challenging decommissioning operation at Fukushima Daiichi.
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All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, May 08, 2014 10:02 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 9 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for today's Weekly Fukushima Update Call.

[Date/time]
Fri, May 9, 2014 at 3 pm Eastern Daylight Time
(**No call next week.** Next call will be on **Fri, May 23** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184

(b)(6) [redacted]

[Major topics]
1. Contaminated Water Committee (4/28/2014)
(only in Japanese)
1-1. Preventive and Multi-layered Additional Measures
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_03-j.pdf

1-2. Status Report of Land-side Impermeable Wall (Frozen Soil Wall) Task Force
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_04-j.pdf

1-3. Status Report of ALPS Task Force
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_05-j.pdf

1-4. Issues List of Tritium Task Force
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_06-j.pdf

1-5. Status of Contaminated Water Countermeasures
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_07-j.pdf

1-6. Additional Measures to Stop Groundwater Ingress
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_08-j.pdf

1-7. Mitigating Risk due to Implementation of "Facing"
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_09-j.pdf

1-8. Addition and Replacement Plan of Contaminated Water Storage Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_10-j.pdf

1-9. Additional Public Offering of Projects for FY2013
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_11-j.pdf

1-10. Application Status of Technology Offered Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_12-j.pdf

1-11. Recent Issues at 1F and Actions Taken
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140428_13-j.pdf

2. Dose Rate and Gamma Camera Investigation Plan for Units 1-3 Reactor Buildings Upper Floors (4/28/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140428_06-j.pdf

3. Gamma Camera Investigation Plan for Units 1-3 Reactor Buildings First Floor (5/8/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140508_07-j.pdf

4. Visual Inspection Results of Unit 4 Fuels (5/1/2014)

http://photo.tepco.co.jp/en/date/2014/201405-e/140501-01e.html

5. IRID Workshop for R&D on Innovative Approach for Fuel Debris Retrieval (4/25/2014)
http://irid.or.jp/fd/?page_id=352

5-1. Current status at Fukushima Daiichi Nuclear Power Station
http://irid.or.jp/debris/S1-1E.pdf

5-2. Status of R&D for Fuel Debris Retrieval
http://irid.or.jp/debris/S1-2E.pdf

5-3. Innovative Approach for Fuel Debris Retrieval, Results of Request for Information (RFI)
http://irid.or.jp/debris/S2-1E.pdf

5-4. Project Scheme for Decommissioning and Contaminated Water Management and RFP Schedule
http://irid.or.jp/debris/S2-2E.pdf

6. Cooperation Statement with Sellafield Ltd. (5/2/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236097_5892.html
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140502_01-e.pdf

7. Nuclear Safety Reform Plan Progress Report (FY2013 Q4) (5/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1236098_5892.html

7-1. Overview
http://www.tepco.co.jp/en/press/corp-com/release/betu14_e/images/140501e0101.pdf

7-2. Attachment-1 (only in Japanese: 16.4 MB)
http://www.tepco.co.jp/cc/press/betu14_j/images/140501j0102.pdf

7-3. Attachment-2 (only in Japanese: 881 KB)
http://www.tepco.co.jp/cc/press/betu14_j/images/140501j0103.pdf

All the best,
Kenji

From: Marksberry, Don
Sent: 31 Jul 2014 05:52:01 -0400
To: Lee, Richard;Salay, Michael;Esmaili, Hossein;Helton, Donald;Norton, Charles;Nakanishi, Tony;Witt, Kevin;Lane, John;Mitman, Jeffrey;Notafrancesco, Allen;Basu, Sudhamay;Randy Gauntt;Siu, Nathan;Jimenez, Manuel;Reckley, William;Arndt, Steven;Laur, Steven;Orders, William;Bernardo, Robert;Williams, Vince;Huffert, Anthony;Fuller, Edward;Pires, Jose;Fuhrmann, Mark;Nosek, Andrew;Skillman, Gordon;Nicholson, Thomas;Aird, David;Tadesse, Rebecca
Subject: FW: [TEPCO Weekly Fukushima Update Call] THU, July 31 at 3pm EDT

The call is today, Thursday

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Wednesday, July 30, 2014 8:47 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] THU, July 31 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, July 31, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 8** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 2 Torus Room Wall Survey (7/29/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140728_05-e.pdf
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=c24iaxhc&catid=61785

2. NRA Special Facilities Monitoring and Evaluation Committee (7/23/2014)
(only in Japanese)
2.1 Progress Status on Freezing of Units 2/3 Seawater Piping Trench Connection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_01.pdf

2.2 Unit 1 Reactor Building Dust Inhibition Measures During Cover Dismantling and Rubble Removal
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_02.pdf

2.3 Replacement of Fuel Rack in Common Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_03_01.pdf

2.4 Fuel Removal Plan for Unit 3 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_03_02.pdf

3. Contaminated Water Treatment Committee (7/25/2014)

(only in Japanese)

3.1 Risk Reduction Owing to Contaminated Water Measures
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_03-j.pdf

3.2 Status and Effectiveness of Groundwater Bypass
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_04-j.pdf

3.3 Tritium Concentration Increase in # 12 Groundwater Bypass Well
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_05-j.pdf

3.4 Task Force Studies on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_07-j.pdf

3.5 Test Results and Demonstration Status of Advanced Multi-Nuclide Removal System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_08-j.pdf

3.6 Tritium Task Force Discussions
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_09-j.pdf

4. National Academy Sciences Fukushima Lessons Learned Report (7/24/2014)
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=18294
(TEPCO's Statement on the NAS Report)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239621_5892.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, July 17, 2014 11:43 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, July 18 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]

Fri, July 18, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **THU, July 31** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Progress Status of Ice Boundary between Units 2/3 Seawater Piping Trenches and Turbine Buildings (7/7/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140707_05-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=rbudts0u&catid=61699

2. Investigation Result of Unit 3 Reactor Building North-West Corner (7/11/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140711_06-j.pdf

3. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (7/14/2014)
(only in Japanese)
3-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_03-j.pdf

3-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_04-j.pdf

3-3. Interim Testing Report on Use of Plastic Scintillation Fiber for Contaminated Water Leakage Detection
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_05-j.pdf

4. No Impact due to M 6.8 Earthquake Near Fukushima (7/12/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1238987_5892.html

5. International Research Institute for Nuclear Decommissioning (IRID) Activities
5-1. RFP for Conceptual Study of Innovative Approach for Fuel Debris Retrieval and Feasibility Study of Essential technologies (7/17/2014)
http://irid.or.jp/fd/?page_id=544

5-2. IRID Annual Symposium 2014 (7/18/2014)
http://irid.or.jp/en/symposium/

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, July 02, 2014 10:04 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, July 3 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, July 3, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, July 18** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (6/27/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_05-j.pdf

1-3. Insertion of Thermometer and Water Level Gauge inside Unit 2 Drywell
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_06-j.pdf

1-4. Status of ALPS, Sr-Immobilization, Groundwater Bypass, Subdrain System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_07-j.pdf

1-5. Status of Groundwater and Seawater Contamination
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_08-j.pdf

1-6. Dismantling of Unit 1 Reactor Building Cover, Decontamination of Unit 3 Reactor Building Refueling Floor, Change in Unit 4 SFP Fuel Transfer Plan
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_10-j.pdf

1-7. Investigation and R&D in Preparation for Fuel Debris Retrieval
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_11-j.pdf

1-8. Radioactive Waste Storage
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_12-j.pdf

1-9. Candidate Site for Construction of Radioactive Material Analysis and Research Facility
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_13-j.pdf

1-10. MEXT's Plan for Establishing International Joint R&D Center for Decommissioning
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_14-j.pdf

1-11. Request for Proposal (RFP) for Innovative Approach for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_17-j.pdf
(See following site for English information on this RFP.)
http://en.dccc-program.jp/2014/07/02/?p=186

2. Final Investigation Report on H4 #5 Tank Leakage of RO-Concentrated Water (6/30/2014)
(only in Japanese)
2-1. Full Report
http://www.tepco.co.jp/cc/press/betu14_j/images/140630j0401.pdf

2-2. Estimated Leakage of Sr-90 and Recovery Rate
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140630_06-j.pdf

3. "How the Other Fukushima Plant Survived" Harvard Business Review Article on 2F Available for Free

http://hbr.org/2014/07/how-the-other-fukushima-plant-survived/ar/1

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, June 26, 2014 7:58 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 27 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 27, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **THU, July 3** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (6/16/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140616_03-j.pdf

1-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140616_04-j.pdf

2. Unit 1 Torus Room Wall Survey Results (6/13/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140613_09-e.pdf

3. Unit 2 Torus Room Wall to be Surveyed by Robots (6/24/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140624_08-e.pdf

4. Decontamination inside Unit 3 Reactor Building to Begin Using Remote-operated Equipment (6/20/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140620_06-e.pdf

5. Revision of Plan to Transfer Fuels from Unit 4 SFP (6/18/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140618_08-e.pdf

6. All 3 Trains of ALPS Back Online (6/26/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1238403_5892.html

7. "How the Other Fukushima Plant Survived" (July-August/2014)
Success story of accident response at Fukushima Daini featured in Harvard Business Review.
http://hbr.org/product/how-the-other-fukushima-plant-survived/an/R1407K-HCB-ENG

8. "'Fukushima 50' Worker Shares Personal Lessons From 2011 Accident" (6/24/2014)
Interview of Shiro Takahira, one of the Fukushima 50, by NEI.

http://www.nei.org/News-Media/News/News-Archives/Fukushima-50-Worker-Shares-Personal-Lessons-From-2

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, June 12, 2014 9:24 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 13 at 3pm EDT

Nuclear Sector Colleagues,
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 13, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, June 27** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (5/29/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140529_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140529_05-j.pdf

1-3. Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140529_06-j.pdf
(page 3/347) Shortening the length of circulating-water cooling system
(page 43/347) Addition of mobile Sr removal system and Sr removal capability to SARRY
(page 186/347) Status of Unit 3 SFP rubble removal
(page 195/347) Installation of new fuel racks in common fuel pool
(page 201/347) Long-term integrity evaluation of fuels removed from SFP
(page 214/347) Study on processing methods for damaged fuels (if any) removed from SFP
(page 225/347) Unit 3 MSIV room investigation results
(page 235/347) Upper S/C investigation equipment testing results
(page 252/347) Gamma camera investigation of reactor buildings
(page 276/347) Improvement of severe accident analysis codes (MAAP and SAMPSON)
(page 300/347) Integrity evaluation of RPV and PCV
(page 314/347) Test results of vent pipe water proofing
(page 326/347) Development of upper PCV and S/C repair technology
(page 339/347) R&D on processing and disposal of solid waste

2-1. Start of Frozen-Soil Wall Construction (5/30/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140530_12-e.pdf

2-2. Start of Frozen-Soil Wall Construction (6/2/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140602_06-e.pdf

3. Leakage of Contaminated Rainwater from 4,000-ton Notch Tank Farm (6/4/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140604_11-j.pdf

4. NRA Special Facilities Monitoring and Evaluation Committee (6/6/2014)
(only in Japanese)

4-1. Considerations on Buried Material During Construction of Frozen-Soil Wall (1/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-1.pdf

4-2. Considerations on Buried Material During Construction of Frozen-Soil Wall (2/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-2.pdf

4-3. Considerations on Buried Material During Construction of Frozen-Soil Wall (3/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-3.pdf

4-4. Considerations on Buried Material During Construction of Frozen-Soil Wall (4/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-4.pdf

4-5. Level Management of Groundwater and Contaminated Water Inside Buildings
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_02.pdf

4-6. Groundwater Monitoring and Emegency Response
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_03.pdf

4-7. Status of ALPS
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_04.pdf

5. Factory-made Welded Tanks Carried into Daiichi Site (6/12/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140611_08-e.pdf

6. Rebuttal on NY Times Article Unfairly Criticizing Fukushima Workers (5/22/2014)
Re "Credibility questions on Fukushima" (May 22):
http://www.nytimes.com/2014/06/02/opinion/fukushima-and-nuclear-safety.html?partner=rssnyt&emc=rss&_r=2

As president of the company that owns the Fukushima Daiichi nuclear plant, I am accustomed to criticism.
But I cannot be silent when our workers are unfairly maligned.
In face of the March 11, 2011, earthquake and tsunami crisis, our workers risked their lives and fought to control the plant even while many of their families were suffering the effects of the tsunami, including the destruction of their homes and, in some cases, the loss of family members' lives. On March 15, when the situation seemed to get worse, we instructed necessary workers to remain and the rest to seek shelter in low-radiation areas. Some took shelter at our nearby Fukushima Daini plant. Our post-accident investigation showed workers evacuated in a safe and orderly way and returned when they were instructed to. Therefore, I do not consider the evacuation to be an inobservance of the site superintendent's instruction. Nor do I believe there was any delay in accident response at Fukushima Daiichi due to the temporary evacuation of some workers.
Certainly nothing justifies the sensational headlines that unfairly suggest workers "fled" in some disorganized, dishonorable way. To the contrary, they stayed on the job and risked their lives to bring the plant under control.

Naomi Hirose, Tokyo
The writer is president and C.E.O. of Tokyo Electric Power Company.
****

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 18 Jun 2015 22:38:17 -0400
To: Tateiwa, Kenji
Subject: Last Call from DC [TEPCO Weekly Fukushima Update Call] Fri, June 19, 2015 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Tomorrow will mark the last Weekly Fukushima Update Call that I will conduct from DC.

After spending almost 4 years, I will be departing DC on June 27 and start working at TEPCO's Tokyo HQ on July 1 as Safety Engineering Group Manager of Fukushima Daiichi D&D Engineering Company.

I will endeavor to continue this call from Tokyo, albeit at a less frequent basis.
I will send out a notice for the next call once I settled into my new position.

Thank you for your continued support to TEPCO and for your interest in the progress at Fukushima Daiichi.
I look forward to keeping in touch.

[Date/time]
Fri, June 19, 2015 at 3 pm Eastern Daylight Time
(Date/time of next call to be determined.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Cabinet-Level Meeting on Decommissioning and Contaminated Water Issues (6/12/2015)
(only in Japanese)
1-1. Outline of Revised Mid-and-Long-Term Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150612_03-j.pdf

1-2. Revised Mid-and-Long-Term Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150612_05-j.pdf

1-3. Revised Schedule for Defueling of Units 1-3 SFPs
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150612_04-j.pdf

2. Summary Progress at Units 1-4 (6/12/2015)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150612_04-j.pdf

3. Transition of Different Types of Contaminated Water Stored in Tank Farms (6/12/2015)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150612_05-j.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)
tateiwa.kenji@tepco.co.jp
(Email address will remain unchanged after my transition to Tokyo.)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, June 04, 2015 10:21 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 5, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 5, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, June 19** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (5/22/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/data/000107869.pdf

1-2. Water Collected on Lid of High-Intensity Container Inside a Box Culvert
http://www.nsr.go.jp/data/000108101.pdf

1-3. Groundwater Inflow Mitigation Measures and Water Level Management
http://www.nsr.go.jp/data/000107730.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (5/25/2015)
(only in Japanese)
2-1. Water Contamination Monitoring Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_03-j.pdf

2-2. Status of Unit 1 Reactor Building Cover Dismantling

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_04-j.pdf

2-3. Status Report on Identification of Risk Factors Related to Off-site Radiological Impact
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_07-j.pdf

2-4. Preparation for Disclosure of All Radiological Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_08-j.pdf

2-5. Status Report on Various Issues (146 pages, 19 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_13-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (5/28/2015)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_05-j.pdf
(English translation as of 4/30/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150430_01-e.pdf

3-3. Unit 1 Drywell Water Level Measurement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_06-j.pdf

3-4. Contaminated Water Treatment *(file size: 11 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_07-j.pdf

3-5. Environmental Radiation Issues *(file size: 15 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_08-j.pdf

3-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_10-j.pdf

3-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_11-j.pdf

3-8. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_12-j.pdf

3-9. Draft Revision of Mid-to-Long Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_13-j.pdf

4. Leakage of Contaminated Water from Transfer Hose (6/1/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150601_06-j.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, May 21, 2015 9:21 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 22, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, May 22, 2015 at 3pm Eastern Daylight Time
(**No Call Next Week.** Next call will be on **Fri, June 5** at 3pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. IAEA Peer Review Mission Report #3 (5/14/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150514_01-e.pdf

"IAEA Issues Report on Fukushima Decommissioning Review" (IAEA Press Release)
https://www.iaea.org/newscenter/pressreleases/iaea-issues-report-fukushima-decommissioning-review

2. Fukushima Nuclear Accident Unresolved Issues Progress Report # 3 (5/20/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1250927_6844.html

(English Summary)
http://www.tepco.co.jp/en/press/corp-com/release/betu15_e/images/150520e0101.pdf

(Japanese Full Report: 503 pages, 27 MB)
http://www.tepco.co.jp/cc/press/betu15_j/images/150520j0102.pdf

3. High-Level Meeting of Decommissioning & Contaminated Water Issues Team (5/21/2015)
(only in Japanese)
3-1. Basic Policy regarding the Mid-and-Long-Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150521_05-j.pdf

3-2. Straw Man for the Mid-and-Long-Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150521_06-j.pdf

3-3. Enhanced Coordination on R&D Activities for Decommissioning and Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150521_03-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, May 07, 2015 9:07 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 8, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, May 8, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week.** Next call will be on **Fri, May 22** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Drywell Internal Investigation by Transforming Robots: Summary of Findings (4/30/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150430_01-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (4/30/2015)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_05-j.pdf
(English translation as of 3/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150326_01-e.pdf

2-3. Contaminated Water Treatment *(file size: 14 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_07-j.pdf

2-4. Environmental Radiation Issues *(file size: 17 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_08-j.pdf

2-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_10-j.pdf

2-6. Preparation for Fuel Debris Removal

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_11-j.pdf

2-7. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_12-j.pdf

2-8. NDF's 2015 Technical Strategy Plan in Preparation for Revising the Mid-to-Long Term Decommissioning Roadmap *(file size: 18 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_14-j.pdf

2-9. Identification of Risk Factors Related to Off-site Radiological Impact
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_15-j.pdf

2-10. Preparation for Disclosing All Radiological Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_16-j.pdf

2-11. Government-Funded Demonstration Testing Results for 5 Contaminated Water Treatment Systems
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_17-j.pdf

3. Test Operation of Brine Circulation for Frozen Soil Wall (4/30/2015)
http://photo.tepco.co.jp/en/date/2015/201504-e/150430-02e.html

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 29 Jan 2015 19:59:46 -0500
To: Uhle, Jennifer;Witt, Kevin
Cc: Norton, Charles;Marksberry, Don;Nicholson, Thomas;Bernardo, Robert
Subject: [NAS Fukushima Phase 2] TEPCO Presentation (1/29/2015)
Attachments: Fukushima Spent Fuel Issues@NAS_01292015.pdf
Importance: Normal

Jennifer and Kevin,

It was nice seeing you at the NAS Fukushima Phase 2 meeting this afternoon.

Per Kevin's request, I am sending you a copy of my presentation.
Feel free to share it with your colleagues at NRC or anyone interested in the topic.

Please let me know if you have any questions.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

Spent Fuel and Spent Fuel Storage Facilities at Fukushima Daiichi

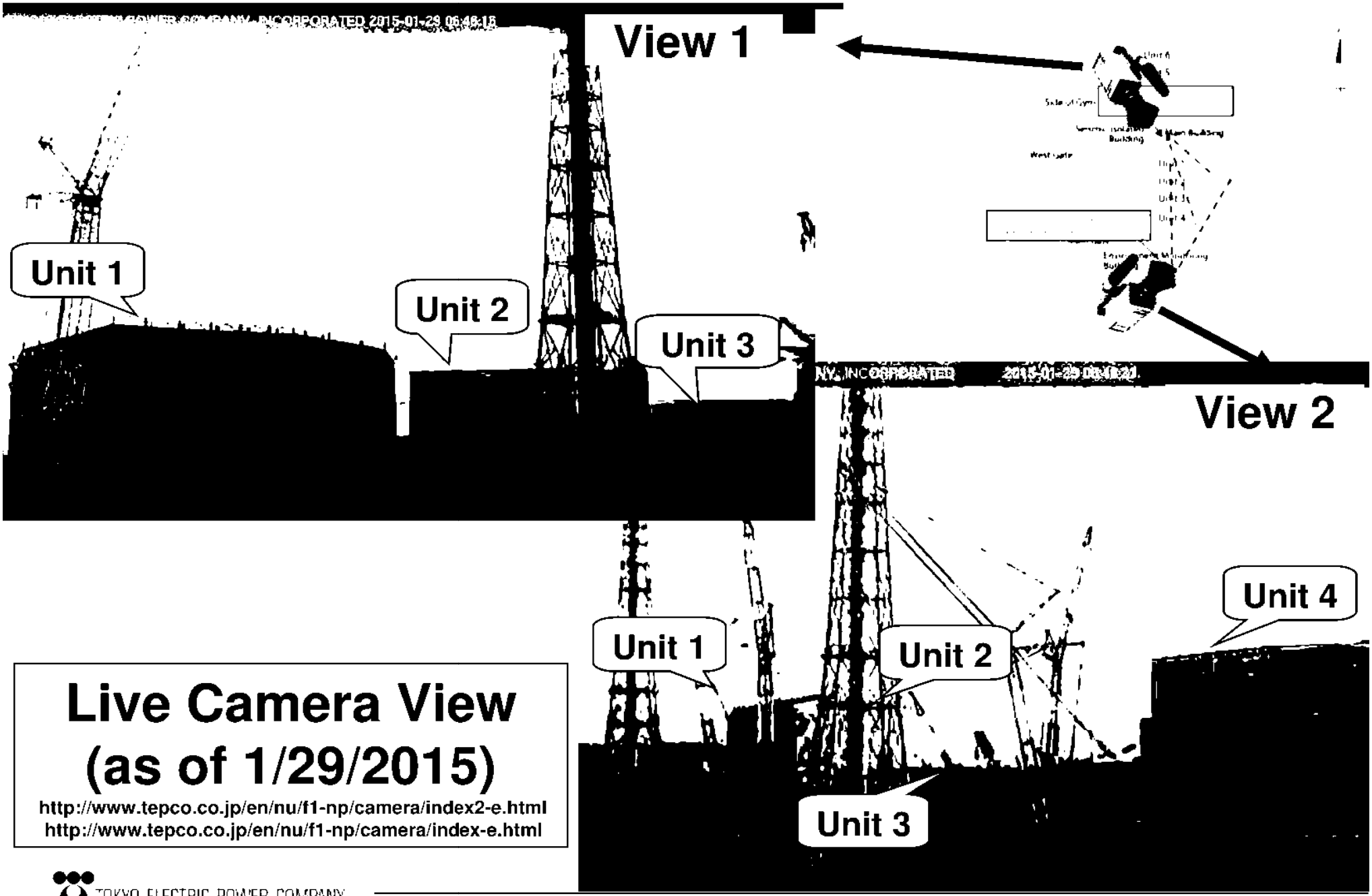
The National Academies "Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants: Phase 2" Meeting #3

Washington, DC
January 29th, 2015

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company, Washington Office
tateiwa.kenji@tepco.co.jp

TEPCO

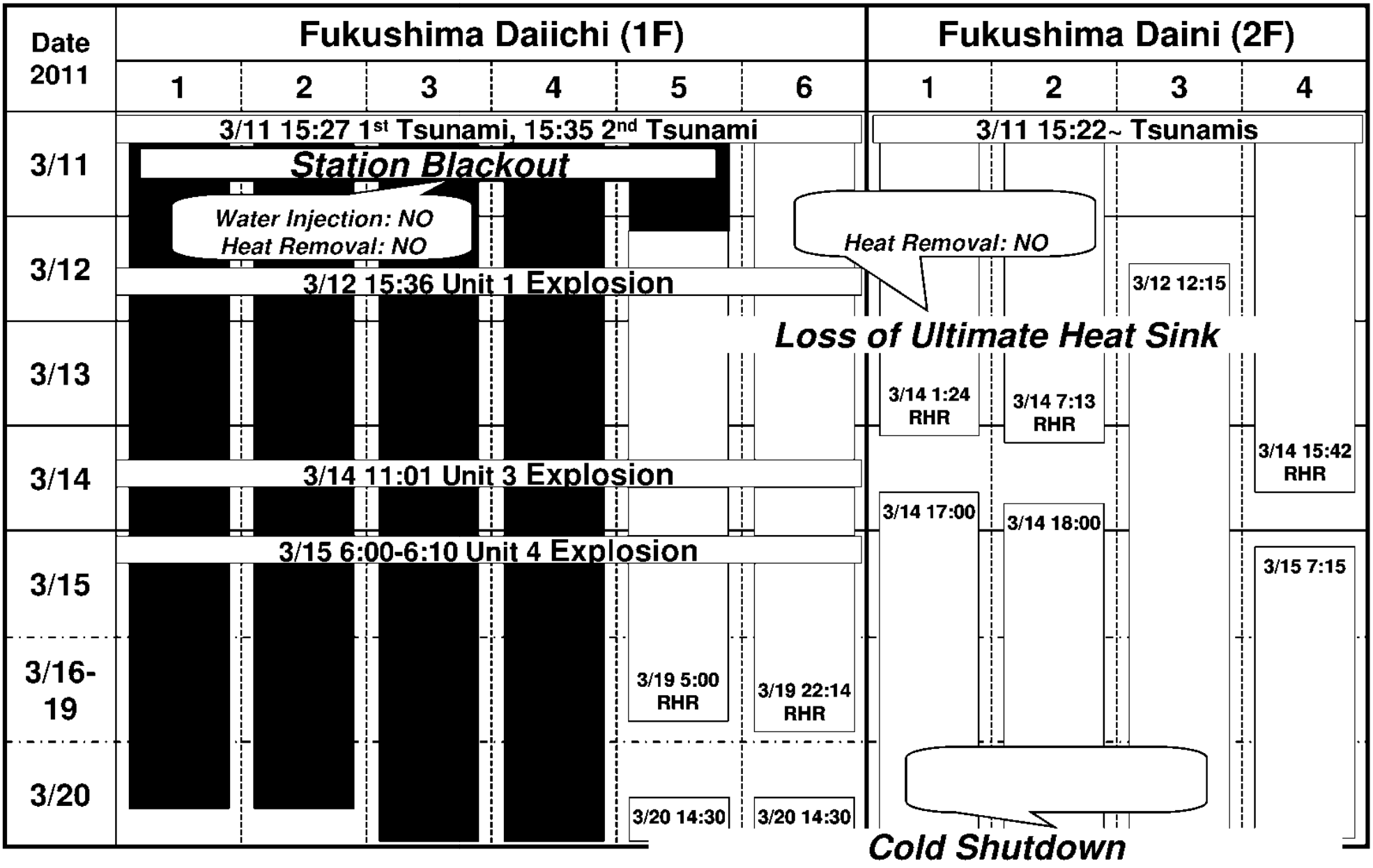
Current Status of Fukushima Daiichi (1F)



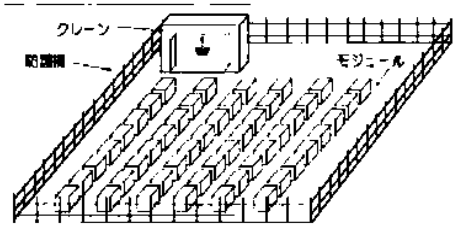
Live Camera View (as of 1/29/2015)

http://www.tepco.co.jp/en/nu/f1-np/camera/index2-e.html
http://www.tepco.co.jp/en/nu/f1-np/camera/index-e.html

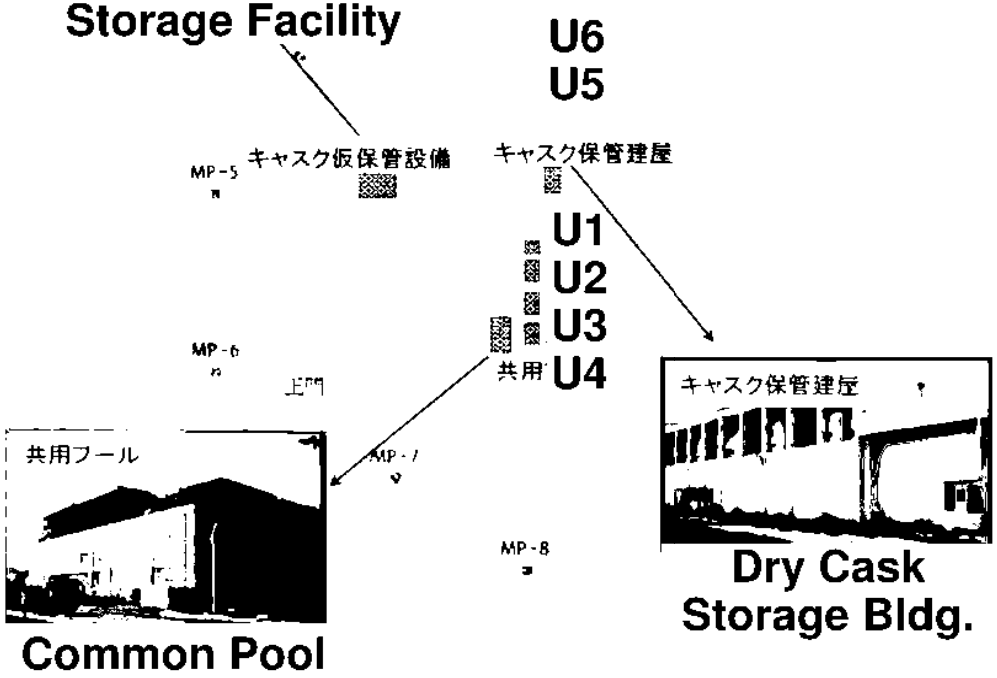
Overview of the 10-Unit Simultaneous Accidents



Spent Fuel Storage Facilities: Overview



Temporary Dry Cask Storage Facility



Dry Cask Storage Bldg.

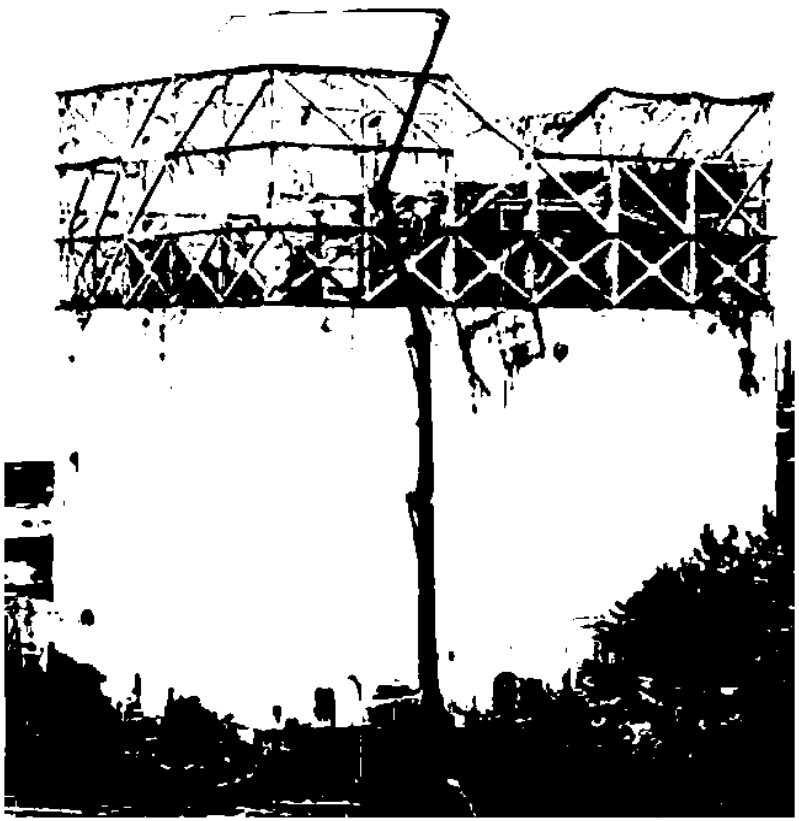
Common Pool

Fukushima Daiichi NPS

Unit	As of 3/11/2011			12/22/2014
	Spent Fuels	New Fuels	Decay Heat (MW)	Total # of Fuels
1	292	100	0.18	392
2	587	28	0.62	615
3	514	52	0.54	566
4	1,331	204	2.26	0
5	946	48	1.01	994
6	876	64	0.87	1,884
Common Pool	6,375	0	1.13	6,799
Dry Cask Storage	408	0	-	0
Temp. Dry Cask Storage	-	-	-	2,930

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

Unit 1 Spent Fuel Pool: Water Injection



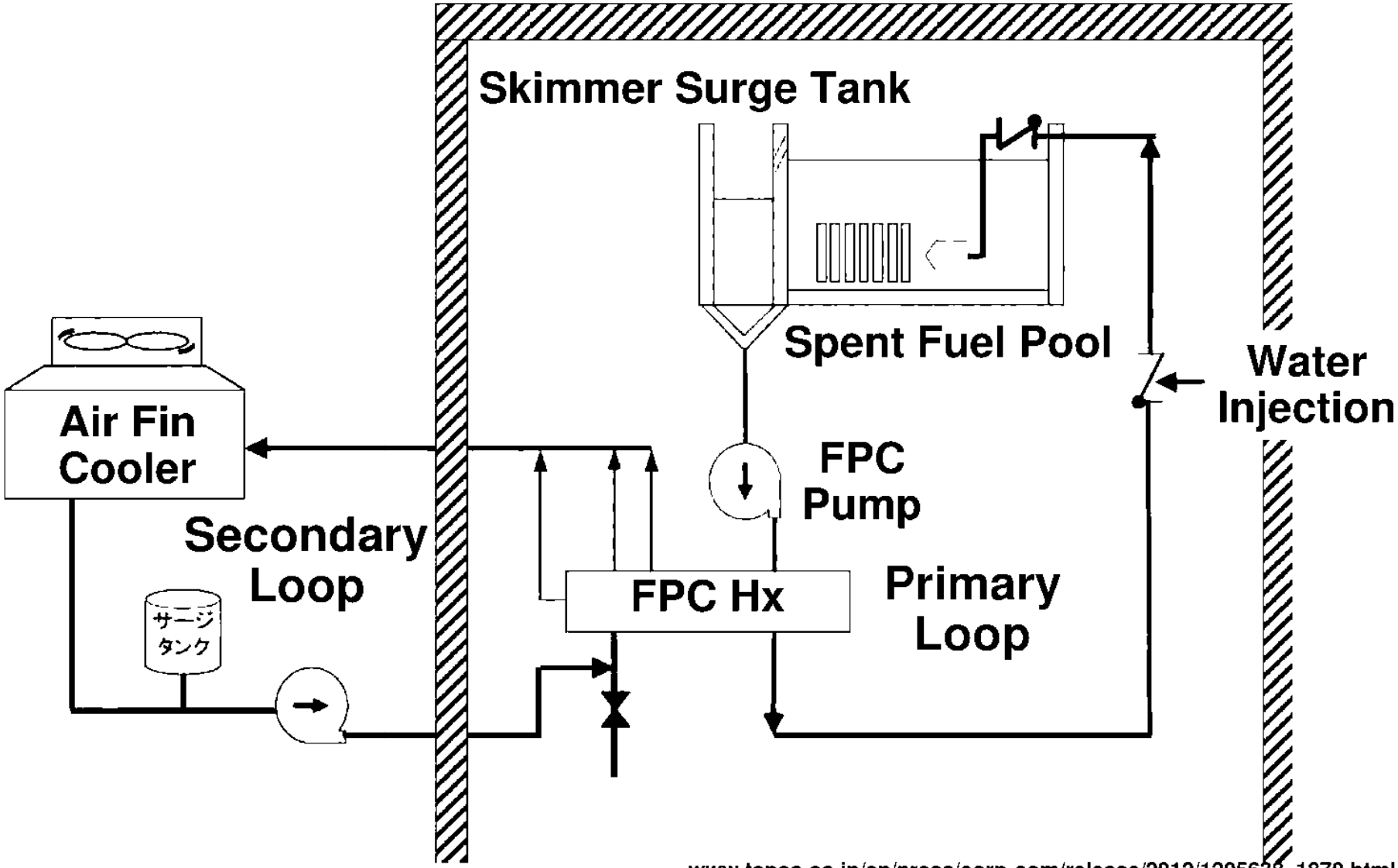
Water Injection into SFP with Concrete Pumper

Date (2011)	Injection Volume (ton)	Source	Injection Method
3/31	90	Fresh Water	Concrete Pumper
5/20	60		
5/22	90		
5/28	5		Fuel Pool Cooling (FPC) System
5/29	168		
6/5	15		
7/5	75		
8/5	75		
8/10	10		
8/10	Closed Cycle Cooling		

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Injected only fresh water (no seawater)

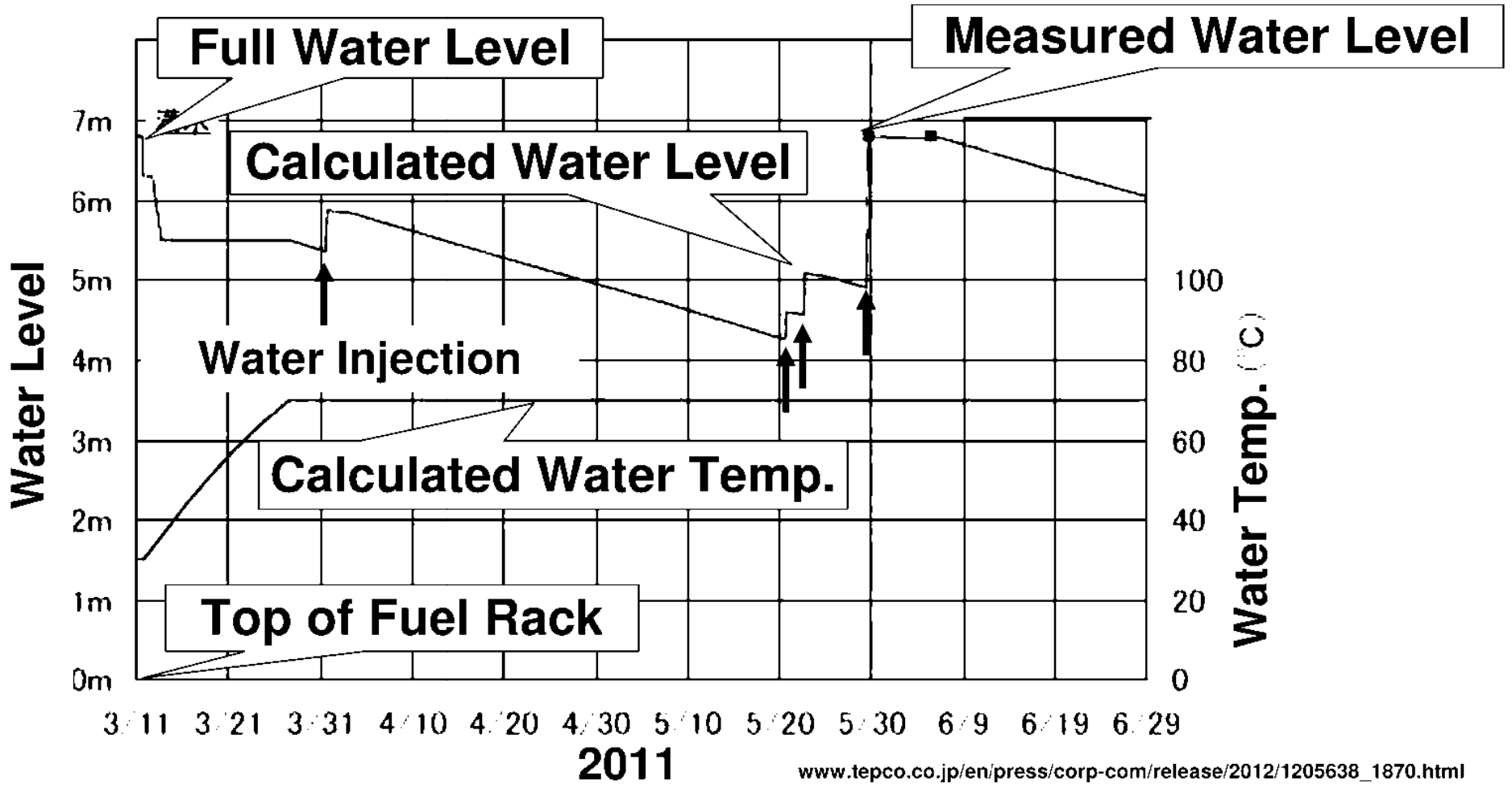
Unit 1 SFP: Closed-Cycle Cooling



www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Stable closed-cycle cooling from 8/10/2011

Unit 1 SFP: Reconstruction of Events



Water level highly unlikely to have dropped close to top of fuel rack

Unit 1 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm^3)			
		Unit 1 Skimmer Surge Tank		*Unit 1 SFP*	*Unit 1 T/B*
		6/22/2011	8/19/2011	*2/11/2011*	*3/26/2011*
Cs-134	2 years	12,000	18,000	*ND*	*1.2E5*
Cs-137	30 years	14,000	23,000	*0.078*	*1.3E5*
I-131	8 days	68	ND	*ND*	*1.5E5*

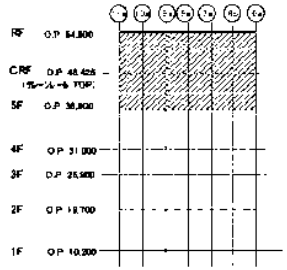
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

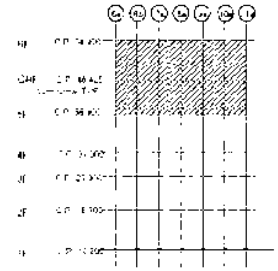
	6/22/2011	7/17/2012
Chloride (ppm)	4.4	5.0

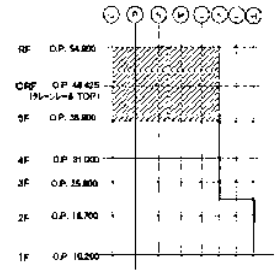
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

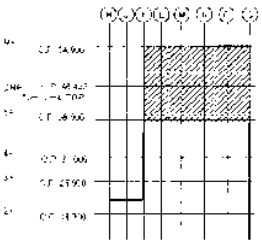
- I-131 most likely to have originated from reactor, not SFP (all fuels >1 year after shutdown)
- Injection of hydrazine for microbes prevention

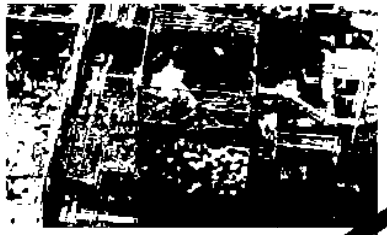
Unit 1 SFP: Structural Integrity Assessment



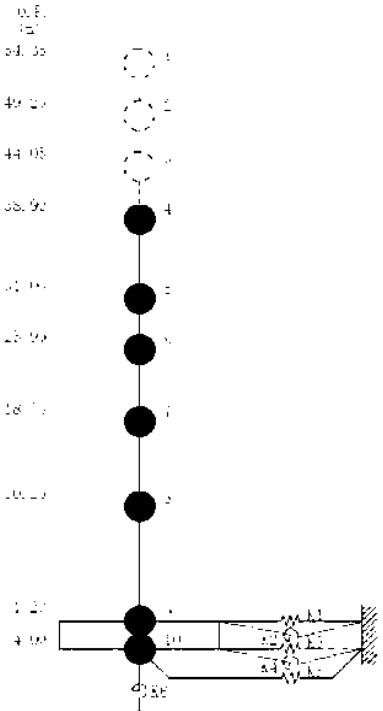








Structural Damage Assessment



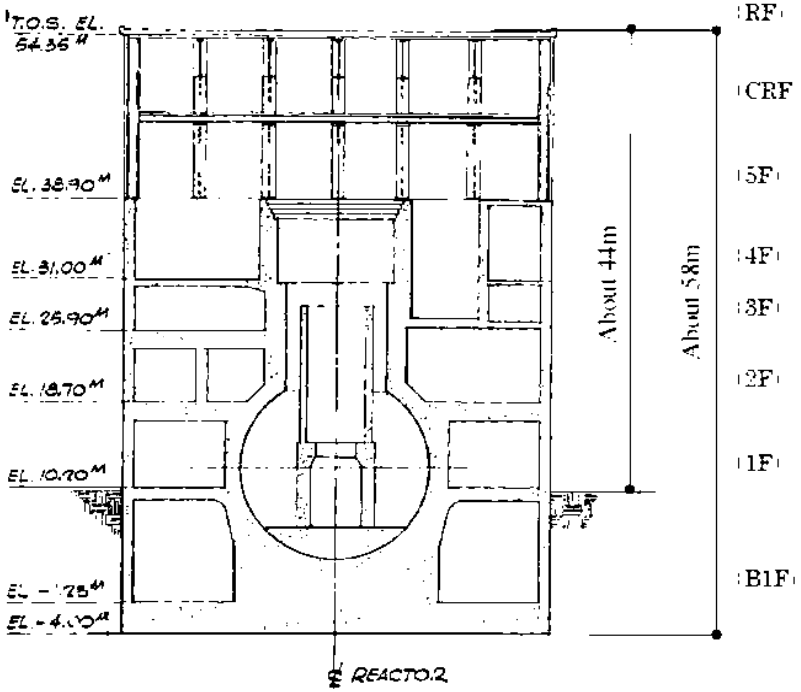


Figure Analysis Model for Seismic Response of the Reactor Building of Unit [illegible]tion)

Seismic Response Model Incorporating Damaged Condition

http://www.tepco.co.jp/en/press/corp-com/release/11052801-e.html

Shear strain from design-basis earthquake confirmed to be within safety limit (5/28/2011)

Unit 1 SFP: Condition of Refueling Floor

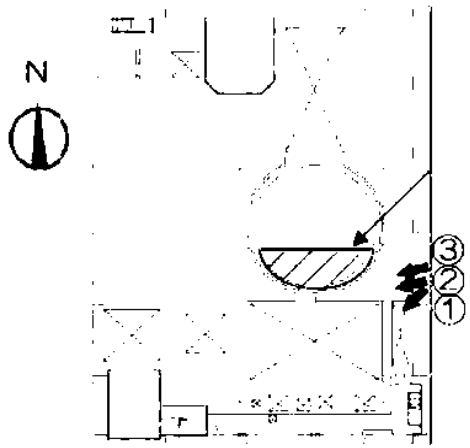
Fuel Handling Machine

Rubble

Reactor Well Cover

Fuel Handling Machine

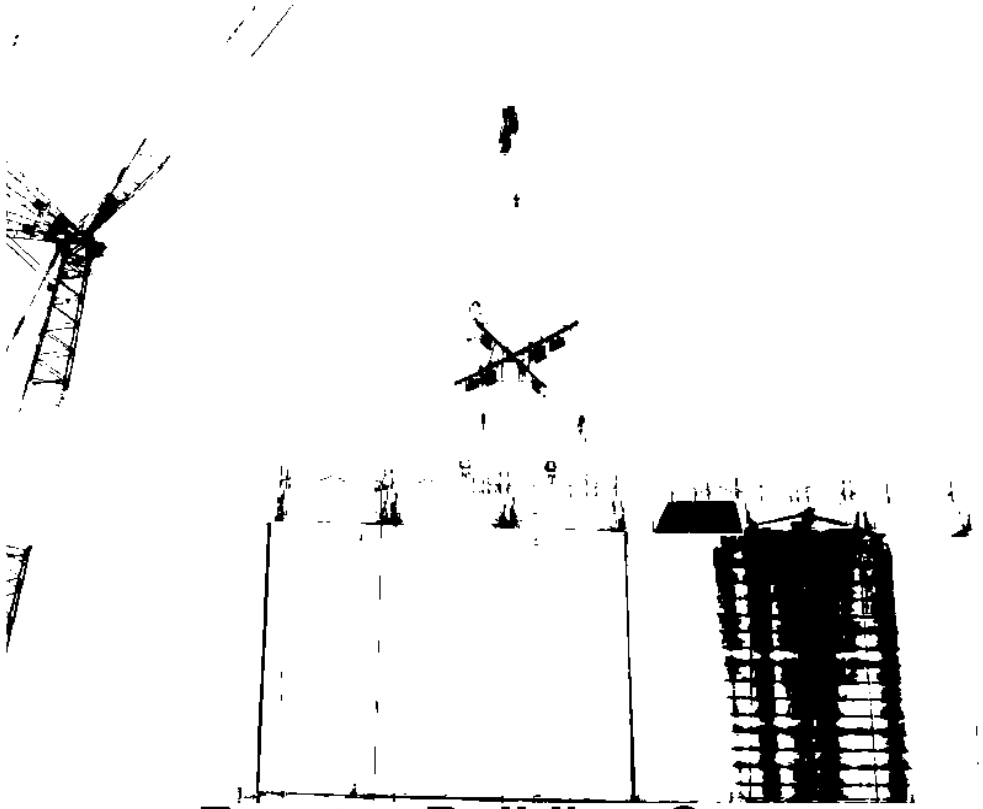
Spent Fuel Pool Surface



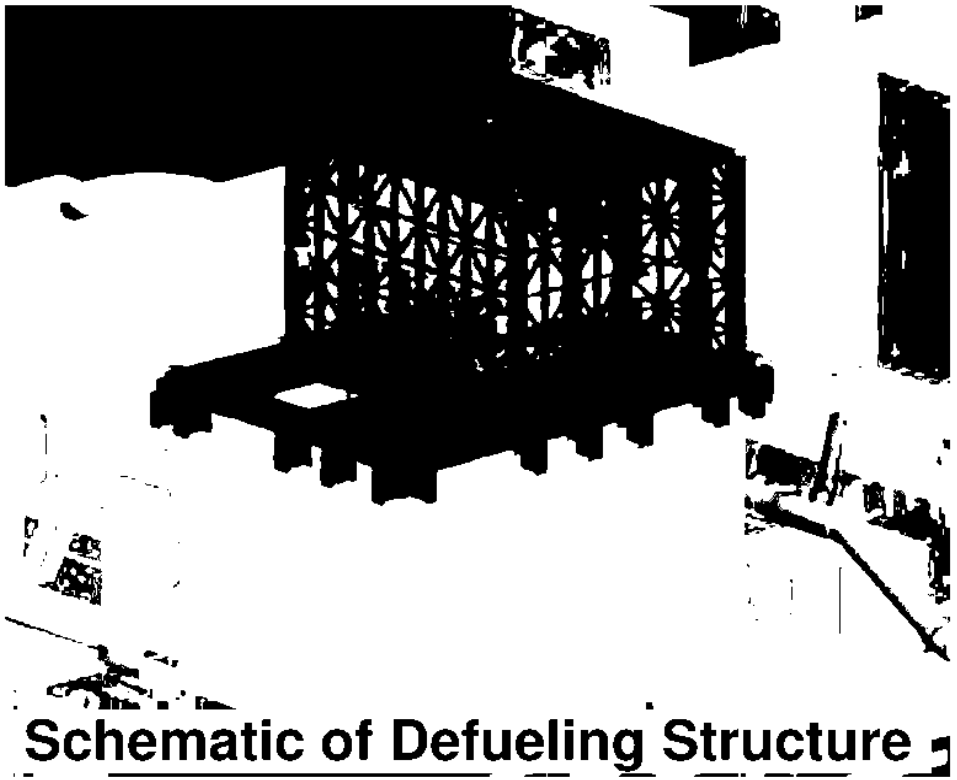
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

Fuel handling machine and overhead crane do not seem to have dropped into SFP (Nov. 2014)

Unit 1 SFP: Next Step



Reactor Building Cover
(12/4/2014)



Schematic of Defueling Structure

Reactor building cover to be dismantled to prepare for defueling

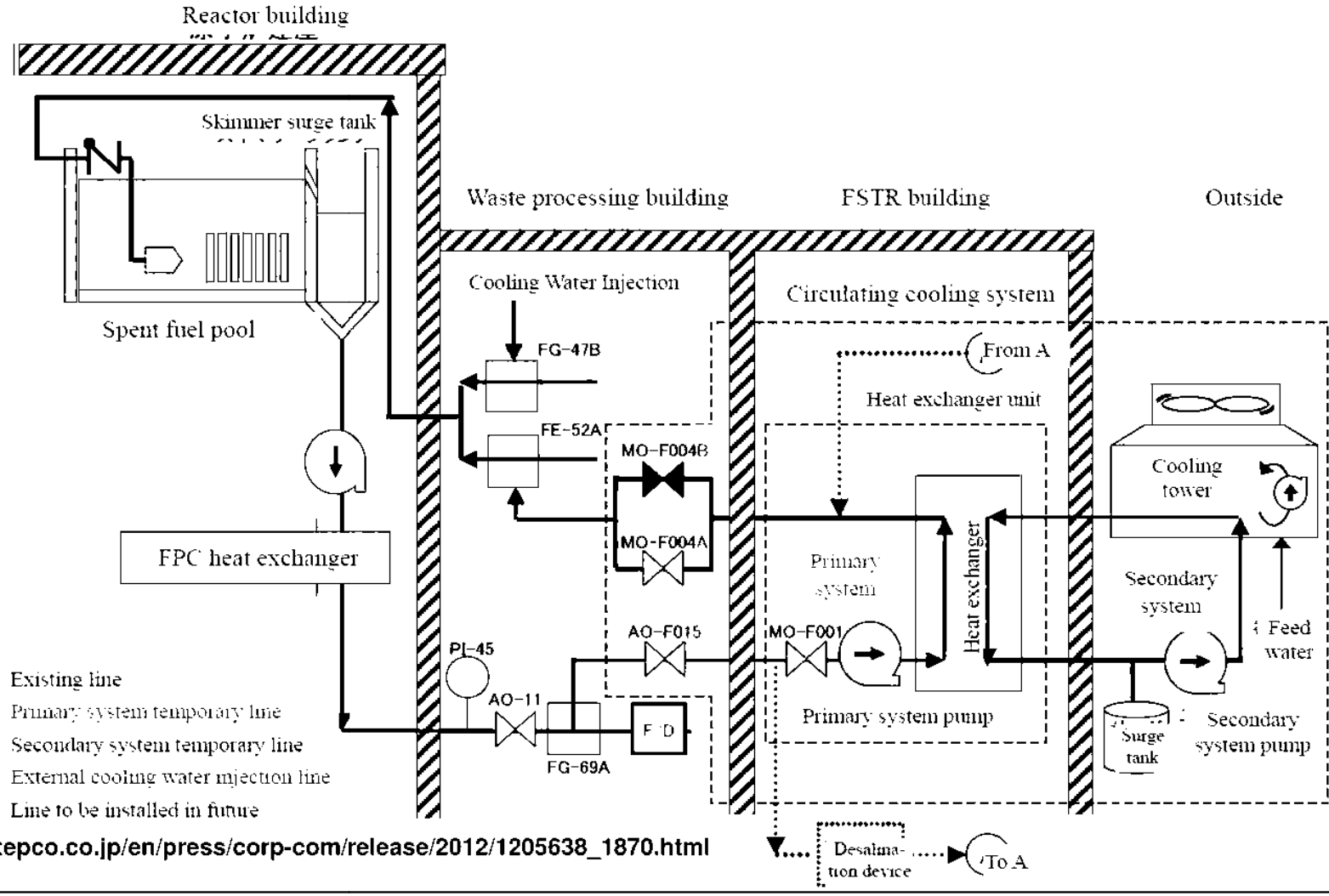
Unit 2 Spent Fuel Pool: Water Injection

Date (2011)	Injection Volume (ton)	Source	Injection Method
3/20	40	Seawater	Fuel Pool Cooling System
3/22	18		
3/25	30		
3/29	15-30	Fresh Water	
3/30	<20		
4/1	70		
4/4	70		
4/7	36		
4/10	60		
4/13	60		
4/16	45		
4/19	47		
4/22	50		
4/25	38		
4/28	43		
5/2	55		
5/6	58		
5/10	56		
5/14	56		
5/18	53		
5/22	56		
5/26	53		
5/30	53		
5/31	Closed Cycle Cooling		

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

FPC system utilized for water injection

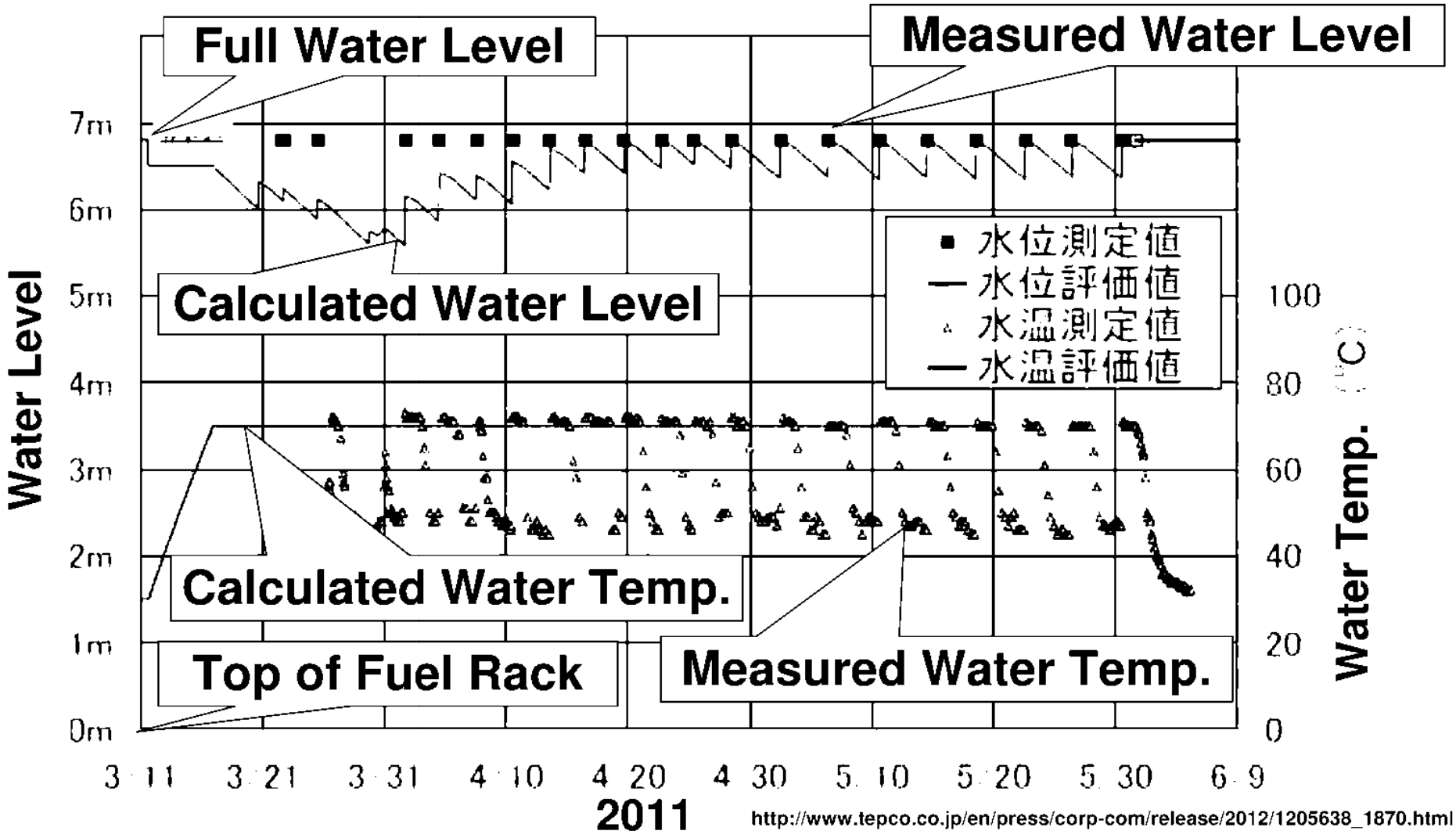
Unit 2 SFP: Closed-Cycle Cooling



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

- **Stable closed-cycle cooling from 5/31/2011**
- **Injection of hydrazine for anti-corrosion and microbe prevention**

Unit 2 SFP: Reconstruction of Events



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Water level highly unlikely to have dropped close to top of fuel rack

Unit 2 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm^3)			
		Unit 2 Skimmer Surge Tank		*Unit 2 SFP*	*Unit 2 T/B*
		4/16/2011	*8/19/2011*	*2/10/2011*	*3/27/2011*
Cs-134	2 years	160,000	110,000	*ND*	*3.1E6*
Cs-137	30 years	150,000	110,000	*0.28*	*3.0E6*
I-131	8 days	4,100	ND	*ND*	*1.3E7*

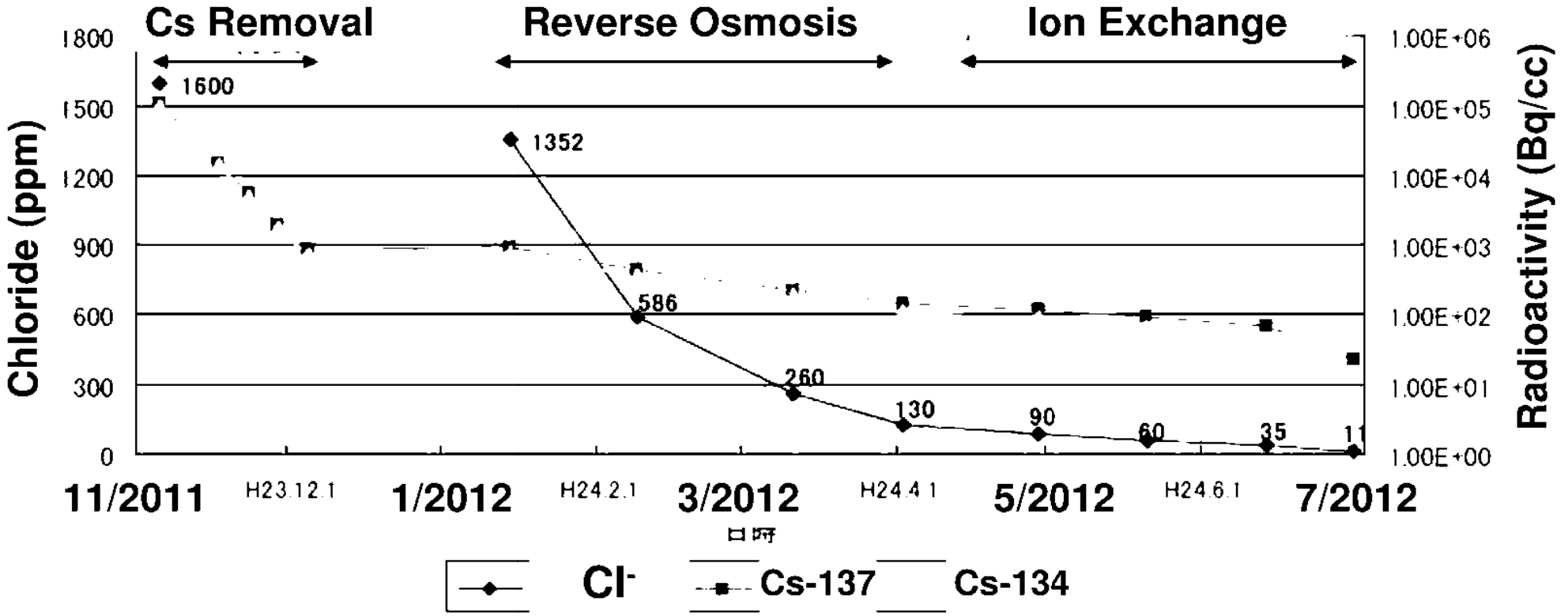
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

	4/16/2011	11/15/2011	4/2/2012	8/30/2012
Chloride (ppm)	1100	1600	130	14

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

I-131 most likely to have originated from reactor, not spent fuel (all fuels >7 months after shutdown)

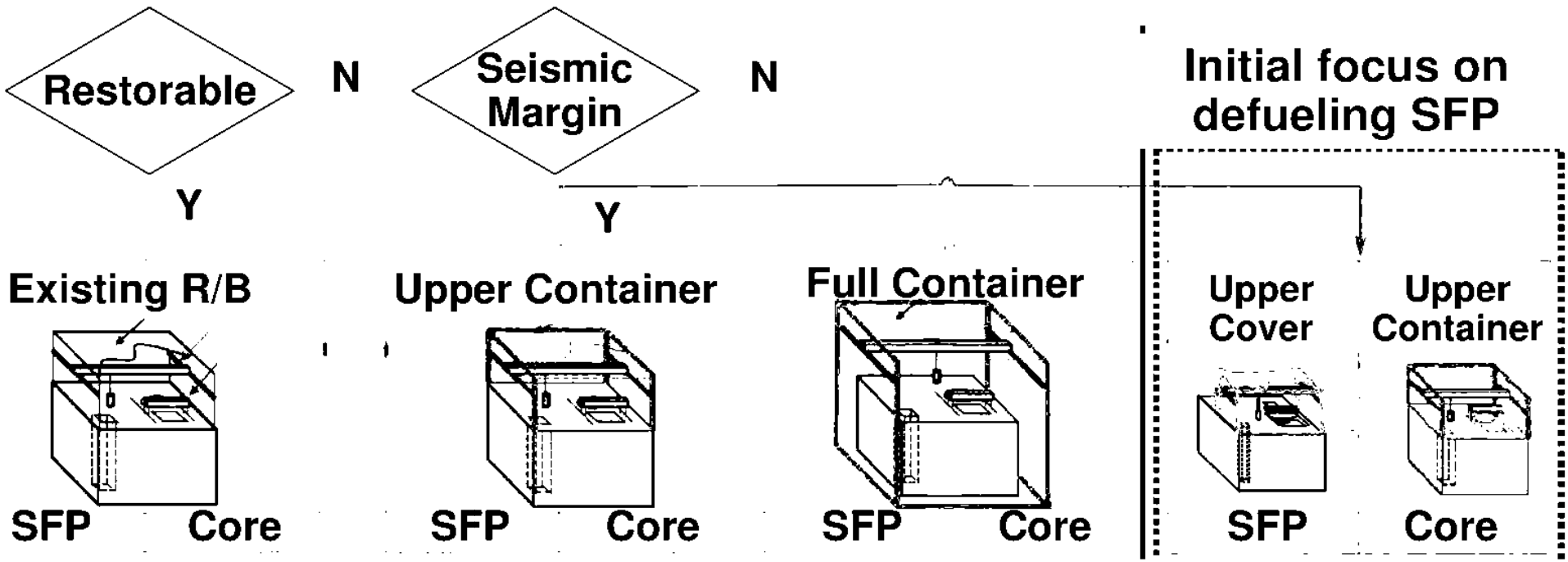
Unit 2 SFP: Water Chemistry (cont'd)



http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m121022_05-j.pdf

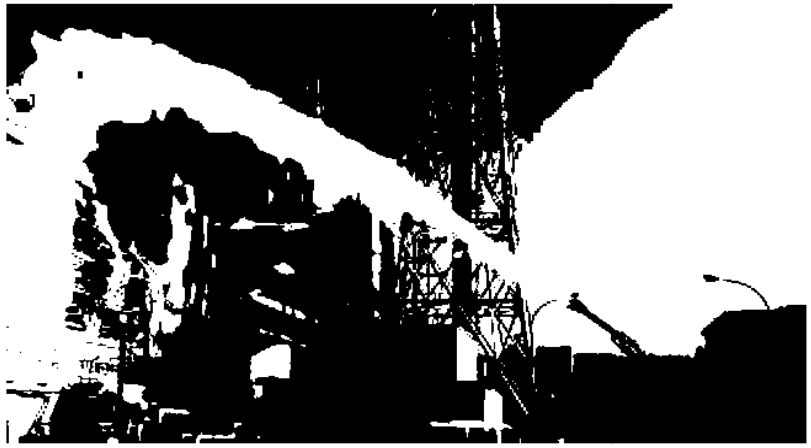
Water quality steadily improved

Unit 2 SFP: Next Step



Defueling strategy to be determined after path for core debris retrieval becomes clearer

Unit 3 Spent Fuel Pool: Water Injection



http://www.mod.go.jp/gsdf/crf/pa/saigaihaken/touhokutihoujisin/kakogazou/kako-jv-touhoku/march/23.3.30_2/jv-touhoku.html

Japan Self Defense Force

http://www.tfd.metro.tokyo.jp/hp-kouhouka/kts/kts_03/kts04.html

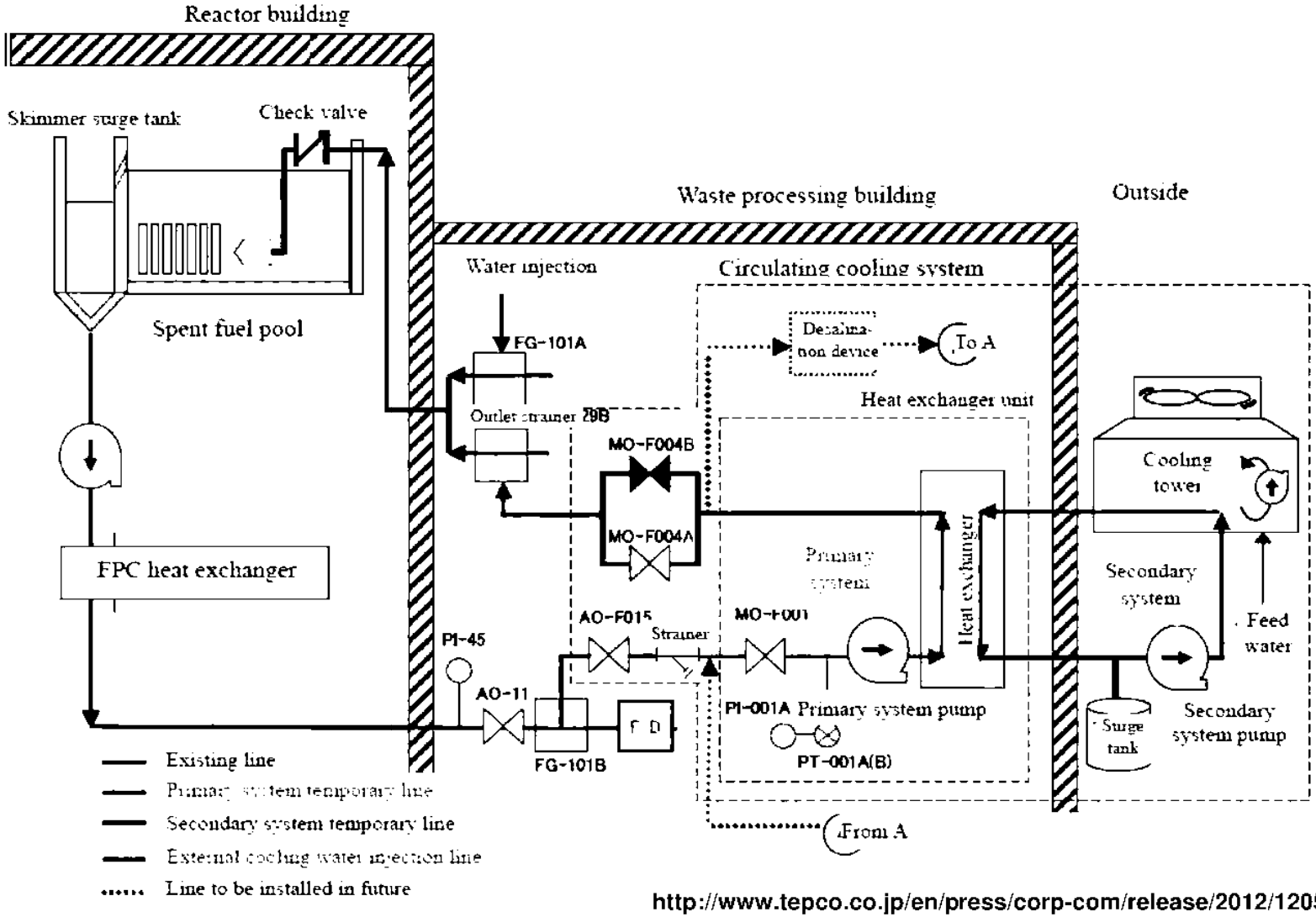
Tokyo Fire Department

Various attempts to inject water

Date (2011)	Injection Volume (ton)	Source	Injection Method
3/17	30	Seawater	Helicopter
3/17	44		
3/17	30	Fresh Water	Water Cannon
3/18	40		
3/18	2		
3/19	60	Seawater	Fire Truck
3/19	2430		
3/20	1137		
3/22	150		
3/23	35		FPC
3/24	120		
3/25	450		Fire Truck
3/27	100		
3/29	100	Fresh Water	Concrete Pumper
3/31	105		
4/2	75		
4/4	70		FPC
4/7	70		
4/8	75		
4/10	80		
4/12	35		
4/14	25		
4/18	30		
4/22	50		
4/26	47.5		
5/8	60		
5/9	80		
5/16	106		
5/24	100		
5/28	50		
6/1	40		
6/5	60		
6/9	55		
6/13	42		
6/17	49		
6/26	45	w/ Boron	
6/27	60		
6/29	30	Fresh Water	
6/30	Closed Cycle Cooling		

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

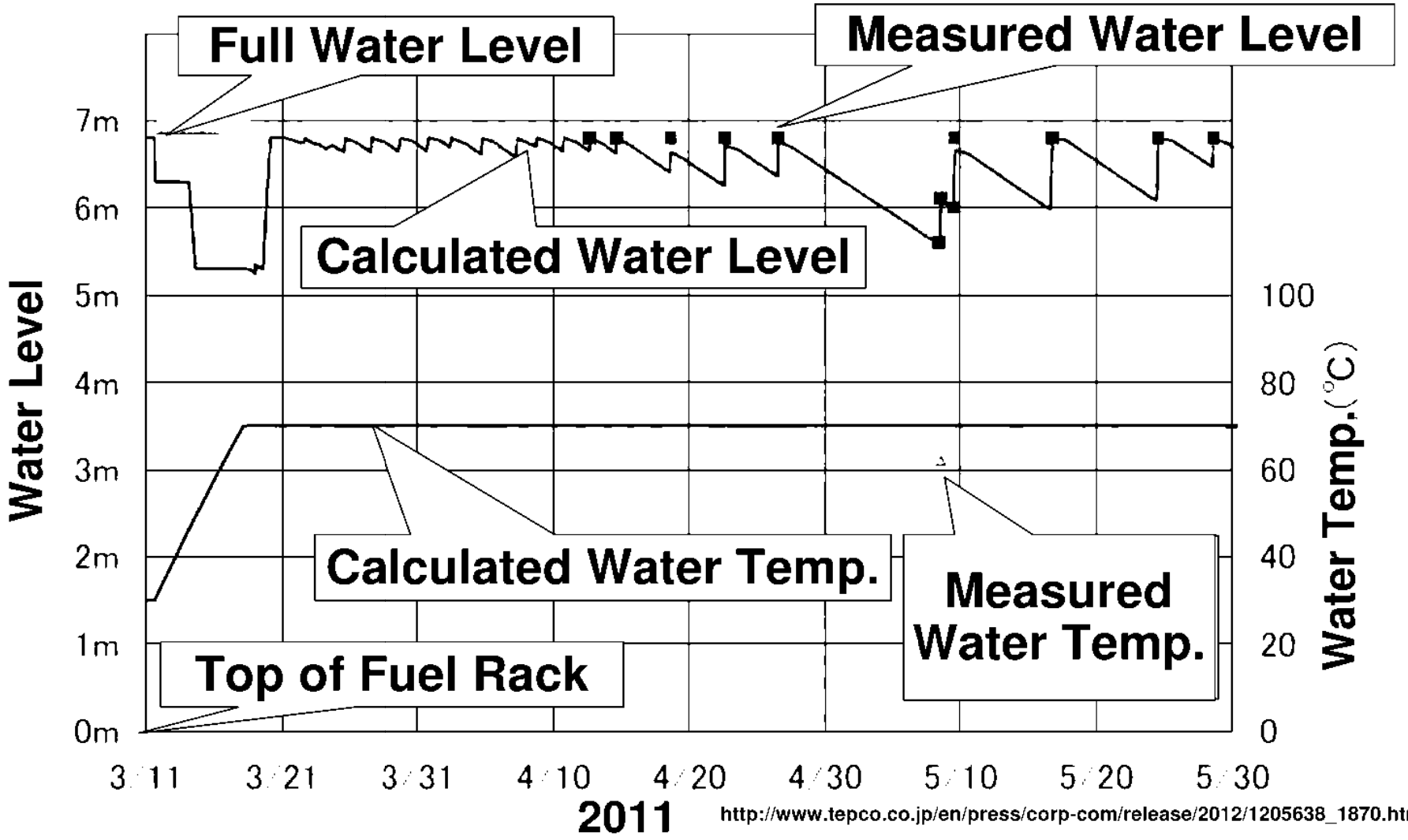
Unit 3 SFP: Closed-Cycle Cooling



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Stable closed-cycle cooling from 6/30/2011

Unit 3 SFP: Reconstruction of Events



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Water level highly unlikely to have dropped close to top of fuel rack

Unit 3 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm^3)				
		Unit 3 SFP			*Unit 3 SFP*	*Unit 3 T/B*
		5/8/2011	7/7/2011	8/19/2011	*3/2/2011*	*4/22/2011*
Cs-134	2 years	140,000	94,000	74,000	*ND*	*1,500,000*
Cs-136	13 days	1,600	ND	ND	*ND*	*44,000*
Cs-137	30 years	150,000	110,000	87,000	*ND*	*1,600,000*
I-131	8 days	11,000	ND	ND	*ND*	*660,000*

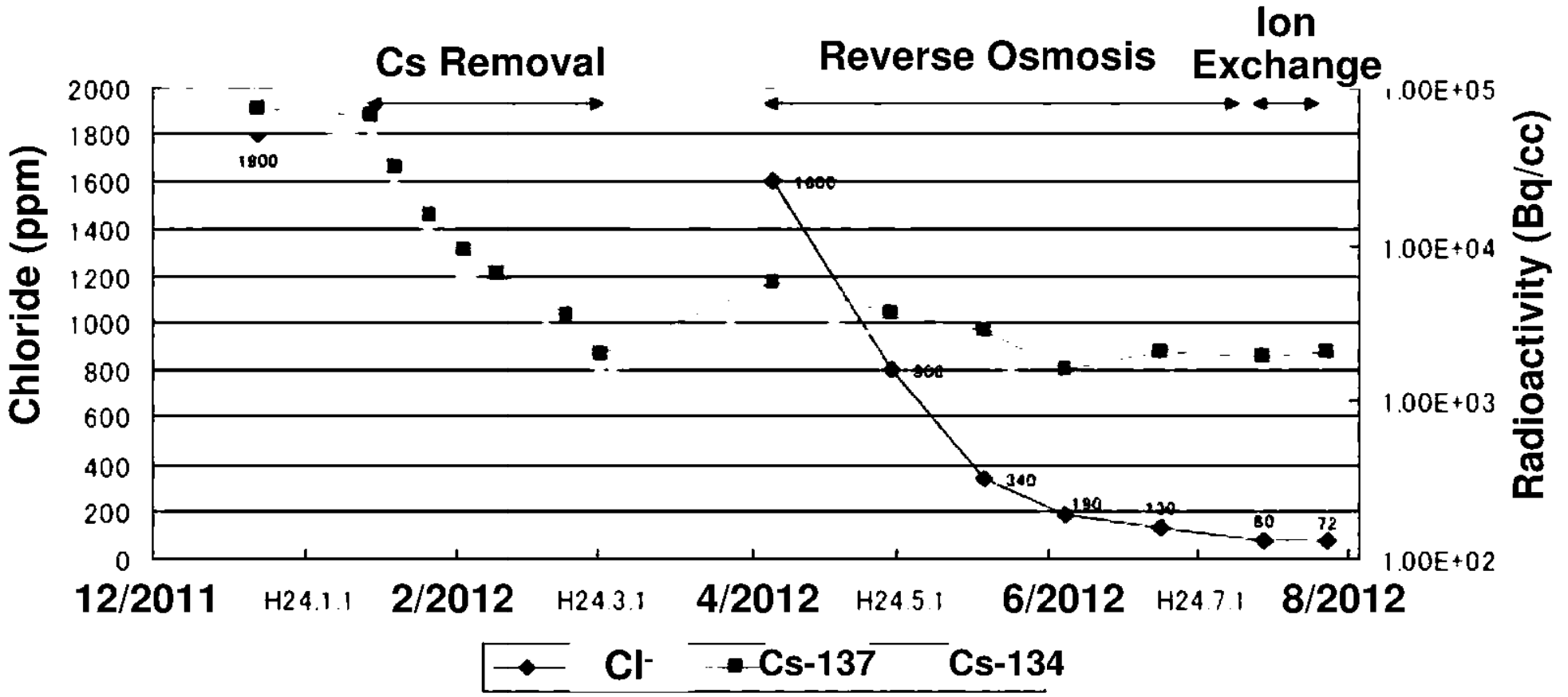
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

	5/8/2011	4/5/2012	6/23/2012	8/30/2012
Chloride (ppm)	2400	1600	130	73

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

- I-131 and Cs-136 most likely to have originated from reactor, not SFP (all fuels >10 months after shutdown)
- Injection of boric acid to neutralize alkalinity from concrete rubble
- Injection of hydrazine for anti-corrosion and microbe prevention

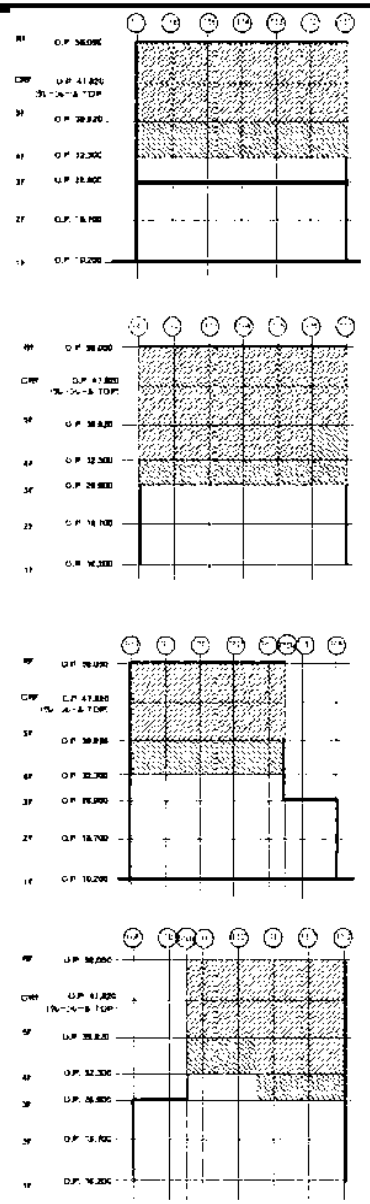
Unit 3 SFP: Water Chemistry (cont'd)

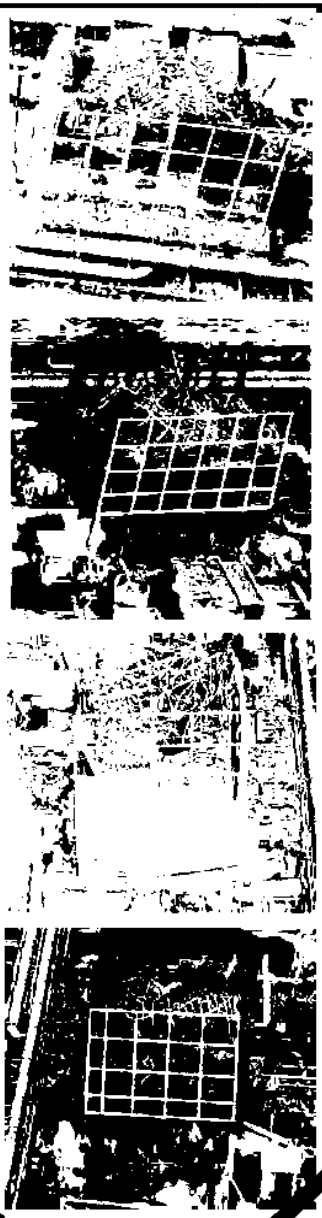


http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m121022_05-j.pdf

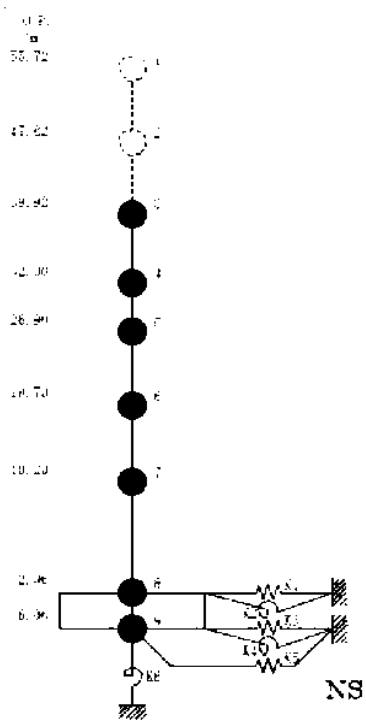
Water quality steadily improved

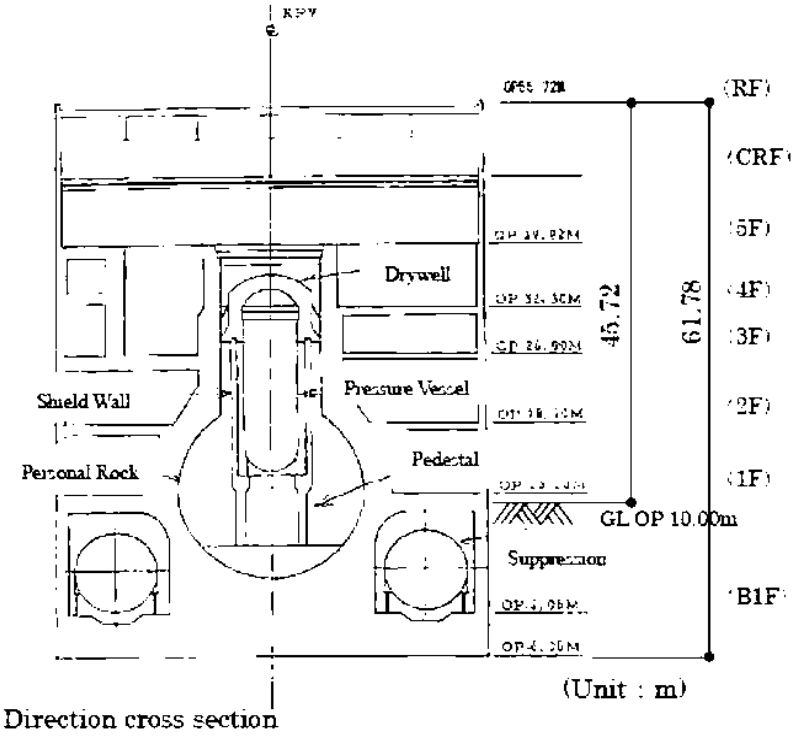
Unit 3 SFP: Structural Integrity Assessment





Structural Damage Assessment





NS Direction cross section

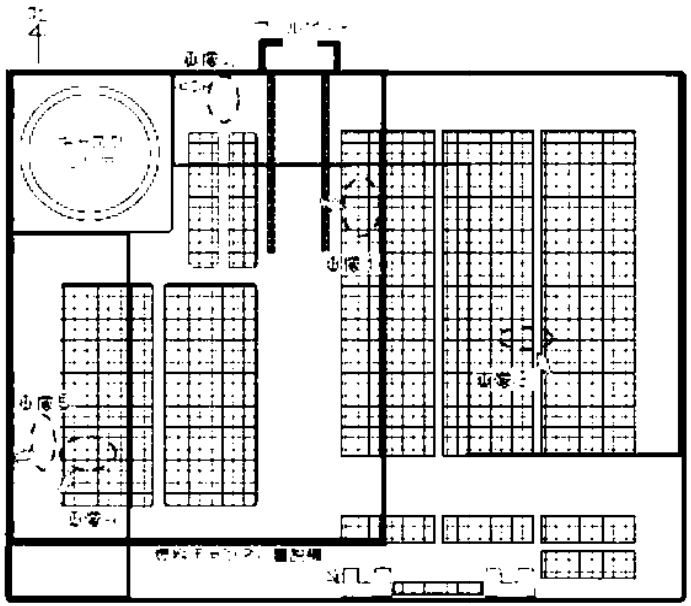
Seismic Response Model Incorporating Damaged Condition

http://www.tepco.co.jp/en/press/corp-com/release/11071307-e.html

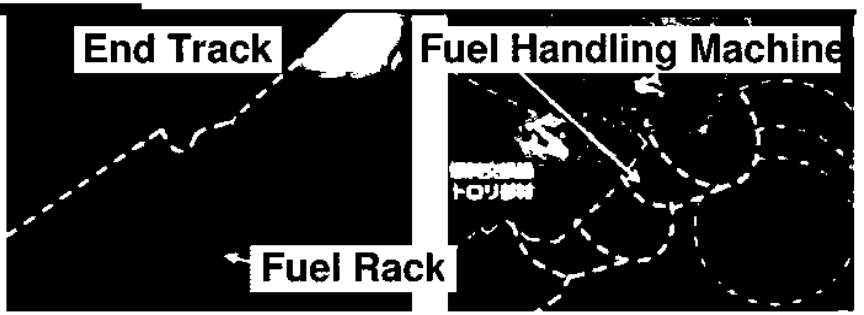
Shear strain from design-basis earthquake confirmed to be within safety limit (7/13/2011)

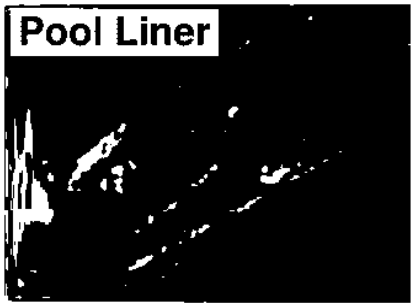
TOKYO ELECTRIC POWER COMPANY

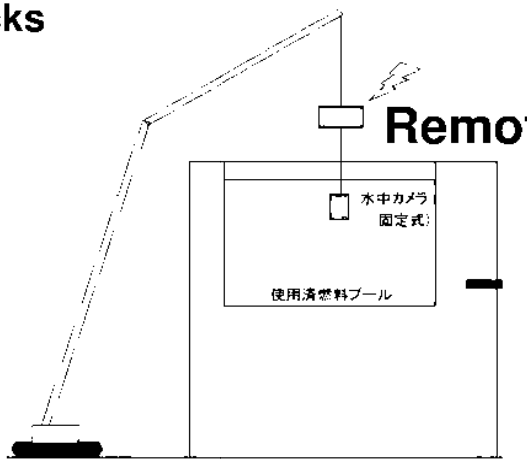
Unit 3 SFP: Rubble Removal

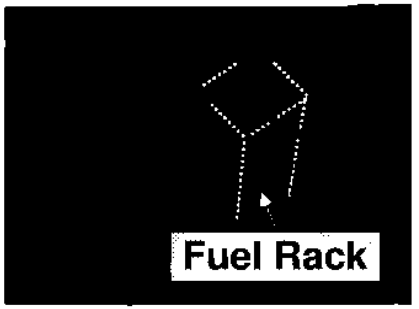


Fuel Racks
Oct. 11
Oct. 12





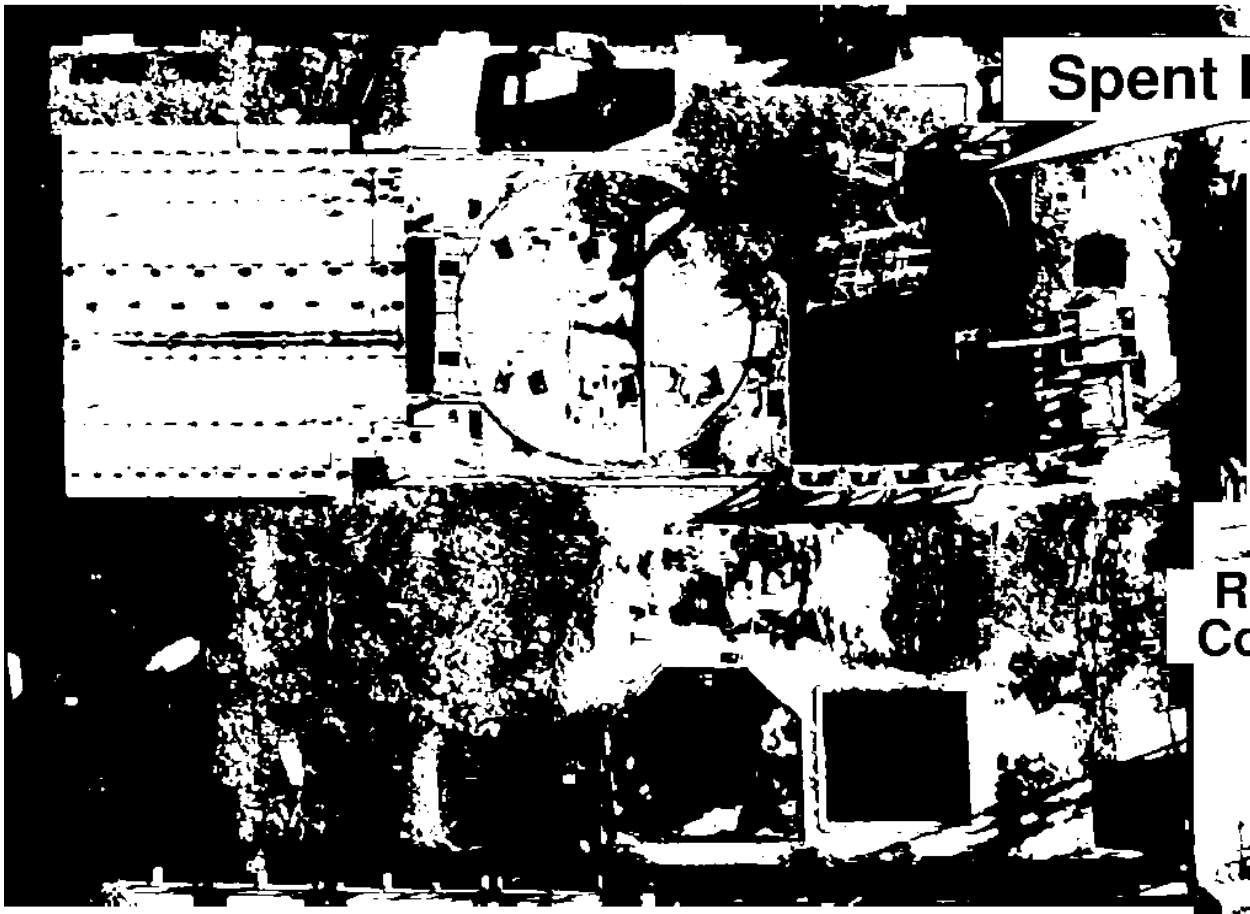




http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m121022_05-j.pdf

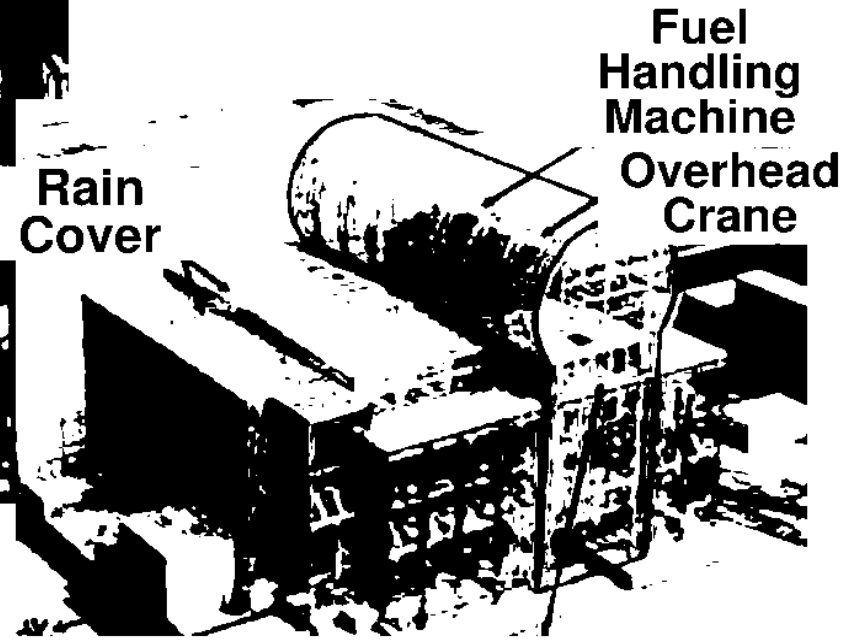
Information on rubble in SFP obtained by remote-controlled underwater camera (Oct. 2012)

Unit 3 SFP: Next Step



Refueling Floor (Dec. 2014)

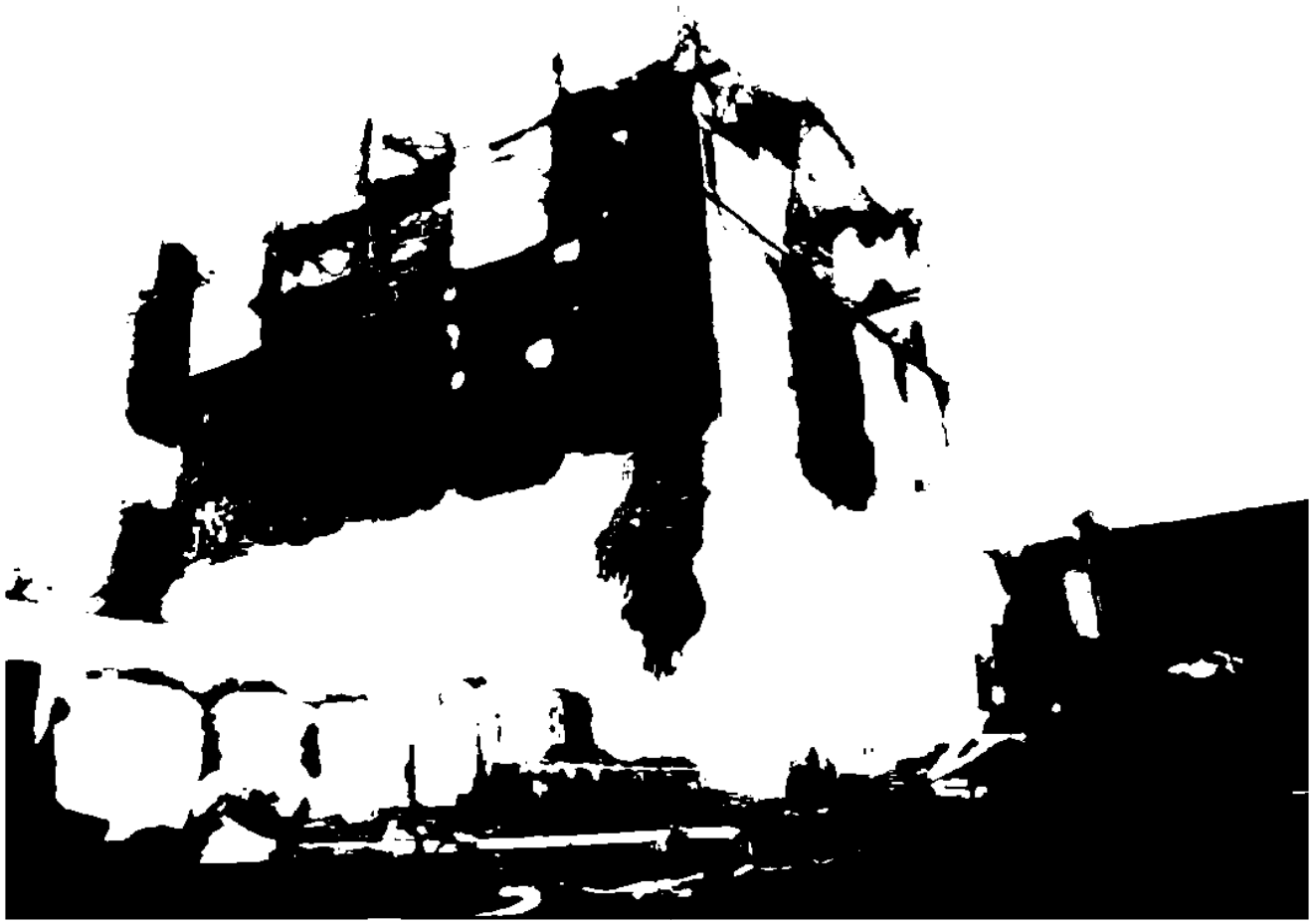
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_10-j.pdf



Schematic of Defueling Structure

Removing rubble from SFP in preparation for defueling

Unit 4 Spent Fuel Pool: Water Injection



Water Injection with Concrete Pumper (3/22/2011)

3/20, water cannon, fresh water, 80 ton

7/31, Closed Cycle Cooling, fresh water

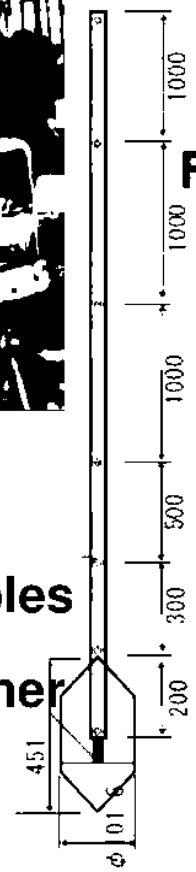
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Injection of seawater and fresh water from Mach 20 using water cannons, concrete pumpers, etc. until July 31, 2011

Unit 4 SFP: Water Level/Temp. Measurement

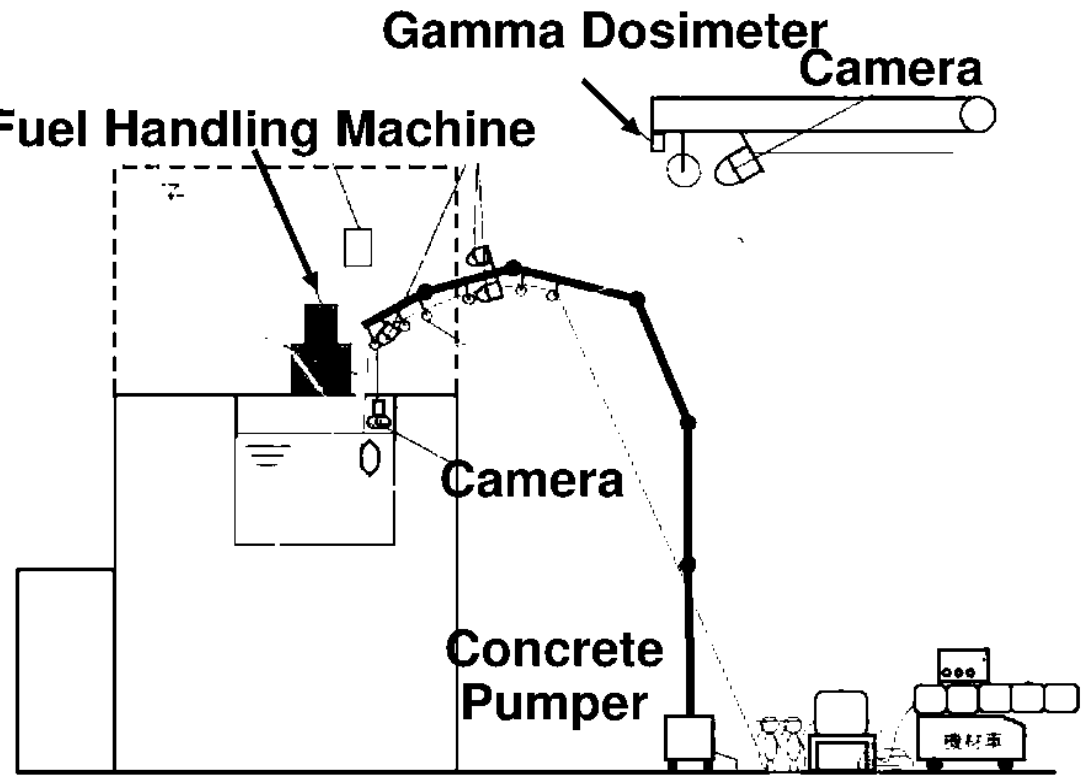
Collecting Water Samples
(4/15/2011)

http://photo.tepco.co.jp/date/2011/201104-j/110415-01j.html



Thermocouples

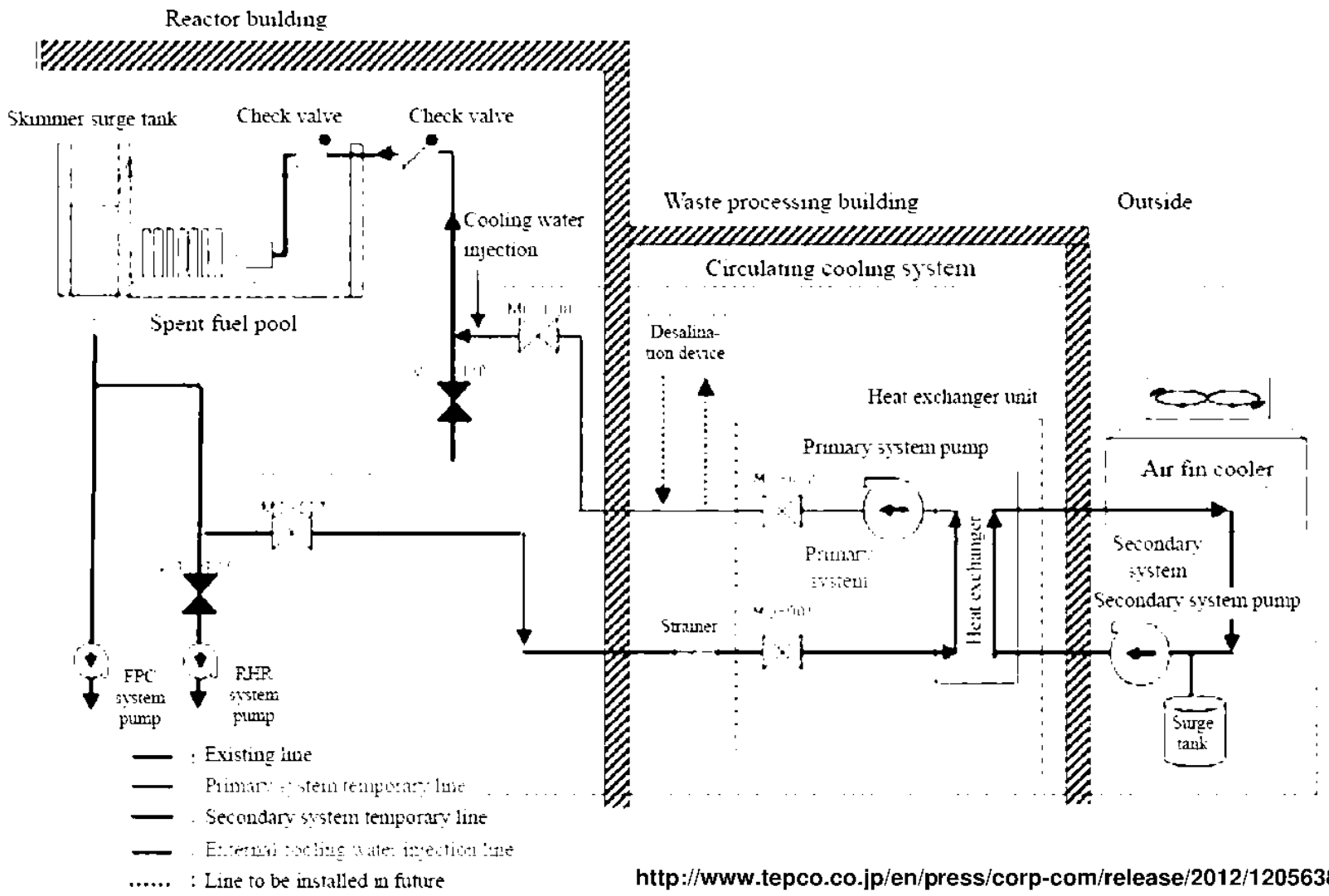
Sampling Container



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Concrete pumper used to measure SFP water level/temperature and collect water samples

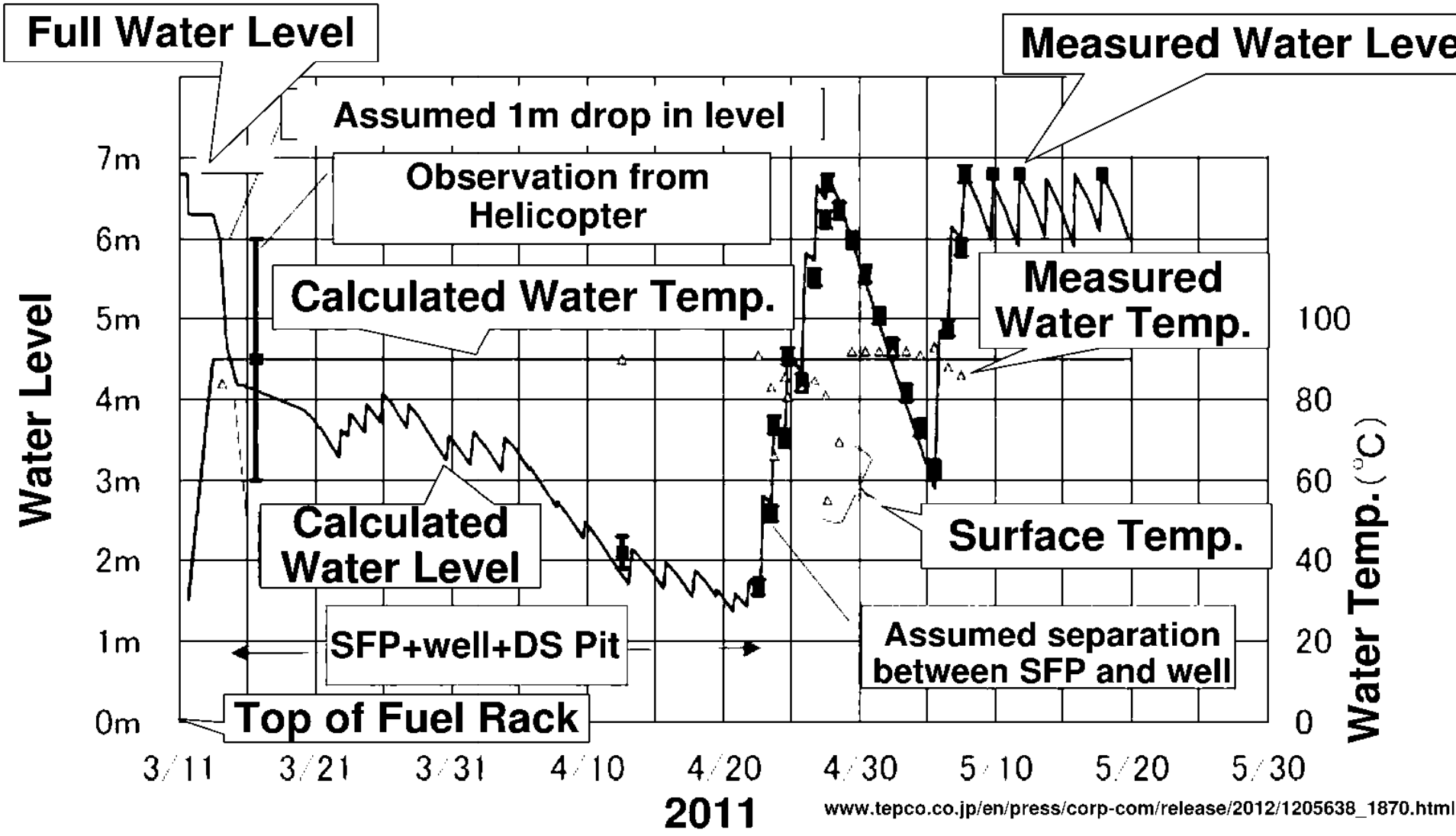
Unit 4 SFP: Closed-Cycle Cooling



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

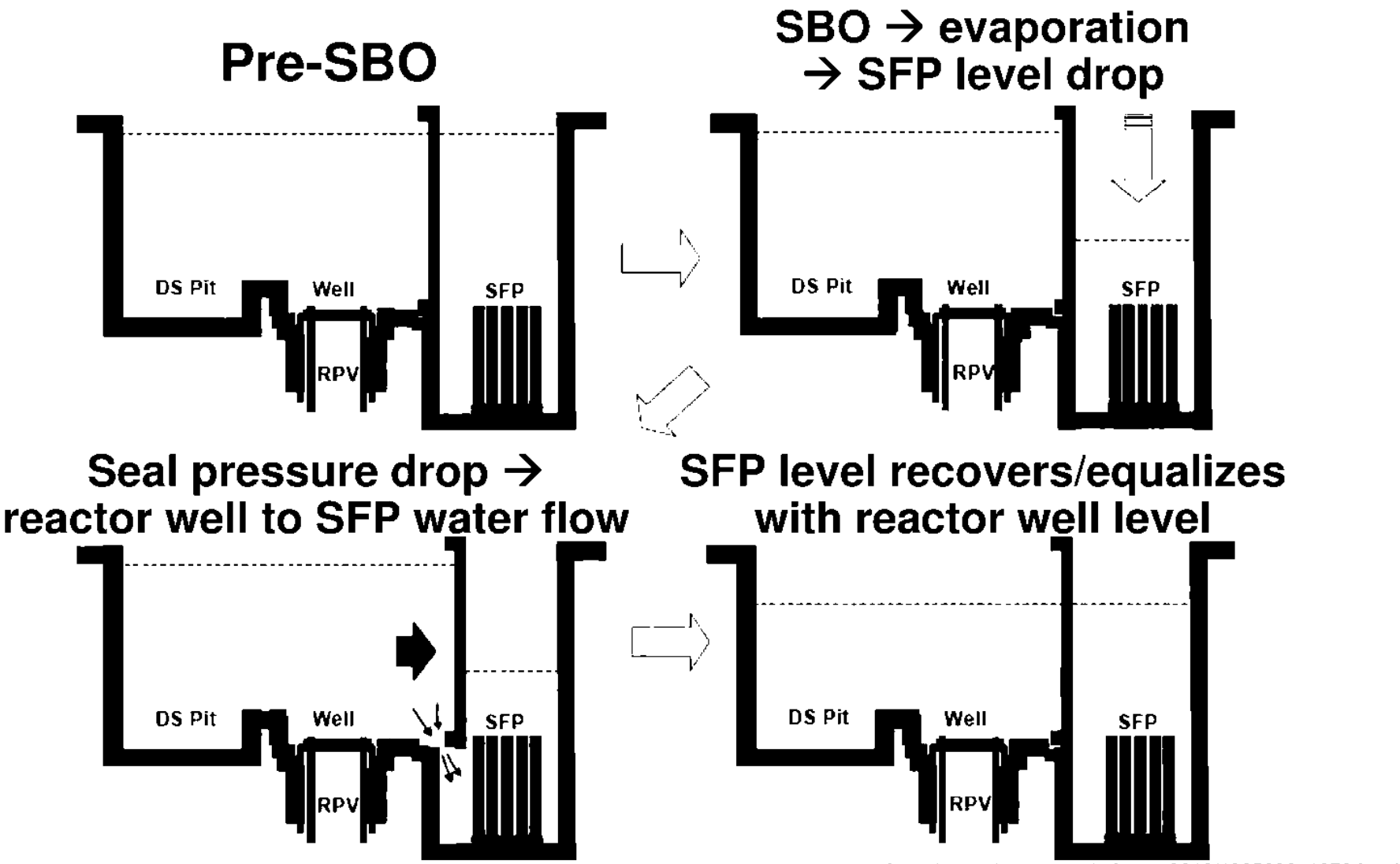
Stable closed-cycle cooling from 7/31/2011

Unit 4 SFP: Reconstruction of Events



Lowest water level at top of fuel rack +1.5 m at around April 20, 2011

Unit 4 SFP: Reconstruction of Events (cont'd)



www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Water from reactor well flowed into SFP during the event

Unit 4 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm^3)					
		Unit 4 SFP				*Unit 4 SFP*	*Unit 4 T/B*
		4/12/2011	4/28/2011	5/7/2011	8/20/2011	*3/4/2011*	*3/24/2011*
Cs-134	2 years	88	49	56	44	*ND*	*31*
Cs-137	30 years	93	55	67	61	*0.13*	*32*
I-131	8 days	220	27	16	ND	*ND*	*360*

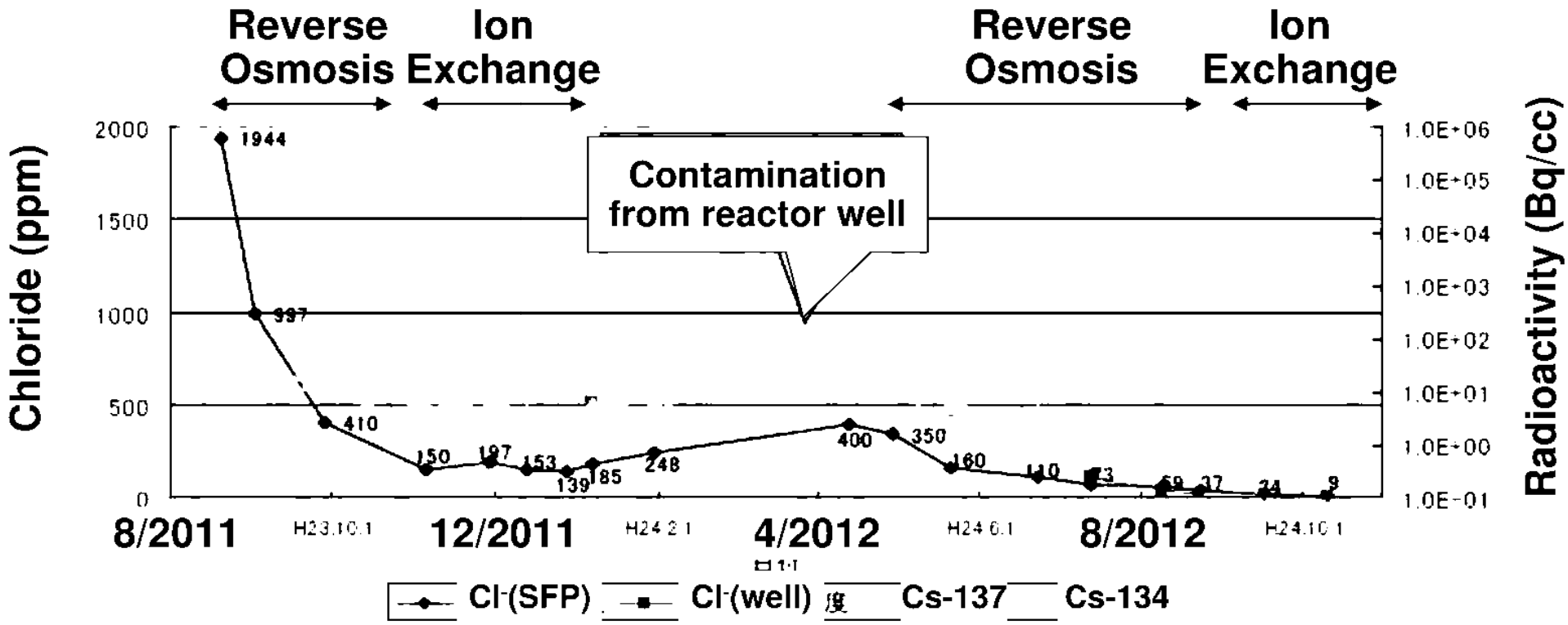
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

	4/12/2011	8/20/2011	11/29/2011	9/16/2012
Chloride (ppm)	6000	1944	197	24

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

- I-131 most likely to have originated from other reactors, not SFP (all fuels >4 months after shutdown)
- Injection of hydrazine for anti-corrosion and microbe prevention

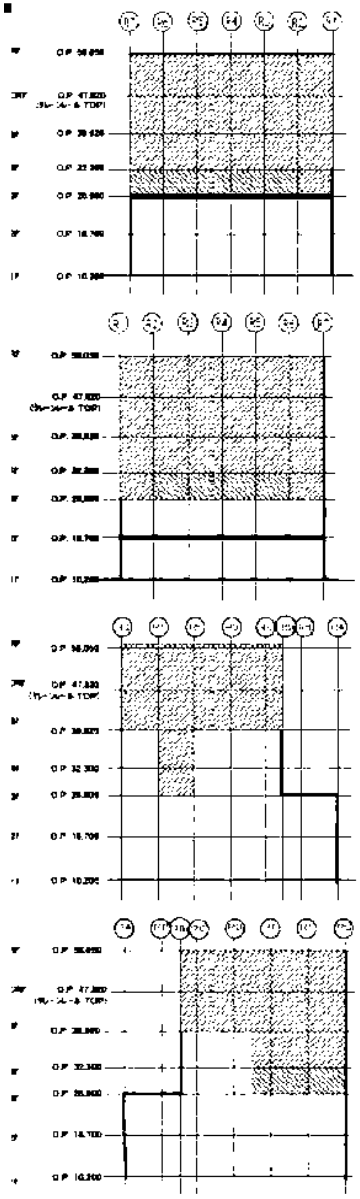
Unit 4 SFP: Water Chemistry (cont'd)

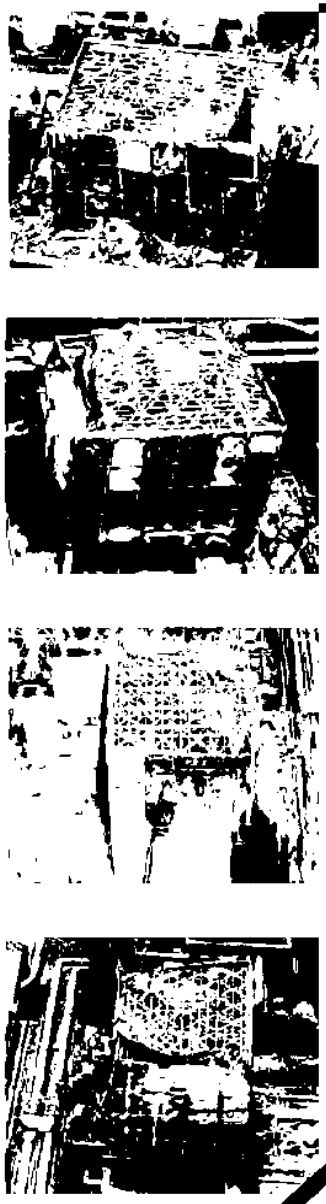


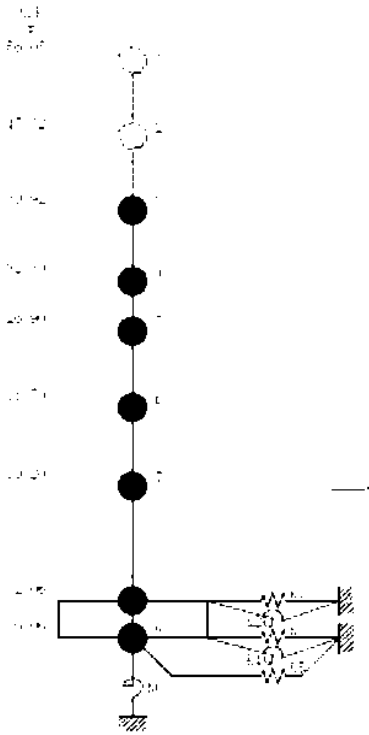
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m121022_05-j.pdf

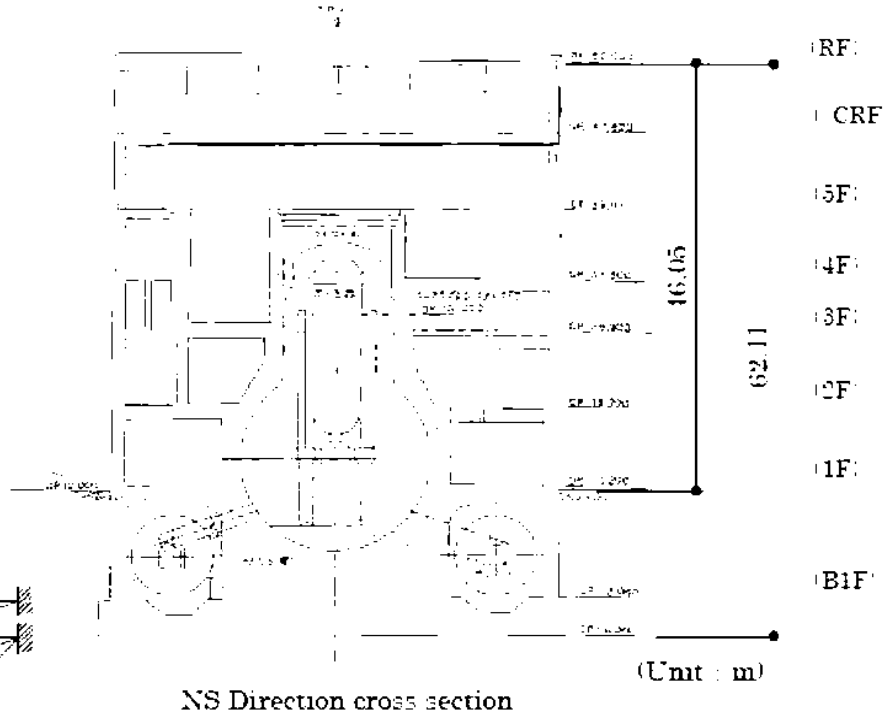
Water quality steadily improved

Unit 4 SFP: Structural Integrity Assessment









NS Direction cross section

Seismic Response Model Incorporating Damaged Condition

http://www.tepco.co.jp/en/press/corp-com/release/11052801-e.html

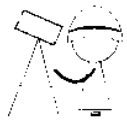
Shear strain from design-basis earthquake confirmed to be within safety limit (5/28/2011)

Structural Damage Assessment

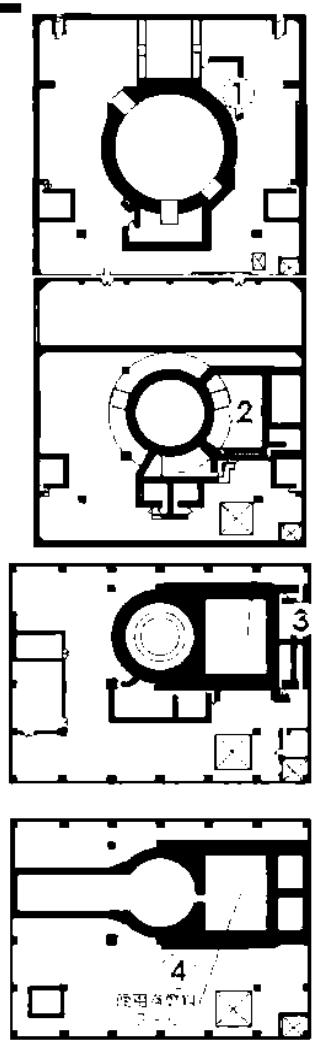
TOKYO ELECTRIC POWER COMPANY

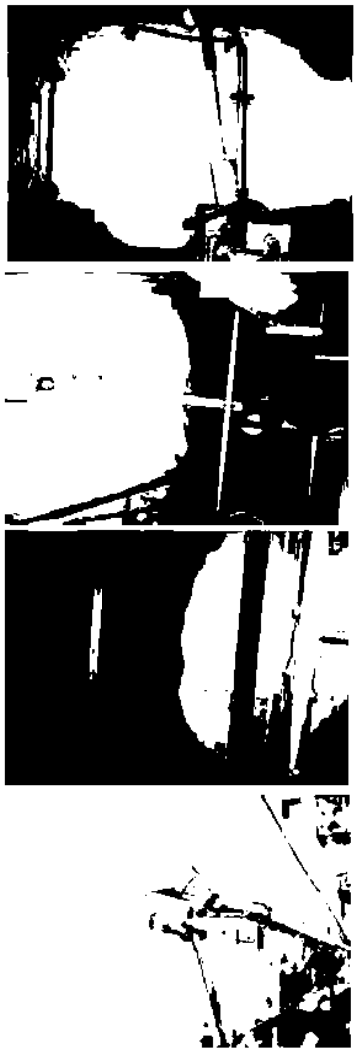
Unit 4 SFP: Structural Integrity Assessment (cont'd)

Optical Measurement
Confirmed No Tilting



Schmidt Hammer Testing
Confirmed Concrete Strength





R/B 1st Floor

R/B 2nd Floor

R/B 3rd Floor

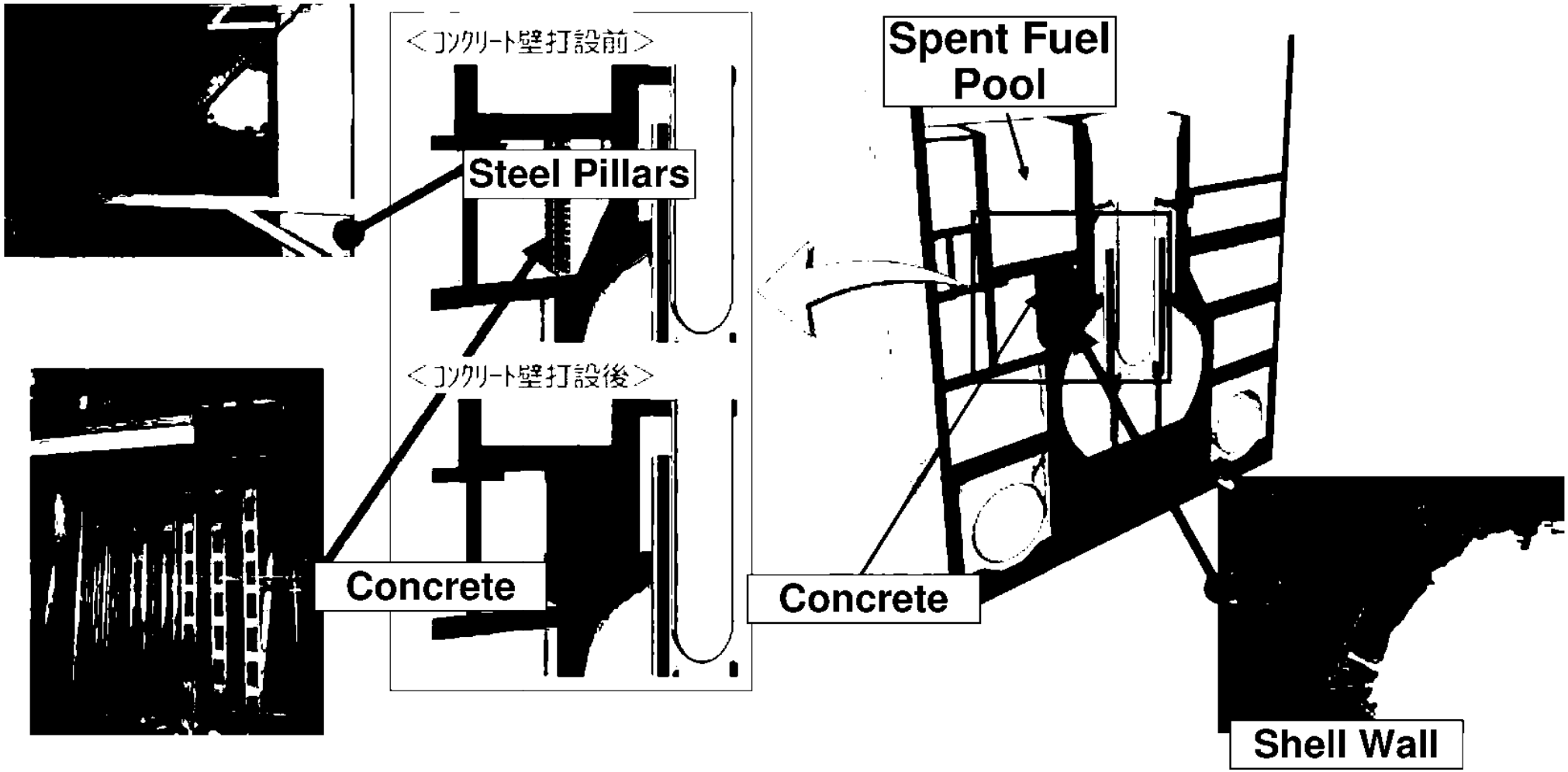
R/B 4th Floor

No Cracks found in SFP Outer Walls

http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120525_07-j.pdf

Quarterly structural integrity inspection found no issues (since 5/25/2012)

Unit 4 SFP: Structural Integrity Reinforcement



http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120516_07-j.pdf

Additional seismic margin by 20% (7/30/2011)

Unit 4 SFP: Progress To Date

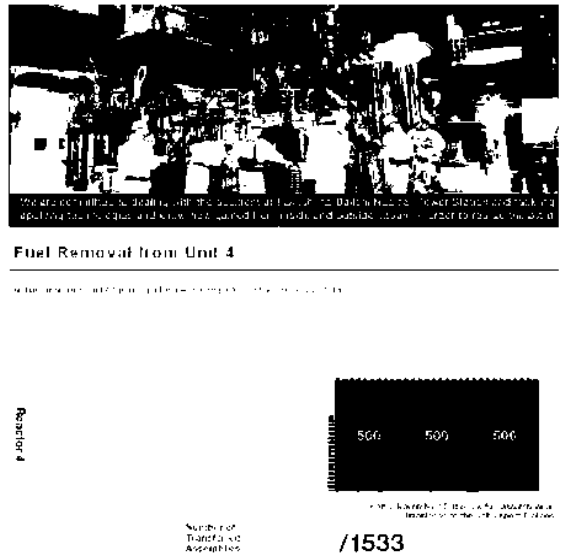
Pre-work Condition
(9/22/2011)

Drywell Head Removal
(8/10/2012)

Defueling Structure
Construction (1/14/2013)

Completion of Defueling
Structure (7/20/2013)

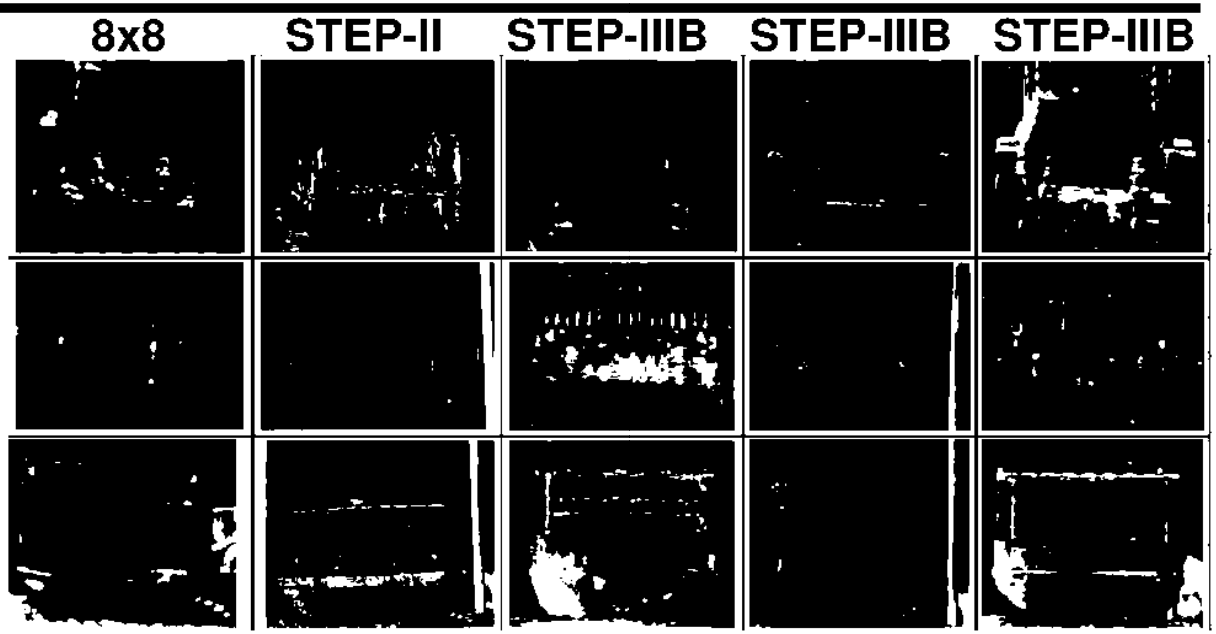
Beginning of Defueling
(11/18/2013)



http://www.tepco.co.jp/en/decommision/index-e.html

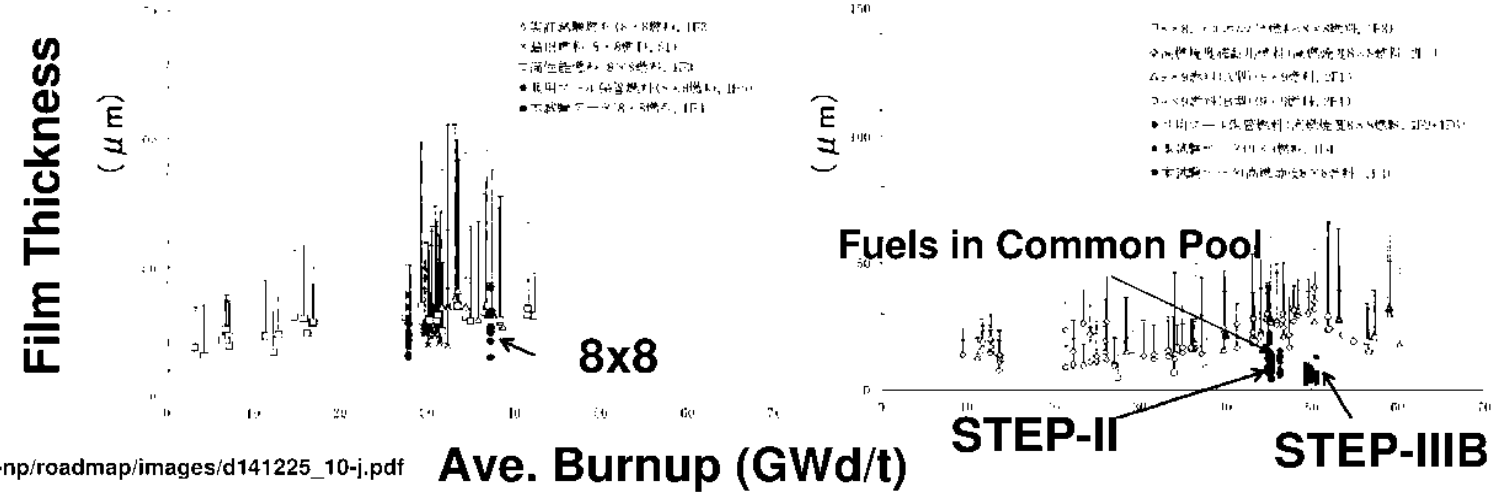
Successful removal of all fuels from SFP (12/22/2014)

Unit 4 SFP: Inspection of Spent Fuels



Visual Inspection

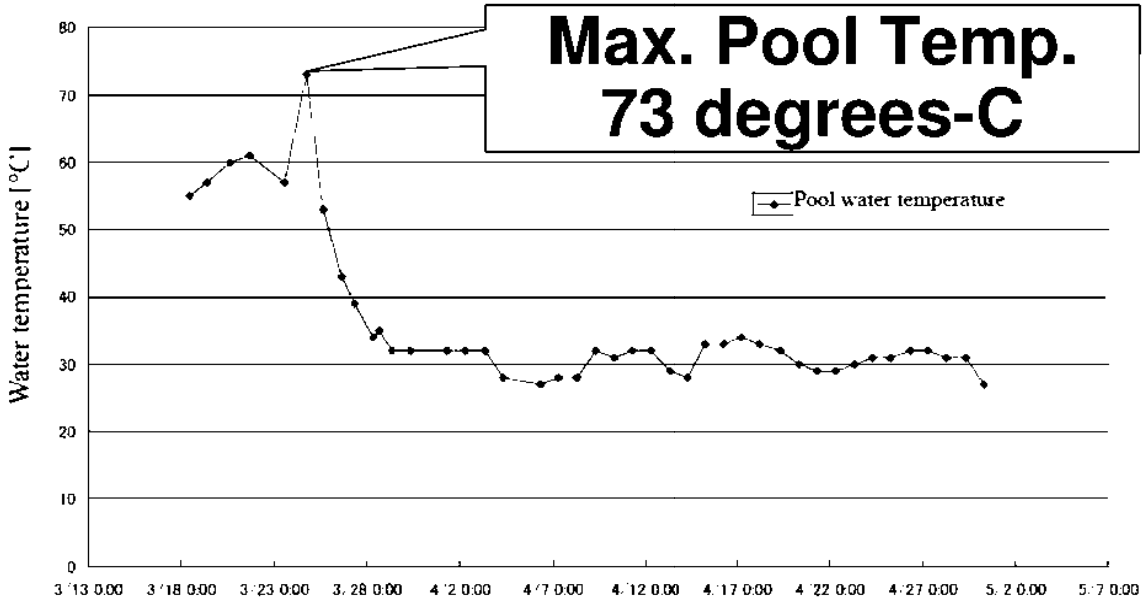
Oxidization Film Thickness Measurement

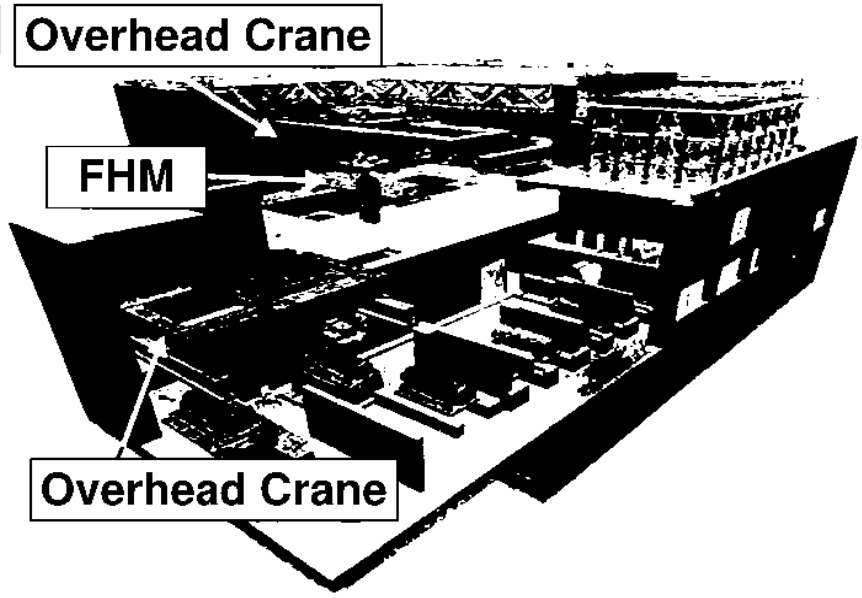


http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

Inspection of five spent fuels from Unit 4 SFP showed no abnormalities (Nov. 2014)

Common Pool



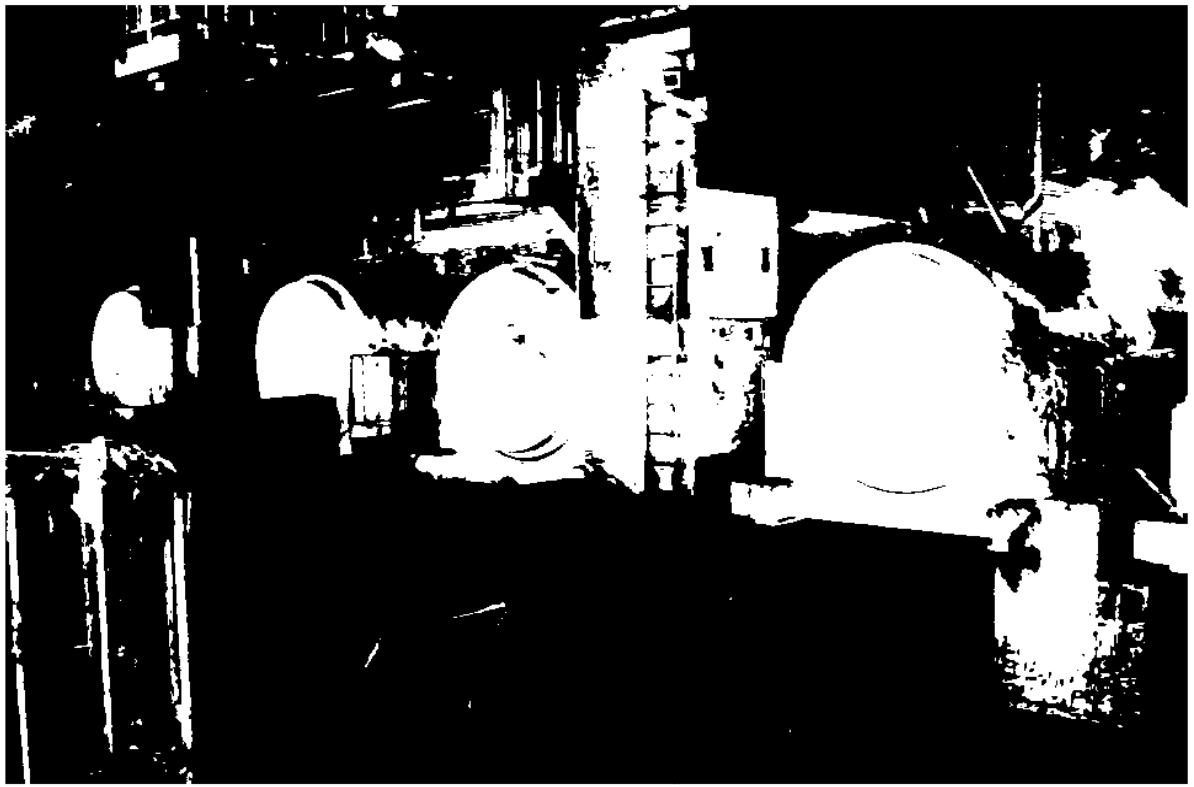


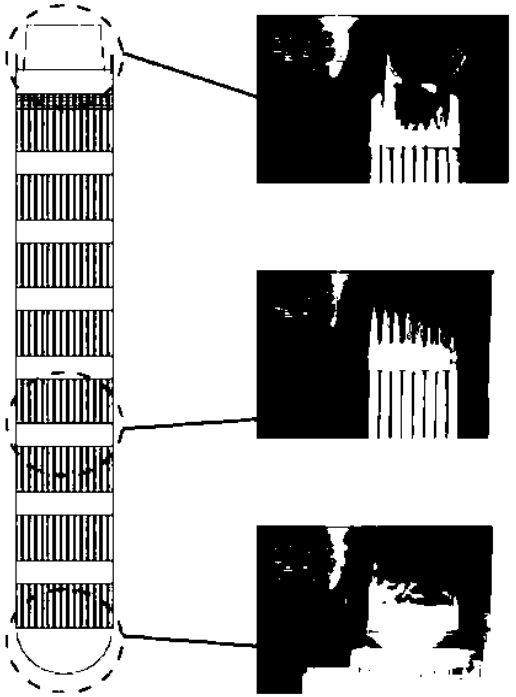
- 3/18/2011: Confirmed pool water level
- 3/24/2011: Pool cooling restored

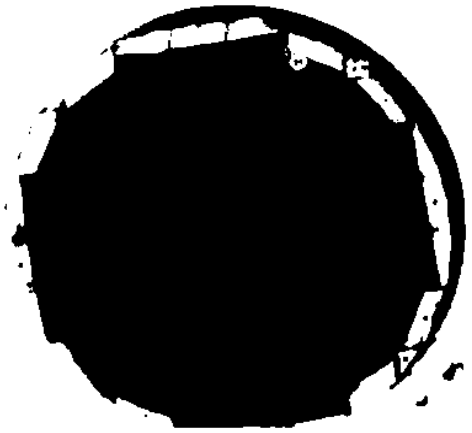
Radio Nuclide	Half Life	Concentration (Bq/cm³)	
		Common Pool	
		5/13/2011	*2/10/2011*
Cs-134	2 years	0.17	*ND*
Cs-137	30 years	1.2	*ND*
I-131	8 days	ND	*ND*

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Dry Cask Storage Facility





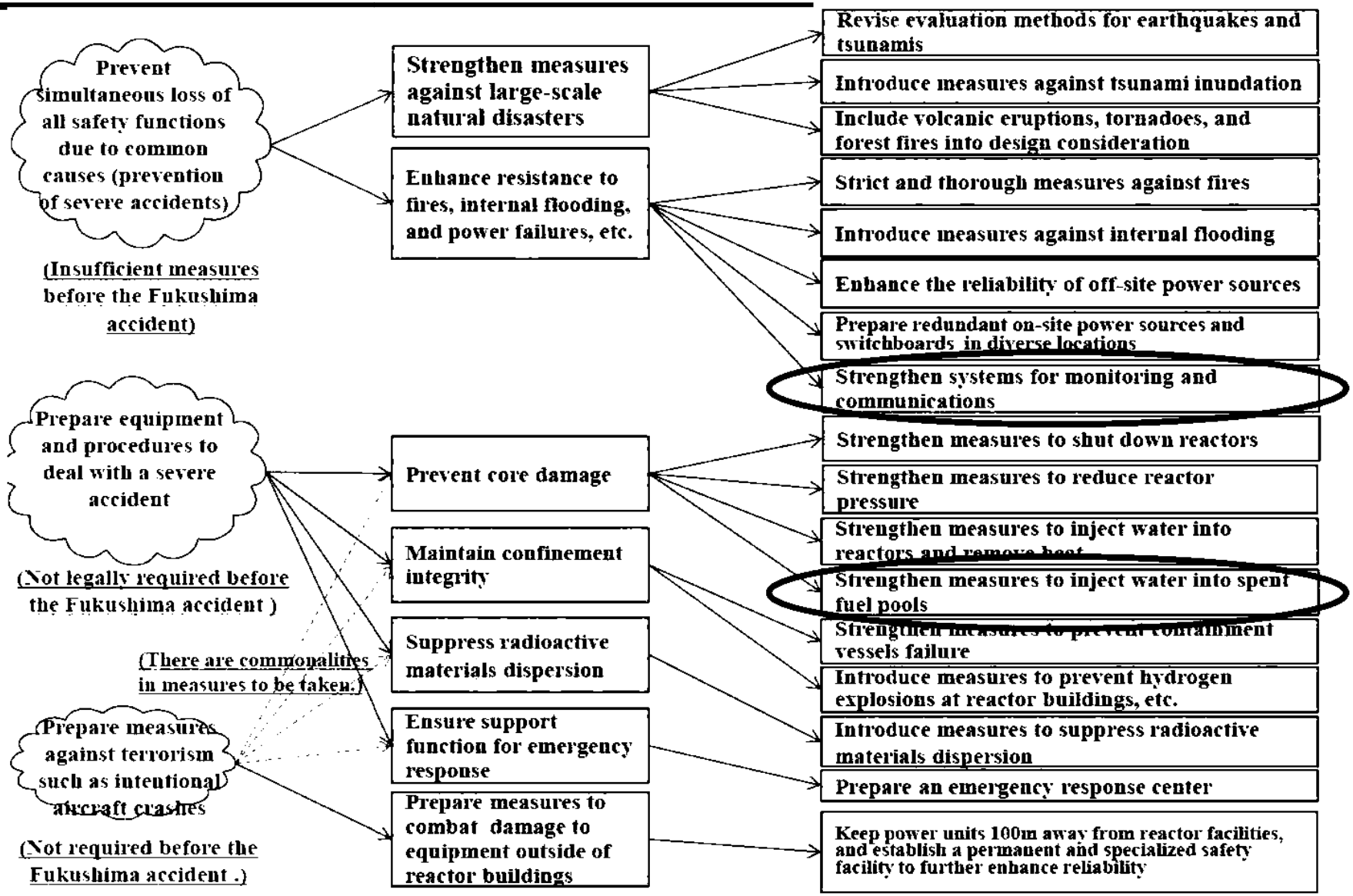


No Damage of Fuel Bundles or Basket

Inspection results of all 9 dry casks showed no abnormalities (5/30/2013)

http://www.meti.go.jp/earthquake/nuclear/pdf/130530/130530_03gg.pdf

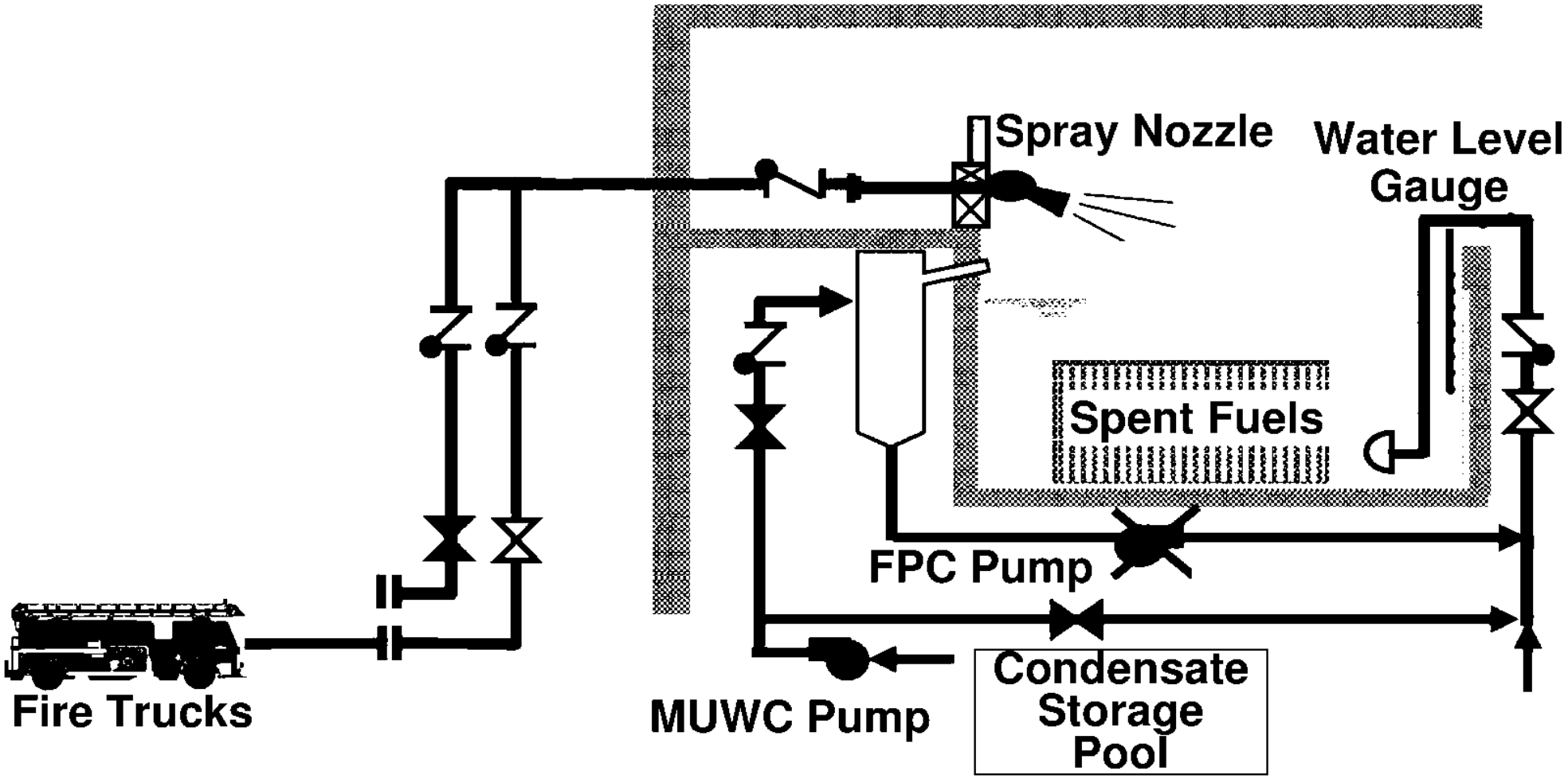
New Regulatory Requirements



http://www.nsr.go.jp/english/e_news/data/13/0912.pdf

Japan Nuclear Regulation Authority enacted new regulatory requirements effective July 2013

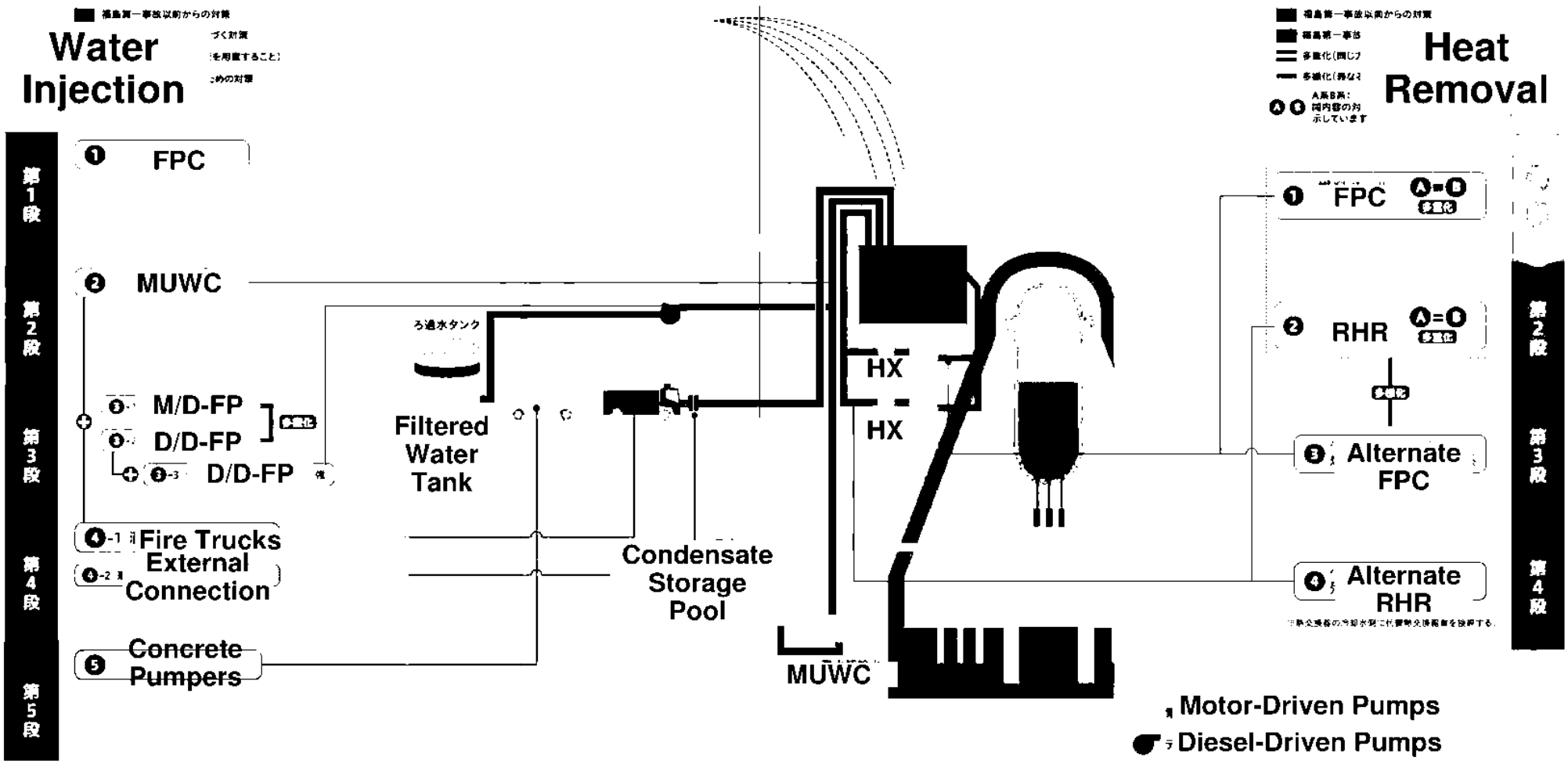
Safety Enhancements at Kashiwazaki Kariwa NPS



www.nsr.go.jp/activity/regulation/tekigousei/shinsa/data/kk67/mendan/20131015_01shiryo_01.pdf

Fixed and flexible alternate injection systems with multiple backup power and water sources

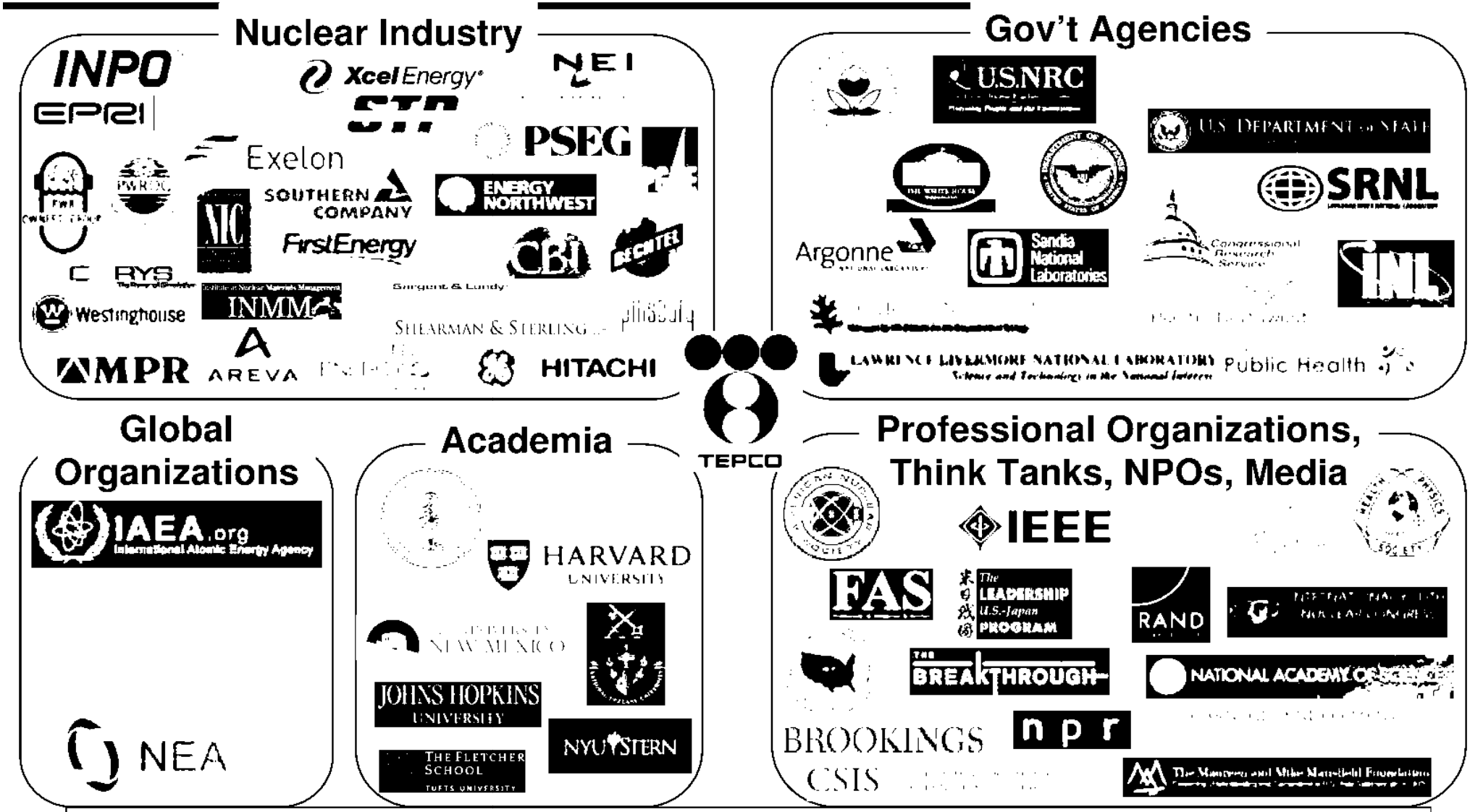
Safety Enhancements at Kashiwazaki Kariwa NPS (cont'd)



http://www.tepco.co.jp/en/nu/kk-np/safety/index-e.html

Multiple layers of defense
(only showing safety measures related to SFP)

TEPCO's Post-Accident Activities in the U.S.



Committed to sharing lessons learned; making nuclear power plants safer; carrying out decommissioning safely

→ Hosting Weekly Update Teleconferences

References

- **TEPCO Website on Decommissioning Status**
  http://www.tepco.co.jp/en/decommision/index-e.html

- **TEPCO Internal Investigation Committee Report (6/20/2012)**
  http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html
  - ✓ **Main Body**
    http://www.tepco.co.jp/en/press/corp-com/release/betu12_e/images/120620e0104.pdf
  - ✓ **Attachment**
    http://www.tepco.co.jp/en/press/corp-com/release/betu12_e/images/120620e0106.pdf

- **IRID Symposium (7/18/2014)**
  http://www.irid.or.jp/en/reports/symposium/
  - **Current Status of Fukushima Daiichi**
    http://irid.or.jp/wp-content/uploads/2014/07/Sympo_Masuda_E.pdf
  - **R&D Projects Related to Fuel Debris Retrieval**
    http://irid.or.jp/wp-content/uploads/2014/07/Sympo_SSuzuki_E.pdf

From: Tateiwa, Kenji
Sent: 24 Nov 2014 10:51:24 -0500
To: Tateiwa, Kenji
Subject: NO CALL THIS WEEK [TEPCO Weekly Fukushima Update Call] Next on Fri, Dec. 5 at 3pm EST
Importance: Normal

Nuclear Sector Colleagues,

Due to unavoidable change in schedule, I will have to **cancel the call planned for tomorrow (Tue, Nov. 25**.)
Next call will be on **Fri, Dec. 5th** at 3 PM.

Apologies for any inconvenience this may cause you.
Feel free to contact me should you have any questions.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, November 12, 2014 7:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Nov. 13 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, Nov. 13, 2014 at 3 pm Eastern Standard Time
(**No call next week.** Next call will be on **TUE, Nov. 25** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Reactor Building Cover Roof Panel Removal (11/10/2014)
http://photo.tepco.co.jp/en/date/2014/201411-e/141110-01e.html

2. TEPCO's Statement on Detection of Trace Amounts of Cs-134 Off U.S. West Coast (11/11/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243939_5892.html

2.1 Woods Hole Oceanographic Institution's Press Release
http://www.whoi.edu/news-release/Fukushima-detection

2.2 Discussion Board on the New REDDIT Journal of Science

http://www.reddit.com/r/science/comments/2lusz5/science_ama_series_im_ken_buesseler_an/?limit=500

3. Radioactivity in Seawater Near Fukushima Daiichi (11/12/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

3.1 Inside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/intake_canal_map-e.pdf

3.2 Outside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/seawater_map-e.pdf

4. Summary Status of Decommissioning Roadmap--English Translation (9/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140925_01-e.pdf

5. Large-Scale Emergency Drill at Kashiwazaki Kariwa NPS (11/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/kk-np/info/tohoku/2014/pdf/26110702.pdf

(photos)
http://photo.tepco.co.jp/en/date/2014/201411-e/141111-01e.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, November 06, 2014 7:36 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Nov. 7 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]

Fri, Nov. 7, 2014 at 3 pm Eastern Standard Time
(Next call will be on **THU, Nov. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (10/30/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_05-j.pdf

1-3. Preparation for Unit 3 Containment Vessel Internal Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_06-j.pdf

1-4. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_08-j.pdf

1-6. Improvement of Work Environment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_10-j.pdf

1-8. R&D Related to Core Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_11-j.pdf

1-9. Storage of Solid Radioactive Waste
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (10/31/2014)
(only in Japanese)
2-1. Waterproofing Connection between Underground Seawater Piping Trench and Turbine Building
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_01.pdf

2-2. Testing of Subdrain Water Treatment Facility
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_02.pdf

2-3. Increase in Radioactivity at Unit 1 Discharge Canal
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_03.pdf

2-4. Effectiveness of Groundwater Bypass System
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_05.pdf

2-5. Use of Dry Storage Casks at Fukushima Daiichi
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_06.pdf

3. Completion of Transferring Spent Fuels from Unit 4 SFP (11/6/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141106_07-j.pdf

4. Nuclear Safety Reform Plan--2014 Q2 Progress Report (11/5/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243826_5892.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, October 29, 2014 6:56 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Oct. 30 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, Oct. 30, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Nov. 7** at 3 pm Eastern Standard Time.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (10/27/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141027_03-j.pdf

1-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141027_04-j.pdf

2. Fukushima Fishermen's Association Meeting (10/29/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141029_07-j.pdf

3. "FORMER U.S. NUCLEAR CHIEF DALE KLEIN CITES FUKUSHIMA PROGRESS,CHALLENGES TEPCO TO DEEPEN SAFETY CULTURE, ESTABLISH KPI'S" (10/29/2014)
Speech at the American Chamber of Commerce in Japan
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243683_5892.html

3-1. Overview of the Seven Water Treatment Facilities at 1F
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141016_04-e.pdf

3-2. Activities of TEPCO's Nuclear Reform Monitoring Committee Members
http://www.nrmc.jp/en/news/detail/index-e.html#date_20141029-103000

4. "On the Brink: The Inside Story of Fukushima Daiichi" (10/7/2014)
Long-awaited English translation of the book that vividly describes the human element of the accident.
http://www.amazon.com/dp/4902075547/?tag=kurodahanpres-20

5. "Fukushima Update" (Sept.-Oct. 2014)
Attached file is a pdf copy of the Nuclear Plant Journal article reprinted and distributed with permission.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 09, 2014 8:27 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 10 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **Oct. 10**, 2014 at 3 pm Eastern Daylight Time
(**No call next 2 weeks**. Next call will be on **Thu, Oct. 30** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (10/3/2014)
(only in Japanese)
1-1. New Postulated Earthquake and Tsunami at Fukushima Daiichi and Risk Mitigation Measures
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141003_04-j.pdf

(page 3/42) Risk mitigation measures
(page 10/42) New postulated earthquake and tsunami results
(page 13/42) Various earthquakes that were considered
(page 25/42) Probability of exceedance for postulated earthquake
(page 28/42) Various tsunamis that were considered
(page 34/42) Probability of exceedance for postulated tsunami
(page 35/42) Risk evaluation and mitigation measures

1-2. Status of Isolating Units 2/3 Seawater Piping Trenches from Turbine Buildings
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141003_03-j.pdf

(page 4/38) Temperature reduction effect of ice injection into the trench
(page 5/38) Assumed water flow preventing formation of ice barrier
(page 18/38) Injection of grout and concrete to fill gap
(page 21/38) Transferring and processing accumulated water in the trench
(page 23/38) Backfilling the trench with anti-washout cement
(page 28/38) Schedule

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http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 02, 2014 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 3 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Oct. 3, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Oct. 10** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (9/22/2014)
(only in Japanese)

1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_03-j.pdf

1-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_04-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (9/25/2014)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_05-j.pdf

2-3. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_07-j.pdf

2-4. Environmental Radiation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_08-j.pdf

2-5. Fuel Removal from SFPs
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_10-j.pdf

2-6. Unit 2 S/C Lower Outer Surface Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_11-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=x04s084o&catid=61699

2-7. Radioactive Waste Management
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_12-j.pdf

3. Investigation Status of ALPS Train B (9/29/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140929_04-j.pdf

4. Start Operation of Mobile Sr Removal System (10/2/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141002_06-j.pdf

5. Technical Cooperation Agreement with UK Sellafield Ltd. (9/30/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140930_04-e.pdf

6. "False Report on Fukushima: The Company Responds" (9/22/2014)
TEPCO President's Letter to the Editor of the NY Times
http://mobile.nytimes.com/2014/09/23/opinion/false-report-on-fukushima-the-company-responds.html?_r=0

All the best,

Kenji

From: Tateiwa, Kenji
Sent: 14 Apr 2015 21:59:30 -0400
To: Madden, Patrick;West, Steven;Bernardo, Robert;Aird, David;koi@k.u-tokyo.ac.jp;andrew.Szilagyi@em.doe.gov;philip.mattson@hq.dhs.gov;kamel.saidi@nist.gov;'Jacoff, Adam S.';Nicholson, Thomas
Subject: Re: First organizational meeting to plan the November 2015 Workshop on the Use of Robotics at Nuclear Facilities
Importance: Normal

Tom and all,

Please find below links to the results of investigation inside Unit 1 drywell conducted on April 10th.

[Slides]
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150413_01-e.pdf

[Photos and Video]
http://photo.tepco.co.jp/en/date/2015/201504-e/150413-01e.html

Although the robot unfortunately got stuck inside the drywell and had to be abandoned, we obtained invaluable data.

The same type of robot will be inserted into the drywell on April 15 at 9 am Japan time and will investigate clockwise inside the drywell.

[Slides: only in Japanese]
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150415_01-j.pdf

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW, Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Nicholson, Thomas
To:'Jacoff, Adam S.' ; kamel.saidi@nist.gov ; philip.mattson@hq.dhs.gov ; andrew.Szilagyi@em.doe.gov ; koi@k.u-tokyo.ac.jp ; Tateiwa, Kenji ; Aird, David ; Bernardo, Robert ; West, Steven ; Madden, Patrick
Sent: Monday, April 13, 2015 1:02 PM
Subject: First organizational meeting to plan the November 2015 Workshop on the Use of Robotics at Nuclear Facilities

Adam, Phil, Kamel, Andrew and Kenji:

Thanks for your responses to my follow-up suggestion.

Yes, everyone has agreed to meet via teleconference on Tuesday, April 21st @1:30 p.m. EDST to discuss how we might organize the subject workshop.

To participate, please call **1-888-677-0358** with passcode [redacted] followed by the # sign. (b)(6)

Please send me any input you may have so that I can prepare a draft agenda and then forward the tentative agenda to you later this week.

Ideas could include the workshop scope, goals, invited organizations, list of topics and possible presenters/organizations.

Thanks …….. Tom

From: Tateiwa, Kenji
Sent: 22 Aug 2014 00:07:25 +0900
To: Bernardo, Robert
Subject: Re: Frozen Soil wall and trench ice wall differences

Bob,

Thank you for your note and for participating in the weekly update calls.

Your write-up is accurate.
I will be explaining the material that we submitted to the NRA on Aug. 19 during this week's update call.
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0026_01.pdf

Thank you for your efforts in dispelling the confusion on this topic.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

On Thu, 21 Aug 2014 09:12:28 -0400
"Bernardo, Robert" <Robert.Bernardo@nrc.gov> wrote:

> Good morning, Kenji,
>
> My name is Bob Bernardo, and I work for the US NRC. I work with Chuck Norton, and I am tasked with monitoring developments at Fukushima. You may have heard my name on the last few weekly phone calls.
>
> There has been a fair amount of press coverage over the last couple of days related to the "frozen Soil wall" and the "trench ice wall", a couple of examples are below. I wanted to take a moment to make you aware of this, since I think the press is still getting this confused.
>
> TEPCO Concedes Failure Of Ice Wall At Fukushima Plant.
CleanTechnica<http://cleantechnica.com/2014/08/20/tepco-concedes-failure-fukushima-ice-wall/> (8/20, Dechert, 12K) reports, "Less than a week ago, Naohiro Masuda, the Tokyo Electric Power Company's Chief Decommissioning Officer, spoke about development of the 'ice wall' around the four ruined reactor units at the Fukushima I power station." Different "story on Tuesday, August 19" as "TEPCO officials told Japanese nuclear regulators that the section of ice wall between the unit #2 turbine building and the cable tunnel--estimated to hold 5-6,000 tons of highly radioactive water--was not working." As "we reported on June 6, workers from a TEPCO subcontractor, Kajioma Corp., had been tasked to install 1,500 thin tubes of refrigerant at -30° C a meter (3 ft) apart and up to 30 meters (100 ft) underground." The "soil thus frozen would create an impervious wall about two meters thick (over 6 ft) around the wrecked react
ors."
>
> TEPCO Concedes Failure Of "Ice Plug" For Tunnel. The Telegraph
(UK)<http://www.telegraph.co.uk/news/worldnews/asia/japan/11045921/Fukushima-radioactive-water-ice-plug-plan-fails.html> (8/21, Ryall, 3.23M) reports, "The operator of Japan's crippled Fukushima nuclear plant has conceded defeat in its effort to create a frozen plug in a tunnel to stop water flowing into the No. 2

reactor building and becoming contaminated with radiation." TEPCO engineers have been working since early June to inject "more than 400 tons of ice and dry ice into the tunnel in an effort to freeze a section of the passage solid." Halting the "flow of water through the tunnel, which was originally used to run cables into the reactor's turbine building, would have made it possible to pump highly radioactive water out to be treated." But now, TEPCO says it will "experiment with cement and other sealant materials in an effort to stop the water moving through the tunnel, as well as installing a filter to
try to slow the flow of water."
>
> Concerns Persist On TEPCO Plan For Ice Wall Around Damaged Fukushima Reactors. In a lengthy report on its website, Vice<http://www.vice.com/read/no-one-wants-you-to-know-how-bad-fukushima-might-still-be-666> (8/20, Magdaleno, 448K) reports on TEPCO's announcement last month that it would proceed with its plan to "construct an 'ice wall'" around the plant's failed reactors, suggesting that "it seemed like a step backwards." In June, "the utility company in charge of decommissioning the plant" indicated that its "initial attempt at installing a similar structure had flopped." The pipes were "apparently unable to freeze the ground, despite being filled with a -22°F chemical solution." Dr. Dale Klein, former NRC Chairman is concerned that there's "little technical understanding of how the natural water sources surrounding the plant might respond." Klein said, "As the water comes down the mountains towards the ocean, it's not clear to me that [TEPCO] really know how it is
going to move around that frozen barrier." He added, "It's such a complicated site and problem, and I don't know if they fully understand that yet."
>
> I've put together some information based on my understanding of the issues, mostly based on what you have shared in the weekly phone call briefings. I'm going to share this with my management to make sure they understand the difference. Could you take a quick look and make sure I'm accurate in my understanding? thanks
> There has been a lot of public confusion about the efforts that TEPCO is making toward freezing the trench ice wall (Ice Plug in article below) and the "frozen soil wall" that will surround the site. Many people think that they are both the same and the difficulties with the trench ice wall show that TEPCO won't be successful installing the "frozen soil wall". TEPCO has produced a You-Tube video to try and clarify the differences. https://www.youtube.com/watch?v=C6YSOrfS1Kc.
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> Here's some information that helps in the understanding:
>
> Frozen Soil Wall:
> In June, 2014, construction began on the "frozen soil wall," a system designed to freeze the soil around the entire perimeter of Units 1-4. The frozen soil was will block groundwater from entering the reactor building basements and dramatically reducing the accumulation of contaminated water from its current level of 400 tons per day. This, in turn, will reduce the need for more storage tanks and will also free up capacity in the water treatment systems to clean water that is already being stored. Drilling and installation of the freezer pipes and monitoring equipment is in progress. TEPCO expects to begin freezing operations in March, 2015. To learn more, see the linked video:
> http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=kyt26951&catid=61795
>
> Trench Ice Plug:
> A significant contamination control effort is underway to remove water from the underground piping tunnels, or trenches, between the turbine buildings and the intake structures. The water entered the trenches during the inundation from the tsunami, and then became highly contaminated as a result of the accident. The water in the trench is not being released into the ocean now. However, if another tsunami were to strike the site, the contaminated water could be washed out of the trenches into the ocean. To remove the water, the trenches must be isolated from the turbine buildings. TEPCO intends to create an Ice Wall at the turbine building end of the trenches to isolate the trench. Once the trench is isolated, the contaminated

water can be pumped out and the trench decontaminated.
> TEPCO began the freezing operation in May on the trench ice wall. Since that time, the efforts to freeze the wall have not been completely successful. They have been installing more freeze pipes and adding dry ice to the trench water to try to freeze the water, as well as adding packing material to minimize the flow of water. These efforts have made some progress, but the trench wall has not yet completely frozen. Detailed material on the additional measures to try to complete the trench ice wall can be found at http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140723_03-e.pdf
> TEPCO met with JNRA on August 19 to talk about where they are and where they think they are going with the trench wall. TEPCO now says it will be difficult to halt the flow of water with an ice blockade alone, so it has decided to augment the ice wall with filler material such as cement or grout. NRA experts agreed to make a decision on whether to approve the plan after they assess the effectiveness of using filler material in tests to be conducted by TEPCO. TEPCO is being very cautious to avoid displacing any of the water in the trench. Any contaminated water displaced from the trench could enter the ocean and wash additional contamination into the port at Fukushima.
>
>
> Bob Bernardo
>
> Policy and Support Branch
> Japan Lessons-Learned Division
> US Nuclear Regulatory Commission
> O-13E11; MS O-13F15M
> 301-415-2621
> Robert.Bernardo@nrc.gov<mailto:Robert.Bernardo@nrc.gov>

From: Bernardo, Robert
Sent: 21 Aug 2014 15:09:49 +0000
To: 'Tateiwa, Kenji'
Subject: RE: Frozen Soil wall and trench ice wall differences

Thanks, Kenji, I appreciate the quick response! I am looking forward to tomorrow's phone call.

Bob Bernardo

Policy and Support Branch
Japan Lessons-Learned Division
US Nuclear Regulatory Commission
O-13E11; MS O-13F15M
301-415-2621
Robert.Bernardo@nrc.gov

-----Original Message-----
From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Thursday, August 21, 2014 11:07 AM
To: Bernardo, Robert
Subject: Re: Frozen Soil wall and trench ice wall differences

Bob,

Thank you for your note and for participating in the weekly update calls.

Your write-up is accurate.
I will be explaining the material that we submitted to the NRA on Aug. 19 during this week's update call.
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0026_01.pdf

Thank you for your efforts in dispelling the confusion on this topic.

All the best,
Kenji

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>
>
> Bob Bernardo
>
> Policy and Support Branch
> Japan Lessons-Learned Division

> US Nuclear Regulatory Commission
> O-13E11; MS O-13F15M
> 301-415-2621
> Robert.Bernardo@nrc.gov<mailto:Robert.Bernardo@nrc.gov>

From: Tateiwa, Kenji
Sent: 4 Apr 2015 08:38:53 +0900
To: Bernardo, Robert
Subject: Re: FW: First report of trace amounts of Fukushima Cs along BC shoreline

Bob,

Thank you for the heads-up.
This is very helpful.

I will ensure this information will be kept strictly within TEPCO until the embargo is lifted.

All the best,
Kenji

On Fri, 3 Apr 2015 13:56:32 -0400
"Bernardo, Robert" <Robert.Bernardo@nrc.gov> wrote:

> Kenji,
>
> This is a head's up about information that will be going public Monday about traces of Fukushima radiation being detected on the shoreline in British Columbia.
>
> Please note the request to keep this from public disclosure until Monday morning, 9:00 am Pacific Time. Please make sure this does not get disclosed in any public way until then.
>
> Bob Bernardo
>
> Policy and Support Branch
> Japan Lessons-Learned Division
> US Nuclear Regulatory Commission
> O-13E11; MS O-13F15M
> 301-415-2621
> Robert.Bernardo@nrc.gov<mailto:Robert.Bernardo@nrc.gov>
>
> -----Original Message-----
> From: Ken Buesseler [mailto:kbuesseler@whoi.edu]
> Sent: Friday, April 03, 2015 7:07 AM
> To: Hamade, Ali K (HSS)
> Subject: First report of trace amounts of Fukushima Cs along BC shoreline
>
>
>
> Hi Ali-
>
> Here is another head's up about our findings on Fukushima Cs along west coast.
>
>
>
> I don't expect this to be big news, and it is certainly not unexpected, but we will be reporting next Monday, our first detectable Fukushima 134Cs from a dock in Ucluelet BC. Levels of 134Cs are 1.4 Bq/m^3, 137Cs 5.8, so combined activity is still 1000 less than US EPA drinking water standards, etc. It is similar to what we (and others) have seen offshore US and Canada last year.
>

>
>
> The samples were collected by citizen scientists as part of OurRadioactiveOcean.org crowd funding campaign, which continues up and down the west coast and a when we can, offshore. Its been successful way to engage the public, and we hope educate them about our radioactive planet and the impacts of Fukushima on the ocean.
>
>
>
> The embargo will be lifted Monday 9am. Until then you can share this PR , but we ask you and others not to post on open web sites or pass on to media, though you can send others to me for additional info.
>
>
>
> The url on going live Monday for the PR and related links will be- http://www.whoi.edu/news-release/fukushima-ucluelet
>
>
>
> Happy Easter, Ken
>
>
>
> --
>
> Ken Buesseler
>
> Senior Scientist, Woods Hole Oceanographic Institution http://cafethorium.whoi.edu Director, Center for Marine and Environmental Radioactivity http://www.whoi.edu/CMER
>
> 508-289-2309
>
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>
>
> Ali Hamade, PhD, DABT
> Environmental Public Health Program Manager
> Alaska Section of Epidemiology
> Office: (907) 269 8086<tel:%28907%29%20269%208086>
> ali.hamade@alaska.gov<mailto:ali.hamade@alaska.gov>
>
> [cid:image001.png@01D06DF2.58163CF0]

From: Witt, Kevin
Sent: 30 Jan 2015 02:24:18 +0000
To: 'Tateiwa, Kenji'
Subject: RE: [NAS Fukushima Phase 2] TEPCO Presentation (1/29/2015)

Thanks Kenji, this was a good presentation.

-Kevin

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Thursday, January 29, 2015 8:00 PM
To: Uhle, Jennifer; Witt, Kevin
Cc: Norton, Charles; Marksberry, Don; Nicholson, Thomas; Bernardo, Robert
Subject: [NAS Fukushima Phase 2] TEPCO Presentation (1/29/2015)

Jennifer and Kevin,

It was nice seeing you at the NAS Fukushima Phase 2 meeting this afternoon.

Per Kevin's request, I am sending you a copy of my presentation.
Feel free to share it with your colleagues at NRC or anyone interested in the topic.

Please let me know if you have any questions.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

From: Tateiwa, Kenji (mobile)
Sent: 7 Oct 2014 09:22:10 -0400
To: Bernardo, Robert
Cc: tateiwa.kenji@tepco.co.jp
Subject: Re: New Tsunami risk evaluation
Importance: Normal

Bob,

Please find below TEPCO's relevant information on the new tsunami risk evaluation.
Unfortunately, they are only available in Japanese.

Document submitted to an NRA meeting on Oct. 3
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141003_04-j.pdf

Handout for the media on Oct. 3
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141003_05-j.pdf

I am in Key West this week, attending a BWROG meeting, but will try to find time to call you to walk you through the material.

All the best,
Kenji

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tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)
tateiwa.kenji@tepco.co.jp

----- Original Message -----
From: Bernardo, Robert
To:tateiwa.kenji@tepco.co.jp
Sent: Tuesday, October 07, 2014 8:53 AM
Subject: New Tsunami risk evaluation

Good day, Kenji,

My management has been asking about a recent reevaluation of the tsunami risk at Fukushima Dai-ichi. I searched the TEPCO and NRA sites and couldn't find anything about a new evaluation. I did find a couple of brief mentions of the updated estimates on the English sites for The Japan Times and Asahi Shimbun, but nothing else. Do you happen to have any additional information that you can share? Thanks!

Bob Bernardo

Policy and Support Branch
Japan Lessons-Learned Division
US Nuclear Regulatory Commission

O-13E11; MS O-13F15M
301-415-2621
Robert.Bernardo@nrc.gov

From: Bernardo, Robert
Sent: Monday, October 06, 2014 1:31 PM
To: Bowman, Gregory
Subject: RE: Japan 10 06 2014

Used Bing to search the internet, not a lot about this. Asahi Shimbun and The Japan Times have short articles which don't really have a lot of information, nothing mentioned at all on the TEPCO or NRA sites.

http://ajw.asahi.com/article/0311disaster/fukushima/AJ201410040044

Asahi Shimbun:

> **TEPCO doubles tsunami height in damage estimate for Fukushima plant** October 04, 2014
>
> By TSUYOSHI NAGANO/ Staff Writer
>
> A tsunami of 26 meters would inundate the already-stricken Fukushima No. 1 power plant, causing a huge amount of radioactive substances to spill into the sea, according to Tokyo Electric Power Co.'s updated estimates.

http://www.japantimes.co.jp/news/2014/10/04/national/fukushima-no-1-at-risk-of-26-meter-tsunami-tepco/

The Japan Times

> **Fukushima No. 1 at risk of 26-meter tsunami: Tepco**
> JIJI
>
> Oct 4, 2014
>
> Tokyo Electric Power Co. has warned its stricken Fukushima No. 1 nuclear plant could be hit by tsunami as high as 26.3 meters.

Bob Bernardo

Policy and Support Branch
Japan Lessons-Learned Division
US Nuclear Regulatory Commission
O-13E11; MS O-13F15M
301-415-2621
Robert.Bernardo@nrc.gov

From: Bowman, Gregory
Sent: Monday, October 06, 2014 1:06 PM
To: Bernardo, Robert
Subject: RE: Japan 10 06 2014

Did you see anything related to reevaluation of the tsunami risk at Fukushima Dai-ichi? Mike F. mentioned this morning that TEPCO had released a new assessment showing the maximum credible tsunami for the site and it sounded like it might get some interest, but maybe it hasn't made its way into the news yet.

Also, I forgot to mention this when I emailed you earlier, but Kevin didn't make any progress on the charter for the review of new issues – he wound up needing to focus on the SECY paper he's developing. Let's plan on discussing next steps when you're back in the office tomorrow, maybe after the branch meeting.

Greg

From: Bernardo, Robert
Sent: Monday, October 06, 2014 12:57 PM
To: Orders, William; Reckley, William; Norton, Charles; Gibson, Lauren; Kratchman, Jessica; Yilma, Haimanot; Stahl, Eric; Chandrathil, Prema; Screnci, Diane; Hannah, Roger; Ledford, Joey
Cc: Bowman, Gregory; Franovich, Mike; Davis, Jack; Skeen, David; McHale, John; Bowen, Jeremy; Whaley, Sheena; Pham, Bo; Bailey, Stewart; Halter, Mandy; Bernardo, Robert
Subject: Japan 10 06 2014

Bob Bernardo

Policy and Support Branch
Japan Lessons-Learned Division
US Nuclear Regulatory Commission
O-13E11; MS O-13F15M
301-415-2621
Robert.Bernardo@nrc.gov

From: Tateiwa, Kenji
Sent: 11 May 2015 14:56:03 -0400
To: Dunn, Darrell;Csontos, Aladar;Gonzalez, Felix;Parrott, Jack;Correia, Richard;Marksberry, Don;'Levitan, William';Madden, Patrick;West, Steven;Bernardo, Robert;Aird, David;koi@k.u-tokyo.ac.jp;andrew.Szilagyi@em.doe.gov;philip.mattson@hq.dhs.gov;kamel.saidi@nist.gov;'Jacoff, Adam S.';Nicholson, Thomas
Subject: Re: Second organizational meeting to plan the Fall 2015 "Workshop on the Use of Robotics at Nuclear Facilities"
Importance: Normal

Tom and all,

Please find below JAEA's presentation (in Japanese) on the Naraha Remote Technology Development Center that we just discussed.
http://fukushima.jaea.go.jp/initiatives/cat01/pdf1502/hokokukai_04.pdf

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW, Suite 910
Washington, DC 20037
tel: ·1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Nicholson, Thomas
To:'Jacoff, Adam S.' ; 'kamel.saidi@nist.gov' ; 'philip.mattson@hq.dhs.gov' ; 'andrew.Szilagyi@em.doe.gov' ; 'koi@k.u-tokyo.ac.jp' ; 'Tateiwa, Kenji' ; Aird, David ; Bernardo, Robert ; West, Steven ; Madden, Patrick ; 'Levitan, William' ; Marksberry, Don ; Correia, Richard ; Parrott, Jack ; Gonzalez, Felix
Cc: Csontos, Aladar ; Dunn, Darrell
Sent: Monday, May 11, 2015 2:08 PM
Subject: Second organizational meeting to plan the Fall 2015 "Workshop on the Use of Robotics at Nuclear Facilities"

Adam, Phil, Lauri, Andy, Kenji, Pat, Bob, David, Carol and Don:

This is a reminder that our next scheduled, organizational meeting to plan the Fall 2015 Workshop on the Use of Robotics at Nuclear Facilities is Monday, May 11th @ 2:30 p.m. EDST.

Attached is a tentative agenda for our subject meeting.

I am also attaching notes prepared by Kamel Saidi, NIST from our earlier meeting at NIST on February 19, 2015 which will help our discussions.

To participate in the teleconference, please call **1-888-677-0358** with passcod[redacted] followed by the # sign. (b)(6)

At our last teleconference we discussed the development of a draft workshop prospectus. We agreed to develop a draft prospectus to identify the intended workshop audience; and the workshop purpose, objectives and goals, and expected outcomes.
The prospectus should mention that we are interested in both historical nuclear applications and experiences (e.g. Fukushima Daiichi, TMI, etc.), and possible future nuclear applications (e.g., Chernobyl, DOE waste cleanups, Shellafield, etc.). We also want to include other applications of mobile robotics such as those in the NASA (e.g., the two Mars Exploration Rovers -- Spirit and Opportunity), and DOD programs which may greatly benefit our needs.

Please help us identify the appropriate NASA and DOD contacts so that we can invite them to our future organizing teleconferences.

Attached is an example of a workshop flyer we prepared on probabilistic flood hazard assessment for your information.

I look forward to your participation at Monday's teleconference.

Thanks …….. Tom

****
Thomas J. Nicholson, Senior Technical Advisor
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Mail Stop CSB 2-A07
11555 Rockville Pike
Rockville, MD 20852
Tel: (301) 251-7498
Fax: (301) 251-7422
E-mail: Thomas.Nicholson@nrc.gov
****

From: Marksberry, Don
Sent: 11 May 2015 18:34:24 -0400
To: Tateiwa, Kenji;Bernardo, Robert;andrew.Szilagyi@em.doe.gov;philip.mattson@hq.dhs.gov;kamel.saidi@nist.gov;'Jacoff, Adam S.';Nicholson, Thomas
Subject: RE: Second organizational meeting to plan the Fall 2015 "Workshop on the Use of Robotics at Nuclear Facilities"
Attachments: Use of Robotics and Remote Control Equipment at TMI.pdf

All

Attached is a list of documents about the use of robotics and remote equipment during the cleanup and defueling at Three Mile Island. Not much documents exist after 25-30 years.

Concerning the "certification" issue, an NRC-licensed defueling senior reactor operator was required to be present during fuel removal operations at TMI. Most of the fuel removal was manual, although, a remote-operated submarine was used to scope up a small amount of fuel debris inside the pressurizer. I would imagine that some kind of licensing and training would be required for remote defueling of a damaged reactor core like Fukushima and Chernobyl.

Don

Use of Robotics and Remote Control Equipment at TMI-2

5/11/2015

References

DOE-NE-34110, Research and Development Activities on TMI-2, Annual Report for 1985, April 1986 (see section 5.1)
http://www.osti.gov/scitech/biblio/5748361

DOE/ID-10276, TMI-2: Lessons Learned by the U. S. Department of Energy, A Programmatic Perspective, March 1990 (see section 3) http://kerepos.inl.gov/TMI/DOE-ID-10276.pdf

DOE-MC-29104-5759, Mobile Worksystems for Decontamination and Decommissioning Operations, Final Report, February 1997 (see section 2.1)
http://www.osti.gov/scitech/biblio/589230

EGG, Vol. 4, No. 2, TMI Unit-2 Technical Information and Examination Program, Update, June 15, 1984) (see page 3---attached)

EGG, Vol. 5, No. 2, TMI Unit-2 Technical Information and Examination Program, Update, February 1985 (see page 15---attached)

GEND-INF-093, Lower Core Support Assembly Defueling Plan and Tools, October 1988 (see section 8) http://kerepos.inl.gov/TMI/GEND-INF-093.pdf

EPRI-TR-100643, Final TMI-2 Technology Transfer Progress Report, May 1992 (see section 2.7) http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=TR-100643

EPRI-NP-6931, The Cleanup of Three Mile Island Unit 2, A Technical History, 1979-1989, September 1990 (see sections 4.4.3, 7.3.1, 7.4.3, 8.2.7)
http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=NP-6931

EPRI-NP-6521, Robotic Program Development Guidelines for Utility Application of TMI-2 Lessons Learned, 1989 (copy not available)

EPRI-NP-4265, Remote Reconnaissance Vehicle Program, 1985 (copy not available)

Nuclear Technology, December 1989, Vol. 87, No. 4, Operations and Achievements of Remote Equipment at Three Mile Island Unit 2 (for purchase)
http://www.ans.org/pubs/journals/nt/a_27704

Nuclear Technology, November 1989, Vol. 87, No. 3, Development of Remotely Controlled Devices for Three Mile Island Unit 2 (for purchase)
http://www.ans.org/pubs/journals/nt/a_27714

Nuclear Technology, November 1989, Vol. 87, No. 3, Implementation of Remote Equipment at Three Mile Island Unit 2 (for purchase)
http://www.ans.org/pubs/journals/nt/a_27716

TMI and Fukushima: How Robots Were Used in Response, July 2014
http://forumonenergy.com/2014/07/08/three-mile-island-and-fukushima-daiichi-how-robots-were-used-in-response/

Scientific American, Radioactive Robot: The Machines That Cleaned Up Three Mile Island, March 2009
http://www.scientificamerican.com/article/three-mile-island-robots/

TMI Unit 2 Technical Information & Examination Program

UPDATE

Volume 4, Number 2 June 15, 1984

TMI Moves One Step Closer to Cleanup with Head Removal

This summer, workers at Three Mile Island (TMI) will take another major step toward defueling the Unit 2 reactor vessel by removing the vessel's head and placing it on the storage stand. After several tests, engineers gave the go-ahead to *remove the head dry—without flooding* the refueling canal. These tests included radiation surveys, sampling, and video inspections of the underside of the head to determine radioactivity, analyze particle makeup, and look for debris that could make removal difficult. *Figure 1* illustrates the three remaining major steps toward disassembly of the reactor at TMI-2: placing the head on the storage stand, storing the plenum under water in the refueling canal, and removing fuel and debris from the vessel.

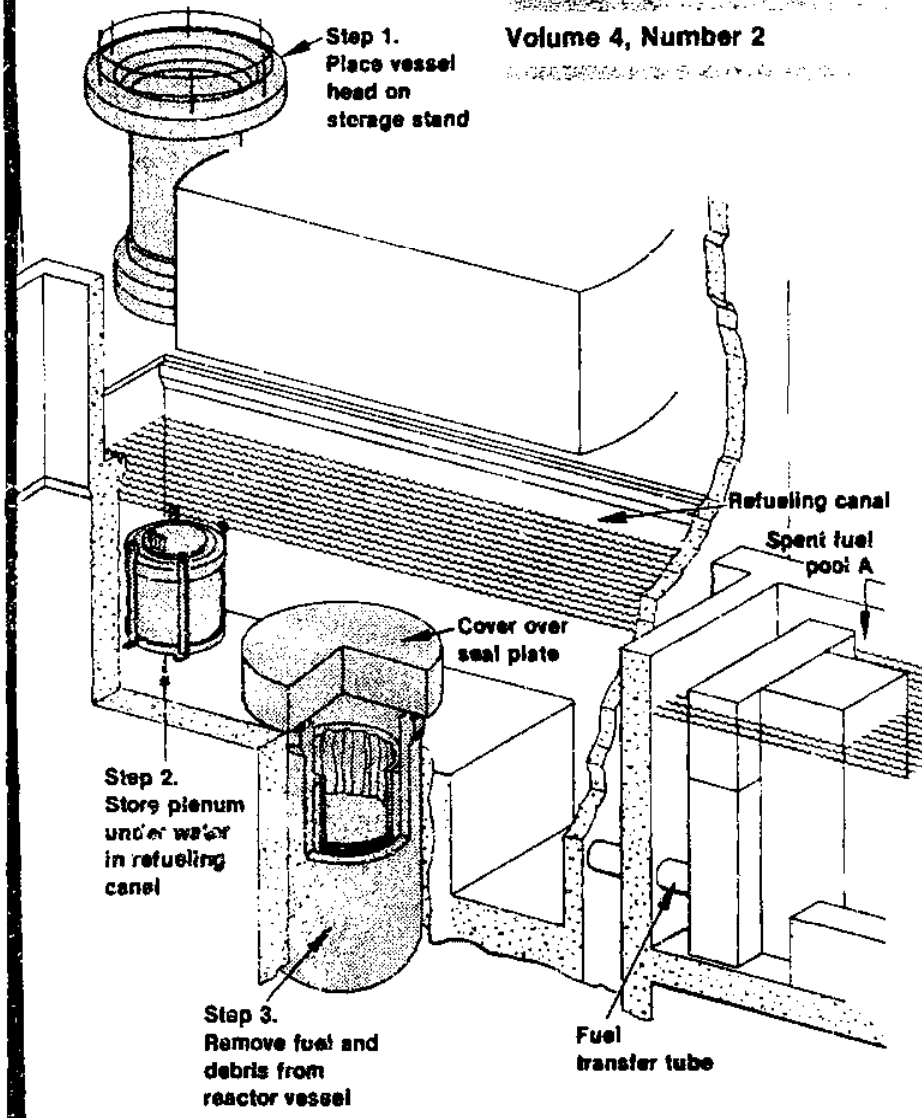


Figure 1 **This schematic illustrates the three major steps toward defueling Unit 2.**

While these activities, and all of the vital projects in between, are scheduled to take the Technical Information and Examination Program (TI&EP) well into 1987, General Public Utilities Nuclear Corporation (GPU Nuclear) and U.S. Department of Energy (DOE) personnel have done much to bring the program to its present stage, discovering along the way new aspects of accident recovery and answering a number of important questions about the nature and impact of the accident.

Published by EG&G Idaho, Inc., for the U.S. Department of Energy

In preparation for head removal, the service structure and refueling canal both were decontaminated, and the lifting and handling equipment was tested. As part of a complete safety evaluation, engineers conducted a head-drop analysis, verifying that the components below could withstand such an impact. Looking for debris that could make head removal difficult, analysts took debris samples from the top of the plenum assembly and found the materials there were nonpyrophoric.

Two final projects in preparing the head for removal are currently underway. Workers are installing the canal seal plate, which will close the gap between the mouth of the reactor vessel and the refueling canal, and they are installing a temporary defueling water cleanup system as a precaution, should an unexpected event require the refueling canal to be flooded for shielding during head lift.

As *Figure 1* illustrates, the second major step toward disassembly is moving the plenum assembly to the shallow end of the refueling canal, where it will be stored under water until its removal. The plan is to first jack the plenum up from its current seated position and then lift it from the reactor vessel using the polar crane.

In 1983, major advances were made in designing tools to inspect and remove the plenum. Four 60-ton hydraulic jacks are being custom designed for the job. From a central pumping station, four operators will hand-pump the jacks, lifting the plenum slowly and in small increments so it may be continuously monitored from top to bottom to check for clearance and prevent jamming. Engineers are already aware from video inspections of the plenum's underside that partial fuel assemblies still hang from the plenum. After initial jacking, workers will knock off these stubs using a tool that is now in the design stages.

Once the plenum assembly is lifted, engineers will wrap it in a large, semi-rigid plastic bag, called the transfer contamination barrier, and place the entire assembly in the shallow end of the refueling canal.

Figure 1 indicates that the final major step to the TMI-2 reactor disassembly is removal of fuel and debris from the reactor vessel. GPU Nuclear and TI&EP engineers have been concentrating on a number of aspects of this task, including a major defueling water cleanup system, fuel removal tools, and canisters in which to ship the fuel and debris.

The extensive defueling water cleanup system to be installed essentially consists of two subsystems, one to provide water filtration and processing for the reactor vessel and contamination barrier, and a second to provide water filtration and processing for the refueling canal and spent fuel pool A *(see Figure 1)*.

Clearly, a key element to defueling is the fuel removal tooling, to which engineers and designers have been devoting much of their efforts. Westinghouse Electric Corporation, selected as contractor to design and fabricate these tools, suggested two designs for consideration. The first design—a manual, remote defueling system—reflects the technical specifications previously established for the necessary mechanical equipment and vacuum and separation equipment. The vacuum would remove fine materials as small as 10 μm and debris as large as fuel pellets. The system would then separate the debris from the water and load the debris into canisters.

Westinghouse's second proposed design also meets the technical specifications, but it is a more automated approach to defueling. The system would use robotic arms to position a vacuum hose and load into a shredder materials too large for vacuuming. All of the debris then would be pumped in a slurry out of the reactor vessel for separation and canister loading.

After discussing options for fuel canisters, TI&EP and GPU Nuclear representatives selected a design wide enough to hold intact cross sections of fuel assemblies. This canister is, however, shorter than anticipated because engineers do not expect to be shipping any full length fuel assemblies; few if any appear to be intact. A benefit to using this canister design is the potential cost savings; government-owned rail shipping casks may be available for transporting the canisters containing the remains of the Unit 2 core from TMI. □

Demineralizer cubicle A —

Louie RCTV —

Robots Reduce Worker Radiation Exposure

Many work areas in the Unit 2 plant contain large amounts of radioactivity and many surfaces are highly contaminated. While workers are protected with anticontamination clothing and monitored with personnel dosimeters, the effort to keep exposure rates low is a challenging one. Researchers are finding that robots can take the place of humans for many tasks in high radiation areas. A look at two robots, destined for use at TMI, illustrates their useful role in reducing human radiation exposures.

"Left-handed Louie" comes to TMI from Westinghouse Hanford Operations after a long history of remote-control work in a variety of environments. Louie's official name is the Remotely Controlled Transporter Vehicle, or RCTV, but since an anonymous technician during the 1950s scrawled "Louie" on the robot's arm, the RCTV has been known by its more humanlike name. Louie will assist in a crucial waste handling operation at TMI, that of monitoring the removal of the Makeup and Purification System demineralizer resins from their tanks.

During the accident, reactor coolant water flowed through the Makeup and Purification System for nearly 18 hours and deposited significant amounts of contaminants on the resins in the purification system demineralizer tanks. Extensive efforts to determine exactly how contaminated these resins are have shown that cesium activity levels in the resins may far exceed known values for any other accident-generated waste in the plant. Research work reported in both the August and December 1983 issues of the *Update* obtained dose rate readings of 3000 R/h in the A cubicle, and 1000 R/h in the B cubicle.

The contaminants in the resins are soluble fission products. They will be removed through a series of rinsing and elution steps conducted remotely through specially adapted plant systems. Dose rates inside the purification resin tank cubicles are much too high to permit human workers to enter routinely, but the resin tanks must be repeatedly monitored to see if the rinsing and elution steps are decontaminating the resins. Left-handed Louie will be used for the job. As shown in *Figure 2*, Louie will carry a gamma radiation detector into a resin tank cubicle and hold the detector in a predetermined place up against the tank wall. Technicians seated at control panels outside the cubicles can then monitor gamma radiation levels.

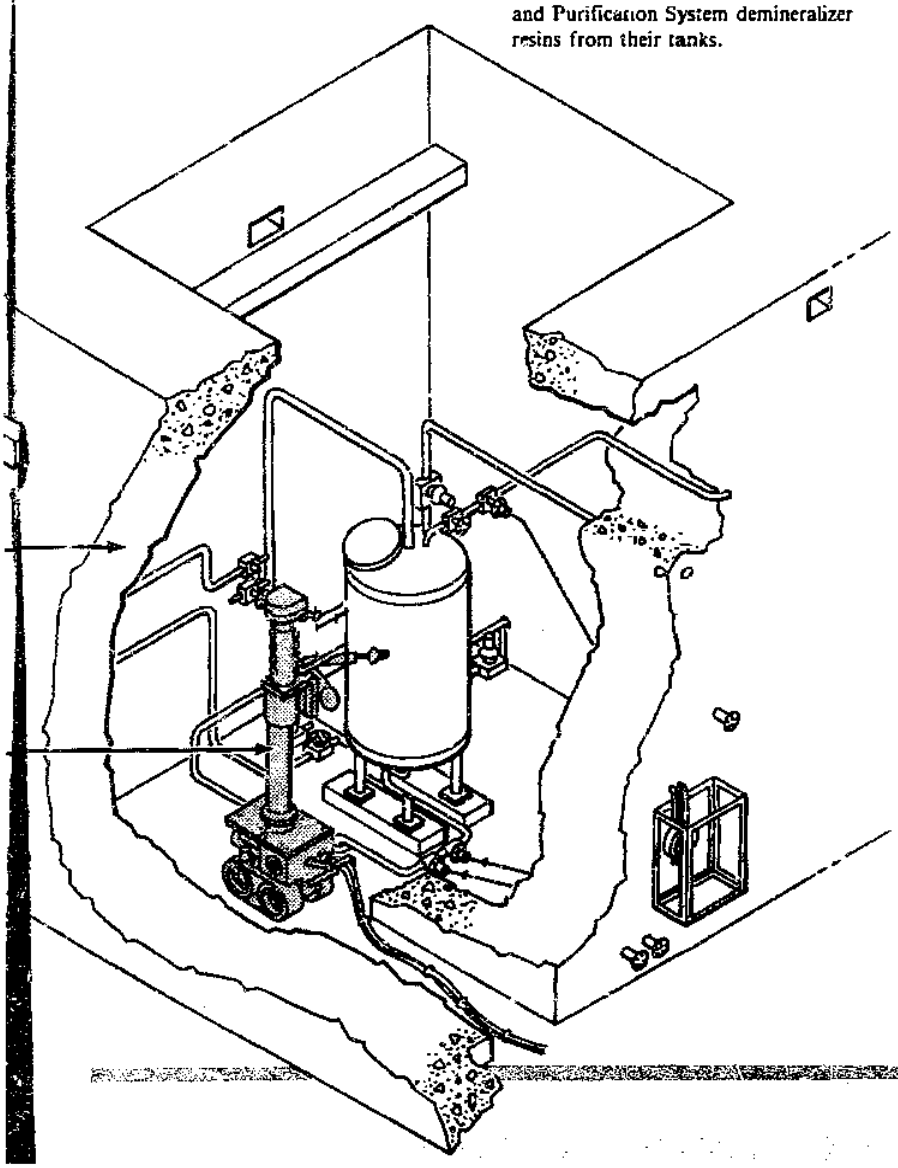


Figure 2 **Louie will enter the demineralizer cubicle to monitor gamma activity in the resin tank during cesium elution.**

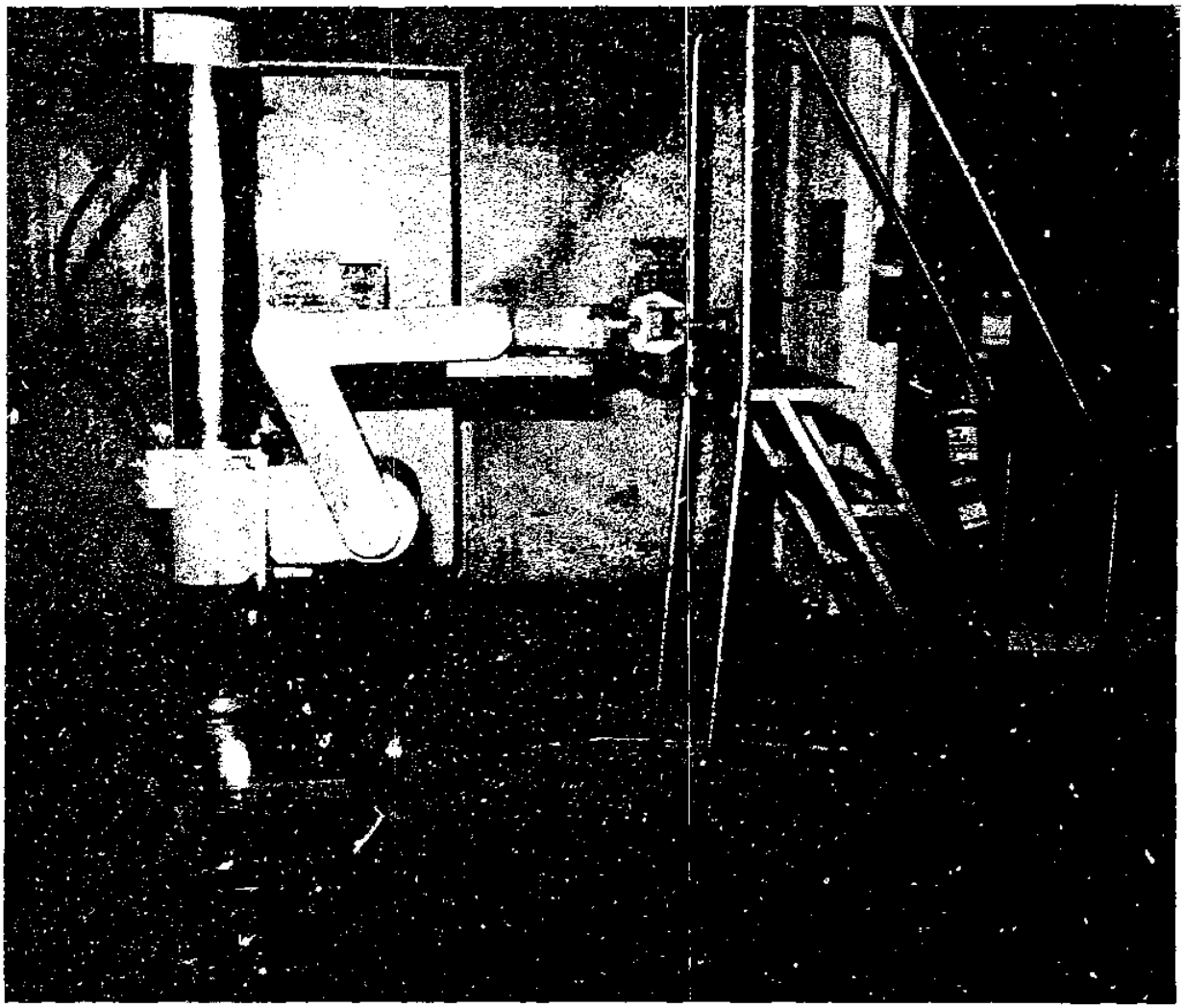


Figure 3 **Louie's 1.3-m manipulator arm will help monitor cesium levels in a high radiation area.**

Louie's components include a transporter base, a telescoping tube, a manipulator arm, three cameras, lights, and a 30-m-long control cable. Pictured in *Figure 3*, Louie's telescoping tube and manipulator arm have a combined vertical reach of 2.9 m, which is ample height to reach nearly to the top of the 3-m-high demineralizer tanks. Its manipulator arm can reach as far as 1.3 m horizontally in any direction. Louie's strength will not be needed for its demineralizer work, but the telescoping tube can hoist up to 450 kg, and the manipulator arm can lift and maneuver up to 68 kg.

Louie's cameras are radiation hardened, and will be the operating technician's "eyes" in the cubicles, not only for positioning Louie and the gamma monitor correctly, but also for observing conditions inside the cubicles during the rinsing and elution processes. The 30-m cable connecting the transporter to the control console outside the cubicles weighs nearly 23 kg.

This robot is a simple one, whose every movement must be dictated by the operating technician. It has no ability to interpret commands or repeat activities on its own. Classed as a "master-slave"

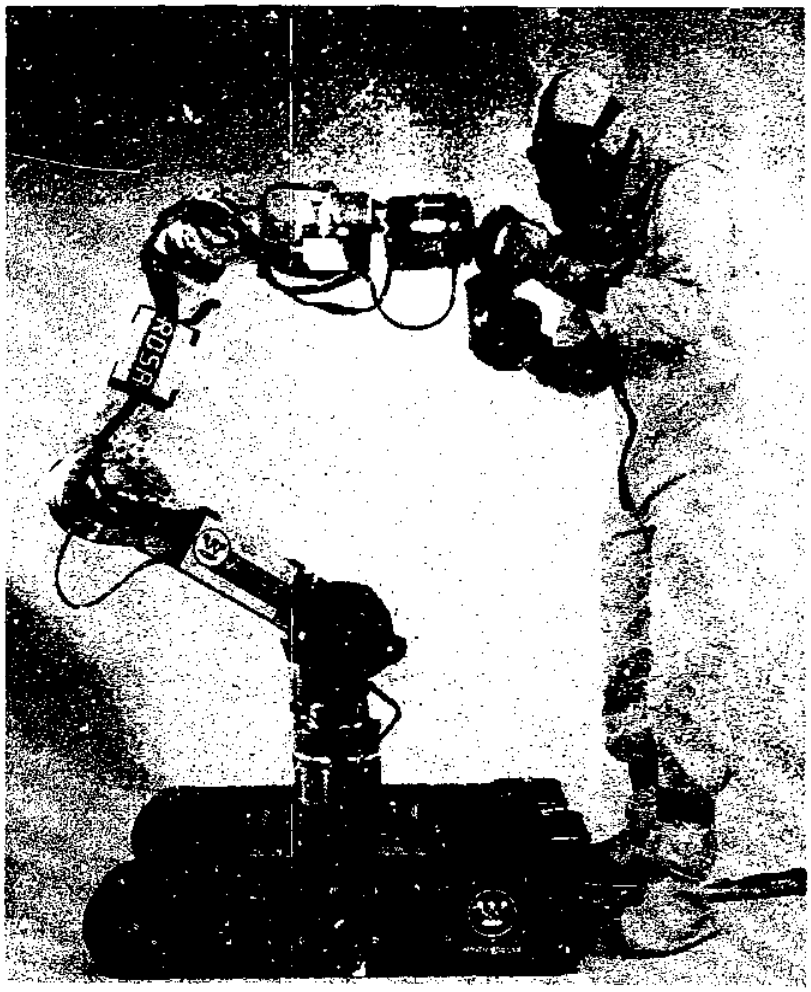
robot, it is basically a hot cell manipulator arm on a transporter. But its simplicity does not diminish its usefulness to the cleanup task in which it will serve. The radiation monitor Louie will carry will help determine when the ^{137}Cs concentrations in the demineralizer resins have been reduced to the lowest practical level. Operating technicians will conclude the rinsing and elution process when the gamma detectors show no change in readings after two consecutive elution cycles. Louie could be exposed to dose rates of up to 3000 R/h in the course of the cesium elution process. Its use will greatly reduce the human exposure risks involved in the important task of eluting and removing the purification system resins from the plant.

Robots may play a key role in the defueling of the reactor vessel, scheduled to begin in late 1986. A remotely controlled tool positioning system called ROSA might be used in place of long-handled tools handled by human workers in the Reactor Building. ROSA is a Westinghouse Electric Corporation robot; its name is an acronym for Remotely Operated Service Arm. It can be used in connection with a Westinghouse-designed defueling system to remove all debris from the damaged Unit 2 reactor.

Research has shown that the accident reduced much of the original core to a bed of rubble. The top 1.5 m of the core is now a large cavity, with a volume of approximately 9.5 m^3. Into this cavity, cleanup engineers will lower a variety of special equipment. Small, loose debris will be vacuumed out of the core into shipping canisters located inside the Reactor Building. Large debris will be reduced to a smaller size and then removed to shipping canisters. Material fused to the rubble bed will be cut loose with cutting shears, chisels, and drills. Items to be removed intact for research studies will be placed into debris baskets hanging inside the core. ROSA can do the lifting, rearranging, and positioning required for these special defueling activities.

Westinghouse's ROSA, shown on a transporter in *Figure 4*, is a manipulator arm with humanlike articulation at a "shoulder," "elbow," and "wrist." Its flexibility comes from its modular design. The arm consists of six segments, each of which is a self-contained unit with a motor, gear train, brake, and position indicators. Constructed of lightweight alloys, the arm is very strong for its 54-kg weight. When fully extended to its 2-m length, ROSA can lift 23 kg; when the arm is close to its base, it can lift more than 90 kg. With special adjustments, ROSA may be able to lift even more weight. ROSA's arm joints are all electric, but are completely watertight so the arm will work well in the flooded vessel and canal.

Figure 4 **ROSA's "shoulder," "elbow," and "wrist" move to commands issued through a computer.**



A 180-m umbilical cable will connect ROSA to its control computer, to be located in a trailer outside the Reactor Building. This computer, containing several microprocessors operating in parallel, is ROSA's brain. For manual control, an operator sits at the control console, issuing commands with a joystick. The computer translates these commands into arm movements.

Unlike the movements of such master-slave robots as Louie, ROSA's movements do not need to be dictated step-by-step. The computer calculates the arm joint movements required along six different axes to move the arm in the manner indicated by the joystick. The calculations are performed in a fraction of a second, and the arm responds almost immediately.

ROSA's computer can be preprogrammed with complete instructions for any standard task. The arm can also be taught to perform a specific activity. An operator first leads ROSA through the activity with the joystick and then instructs the robot to repeat that activity, unsupervised. ROSA's memory records all the information necessary to repeat the activity indefinitely. Both the preprogramming and the teachability will be useful for repetitive, tedious tasks.

Westinghouse developed ROSA in the early 1980s and has used ROSA in steam generator repair work and inside reactor vessels. ROSA would remain the property of Westinghouse during its use at TMI. Indeed, it would be accompanied by a Westinghouse technical adviser and operated by Westinghouse technicians. But the robotic arm can far outwork its human counterparts. While they are restricted to eight-hour days, ROSA can work without rest or maintenance for 1500 nonstop hours. ROSA's flexibility, strength, and ease of operation can help to complete the defueling operation safely and efficiently.

Louie and ROSA can complete vital cleanup tasks along the road to cleanup of the TMI-2 plant. They are designed to be versatile, and each could be used for jobs not discussed here. GPU Nuclear is working with the Electric Power Research Institute and Carnegie-Mellon University to develop another robot for performing characterization and cleanup tasks, and the potential for using robots in other areas in the future continues to be examined. These machines can play a useful role in both simple and complex jobs as they help keep human exposure as low as is reasonably achievable.□

Source Term Assessment Continues at TMI

The TI&EP continues to make progress in its studies of source term, recently completing visual inspections of the TMI-2 Reactor Coolant Drain Tank (RCDT) and investigating the concentration of radioiodine and tellurium in the reactor core and building basement. In a related effort, GPU Nuclear engineers took concrete core samples on the 305-ft and 347-ft elevations to assess radionuclide penetration into the concrete.

The RCDT was the major pathway for the release of accident water into the Reactor Building basement. In video inspections of the tank below the vent line, analysts saw a dark, particulate sediment of less than 0.32 cm thick, nonuniformly distributed on the bottom. Personnel also saw particles larger than they predicted would have been released through the pressurizer to the drain tank; they calculated a maximum particle size of 30 μm.

During each of these inspections, samples of the water and sediment were extracted for analysis. By studying the samples, personnel at the Idaho National Engineering Laboratory (INEL) will determine the quantity of fuel and fission products released to the RCDT. The resulting data will also support ongoing analyses of fission product mass balance and source term—the concentration and distribution of radionuclide activity.

In defining the source term in Unit 2, program personnel are placing special emphasis on determining the concentration of ^{129}I and ^{130}Te in liquid and solid samples collected from the reactor core and Reactor Building basement. Data collected to date indicate that the fraction of radioiodine released from the core to the basement is significantly less than the fraction of radiocesium released to the basement. Basement sediment samples are being analyzed to determine if the radioiodine precipitated. Lead screw and core grab samples are being analyzed for ^{130}Te—whose behavior is important because it is a parent of iodine—to determine if plateout or scavenging of the tellurium significantly reduced the amount of radioiodine released from the core.

To assess the extent to which radionuclides migrated into the concrete in the building, engineers obtained 17 samples of concrete from the 305-ft and 347-ft elevations. (The basement concrete was not included in this study because of its inaccessibility.) Tests on these large core samples, obtained using a concrete boring tool, resulted in one significant finding: that the majority of radionuclides released from the Reactor Coolant System (RCS) into the Reactor Building environment were trapped in the concrete's surface coatings.

Most concrete surfaces in TMI-2 are protected with epoxy-based, nuclear-grade coatings, making an otherwise porous concrete resistant and easier to decontaminate. Pictured in *Figure 5* is a sample of concrete taken from the D ring wall at the 305-ft elevation. To its right is the sample's autoradiograph, which documents the coating's ability to absorb radionuclides and prevent them from penetrating the concrete. Only where the coating was scarred and the unprotected surface was exposed to contaminated water for an extended period of time did analysts discover significant radionuclide penetration.

The analysts then removed the coatings from the samples to see if this would effectively decontaminate the surfaces; and up to 98.5% of total activity measured was removed with the coating.

While analysts are not saying widespread coating removal in TMI-2 is necessary, it may be beneficial in areas where long-term personnel operations are planned. A GPU Nuclear report suggests devising other equally effective decontamination methods as alternatives to coating removal.□

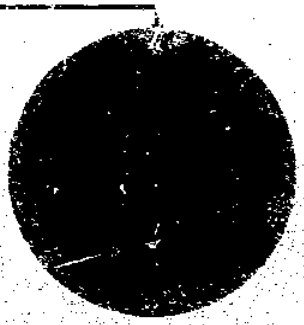


Figure 5 **This concrete core sample, whose coating was accidentally chipped during removal, was taken from the D ring wall at the 305-ft elevation. Its autoradiograph, at right, shows dark shading where the coating protected the concrete rom radionuclide penetration.**

Hydrogen Burn Study Answers Questions About Its Cause and Damage

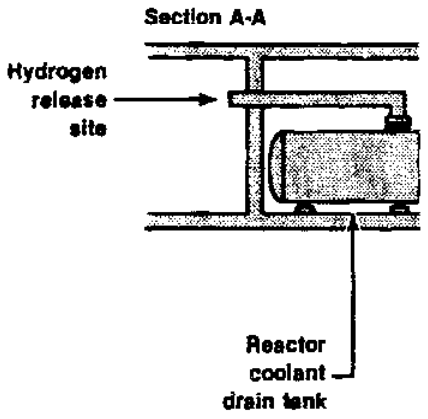
After two years of research and analysis, TI&EP engineers completed their studies of the hydrogen burn that occurred at TMI, answering a number of questions generated from the event and gaining a better understanding of its cause and its damage.

Overall, analysts concluded that the hydrogen burn caused little damage to the Reactor Building itself and no damage to safety systems. The damage that was found, for the most part, was fully consistent with TI&EP expectations.

The burn occurred about 10 hours into the accident, after the reactor core overheated and the zircaloy cladding that encased the fuel reacted with steam, liberating large quantities of hydrogen to the building, where the gas later ignited. The estimated pressure rise time for the event was 10 to 15 seconds, but most of the 28-psig pressure increase occurred in the final 3 to 6 seconds.

Evidence, such as charred paint and cables, indicates a flame rose from the building basement to the dome, where it remained until quenched.

The precise location and ignition source of the flame are unknown and may always be so, but evidence indicates the burn originated on the building's west side, in the basement. Among the candidate sources of the burn is the electrical equipment on two Motor Control Centers that tripped at the time of the event. Access to the 282-ft level will provide further insight into the ignition source and location.



Calculations by several researchers indicate that about 370 kg of hydrogen were in the Reactor Building at ignition, of which about 320 kg burned. A hydrogen and steam mixture was released into the building through the discharge duct from the RCDT, as illustrated in *Figure 6*. The hydrogen then rose through openings and became well mixed throughout most of the building by way of the ventilation system, with an average concentration being 7 to 8%, depending on water vapor concentrations. Somewhat leaner hydrogen concentrations existed in the unventilated enclosed stairwell and elevator hoistway, while richer concentrations existed immediately before the burn in the vicinity of the release site and open stairway.

Since the electrical equipment was operating in the presence of a flammable mixture for one to seven hours, analysts questioned why ignition did not occur earlier. They developed three possible explanations. First, releases of steam early in the accident generated relatively high concentrations of water vapor, thus raising the lower flammability limit of hydrogen in air. Second, sparks occurring earlier may have been too weak to cause an ignition. And third, it is possible that earlier ignitions did actually occur, but without any significant flame propagation away from the ignition site.

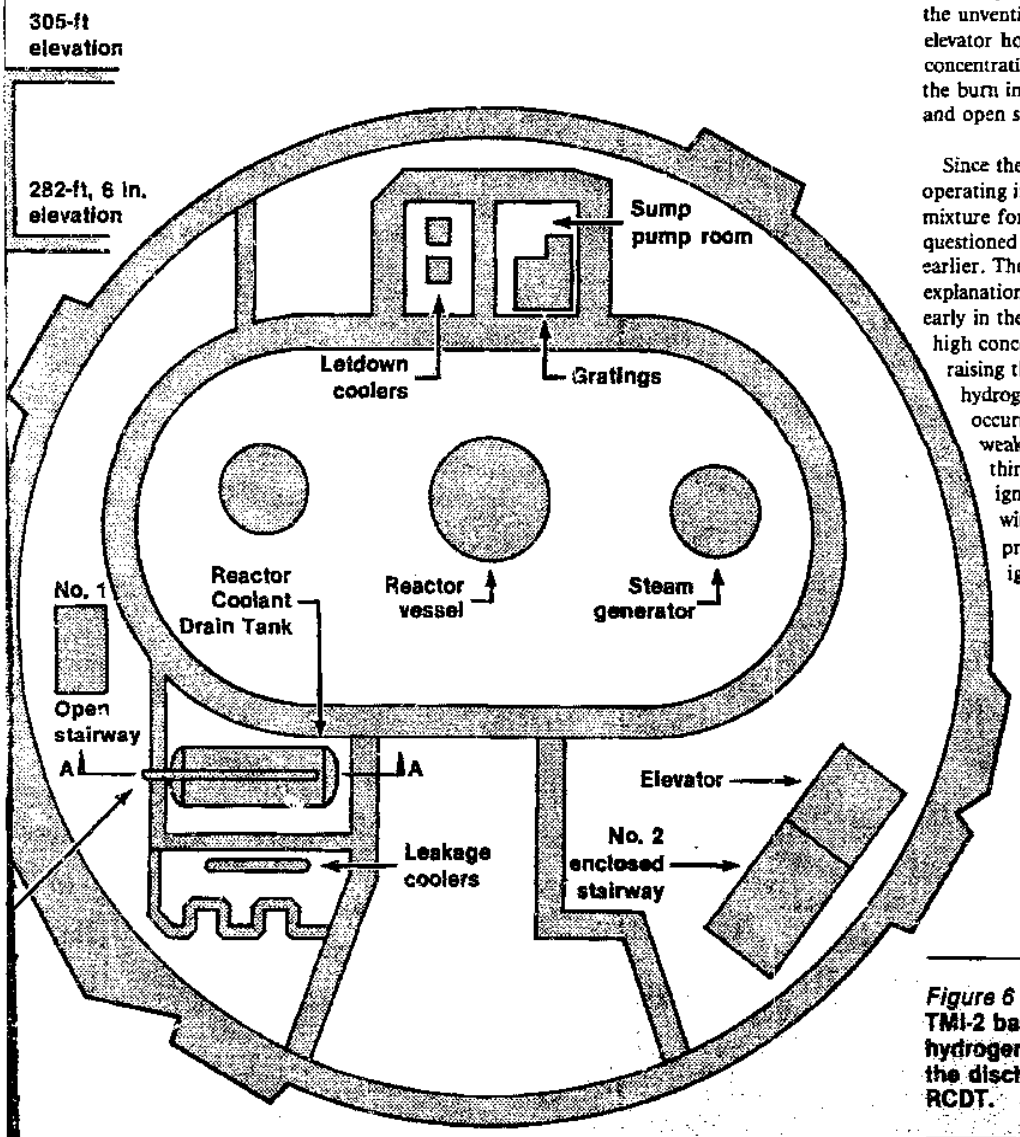
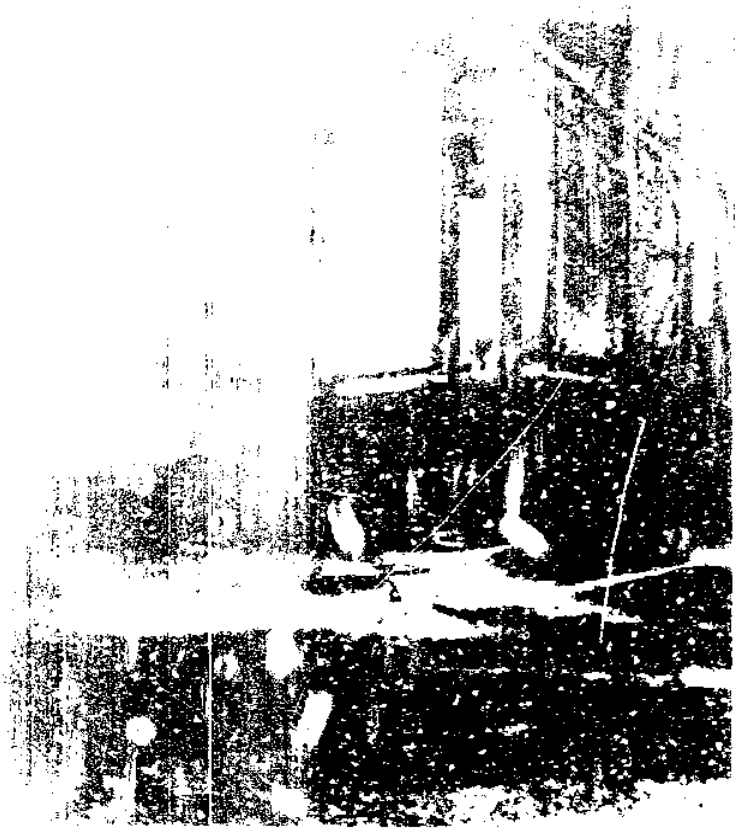


Figure 6 **As this drawing of the TMI-2 basement indicates, the hydrogen was released through the discharge duct from the RCDT.**



TMI Program Highlights Available on Videotape

The *TMIEP* has released a videotape program for loan without charge. "1983 in Review: A DOE TMI-2 Programs Brief" is a 16-minute program highlighting the accomplishments of 1983 at TMI. The program covers the shipment of the last processing container used to decontaminate accident water, experiments to immobilize the contaminated contents of this and other containers, the study of the hydrogen burn event, tests to determine cable and connection performance in accident and nonaccident environments, sampling of the rubble bed in the core, and fabrication of a clear plastic model of the cavity in the damaged reactor, among other achievements.

The videotape may be obtained by contacting Jean Haddock, EG&G Idaho, Inc., TMI Site Office, P.O. Box 88, Middletown, Pa. 17057, telephone FTS 590-1019 or (717) 948-1019.

DOE Studies of Ion Exchange Media Focus on Gas Generation and Resin Degradation

Through DOE research into the accident at TMI, laboratory personnel have learned a great deal about organic and inorganic ion exchange media, both of which have been part of the cleanup process there. Researchers analyzed the media in the EPICOR II prefilters, Makeup and Purification System demineralizers, and Submerged Demineralizer System (SDS) liners, focusing specifically on two major concerns: radiolytic generation of combustible gases and resin degradation.

Organic ion exchange resins were used alone or in combination with inorganic zeolites in the 50 EPICOR II prefilters that decontaminated accident water from the Auxiliary and Fuel Handling buildings. Research on the EPICOR II ion exchange media focused specifically on radiolytic generation of combustible gases, resin degradation, and liner integrity. Laboratory scale studies have shown that at doses of about 10^7 rads and more, residual water in the organic resin decomposes and the resin itself degrades. Both processes generate gases which could lead to combustible gas mixtures in containers during handling, shipping, or storage.

The radiolytic decomposition of water produces hydrogen, which accumulates in sealed containers, and oxygen, which is consumed during a reaction with the organic resin and water in the container. The hydrogen gas generation rate is dependent on the radiation dose to the water and organic resin: the rate increases in a nearly linear relationship with an increasing curie content *(see Figure 8)*. Internal pressure in a sealed container will at first decrease sharply as oxygen in the air inside the container is consumed by a chemical reaction. The dose delivered to the organic resin acts as a catalyst for this reaction. When all the oxygen has reacted, the ongoing radiolytic process builds up hydrogen gas concentrations in the container, causing an increase in container pressure above atmospheric pressure.

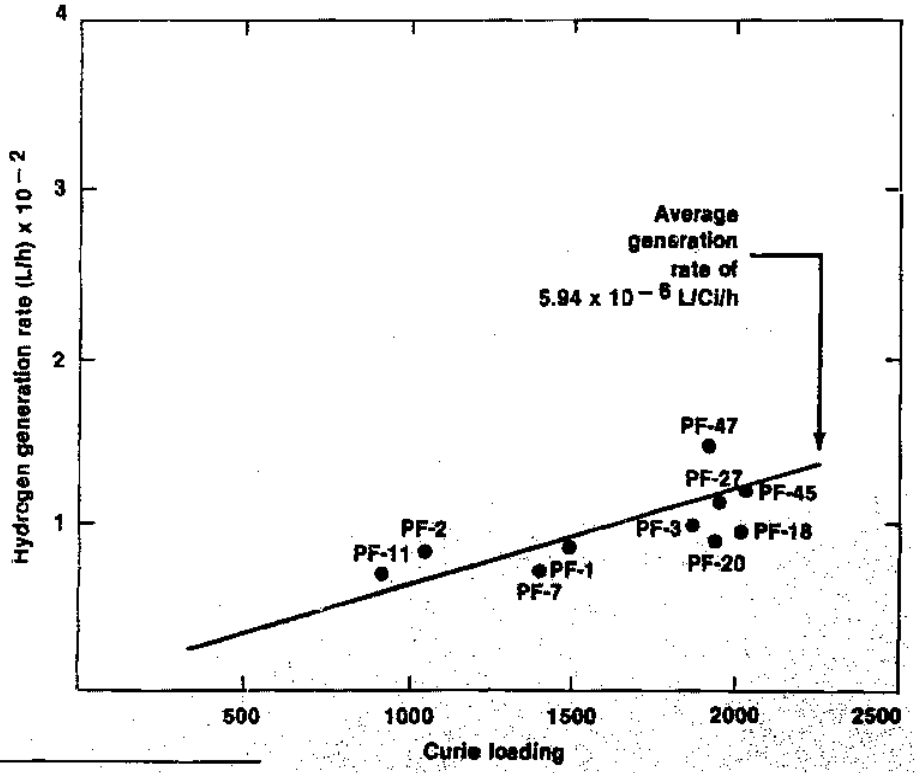


Figure 8 **This graph presents hydrogen generation rates versus curies for EPICOR II prefilters.**

At TMI, potential hazards associated with this hydrogen gas buildup in sealed containers led DOE researchers to develop a tool to solve the problem. A gas sampler with a remotely operated support facility safely vented, sampled, and purged gases in waste containers. The remote operation reduced both man-rem exposure and potential hazards associated with hydrogen gas.

In a closer look at resin degradation, analysts characterized the two worst-case EPICOR II prefilters and found that the pH of the ion exchange media was acidic and became significantly more so from top to bottom of the bed. But resin degradation, such as surface cracking, spalling, and fragmentation due to radiation exposure appeared to be minimal. This minimal degradation was observed at the bottom of the bed, far from the highest activity loading. Thus, it likely was the result of high moisture content or chemical attack. Analyses also demonstrate no significant leaching of nuclides from the resin and essentially no threat to liner integrity. And results of metallurgical studies suggest that the liners can be disposed of safely for more than 300 years in high-integrity containers without any threat to the environment.

Studying the two Makeup and Purification System demineralizers, analysts focused on resin degradation due to irradiation and high temperatures. After five years of radioactive decay, demineralizer A contains approximately 5000 Ci of cesium, and demineralizer B holds about 14,000 Ci of cesium. To date, these resins have absorbed a dose of more than 10^9 rads. In addition, fission product decay heat likely produced temperatures of up to 811 K. As expected, this combination of high temperatures and radiation dose caused the demineralizer resins to degrade; the bed size reduced by about 70%.

Samples of both demineralizer beds were sent to Oak Ridge National Laboratory for analysis. Demineralizer A was found to be dry, with agglomerated, black resin fragments, indicating temperatures in excess of 672 K and extensive radiation damage. Analysts have not concluded whether this vessel's resins are sluicible, but they have confirmed that demineralizer B resins likely can be sluiced because they remained under water.

As expected in resins irradiated to the high levels found in these two vessels, radiolysis produced hydrogen and oxygen gases. Analysts say the hydrogen generation and oxygen depletion mechanisms observed in these resins were the same as in the EPICOR II system ion exchange media. Before sluicing, the cesium will be removed by elution from the resins and processed by the SDS zeolites, whose abilities to handle such high curie loadings has been proven.

SDS was the third system at TMI in which an ion exchange medium was used. The inorganic zeolites in these liners effectively processed about 3785 m^3 of contaminated water from the reactor coolant bleed tanks, the RCS, and the building basement.

Below a dose of 10^9 rads, inorganic zeolites do not suffer radiation degradation; the only effect of the extremely high curie loading is radiolytic generation of hydrogen and oxygen gases. Focusing their studies on this concern, analysts have found that gas generation rates are approximately proportional to curie loading. Also, the oxygen depletion mechanism found in organic resins does not occur with inorganic zeolites to the same degree. The measured fraction of hydrogen was greater than stoichiometric, but oxygen was generated in sufficient quantities to form a combustible mixture in a sealed container.

Zeolite liners in storage at TMI exhibited gas generation rates of nearly 1 L/h. Rockwell Hanford Operations developed a catalyst recombiner and vacuum outgassing system to solve the gas generation problem. Vacuum outgassing removed residual water, and palladium catalyst pellets recombined the radiolytic gases generated from both the residual and chemically bound water so the liners could be safely shipped from the Island.□

Core Topography System Data and Photos Give First Accurate Picture of Core Void

As reported in the December 15, 1983, issue of the *Update*, engineers lowered a sonic sensing head into the TMI-2 core and collected nearly 500,000 data points to acoustically map the size and shape of the cavity inside the damaged reactor.

Since then, these individual data points have been reconstructed into the three-dimensional clear plastic model pictured in *Figure 9*. This model is the first accurate map of the upper portion of the core, which experienced considerable damage during the accident.

The model shows in some places the void extends all the way to the edge of the core. The suspended materials in the model are axial power shaping rods, which were driven in after the accident, and stubs of fuel assemblies. After studying the results of the core topography system, engineers have determined the cavity volume to be approximately 9.5 m^3. At the deepest point, the cavity drops about 2 m, as measured from the underside of the plenum.

Figure 9 **Mike Martin, senior project engineer, explains the making of this clear plastic model of the core void, developed from nearly 500,000 data points.**

These findings are also supported by videotapes of the region between the plenum and rubble bed. *Figure 10* shows the stubs of fuel assemblies hanging unsupported from the underside of the reactor plenum. Data from the sonar mapping device indicate these segments typically are 5 to 25 cm long. A close shot, seen in *Figure 11*, reveals an exposed fuel rod plenum spring. In *Figure 12*, the core former wall is clearly visible and appears in most places to be undamaged. Just in one area on the east side of the reactor does the core former wall appear to bow outward by about 6 cm.

Figure 10 **Stubs of fuel assemblies hang from the underside of the plenum assembly.**

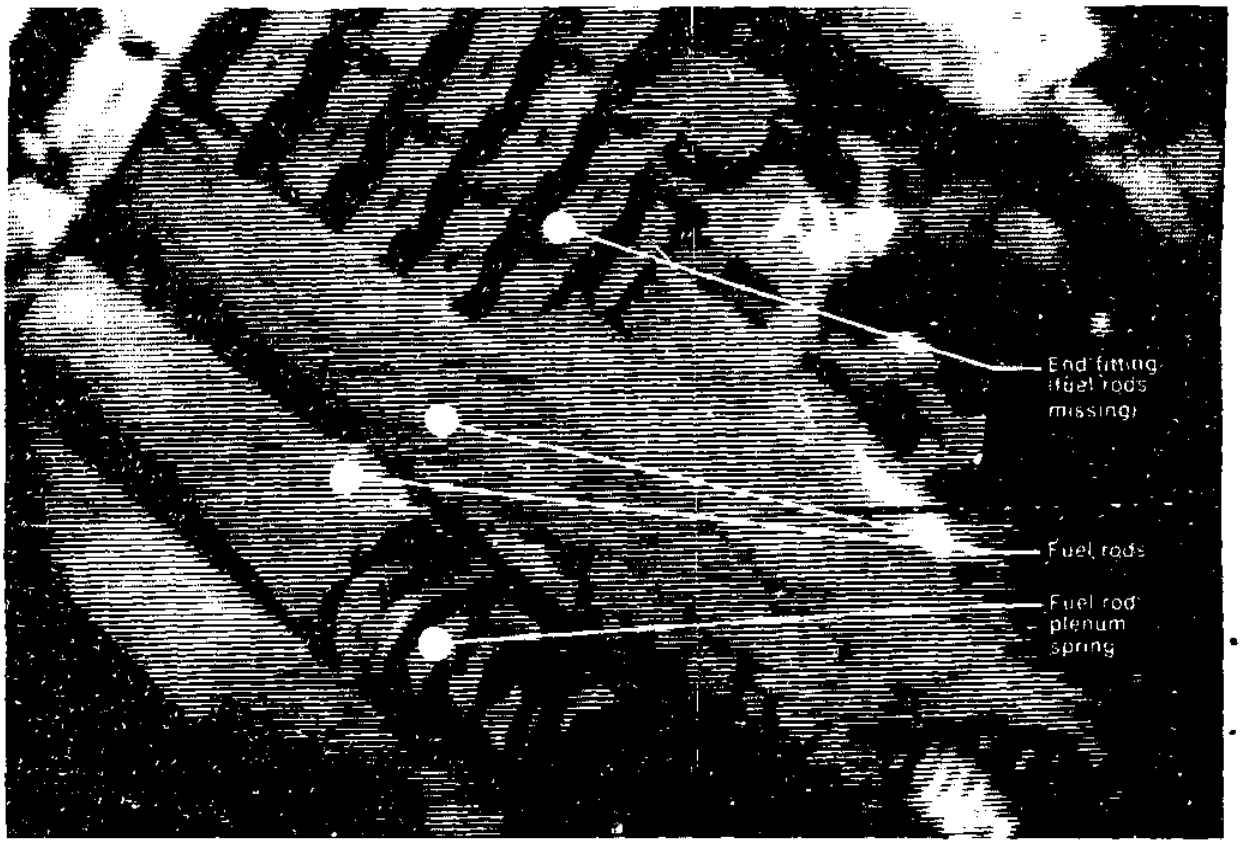


Figure 11 **This fuel rod broke off close to the end fitting, exposing the fuel rod plenum spring.**

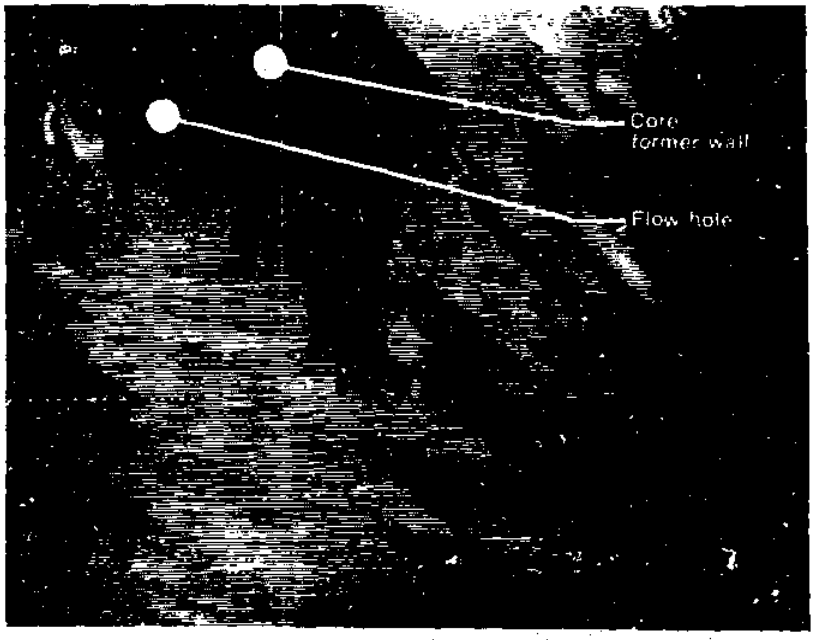


Figure 12 **Although the void extends, in most places, to the edge of the core, the core former wall appears undamaged.**

Only the top 1.5 m of the nearly 4-m-tall core are visible to analysts at this time; the area below is still unknown. But looking down, the video camera has provided some clear photographs of the rubble bed. In *Figure 13*, fractured fuel rods lay like pickup sticks on the surface of the gravel-like rubble bed. Fuel rod plenum springs are also visible there *(see Figure 14)*. And contrary to earlier conclusions based on limited visual observations, the surface of the rubble bed is uneven. In one region of the rubble bed, engineers saw a "valley," which they speculate was created during the accident by upward water flowing through the rubble bed.

Figure 13 **Fractured fuel rods lie scattered across the surface of the rubble bed.**

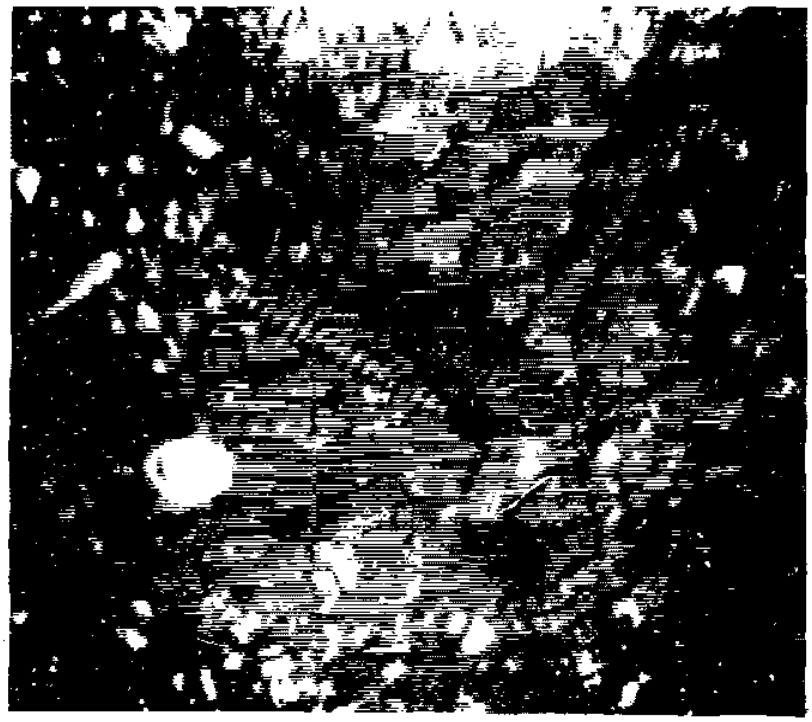


Figure 14 **In a closer shot, fuel rod plenum springs are also visible on the rubble bed surface.**

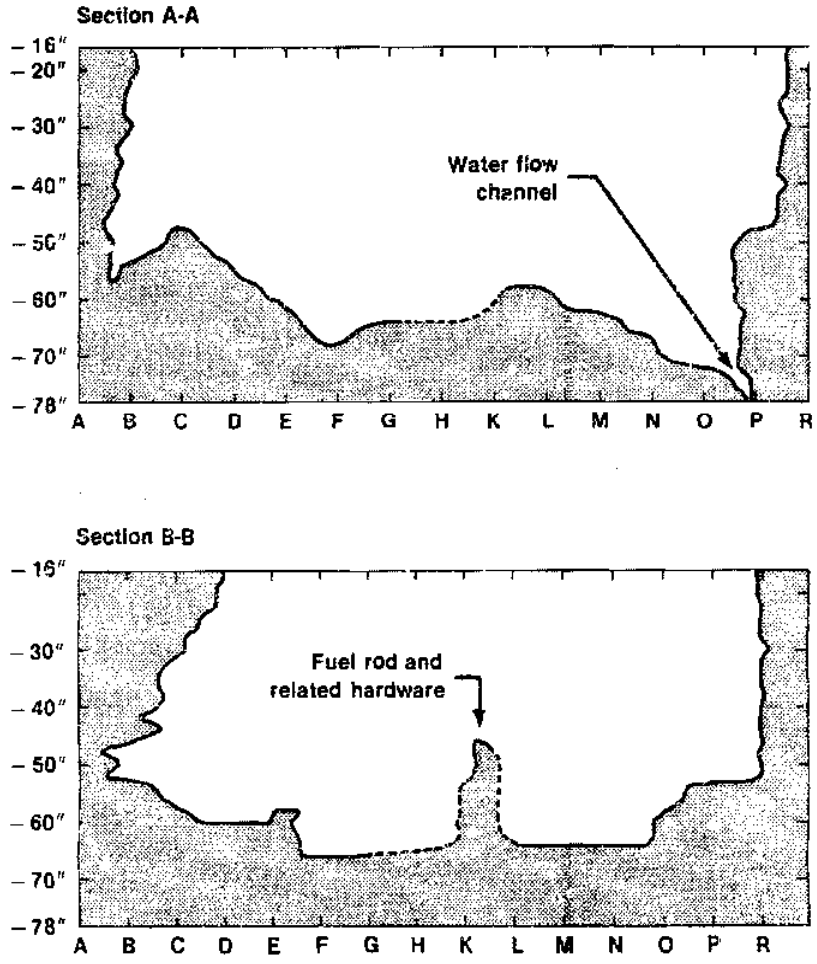


Figure 15 **Sections A-A and B-B are topographical plot cross sections of the TMI-2 core void.**

Using the data collected from the sonic sensing head, engineers also were able to plot cross sections of the void. Two such cross sections are presented in *Figure 15*. The solid lines in these drawings were produced from actual data, while the dashed lines are approximate locations obtained by extrapolation or interpolation. (A few areas of the rubble bed were not within the range of the acoustic transducers.)

Section A-A of *Figure 15* shows the deepest point of the void, at Position P, where water possibly flowed, as explained earlier. The bottom of this narrow channel is about 2 m into the core. In Section B-B, the data points plotted in the center of the cross section jut up into the void. As videotapes of this region confirm, this protrusion is a partial fuel rod and its associated hardware, which fell from the plenum into the rubble bed.

As a result of this information, analysts have concluded that 135 of the total 177 fuel assemblies in Unit 2 are broken, thus creating the void in the top 1.5 m of the core. Of the remaining 42 assemblies, 19 are more than 50% intact (including the two possible fully intact assemblies), and 23 are less than 50% intact. Again, these numbers strictly pertain to the known 1.5 m of the core. This and other sonar topographic data are still being evaluated and will be useful in planning for plenum and fuel removal.

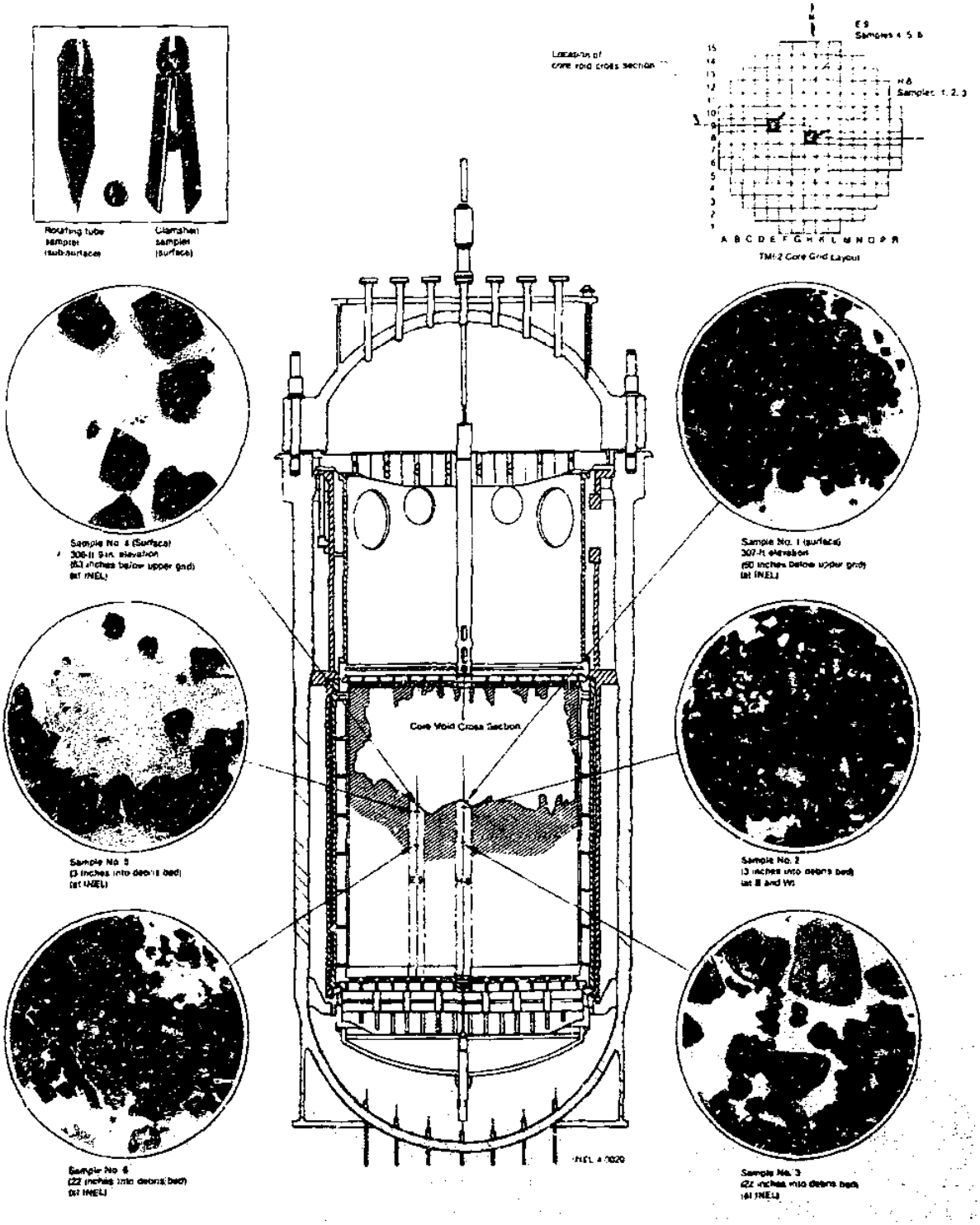
Engineers plan this year to answer some questions about the unknown region below the currently defined void by analyzing more samples taken from deep in the rubble bed.□

First Samples of Core Debris Analyzed

These six samples shown at right were the first obtained from the damaged TMI-2 reactor core. After their removal last fall, five of the samples were sent to the INEL and the sixth to Babcock & Wilcox laboratories in Lynchburg, Virginia, where they were weighed and photographed.

At the INEL, analysts removed eight particles from the five samples for gamma spectroscopy and fissile determination. The core debris consisted of fuel pellet fragments, shards of cladding or guide tubes, and particles which appear to be glazed with previously liquid material. Five of the eight particles were primarily fuel. While ^{144}Ce, ^{106}Ru, and ^{154}Eu appeared to be associated mostly with the fuel, ^{137}Cs and ^{125}Sb were released from the fuel particles. Based on a limited analysis, the released cesium and antimony appear to be present on other core materials. Radiation levels for the five samples, using a teletector from 2.5 cm away, ranged from 3 to 36 R/h gamma. Particle sizes ranged from about 0.6 cm to a fine debris. One surface sample consisted of 13 large chunks of material.

Future work will address the chemistry of the debris in all six samples. The information from the debris samples will aid in assessing the tools and procedures required to defuel the TMI-2 reactor. In addition, the data will be used to define the behavior of a commercial reactor core under the accident conditions found in TMI-2. □


Rotating tube sampler (sub-surface)
Clamshell sampler (surface)
Location of core void cross section
E9
Samples 4, 5, 6
H8
Samples 1, 2, 3
A B C D E F G H K L M N O P R
TMI-2 Core Grid Layout
Sample No. 4 (Surface)
306-ft elevation
(63 inches below upper grid)
(at INEL)
Sample No. 1 (surface)
307-ft elevation
(50 inches below upper grid)
(at INEL)
Core Void Cross Section
Sample No. 5
(3 inches into debris bed)
(at INEL)
Sample No. 2
(3 inches into debris bed)
(at INEL)
Sample No. 6
(22 inches into debris bed)
(at INEL)
Sample No. 3
(22 inches into debris bed)
(at INEL)
INEL 4 7020

TMI-2 Topics

[redacted]

TEST PROVES CRANE CAN LIFT VESSEL HEAD

The Unit 2 polar crane successfully passed a test lifting test on February 28 when it lifted and maneuvered a 214 ton load in the Reactor Building. The load test indicates the crane has ability to safely remove the 170 ton reactor vessel head. The polar crane was damaged as a result of the 1979 accident and underwent nearly a year of inspections and repairs. Engineers first tested the crane without fuel to assess its structural integrity and its mechanical and electrical functions. The load test was ordered after years of concerns about the safety and feasibility of the test. The Nuclear Regulatory Commission investigated the safety of the test and concluded in November 1984 that it could be conducted without risk.

The crane stacked four 40 ton missile shields from over the reactor vessel and one 32 ton missile shield from over the reactor system pressurizer. The shields were then moved to the fuel handling area. This stack, together with the lifting frame and special rigging assemblies, constituted the test load. A welder was [redacted] welded and [redacted] holding the load broke and then [redacted] to the floor. Then the load was transported to and set on the [redacted] valley and above the [redacted] to and [redacted] of the crane bridge. The load was moved [redacted] 180 degrees and the load was [redacted] lifting and removal of the reactor vessel head [redacted] engineers and technicians from the [redacted]

NEW TOOL HANDLE METAL SHIELDS

[redacted] Laboratory have developed a [redacted] that safely handles metal [redacted]

MONITORS MAY NOT BE SUITABLE FOR REACTOR BUILDING USE

Investigations of failed radiation monitors at TMI-2 have revealed that the causes of failure are not unique to an accident environment. Failures experienced by monitors at TMI could occur in similar nonqualified monitors in operating plants, indicating that these monitors may not be suitable for reactor building use.

Incorrect installation instructions supplied by vendors and installation problems are among the factors associated with radiation monitor failure at TMI. Investigations of one monitor revealed that the cable connector attaching the cable to the monitor was not screwed on properly. This improper seal allowed water to enter the connector and accumulate on the connector pins, causing a short circuit. The situation was aggravated by the fact that the entire monitor was installed upside down. Ambiguous instructions in the manufacturer's installation manual led technicians to install the monitor with the cable connection facing the ceiling. The manufacturer has since corrected the manual.

The manufacturer advises against subjecting monitors to pressures greater than 30 psig. During standard reactor building integrated leak rate tests, sealed equipment can experience differential pressures as high as 69 psig. Consequently, TMI-2 monitors had to be removed from the building during each integrated leak rate test. This only increased wear-and-tear on the instruments and the potential for installation mistakes.

Investigations have also shown that radiation monitors with connecting cables longer than 152 m can fail at radiation levels as low as 500 mR/h. The failure mode, called a foldover effect, causes control room ratemeters to show decreasing radiation levels, when in fact the levels in the plant may be increasing. The foldover is caused by a normally inconsequential impedance mismatch along the cable connecting the monitor to the ratemeter. As radiation levels increase, the instrument circuit operates at a higher frequency and the mismatch is amplified, causing a faulty drop in the ratemeter readout.

The foldover effect is amplified by another factor associated with failure of radiation monitors. Monitor components called metal oxide silicon transistors are known to degrade with accumulated radiation exposure. The TMI studies reveal that their degradation also compounds the foldover effect.

All TMI-2 studies indicate that these monitors may not be suitable for use in a reactor building. While the monitors perform satisfactorily in support building environments, they are subject to failure in the harsh environments which can be encountered in reactor buildings. □

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UPDATE

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Authors ..... B.A. Ettinger
C.J. Hess
T.J. Lewis
D.E. Scardena

Editor ..... C.J. Hess

Production Editor ..... G.R. Brown

Designer ..... R.E. Reynolds

DOE-TMI Site
Office Manager ..... W.W. Bixby

EG&G Idaho TMI-2 Programs
Branch Manager ..... H.M. Burton

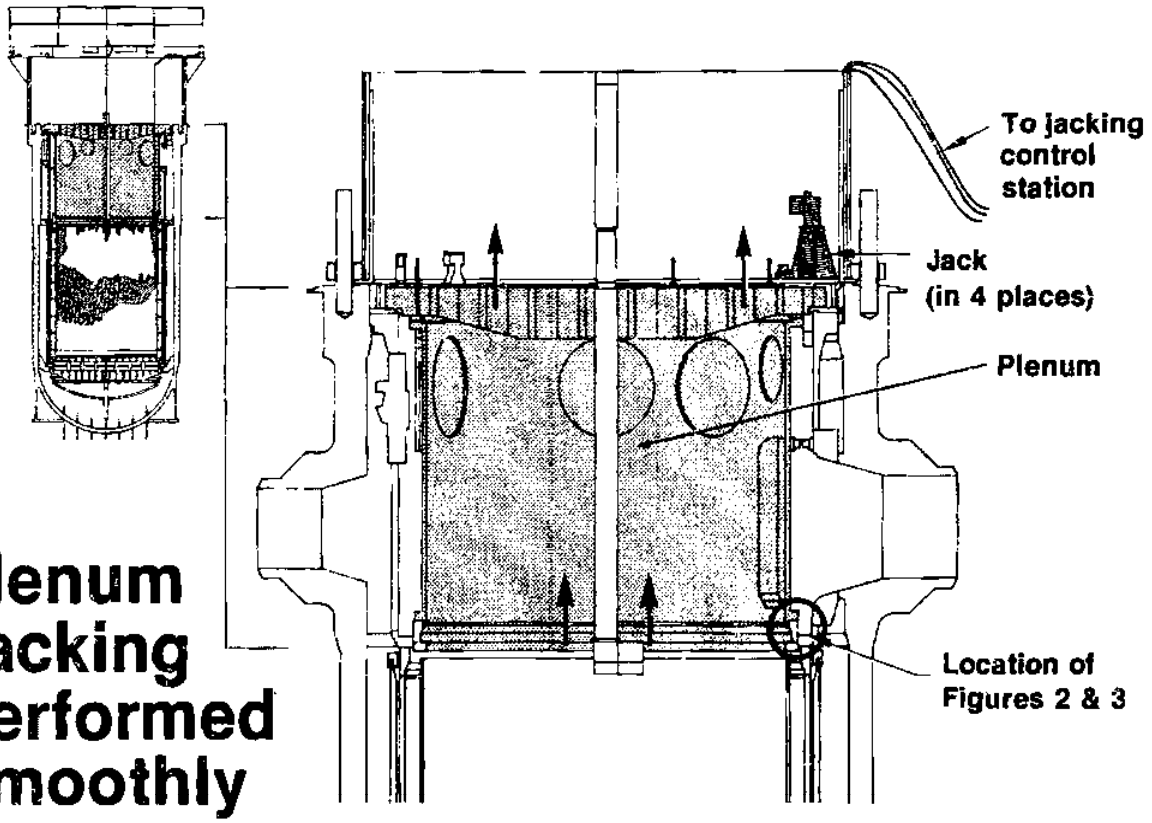
B3360-0684-3.5M

TMI Unit 2 Technical Information & Examination Program

UPDATE

Volume 5, Number 2 February 1985

Plenum Jacking Performed Smoothly



The plenum assembly, the 55-ton cylinder on top of the core containing the guide tubes for the control rods, was jacked in December 1984 in preparation for its removal in May (see Figure 1). Removal of the plenum will provide access for defueling the damaged reactor.

Figure 1. **In December 1984, the plenum assembly was jacked to 7-1/4 in. The highlighted area indicates the location of the photographs in Figures 2 and 3.**

Published by EG&G Idaho Inc., for the U.S. Department of Energy

Plenum jacking operations began at Three Mile Island Unit 2 (TMI-2) last October with video inspections under the plenum and between it and the core support assembly. The inspections, which continued through November, were to assess the condition of the plenum, specifically to determine its available clearances and freedom from interference from other reactor components.

The inspections revealed that GPU Nuclear can expect little difficulty in plenum removal. Babcock & Wilcox (B&W) had predicted before jacking that potential thermal deformation in the way of binding could occur. GPU Nuclear did find distortion at the bottom of the plenum, but any binding resistance would have been well within the lifting capacity of the hydraulic jacks.

In concert with the inspections, which also revealed debris on the lower regions of the plenum assembly, workers dislodged unsupported fuel assembly end fittings. Many of the end fittings were already missing when workers inspected the region under the plenum. Plans for selectively knocking off the remaining end fittings reflected GPU Nuclear's expectations that many of them would drop off as the plenum was jacked. All eight of the axial power shaping rods also were removed during the end fitting separation activity.

After receiving Nuclear Regulatory Commission (NRC) approval of the required Safety Evaluation Report and permission to jack the plenum, GPU Nuclear moved the jacks into the Reactor Building from their mockup positions in the Turbine Building. During staging in the Reactor Building, two of the jacks required alterations to fit the plenum, but no other significant delays occurred.

The original plan was to jack the plenum 2-1/2 in., remove any remaining fuel assembly material, and then jack it another 2-1/2 in. Another inspection and clean-off procedure was then to follow before the plenum was to be jacked 2-1/4 in. more, to an overall 7-1/4 in.

However, jacking to 2-1/2 in. was performed with no apparent binding, so following inspection and peripheral end fitting knock-down, the plenum was jacked directly to 7-1/4 in. Jacking the plenum resulted in no measurable increase in either Kr-85 or radiation levels.

The video inspections, jacking, and end fitting knock-down were observed on remote closed-circuit television monitors and recorded on high-resolution, broadcast-quality video recording equipment. From these high-quality videotapes, enhanced photographs were obtained as further illustration of the plenum activities. In enhanced video photography, several frames of videotape (an average of 17 frames was necessary for each of the photographs seen here) are compiled into one image, resulting in a much clearer view than could be obtained from any individual frame.

Figure 2 is a closeup of "ears" to a fuel assembly's upper end fitting; the "ears" guide the upper end fitting into the plenum assembly.

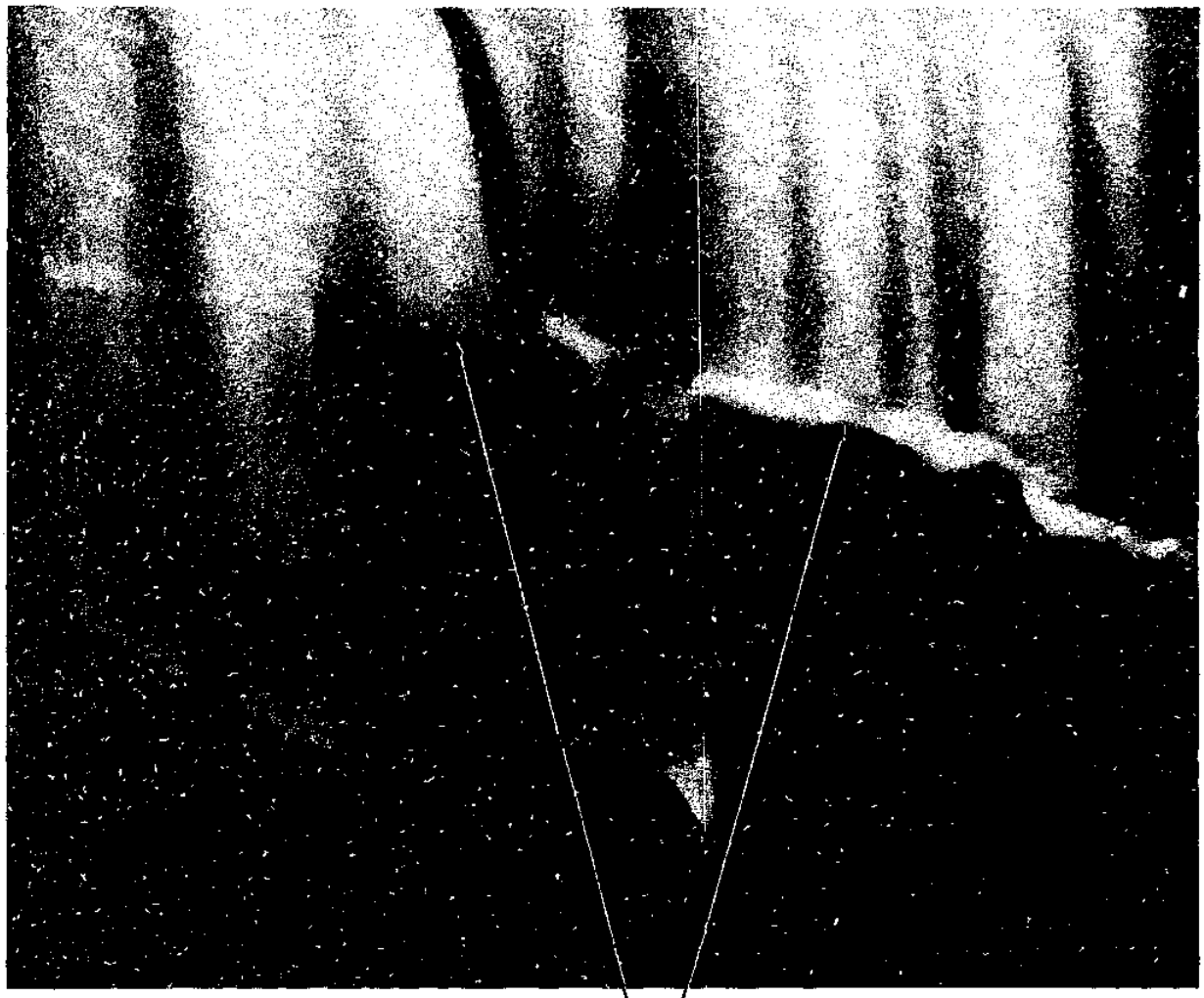


Figure 2. **This closeup focuses on "ears" to a fuel assembly's upper end fitting. The "ears" are beveled to guide the upper end fitting into the plenum assembly.**

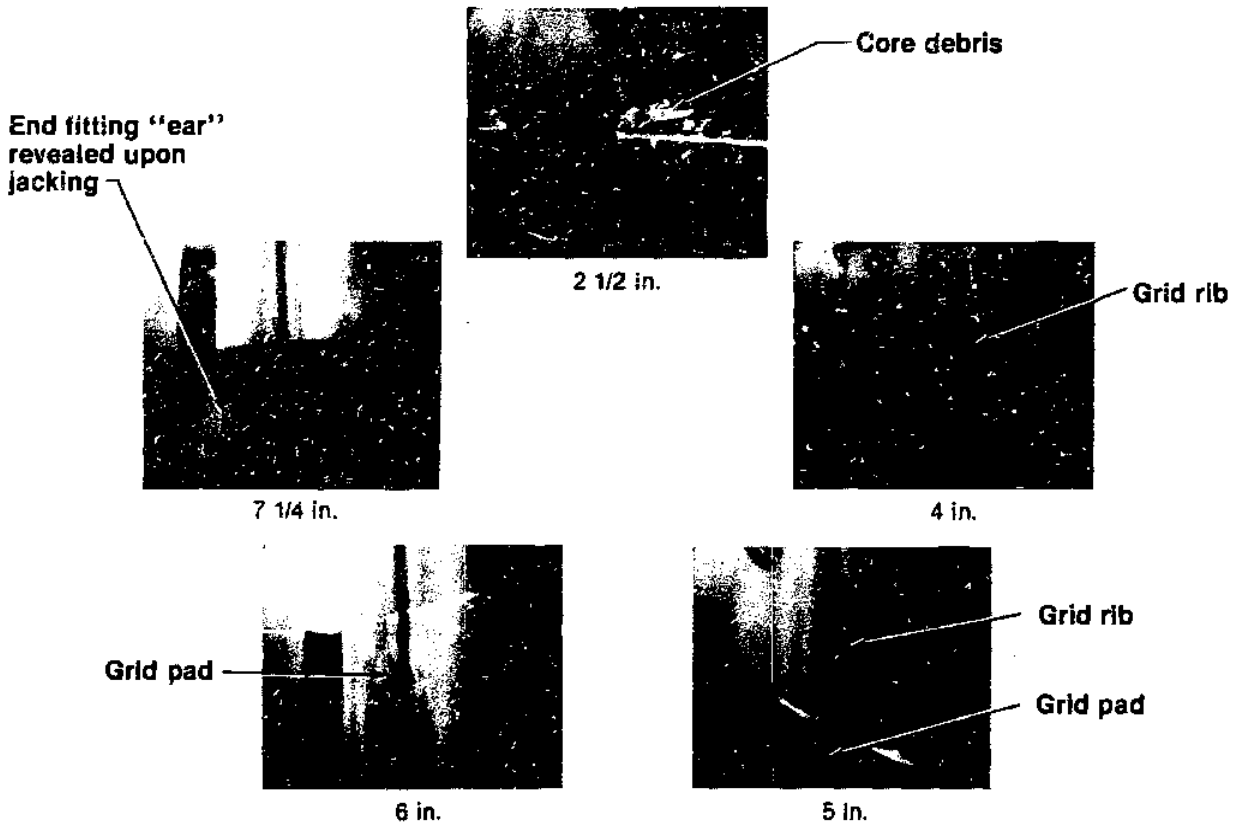


Figure 3 illustrates the jacking sequence from 2-1/2 in. to the final jacking position of 7-1/4 in., with the camera closely focused on an inside section of the plenum. Clockwise from top center, the figure shows the plenum at 2-1/2 in., 4 in., 5 in., 6 in., and 7-1/4 in. In the final picture, an end fitting "ear" has come into view, after previously being obscured by a grid pad. In enhanced photographs of stages between 6 and 7-1/4 in., the position of this "ear" is seen as unchanged, indicating the end fitting did not rise with the plenum.

Following the second jacking, workers separated the rest of the end fittings from the plenum, inspected the rubble bed and the underside of the plenum, and probed the rubble bed in an effort to determine its depth and the condition of the core below.

Preparations for removing the plenum this spring include installing a dam to hold water in the deep end of the refueling canal, putting the plenum storage stand in place, laying on the stand a large cover in which the plenum will be wrapped, and flooding the deep end of the canal. After the plenum is lifted with the polar crane, it will be placed on its storage stand and wrapped. □

Figure 3. **Clockwise from top center, these enhanced photographs show the plenum at five jacking stages. The photographs, magnified two to three times the actual size, were taken from a small area inside the plenum, using an 11-mm lens. (See Figure 1 for location of photographs.)**

Reactor Vessel Defueling Scheduled to Start in July

Within just a few months, workers will begin defueling the damaged Unit 2 reactor vessel, whose head was removed in 1984 and plenum is scheduled for removal in May. GPU Nuclear will defuel the vessel by loading the debris into canisters that will then go through several stages of transfer and storage before being shipped off the Island to the Idaho National Engineering Laboratory (INEL). A number of contamination controls have been incorporated into the scheme to keep radiation levels as low as reasonably achievable. Figure 4 is a schematic of the defueling system for TMI-2.

Defueling will occur in two major phases: early defueling—removal of loose core debris by vacuuming, to begin in July 1985—and bulk defueling—removal of the remaining larger core debris using manually operated tools and robotic devices, to begin in November 1985.

Both activities will be carried out with much of the refueling canal dry; only the deep end of the canal will be flooded to provide shielding from the relocated plenum and the canisters loaded with core debris. Shielding over the open reactor vessel will continue to be provided by the Reactor Coolant System water in the internals indexing fixture (IIF) that sits atop the reactor vessel. Among the advantages of keeping the canal dry: a smaller volume of water will be contaminated and have to be processed.

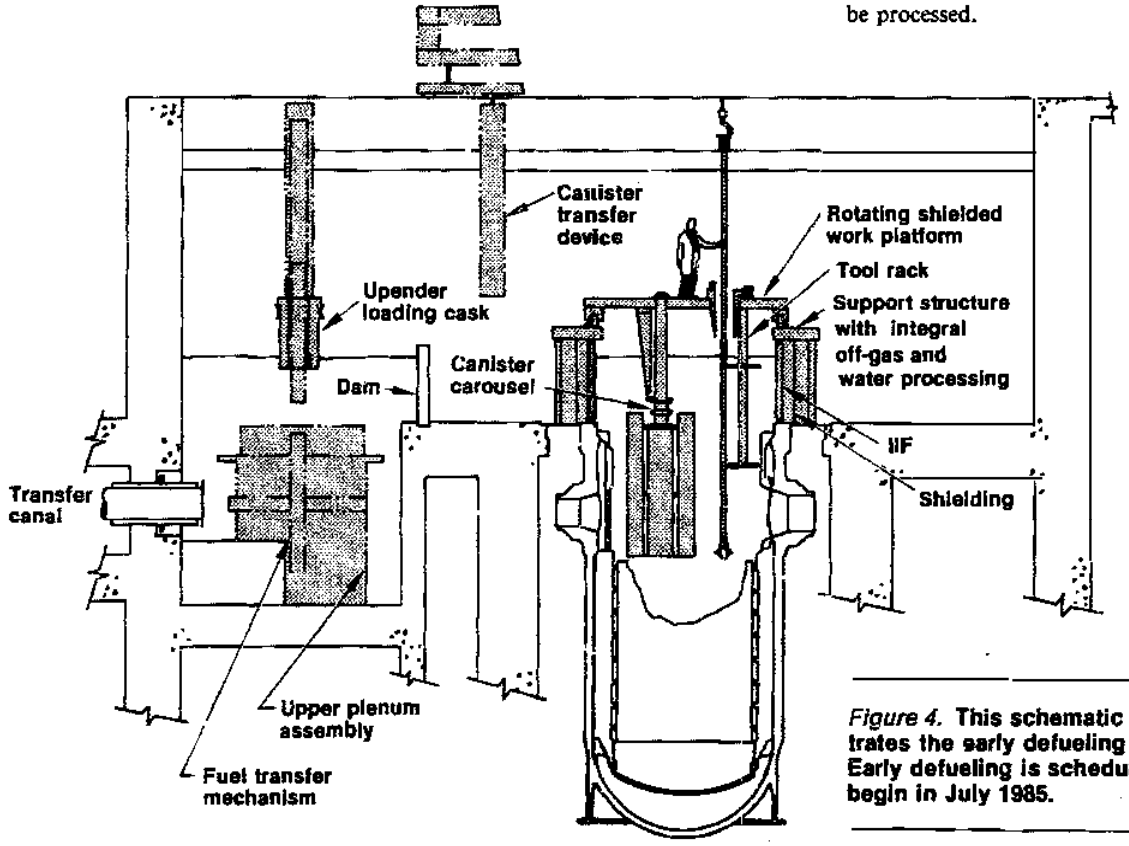


Figure 4. **This schematic illustrates the early defueling system. Early defueling is scheduled to begin in July 1985.**

In preparation for early defueling, workers will use long-handled tools to remove fuel assembly end fittings and some of the other large pieces of debris to clear the rubble bed for vacuuming. The workers will stand on a newly designed, steel shielded work platform and manipulate the tools through an 18-in.-wide slot. This work platform and the water in the IIF together should provide enough shielding to keep dose rates 18 in. above the platform at an average 7 mR/h. Dose rates over the 18-in. slot in the platform will be maintained at 17 mR/h. The workers will continue their "pick-and-place" work later as they vacuum out the debris.

The vacuum system will be located under the shielded work platform and will comprise a pump, piping, valves, and a filtration system. Its control console, to be located on top of the platform, will give workers the necessary valve actuation readouts, pump monitoring, manifold control, backflush control, and other fail-safe information for the entire system.

Debris and fine particles, all in Reactor Coolant System water, will be drawn through a nozzle that will be manually operated with a long-handled tool. The debris will flow into knockout canisters that will retain particulates ranging in size from about 130 μm to the size of whole fuel pellets. The knockout canister removes the medium-sized debris from the water by reducing the flow velocities, thereby allowing the particles to settle.

The smaller debris that are not retained in the knockout canisters will be drawn through the vacuum pump and discharged through filter canisters that will retain particles as small as 0.2 μm. The processed Reactor Coolant System water will then be channeled back into the reactor vessel. In the event of excessive wear or clogging, system components can be backflushed or replaced. Later, when bulk defueling begins larger pieces of debris, such as partial fuel assemblies, will be loaded into fuel canisters.

All three canister types—fuel, filter, and knockout—have an outside diameter of 14 in. and length of 150 in. The filter canisters will be positioned, two at a time, in a bracket in the vessel, below the work platform. The knockout and fuel canisters, meanwhile, will be positioned in a carousel, also inside the reactor vessel. The carousel permits one canister at a time to rotate into the loading position and will be able to hold as many as five loaded canisters in-vessel.

The three canister types have a design life of at least 30 years and can be vented, dewatered, and leak-tested. The fuel canister has an internal shroud that controls the size of the internal cavity and provides a means for encapsulating the neutron absorbing material that will provide criticality control during shipment. Also, catalyst recombiners will be incorporated at the top and bottom of each of the three types of canisters to recombine hydrogen and oxygen gases formed by radiolytic decomposition of the water in the debris.

The central feature of the defueling system is the earlier mentioned, newly designed shielded work platform. This new platform will be placed over the IIF, 9 ft above the reactor vessel flange, replacing the temporary platform that was installed after head lift. The platform rotates to provide workers with full core access. The platform also will serve as a support for in-vessel equipment, including the vacuum system and canister carousel, and provide shielding to workers standing on top.

Between the work platform and its own support structure will run various lines for water treatment and air ventilation to control off-gassing. So that the platform's ability to rotate is not impaired, careful management of cables and service lines went into the platform's design.

Because the defueling operators will not have full, direct view of their work, a system of lights and cameras will be incorporated, with techniques to improve viewing through turbid water. Monitors will be stationed on top of the work platform, as well as in the Unit 2 Command Center. Technicians will also consult reliable control and console readouts to be sure all operations are running smoothly.

Much of the defueling work will be done manually using tools mounted on the ends of 30- to 37-ft-long handles. High-pressure lines will run through the handles to activate the tools.

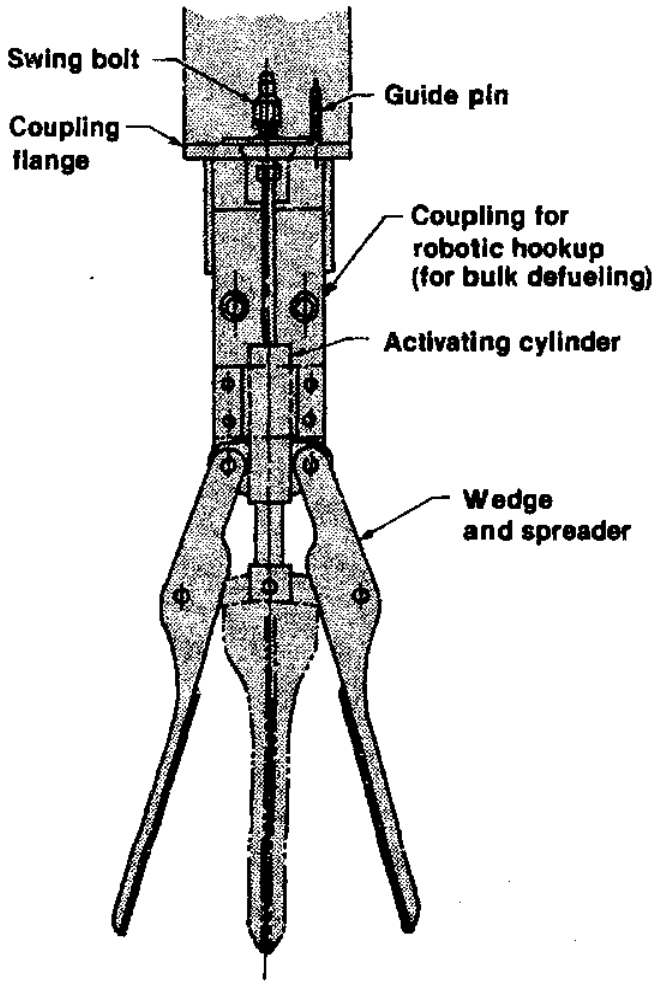
Among the tools are locking pliers to grip large pieces of debris or adjust hoses and cables; three- and four-point grippers to pick up objects from the debris pile; a grapple to lift irregular pieces, such as end fittings and spider assemblies; single rod shears, similar to scissors and capable of cutting one or two fuel rods at a time; a hydraulic parting wedge to separate and fracture material for easier handling and vacuuming (see Figure 5); bolt cutters for light-duty vertical and horizontal cutting; and hooks to lift and move debris.

Figure 5. **Among the defueling tools being designed is this hydraulic parting wedge to separate and fracture material for easier handling and vacuuming.**

A number of the tools have undergone proof-of-principle tests. A hydrolaser, for example, was capable of cutting through 1/2-in.-thick stainless steel by means of a high-pressure water stream and an abrasive. Some of the other tools, meanwhile, have been part of reactor servicing operations for years.

The defueling activities may release substantial amounts of soluble and suspended solids in the reactor water. Meanwhile, the Makeup and Purification Demineralizer System that normally cleans the Reactor Coolant System water has been inoperable since the accident. A defueling water cleanup system (DWCS) was therefore designed as the means to maintain a low, stable level of radioactivity in the water. The DWCS is capable of processing water from the reactor vessel, as well as from the fuel transfer canal and spent fuel pool where the loaded canisters will be temporarily stored.

The eight filter canisters that are part of the water cleanup system each will be capable of filtering 3 L/s of water. The filters are made of sintered stainless steel metal and will remove fuel fines and debris particles as small as 0.2 μm. As designed, the DWCS will be able to process out suspended solids from reactor coolant water at a rate of up to 400 gpm and soluble radioisotopes at up to 60 gpm.



Once the canisters—still in the reactor vessel—are loaded with debris, they will be hoisted through the opening in the platform into a shielded transfer cask attached overhead to the fuel handling bridge. A collar around the cask will be lowered to the platform to contain radiation fields as the canister is withdrawn from the vessel. The canister, inside the cask, will then be transported over the refueling canal to the canal's dammed and flooded deep end. Then the canister will be lowered into the water, where it will either be placed in a storage rack or immediately placed in the fuel transfer mechanism that will move the canister through the fuel transfer canal and into spent fuel pool A.

The loaded canisters will sit in storage racks in the water-filled spent fuel pool until GPU Nuclear is ready to transfer them to the Fuel Handling Building truck bay, where they will be prepared for shipment. The storage racks will have room to accommodate at least 250 canisters, during the interim, in the spent fuel pool.

In the following article, the Technical Information and Examination Program (TI&EP) presents details on the shipping cask that will be used to safely transport the loaded canisters to the INEL. □

Selected Shipping Cask Design Stresses Safety

Loaded with debris from the damaged TMI-2 core, 238 canisters will be transported by train to the INEL, where they will be temporarily stored and later used for research. Two rail casks—each capable of carrying seven debris-filled canisters at a time—will be required for the operation; after unloading their freight in Idaho, the casks will be returned to the Island for their next shipment.

Designed by Nuclear Packaging, Inc. (NuPac), the casks will ensure that the TMI-2 core debris will be safely carried off the Island and transported to the INEL. At the Test Area North facility in Idaho, the canisters will be unloaded remotely and placed in storage racks in a water pit.

Using a conservative approach to meeting U.S. shipping regulations, the cask design provides for two levels of containment. Federal regulation 10 CFR 71.63 requires two separate containers for shipping plutonium-bearing material. In addition, the cask and its inner containment vessel will have seals that meet "leak-tight" leak rate criteria. At this low leak rate, specified in ANSI N14.5, the cask can be used to transport the core debris canisters without precise isotopic information that would be needed to calculate allowable release rates for higher leak rate seals.

As designed, the cask could be loaded wet—in a fuel pool. But to optimize the operations, these casks will be loaded dry. Additionally, the fuel pool that would be used for wet loading now holds equipment that precludes placing the rail cask in the underwater cask loading pit. Therefore, equipment is being designed to load the casks standing upright on a rail car in the truck bay, and a special loading system will be used to transport the canisters to the cask from the fuel pool.

This loading system is being designed such that operations personnel will always be shielded from the canisters and thus protected from direct radiation exposure.

Canisters containing core debris will be transferred inside a protective transfer bell from the spent fuel pool to the rail cask waiting in the truck bay (see Figure 6). The transfer bell, whose base has a sliding gate, will come to rest on the floor valve that is part of the temporary loading head that sits atop the cask. The transfer bell's sliding gate and the valve together will open, allowing the canister to be lowered into one of the cask's seven cavities. After the transfer bell is removed and sent to bring the next canister for loading, a shield plug will be placed in the cask cavity above the canister that was just loaded. (A "mini hot cell" will provide the necessary shielding over the open cavity during the plug's installation.)

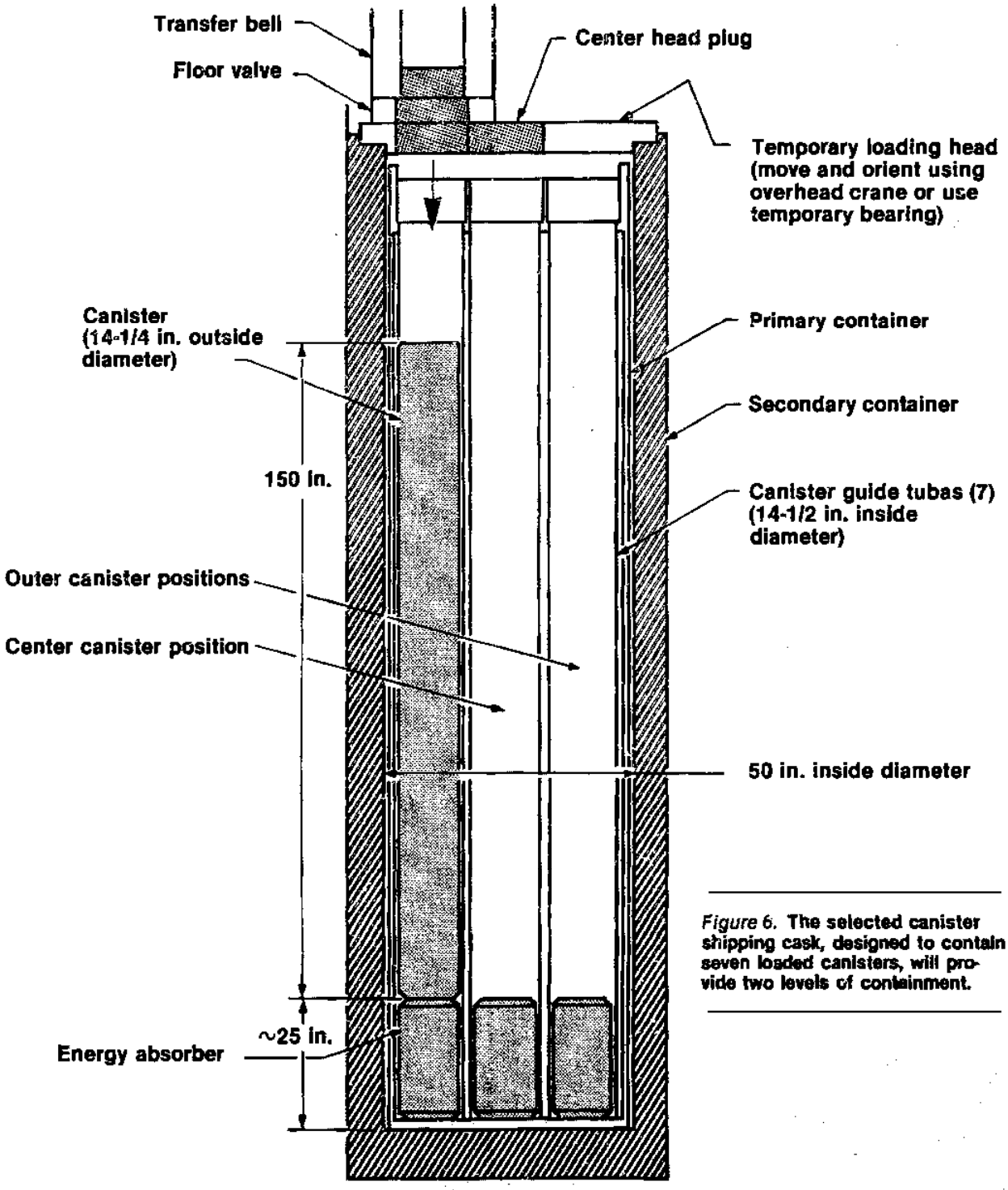


Figure 6. **The selected canister shipping cask, designed to contain seven loaded canisters, will provide two levels of containment.**

The temporary loading head allows the cask to be filled with canisters without leaving any of the already loaded canisters exposed (see Figure 7). This loading head has an outer head plug port that rotates over the six outer canister positions, leaving one position open at a time for loading, and a center head plug port to fill the center cavity. Once loaded, the cask will be sealed, leak-tested, and rotated from a standing to a horizontal position on the rail car using a crane.

Each cask can be loaded in four days, after which the two casks will be gone for 32 days. While the casks are away, other operations in the truck bay can be performed. Shipping 238 canisters, seven canisters per cask, two casks per train, will take about 23 months.

In addition to meeting federal regulations, the NuPac cask meets NRC licensing requirements regarding brittle fracture, containment vessel stresses (allowable stress criteria, fabrication stresses, transportation vibratory stresses, and hypothetical accident-condition impact stresses), and containment requirements (double containment provisions and containment "leak-tight" leak rates). The cask will provide criticality control for the array of seven canisters placed inside. This measure for criticality control is in conjunction with that being provided within the individual canisters for the most severe accident postulated.

In parallel with the preparation of the cask Safety Analysis Report, a drop test sequence of a one-quarter-scale cask model is being planned to verify the structural performance of the casks during impact events and thus provide experimental verification of assumptions used in analytical models. In addition, the drop test will provide the public with a readily understandable demonstration of the safety of the cask, complementing the analytical approaches to demonstrating cask safety. □

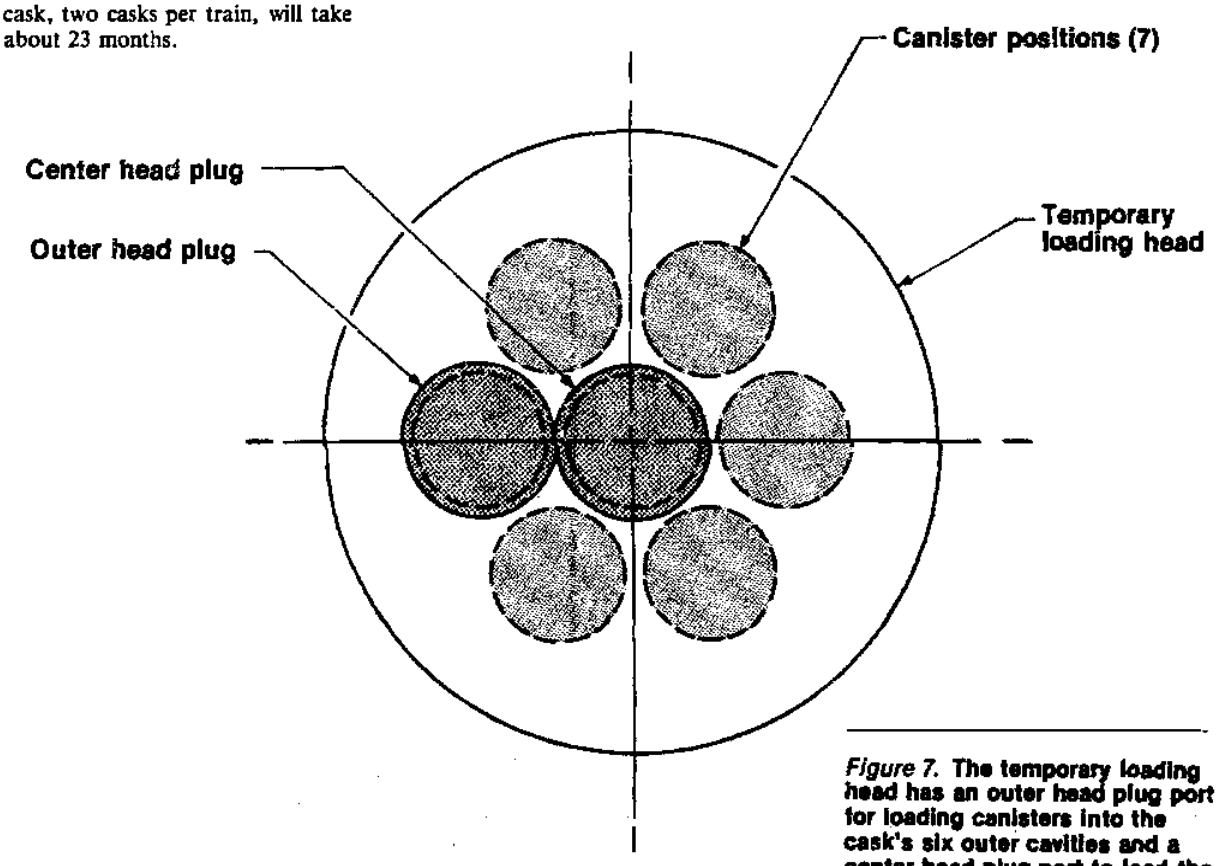


Figure 7. **The temporary loading head has an outer head plug port for loading canisters into the cask's six outer cavities and a center head plug port to load the seventh canister into the center cavity.**

Cesium Elution of Demineralizers Begins

In the autumn of 1984, processing began for the two makeup and purification demineralizers that were contaminated as a result of the accident at TMI. The demineralizers contained the highest concentration of radioactive isotopes outside the Reactor Building and, as a result, left them inaccessible to workers.

During normal plant operation, the demineralizer tanks remove impurities from Reactor Coolant System water. But during the 1979 accident, highly contaminated coolant water passed through the tanks, whose resins captured about 11,000 Ci of radioactive cesium. The tanks also contained as much as 9 lb of reactor fuel particles. GPU Nuclear, with the U.S. Department of Energy (DOE), EG&G Idaho, Inc., and contractors, developed a program to remotely characterize the demineralizers, elute the high activity radionuclides from the resins, and process the resulting waste stream. (In 1983, the demineralizer resins were characterized in preparation for cesium elution. For more about this characterization, see *Update* Volume 3, Number 2, August 15, 1983.)

To remove the radioactive fission products, a mixture of water and sodium hydroxide is first pumped into each demineralizer vessel, where ions of cesium are exchanged for sodium ions from the sodium hydroxide. Consequently, the cesium is no longer bound to the resin, but dissolved in the water. Boric acid is added to this mixture to reduce its pH.

The elution equipment was designed using the data gathered from characterization and sample testing. The equipment removes the high specific activity liquid from the demineralizers through existing access points on the resin fill lines, filters it, and delivers batches to the plant neutralizer tanks. The water is then processed through the Submerged Demineralizer System (SDS).

Each batch of eluant is pumped out of the demineralizer and delivered to a filtration system located about 20 ft away. This filtration system uses a 20-μm stainless steel filter that prevents suspended particles and resin debris from being transported to downstream equipment. The filtered eluant, which contains cesium, strontium, organic contaminants, and other radionuclides, is then stored in tanks and sampled.

These samples tell engineers how effective the process is in releasing the cesium and decontaminating the demineralizer resins, whether more or less sodium hydroxide is needed to release cesium from the resins in the next batch, and what the cesium concentration is in the water in the neutralizer tanks before the mixture moves on to the SDS.

The inorganic material in the liners of the SDS captures the radioactivity that was released from the demineralizer resins, and packages it in a state that is safe for shipment to an approved waste disposal site.

The two SDS liners generated from cesium elution are expected to contain 90% of the cesium originally in the demineralizers, and will be shipped to a DOE laboratory for disposition. □

Researchers Analyze Samples to Define Core Condition

Over the past year, scientists at the INEL and the B&W laboratory in Lynchburg, VA, have been closely examining material acquired from the TMI-2 core. Not only does this study help them to determine the state and nature of the core's damage and its postaccident condition, but it is providing information especially helpful for developing tools and procedures for defueling the reactor.

Eleven samples of loose debris were obtained—six at the center of the core, from the surface to the depth of 30-1/2 in., and five at the mid-radius point, again from the surface but to the depth of 37 in. (see Figure 8).

In the course of their work, analysts have been gathering data on the

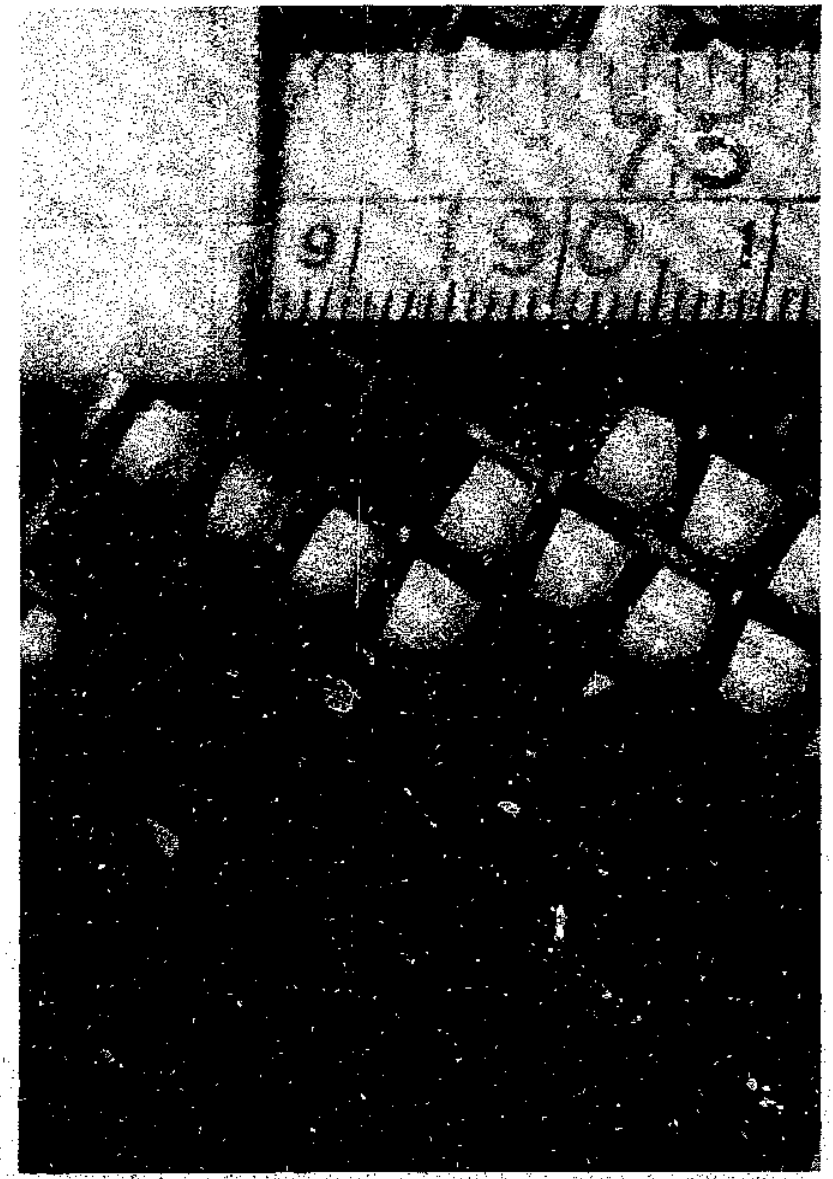


Figure 8. **These particles of greater than 0.157 in. are among the debris in the sample obtained 37 in. into the rubble bed at the core's mid-radius.**

samples' physical makeup—specifically size, shape, structure, and origin. They have been studying the chemical and microstructural makeup of some of the particles by conducting metallographic examinations, scanning electron microscopy, X-ray diffraction, and Auger analyses. Researchers also have been quantifying the particles' fission products. In pyrophoricity tests of the samples, they found that the particle content was not combustible in the presence of oxygen, reducing this concern during fuel shipment.

Key among their findings are the temperatures the core apparently experienced during the accident. Researchers found particles of a ceramic material of uranium and zirconium that could only have formed at temperatures above 4800°F—which is 280°F below the melting point of UO_2 fuel (see Figure 9). The ceramic forms when UO_2 fuel pellets, in contact with zircaloy cladding at that high temperature, are dissolved by the zirconium, forming a liquid phase of Zr-U-O, termed "liquefied fuel."

While this ceramic material is the first concrete evidence of such temperatures, the finding generally agrees with predictions by computer codes for severe core damage. In fact, one of the computer analyses predicted peak temperatures in the range of 5000°F.

Fission products have been retained in the core to different extents, according to their chemical characteristics. The data obtained from the grab samples provide information on the fractions of core inventory retained. The Cs-137 concentrations showed a much lower retention level than Sr-90 and I-129. Researchers hypothesize that the majority of Cs-137 was released into the Reactor Coolant System due to its high solubility in water. That I-129 and Sr-90 had a higher degree of retention in the core is significant because these radionuclides carry with them considerable consequences to personnel, as well as the public, if released to the environment.

In lesser quantities, other gamma-emitting radionuclides present in the core debris were Co-60, Ru-106, Ag-110m, Sb-125, Eu-154, Eu-155, and Am-241. A comparison with computer code data indicated that some of these fission products, such as Ce-144, Eu-154, and Eu-155, remained primarily with the fuel and were not transported out of the reactor core. An analysis of one sample, for instance, indicated that while 13% of Cs-137 was retained, 27 to 40% of Ru-106 and 70 to 100% of Ce-144 and Eu-154 were retained.

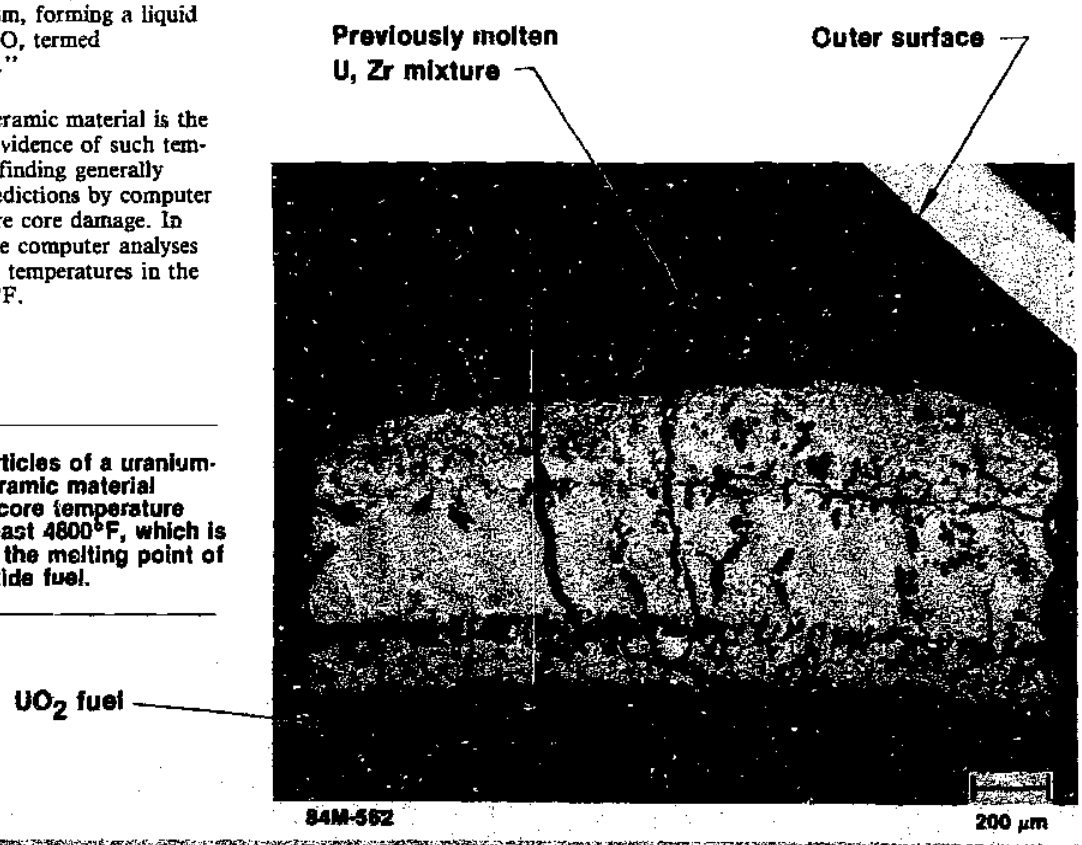


Figure 9. **Particles of a uranium-zirconium ceramic material indicate the core temperature reached at least 4800°F, which is 280°F below the melting point of uranium dioxide fuel.**

Through this effort and the ongoing mass balance project, research engineers will be able to establish the behavior of these radionuclides in situations like the one at TMI. As these studies continue, the INEL plans to determine the core materials to which the radionuclides tend to attach themselves to thus allow retention. In the end, this information will help engineers gain a better understanding of fission product transport and may help to change the approach for siting nuclear plants; the current 10-mile evacuation plan may be unnecessarily restrictive.

In work geared specifically toward the defueling effort, a series of turbidity, cesium release, and airborne activity potential tests were performed in two stages: undisturbed, without fracturing the debris particles, and disturbed, after crushing the debris particles to expose freshly fractured surfaces.

Researchers found that crushing the debris had minimal impact on turbidity. This work directly influences plans for defueling the damaged reactor because maximum water clarity is essential.

Disturbing the debris by crushing did, however, increase the soluble Cs-137 concentrations by a factor of 4 or 5. The soluble Cs-137 went into solution in 5 min, with little subsequent leaching. In evaporation tests, airborne activity increased 2 to 3 orders of magnitude near the end of the process, just before the liquid dried out. As soon as the liquid evaporated, airborne activities decreased almost to zero, indicating the activity possibly was transported with the water vapor. These studies regarding cesium release and airborne activity potential are essential to establishing radiation exposure controls for personnel who will participate in the defueling operations.

Among some of the general physical observations of the 11 samples: they contain fuel pellet fragments and shards of cladding or guide tubes, as well as other core structural material.

All of this research will have an impact on defueling in a number of ways. First, the physical form of the debris is significant because small particles, for example, may be suspended in the Reactor Coolant System water during defueling and cause cloudiness. Knowledge of the particle size distribution is necessary to determine the type, number, and effectiveness of filters to be used to clean the water.

The content of retained fission products also is important because it represents a potential radiological source that must be controlled. Researchers must define core source term and the levels of leachable radionuclides, such as Cs-137, that could potentially dissolve in the water during the defueling operation.

Meanwhile, the type of material in the rubble bed will influence tool designs and the defueling method.

Overall, this research is important to defining the behavior of a commercial light water reactor core under the accident conditions found in Three Mile Island's Unit 2. □

Robot Inspects Basement Where People Are Still Prohibited

Late in 1984, GPU Nuclear initiated the most extensive examination of the Unit 2 Reactor Building basement since the 1979 accident. But *workers* were not assigned to conduct the inspection in this most highly contaminated part of the building. Instead, a six-wheeled, remote-controlled vehicle, nicknamed Rover, was called in to do the job.

Rover, a 6-ft-tall "remote reconnaissance vehicle" equipped with radiation instruments and three television cameras (see Figure 10), was twice lowered into the basement.

Two workers stationed in the basement of the adjacent Turbine Building remotely operated the robot.

Technicians used an electrically operated hoist to lower the 1000-lb robot through a hatch in the building's 305-ft elevation floor. As Rover was eased 24 ft downward, its six lights shone on the walls, still marked with a "bathtub ring," a reminder of where accident water once stood. The robot's cameras also sent back views of digital readouts from the radiation instruments.

Figure 10. **This 6-ft-tall, remote-controlled vehicle used radiation instruments and three television cameras to inspect the TMI-2 basement.**

Once it reached the floor, Rover set out on its mission of simultaneously conducting radiological and camera surveys over preplanned paths. Before the close of the year, Rover surveyed almost half of the circumference of the basement that at one time was flooded with radioactive water from the accident. The 2 to 4 in. of water Rover waded through is water that collects in the basement with decontamination work; the water is pumped out periodically and processed.

As a result of Rover's work, GPU Nuclear has learned that an apparently thin layer of sediment lies in patches on the basement floor. General area gamma radiation readings, taken 4 to 5 ft above the floor, were between 5 and 35 R/h; and localized readings, from 4 to 7 ft up the walls, were anywhere from 5 to 1100 R/h. The highest localized radiation readings were recorded at the concrete block wall of the enclosed stairwell and elevator shaft. In comparison, radiation levels where people now work in the building are generally 0.035 to 0.1 R/h.

Data from these and future entries will help planners prepare for decontamination of the basement. After Rover and other remote-controlled vehicles complete their inspections, they will be modified to collect samples and actually carry out the decontamination activities. Technicians demonstrated on Rover's first entry that these vehicles can in fact be recovered for modifications and reused: the surface contamination that accumulated on the remote reconnaissance vehicle easily washed off with hot water before it was lifted out of the basement. □

Videotape Reviews TMI Activities of 1984

The TI&EP recently completed a videotape program titled "1984 in Review: A DOE TMI-2 Programs Brief." Now available for loan without charge, this program reviews accomplishments in the recovery and research and development activities of 1984. Specifically discussed are head removal; plenum jacking; preparations for defueling, including tool design and characterization of the reactor core through sample acquisition and analysis; plans for shipment of core contents; preparations for core receipt; studies of various electrical components; and the continued immobilization of highly radioactive waste.

The program is available in a 20-min version and a condensed 9-min version. To obtain either of these versions of the program, contact Kim Haddock, EG&G Idaho, Inc., TMI Site Office, P.O. Box 88, Middletown, PA 17057, telephone FTS 590-1019 or (717) 948-1019. □

TMI-2 Topics

In the TMI-2 Topics, you will read news items of interest to the nuclear power industry which may not cover work conducted under the auspices of the DOE TI&EP. The TI&EP Information and Industry Coordination group transmits such news items at technical meetings and through the Electric Power Research Institute (EPRI), the Institute of Nuclear Power Operations (INPO), and the Nuclear Operations and Maintenance Information Services (NOMIS). For more information, contact John Saunders or Jim Flaherty, TI&EP Information and Industry Coordination, FTS 590-1063 or (717) 948-1063.

GPU NUCLEAR PROBES REACTOR CORE

In December 1984, GPU Nuclear conducted a series of probes of the damaged reactor core and found that the depth of the rubble bed averages 14 to 46 in. Using a 39-ft-long, 130-lb, stainless steel rod, and with the help of closed-circuit television cameras, workers probed the core at 18 locations.

The depth of the void, they confirmed, averaged 56 to 80 in. from the 312-ft, 1/2-in. elevation—the underside of the plenum had it been in its seated position.

Workers first carefully lowered the tapered, 7/8-in.-diameter probe until they saw on camera monitors or felt, when no visual aid was available, that it was touching the surface of the rubble bed. Then they let it drop freely to sink into the bed by its own weight. After recording the penetration, workers manually pushed the rod into the bed as deeply as they could, recording the penetration each step of the way, and then hammered it in until it would go no farther.

In most cases, the workers noted, the rod sank relatively easily into the rubble, requiring only 3 to 10 hits of the 30-lb hammer until the rod reached a hard surface. But in one probe, the workers had to drive the rod 18 times with the hammer; each time the rod sank by just fractions of an inch. The average depth at which penetration ceased was 90 to 106 in. from the 312-ft, 1/2-in. elevation.

These data most consistently indicate the bottom of the rubble bed—the level at which the probe hit impenetrable material. Analysts, however, were unable to determine the state of the material below the rubble, except that the workers had no trouble withdrawing the tool; it did not get lodged or stuck in any substance.

In conjunction with this work, GPU Nuclear took a number of radiation readings from thermoluminescent dosimeters positioned in the jacked plenum. Readings ranged from 3 to 360 R/h, which was considerably lower than the expected 800 to 1000 R/h.

Monitoring of the operation was possible using carefully positioned underwater cameras and drop lights, and the entire operation was recorded on videotape. Personnel meanwhile took advantage of the probing project to test out a new visual enhancement technique that improves low-light or photon-starved images, such as those taken from a video monitor.

SIMPLE MEASURES CAN PREVENT INSTRUMENT FAILURE

Research engineers at TMI have learned that water damage was the most prevalent cause of failure in instrumentation and electrical equipment in the Unit 2 Reactor Building. In most cases, however, simple measures could have been taken to prevent or significantly delay moisture-related problems.

Researchers arrived at this conclusion after examining two representative pressure transmitters and three representative level transmitters from the core flood tanks. Laboratory tests confirmed the pressure transmitters operated flawlessly, while the level transmitters failed from water damage.

The difference? The pressure transmitters were equipped with moisture barriers; the level transmitters were not. Simple, inexpensive protective devices, such as conduit seals and drip shields, installed during plant construction or when the plant is down for refueling, can prevent or delay failures like those found in Unit 2.

Research engineers also have found that operator confusion could result when level transmitters and related signal conditioners and control room readouts are recalibrated for dc output signals of -10 to +10 V. In this case, a transmitter that fails will have a 0-V output signal that results in a midscale control room meter reading, giving control room operators an erroneous indication. By using a level transmitter with a dc output signal of 4 to 20 mA or 0 to 10 V and recalibrating the readout circuitry, operators have a clear indication of device operability; a control room meter reading of zero means a possible system problem or instrumentation failure.

The performance, or failure, of the TMI-2 transmitters illustrates the value of implementing such preventive strategies for all instrumentation installed in a reactor building. If you are interested in further documentation of this work, contact the Information and Industry Coordination office at FTS 590-1063 or (717) 948-1063.

SCABBLING FURTHER REDUCES DOSE RATES IN UNIT 2

Technicians at TMI have significantly reduced radiation dose rates in the Unit 2 Reactor Building by removing contaminated paint from concrete floors. In this latest dose-reduction activity, GPU Nuclear decreased general area gamma dose rates by an average of 38% on the 347-ft elevation floor, from a dose rate of approximately 80 mR/h to about 50 mR/h.

The decontamination process, known as scabbling, called for the loosening of paint and about 1/16 in. concrete from 3700 ft^2 of concrete floor. Once scabbled, the floor was repainted with a nuclear-grade paint.

The scabblers use the up-and-down motion of pistons to loosen the material and are used routinely by the construction industry. TMI-2 technicians have adapted the machines for decontamination work, the major modification being the installation of a vacuum system for collecting and packaging the loosened material and minimizing the

amount of airborne contamination generated during the operation.

Scabbling is part of an overall dose-reduction program, begun in early 1983, that has reduced dose rates at the 347-ft elevation of the Reactor Building to approximately 50 mR/h from 117 mR/h. TMI-2 engineers estimated that total radiation exposure to workers from early 1983 through August 31, 1984 was reduced 43%—from a potential total exposure of 893 man-rem to an actual total exposure of 510 man-rem.

TMI-2 workers have since begun scabbling the 305-ft elevation, whose floors were contaminated by radioactive material in the water that spilled during the 1979 accident.

TMI RECEIVES INDUSTRY FUNDING SUPPORT

On January 1, the electric utility industry began aiding the Unit 2 cleanup by making volunteer payments to a program set up by the Edison Electric Institute (EEI). The EEI board of directors in 1983 adopted a resolution to create a program to voluntarily provide $150 million over six years, $25 million per year, as part of its cost-sharing effort for the TMI-2 cleanup. The board subsequently modified its plan in 1984 in order to maintain the cleanup schedule at TMI and approved a two-part program: an industry voluntary program and a program of supplemental research and development grants from six Pennsylvania and New Jersey utility companies.

The $25 million per year is the sum of approximately $11 million from the EEI industry voluntary program and $14 million from the supplemental program. Thirteen utilities have pledged to support the industry voluntary program for a total of about $66 million. Monies for the supplemental program come from funds that the six utilities otherwise would have paid as dues to the research and development organization, EPRI.

The companies participating in the supplemental program are GPU Corporation, Pennsylvania Power & Light Company, Duquesne Light Company, Rockland Electric Company, Philadelphia Electric Company, and Public Service Electric & Gas Company. Atlantic City Electric Company, while not a member of EPRI, is also a participant in the supplemental program. □

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Authors: ..... **Jack N. Earley**
Cynthia J. Hess
David E. Scardena

Editor: ..... **Cynthia J. Hess**

Production Editors: ... **Gordon R. Brown**
M. Catherine Majumder

Designer: ..... **E. Nelson Soucek**

DOE-TMI Site
Office Manager: ..... **Willis W. Bixby**

EG&G Idaho TMI-2 Programs
Branch Manager ..... **James B. Colson**

BL 385 0285 2.1M T

From: Tateiwa, Kenji
Sent: 22 Aug 2014 08:49:05 -0400
To: Bernardo, Robert
Subject: Re: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 22 at 3pm EDT
Importance: Normal

Bob,

With pleasure.
Thank you for following this topic.

All the best,
Kenji

----- Original Message -----
From: Bernardo, Robert
To:'tateiwa.kenji@tepco.co.jp'
Cc: Marksberry, Don
Sent: Friday, August 22, 2014 8:44 AM
Subject: RE: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 22 at 3pm EDT

Good day, Kenji,

Could you please add me to your distribution for the weekly update? Thank You.

Bob Bernardo

Policy and Support Branch
Japan Lessons-Learned Division
US Nuclear Regulatory Commission
O-13E11; MS O-13F15M
301-415-2621
Robert.Bernardo@nrc.gov

From: Marksberry, Don
Sent: Friday, August 22, 2014 8:38 AM
To: Lee, Richard; Salay, Michael; Esmaili, Hossein; Helton, Donald; Norton, Charles; Nakanishi, Tony; Witt, Kevin; Lane, John; Mitman, Jeffrey; Notafrancesco, Allen; Basu, Sudhamay; Randy Gauntt; Siu, Nathan; Jimenez, Manuel; Reckley, William; Arndt, Steven; Laur, Steven; Orders, William; Bernardo, Robert; Williams, Vince; Huffert, Anthony; Fuller, Edward; Pires, Jose; Fuhrmann, Mark; Nosek, Andrew; Skillman, Gordon; Nicholson, Thomas; Aird, David; Tadesse, Rebecca
Subject: FW: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 22 at 3pm EDT

All

Send Kenji an e-mail if you would like to be added to the distribution list for his weekly update.

From: Tateiwa, Kenji (mobile) [mailto:tateiwa@wash.tepco.com]
Sent: Thursday, August 21, 2014 8:19 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 22 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 22, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, Sept. 5** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Demonstration Testing of Underwater Robot for Inspecting Lower-outer Surface of Torus (8/18/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140818_03-j.pdf

2. Verification Testing of High-performance ALPS (8/18/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140818_07-j.pdf
(photos: 8/20/2014)
http://photo.tepco.co.jp/_1212/140820-01j.html

3. NRA Special Facilities Monitoring and Evaluation Committee (8/19/2014)
(only in Japanese)
3-1. Status of Seawater Piping Trench "Ice Barrier" and Mockup Testing of Grout Injection, etc.
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_02-j.pdf

3-2. Estimated Release of Radioactivity Due to Unit 3 Reactor Building Rubble Removal
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_03-j.pdf

4. Construction Status of "Frozen Soil Wall" (8/21/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140821_05-j.pdf

5. Improved Process to Analyze Strontium-90 (8/19/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_05-j.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037

tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)
tateiwa.kenji@tepco.co.jp

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, August 14, 2014 6:43 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 15 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 15, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 22** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Verification Testing of Subdrain Water Treatment Facility (8/11/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140811_04-e.pdf

2. Measures to Reduce Seawater Contamination (8/11/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140811_03-e.pdf

3. Difference between Ice Barrier of Trench and Frozen Soil Wall (8/5/2014)
(video clip)
https://www.youtube.com/watch?v=C6YSOrfS1Kc

4. Retiring Areva Water Treatment Facility (8/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140811_07-j.pdf

5. Construction Plan for Additional Solid Waste Storage Warehouse (8/13/2014)
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu14_j/images/140813j0209.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, August 07, 2014 5:16 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 8 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]

Fri, Aug. 8, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 15** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Plan Towards a Full-Scale Operation of the Multi-Nuclide Removal Facility (ALPS) (7/31/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140731_01-e.pdf

2. Unit 1 Reactor Building Cover to be Dismantled (8/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239910_5892.html
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140801_01-e.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (7/31/2014)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_04-j.pdf
(page 6/8) Contaminated water storage volume trend.

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_05-j.pdf
(page 9/21) Seawater sampling results (inside the port)
(page 10/21) Seawater sampling results (outside the port)

3.3 Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_06-j.pdf
(page 3/300) Unit 1 RPV nitrogen purging from jet pump sensing line
(page 27/300) Construction status of frozen soil wall
(page 28/300) Status of ice barrier at Unit 2 seawater piping trench
(page 75/300) Estimated reduction of groundwater ingress by waterproofing HTI building
(page 121/300) Covering sea-bottom soil inside the port
(page 197/300) Unit 4 reactor building periodic integrity inspection results (9th)
(page 225/300) IRID development of PCV repair and waterproofing technologies
(page 260/300) IRID development of PCV internal investigation technologies
(page 272/300) IRID development of RPV internal investigation technologies
(page 282/300) IRID development of core debris criticality control technologies

4. Regulatory Approval for Subdrain Processing Facility and Verification Facility of Advanced ALPS (8/7/2014)
(only in Japanese)
http://www.tepco.co.jp/cc/press/2014/1240299_5851.html

5. Nuclear Safety Reform Plan FY2014-Q1 Progress Report (8/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239901_5892.html
(video message by Dr. Dale Klein, Chairman of TEPCO's Nuclear Reform Monitoring Committee)
http://www.nrmc.jp/en/report/detail/1239770_5233.html

6. Fukushima Nuclear Accident Unresolved Issues Progress Report # 2 (8/6/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1240140_5892.html
(English Summary)
http://www.tepco.co.jp/en/press/corp-com/release/betu14_e/images/140806e0101.pdf
(Japanese Full Report: 23 MB)

http://www.tepco.co.jp/cc/press/betu14_j/images/140806j0102.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, July 30, 2014 8:46 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, July 31 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, **July 31**, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 8** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **Unit 2 Torus Room Wall Survey (7/29/2014)**
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140728_05-e.pdf
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=c24iaxhc&catid=61785

2. NRA Special Facilities Monitoring and Evaluation Committee (7/23/2014)
(only in Japanese)
2.1 Progress Status on Freezing of Units 2/3 Seawater Piping Trench Connection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_01.pdf

2.2 Unit 1 Reactor Building Dust Inhibition Measures During Cover Dismantling and Rubble Removal
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_02.pdf

2.3 Replacement of Fuel Rack in Common Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_03_01.pdf

2.4 Fuel Removal Plan for Unit 3 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_03_02.pdf

3. Contaminated Water Treatment Committee (7/25/2014)
(only in Japanese)
3.1 Risk Reduction Owing to Contaminated Water Measures
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_03-j.pdf

3.2 Status and Effectiveness of Groundwater Bypass
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_04-j.pdf

3.3 Tritium Concentration Increase in # 12 Groundwater Bypass Well
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_05-j.pdf

3.4 Task Force Studies on Frozen Soil Wall

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_07-j.pdf

3.5 Test Results and Demonstration Status of Advanced Multi-Nuclide Removal System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_08-j.pdf

3.6 Tritium Task Force Discussions
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_09-j.pdf

4. National Academy Sciences Fukushima Lessons Learned Report (7/24/2014)
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=18294
(TEPCO's Statement on the NAS Report)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239621_5892.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, July 17, 2014 11:43 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, July 18 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, July 18, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **THU, July 31** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Progress Status of Ice Boundary between Units 2/3 Seawater Piping Trenches and Turbine Buildings (7/7/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140707_05-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=rbudts0u&catid=61699

2. Investigation Result of Unit 3 Reactor Building North-West Corner (7/11/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140711_06-j.pdf

3. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (7/14/2014)
(only in Japanese)
3-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_03-j.pdf

3-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_04-j.pdf

3-3. Interim Testing Report on Use of Plastic Scintillation Fiber for Contaminated Water Leakage Detection
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_05-j.pdf

4. No Impact due to M 6.8 Earthquake Near Fukushima (7/12/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1238987_5892.html

5. International Research Institute for Nuclear Decommissioning (IRID) Activities
5-1. RFP for Conceptual Study of Innovative Approach for Fuel Debris Retrieval and Feasibility Study of Essential technologies (7/17/2014)
http://irid.or.jp/fd/?page_id=544

5-2. IRID Annual Symposium 2014 (7/18/2014)
http://irid.or.jp/en/symposium/

All the best,
Kenji

From: Norton, Charles
Sent: 31 Jul 2014 07:38:55 -0400
To: 'Tateiwa, Kenji'
Cc: Marksberry, Don;Bernardo, Robert
Subject: RE: [TEPCO Weekly Fukushima Update Call] THU, July 31 at 3pm EDT

Kenji,

My apologies but I will not be able to be on the call today. I have another commitment that I cannot reschedule and must attend.

I have looked through the handouts and generally understand the content. I have some questions that I will try to clear up when we next talk.

- Smokey swirls in the U2 torus area investigation video
- 2-2 explanation of the points displayed on aerial view page 9/27
- 3-1 Graphs starting on page 50
- 3-4 Double sleeve on frozen wall on sea side

I will be on the next call on Friday August 8 at 3 pm. Friday is a better day for my availability.

We at NRC appreciate your efforts in concisely compiling and communicating this information.

The best to you,
Chuck Norton
US NRC/JLD/JOMB
301 415 7818

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Wednesday, July 30, 2014 8:47 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] THU, July 31 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, July 31, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 8** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 2 Torus Room Wall Survey (7/29/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140728_05-e.pdf
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=c24iaxhc&catid=61785

2. NRA Special Facilities Monitoring and Evaluation Committee (7/23/2014)
(only in Japanese)
2.1 Progress Status on Freezing of Units 2/3 Seawater Piping Trench Connection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_01.pdf

2.2 Unit 1 Reactor Building Dust Inhibition Measures During Cover Dismantling and Rubble Removal
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_02.pdf

2.3 Replacement of Fuel Rack in Common Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_03_01.pdf

2.4 Fuel Removal Plan for Unit 3 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_03_02.pdf

3. Contaminated Water Treatment Committee (7/25/2014)
(only in Japanese)
3.1 Risk Reduction Owing to Contaminated Water Measures
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_03-j.pdf

3.2 Status and Effectiveness of Groundwater Bypass
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_04-j.pdf

3.3 Tritium Concentration Increase in # 12 Groundwater Bypass Well
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_05-j.pdf

3.4 Task Force Studies on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_07-j.pdf

3.5 Test Results and Demonstration Status of Advanced Multi-Nuclide Removal System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_08-j.pdf

3.6 Tritium Task Force Discussions
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_09-j.pdf

4. National Academy Sciences Fukushima Lessons Learned Report (7/24/2014)
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=18294
(TEPCO's Statement on the NAS Report)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239621_5892.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company

Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, July 17, 2014 11:43 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, July 18 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, July 18, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **THU, July 31** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Progress Status of Ice Boundary between Units 2/3 Seawater Piping Trenches and Turbine Buildings (7/7/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140707_05-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=rbudts0u&catid=61699

2. Investigation Result of Unit 3 Reactor Building North-West Corner (7/11/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140711_06-j.pdf

3. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (7/14/2014)
(only in Japanese)
3-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_03-j.pdf

3-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_04-j.pdf

3-3. Interim Testing Report on Use of Plastic Scintillation Fiber for Contaminated Water Leakage Detection
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140714_05-j.pdf

4. No Impact due to M 6.8 Earthquake Near Fukushima (7/12/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1238987_5892.html

5. International Research Institute for Nuclear Decommissioning (IRID) Activities
5-1. RFP for Conceptual Study of Innovative Approach for Fuel Debris Retrieval and Feasibility Study of Essential technologies (7/17/2014)
http://irid.or.jp/fd/?page_id=544

5-2. IRID Annual Symposium 2014 (7/18/2014)
http://irid.or.jp/en/symposium/

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, July 02, 2014 10:04 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, July 3 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, July 3, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, July 18** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (6/27/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_05-j.pdf

1-3. Insertion of Thermometer and Water Level Gauge inside Unit 2 Drywell
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_06-j.pdf

1-4. Status of ALPS, Sr-Immobilization, Groundwater Bypass, Subdrain System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_07-j.pdf

1-5. Status of Groundwater and Seawater Contamination
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_08-j.pdf

1-6. Dismantling of Unit 1 Reactor Building Cover, Decontamination of Unit 3 Reactor Building Refueling Floor, Change in Unit 4 SFP Fuel Transfer Plan
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_10-j.pdf

1-7. Investigation and R&D in Preparation for Fuel Debris Retrieval
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_11-j.pdf

1-8. Radioactive Waste Storage
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_12-j.pdf

1-9. Candidate Site for Construction of Radioactive Material Analysis and Research Facility
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_13-j.pdf

1-10. MEXT's Plan for Establishing International Joint R&D Center for Decommissioning
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_14-j.pdf

1-11. Request for Proposal (RFP) for Innovative Approach for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140627_17-j.pdf
(See following site for English information on this RFP.)
http://en.dccc-program.jp/2014/07/02/?p=186

2. Final Investigation Report on H4 #5 Tank Leakage of RO-Concentrated Water (6/30/2014)
(only in Japanese)
2-1. Full Report
http://www.tepco.co.jp/cc/press/betu14_j/images/140630j0401.pdf

2-2. Estimated Leakage of Sr-90 and Recovery Rate
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140630_06-j.pdf

3. "How the Other Fukushima Plant Survived" Harvard Business Review Article on 2F Available for Free
http://hbr.org/2014/07/how-the-other-fukushima-plant-survived/ar/1

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, June 26, 2014 7:58 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 27 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 27, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **THU, July 3** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (6/16/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140616_03-j.pdf

1-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140616_04-j.pdf

2. Unit 1 Torus Room Wall Survey Results (6/13/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140613_09-e.pdf

3. Unit 2 Torus Room Wall to be Surveyed by Robots (6/24/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140624_08-e.pdf

4. Decontamination inside Unit 3 Reactor Building to Begin Using Remote-operated Equipment (6/20/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140620_06-e.pdf

5. Revision of Plan to Transfer Fuels from Unit 4 SFP (6/18/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140618_08-e.pdf

6. All 3 Trains of ALPS Back Online (6/26/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1238403_5892.html

7. "How the Other Fukushima Plant Survived" (July-August/2014)
Success story of accident response at Fukushima Daini featured in Harvard Business Review.
http://hbr.org/product/how-the-other-fukushima-plant-survived/an/R1407K-HCB-ENG

8. "'Fukushima 50' Worker Shares Personal Lessons From 2011 Accident" (6/24/2014)
Interview of Shiro Takahira, one of the Fukushima 50, by NEI.
http://www.nei.org/News-Media/News/News-Archives/Fukushima-50-Worker-Shares-Personal-Lessons-From-2

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, June 12, 2014 9:24 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 13 at 3pm EDT

Nuclear Sector Colleagues,
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 13, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, June 27** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (5/29/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140529_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140529_05-j.pdf

1-3. Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140529_06-j.pdf
(page 3/347) Shortening the length of circulating-water cooling system
(page 43/347) Addition of mobile Sr removal system and Sr removal capability to SARRY
(page 186/347) Status of Unit 3 SFP rubble removal
(page 195/347) Installation of new fuel racks in common fuel pool
(page 201/347) Long-term integrity evaluation of fuels removed from SFP

(page 214/347) Study on processing methods for damaged fuels (if any) removed from SFP
(page 225/347) Unit 3 MSIV room investigation results
(page 235/347) Upper S/C investigation equipment testing results
(page 252/347) Gamma camera investigation of reactor buildings
(page 276/347) Improvement of severe accident analysis codes (MAAP and SAMPSON)
(page 300/347) Integrity evaluation of RPV and PCV
(page 314/347) Test results of vent pipe water proofing
(page 326/347) Development of upper PCV and S/C repair technology
(page 339/347) R&D on processing and disposal of solid waste

2-1. Start of Frozen-Soil Wall Construction (5/30/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140530_12-e.pdf

2-2. Start of Frozen-Soil Wall Construction (6/2/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140602_06-e.pdf

3. Leakage of Contaminated Rainwater from 4,000-ton Notch Tank Farm (6/4/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140604_11-j.pdf

4. NRA Special Facilities Monitoring and Evaluation Committee (6/6/2014)
(only in Japanese)
4-1. Considerations on Buried Material During Construction of Frozen-Soil Wall (1/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-1.pdf

4-2. Considerations on Buried Material During Construction of Frozen-Soil Wall (2/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-2.pdf

4-3. Considerations on Buried Material During Construction of Frozen-Soil Wall (3/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-3.pdf

4-4. Considerations on Buried Material During Construction of Frozen-Soil Wall (4/4)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_01-4.pdf

4-5. Level Management of Groundwater and Contaminated Water Inside Buildings
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_02.pdf

4-6. Groundwater Monitoring and Emegency Response
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_03.pdf

4-7. Status of ALPS
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0023_04.pdf

5. Factory-made Welded Tanks Carried into Daiichi Site (6/12/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140611_08-e.pdf

6. Rebuttal on NY Times Article Unfairly Criticizing Fukushima Workers (5/22/2014)
Re "Credibility questions on Fukushima" (May 22):
http://www.nytimes.com/2014/06/02/opinion/fukushima-and-nuclear-safety.html?partner=rssnyt&emc=rss&_r=2

As president of the company that owns the Fukushima Daiichi nuclear plant, I am accustomed to criticism.
But I cannot be silent when our workers are unfairly maligned.
In face of the March 11, 2011, earthquake and tsunami crisis, our workers risked their lives and fought to control the plant even while many of their families were suffering the effects of

the tsunami, including the destruction of their homes and, in some cases, the loss of family members' lives. On March 15, when the situation seemed to get worse, we instructed necessary workers to remain and the rest to seek shelter in low-radiation areas. Some took shelter at our nearby Fukushima Daini plant. Our post-accident investigation showed workers evacuated in a safe and orderly way and returned when they were instructed to. Therefore, I do not consider the evacuation to be an inobservance of the site superintendent's instruction. Nor do I believe there was any delay in accident response at Fukushima Daiichi due to the temporary evacuation of some workers.
Certainly nothing justifies the sensational headlines that unfairly suggest workers "fled" in some disorganized, dishonorable way. To the contrary, they stayed on the job and risked their lives to bring the plant under control.

Naomi Hirose, Tokyo
The writer is president and C.E.O. of Tokyo Electric Power Company.
****

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 7 Jun 2014 18:21:53 -0400
To: Norton, Charles
Cc: Witt, Kevin
Subject: Re: Unit 4 fuel
Importance: Normal

Chuck,

Sorry for the late reply.
I was traveling to Chicago on business this week and just returned to DC.

Please see page 452/643 of TEPCO's Internal Investigation Report.
"Fukushima Nuclear Accidents Investigation Report (Attachment) (PDF 28.1MB)"
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

"Chart 3 Unit 4 SFP water analysis results" shows Cs-134, Cs-137 and I-131 concentration of water samples taken from Unit 4 SFP.
As the ratio of Cs-134 and Cs-137 is about the same, given that the freshest fuel in Unit 4 SFP had been taken out of the core 4 months prior to 3-11, these radionuclides likely originated from other units.

Although we cannot completely rule out the possibility of damage to the fuels in Unit 4 SFP, visual inspection found no significant damage (pages 458-459/643).

Also see TEPCO's presentation on results of visual inspection of fuels taken out from Unit 4 SFP (for 4 different types of fuel bundles).
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140430_07-e.pdf

Let me know if you have further questions.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Norton, Charles
To:tateiwa.kenji@tepco.co.jp
Cc: Witt, Kevin
Sent: Friday, June 06, 2014 5:11 AM
Subject: Unit 4 fuel

Good Morning Kenji,

Can you direct me to a publically available document that describes the condition of the fuel in unit 4. I know that there have been studies that show the structure of the building to be sound, but what I am

being asked to find is a report that describes the fuel itself to be undamaged by the earthquake and building explosion.

Thank you for your help,
Chuck Norton
US NRC
NRR/JLD/PSB

From: Tateiwa, Kenji
Sent: 23 Apr 2015 22:42:32 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, April 24, 2015 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, April 24, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, May 8** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Drywell Internal Investigation by Transforming Robots (4/10~19/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249780_6844.html

(April 10 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150413_01-e.pdf
(video clip for April 10)
http://photo.tepco.co.jp/en/date/2015/201504-e/150413-01e.html

(April 15 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150416_01-e.pdf
(video clip for April 15)
http://photo.tepco.co.jp/en/date/2015/201504-e/150416-01e.html

(April 16 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150417_01-e.pdf
(video clip for April 16)
http://photo.tepco.co.jp/en/date/2015/201504-e/150417-01e.html

(April 18-19 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150420_01-e.pdf
(video clip for April 18-19)
http://photo.tepco.co.jp/en/date/2015/201504-e/150420-01e.html

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (4/13/2015)
(only in Japanese)
2-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_04-j.pdf

2-2. Preparation for Dismantling Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_05-j.pdf

2-3. Outdoor Cable Fire
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_11-j.pdf

2-4. Status Report on Identification of Risk Factors Related to Off-site Radiological Impact
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_12-j.pdf

2-5. New Framework and Organization Related to Disclosure of All Radiological Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_13-j.pdf

2-6. NDF's Draft 2015 Technical Strategy Plan in Preparation for Revising the Mid-to-Long Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_15-j.pdf

2-7. Draft Straw Man for the Revised Mid-to-Long Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_18-j.pdf

2-8. Status Report on Various Issues (155 pages, 13.3 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_19-j.pdf

3. NRA Special Facilities Monitoring and Evaluation Committee (4/22/2015)
(only in Japanese)

3-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/data/000104663.pdf

3-2. Water Collected on Lid of High-Intensity Container Inside a Box Culvert
http://www.nsr.go.jp/data/000104664.pdf

3-3. Groundwater Inflow Mitigation Measures and Water Level Management
http://www.nsr.go.jp/data/000104677.pdf

3-4. Reduction of Radioactivity in Drainage Channels
http://www.nsr.go.jp/data/000104668.pdf

4. Inadvertent Stop of Drainage Pumps at K Drainage Channel--Now Restored (4/21, 23/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249920_6844.html
(Detailed Info)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150421_01-e.pdf

5. IAEA Delegation Visit to Fukushima Daiichi (4/19/2015)
http://photo.tepco.co.jp/en/date/2015/201504-e/150421-01e.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company

Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, April 08, 2015 8:25 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, April 9, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, April 9, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week.** Next call will be on **Fri, April 24** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 3 Shield Plug in Front of Containment Vessel Equipment Hatch: Assumed Cause of Movement (3/30/2015)
Shield plug could have moved due to pressure differential between containment vessel and reactor building when R/B hydrogen explosion occurred.
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150330_04-j.pdf

2. Unit 3 Spent Fuel Pool Gate Condition (4/6/2015)
Visual inspection found no significant impact to one of the two layers of gates (G1) maintaining water-tightness of pool.
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150406_04-j.pdf

3. Crawler Robot to Investigate Inside Unit 1 Drywell (4/6/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150406_01-e.pdf

4-1. Nuclear Safety Reform Plan: Quarterly Progress Report (3/30/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249285_6844.html

4-2. Full Report
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu15_j/images/150330j0102.pdf

4-3. TEPCO's Nuclear Reform Monitoring Committee
http://www.nrmc.jp/en/report/detail/1249278_5233.html

4-4. "Reviewing the Two Years of Nuclear Safety Reform"

http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/04/02/E-5.pdf

5-1. *"Trace Amounts of Fukushima Radioactivity Detected Along Shoreline of British Columbia"* (4/6/2015)
Press release by the Woods Hole Oceanographic Institution.
http://www.whoi.edu/news-release/fukushima-ucluelet

5-2. TEPCO's Sea Water Sampling Data
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

5-3. TEPCO's Seawater Monitoring Plan (4/1/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150401_06-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, March 26, 2015 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, March 27, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, March 27, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week.** Next call will be on **THU, April 9** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Muon Tomography Preliminary Results (3/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150319_01-e.pdf

2. Contaminated Water Committee (3/17/2015)
(only in Japanese)
2-1. Studies Related to Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150317_07-j.pdf

2-2. Studies Related to High-Performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150317_08-j.pdf

3. NRA Special Facilities Monitoring and Evaluation Committee (3/25/2015)
(only in Japanese)
3-1. "K" Drainage Line Investigation and Actions
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150325_04-j.pdf

3-2. Closure of Seawater Piping Trenches of Units 2, 3, 4

http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150325_08-j.pdf

4. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (3/26/2015)
(only in Japanese)
4-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_04-j.pdf

4-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_05-j.pdf
(English translation as of 2/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150226_01-e.pdf

4-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_07-j.pdf

4-4. Environmental Radiation Issues *(large file size: 56 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_08-j.pdf

4-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_10-j.pdf

4-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_11-j.pdf

4-7. Radioactive Waste Processing (Radionuclide Analyses of Samples Taken from Units 1-3 R/B)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_12-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, March 12, 2015 8:50 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, March 13, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, March 13, 2015 at 3 pm Eastern **Daylight** Time
(**No Call Next Week.** Next call will be on **Fri, March 27** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (3/2/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4

http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_05-j.pdf

1-2. Measures to Reduce Radioactivity in "K" Drainage Line
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_06-j.pdf

1-3. Investigation on Temporary Increase in Radioactivity in Downstream of "B and C" Drainage Line
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_07-j.pdf

1-4. Water Level Management after Operation of Frozen-Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_08-j.pdf

2. Rain Water Level Drop in Outer Weir of H4 Area Tank (3/12/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150312_04-j.pdf

3. New Disclosure Policy and Independent Audit in Light of Recent Drainage Water Issue (3/6/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248564_6844.html

4. TEPCO President's Remarks on 4th Anniversary of Great East Japan Earthquake (3/11/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248663_6844.html

5. "Nuclear Energy in Japan Since Fukushima " (2/17/2015)
TEPCO's presentation at the Platts Nuclear Energy Conference.
http://www.platts.com/IM.Platts.Content/ProductsServices/ConferenceandEvents/2015/pc509/presentations/Kenji_Tateiwa.pdf

6. "Estimated Amount of Radioactive Materials Released into the Air by the Fukushima Daiichi NPS Accident" (3/10/2015)
TEPCO's presentation at the US NRC Regulatory Information Conference (RIC.)
https://ric.nrc-gateway.gov/docs/abstracts/tateiwak-t5-hv-r1.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 26, 2015 10:50 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 27, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 27, 2015 at 3 pm Eastern Standard Time
(**No Call Next Week**. Next call will be on **Fri, March 13** at 3 pm **EDT**.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]

1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (2/23/2015)
(only in Japanese)

1-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_04-j.pdf

1-2. Dismantling Plan for Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_05-j.pdf

1-3. Occupational Safety Corrective Actions
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_06-j.pdf

1-4. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_12-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (2/26/2015)
(only in Japanese)

2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_05-j.pdf
(English translation as of 1/29/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150129_01-e.pdf

2-3. Re-insertion of Thermocouple into Unit 2 RPV Bottom via SLC Line
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_06-j.pdf

2-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_07-j.pdf

2-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_08-j.pdf

2-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_10-j.pdf

2-7. Preparation for Fuel Debris Removal (3D Laser Scanning, Muon Tomography)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_11-j.pdf

2-8. D&D-Related R&D Progress and Future Plans
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_13-j.pdf

2-9. Selection of Technologies to Undergo Tritium-Separation Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_14-j.pdf

2-10. Establishment of Global Decommissioning Joint Research Center

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_15-j.pdf

3. Temporary Increase in Radioactivity in Downstream of "B and C" Drainage Line (2/24/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248327_6844.html

4. Unit 2 Reactor Building Truck Bay Door Roof Likely Source of Radioactivity in "K" Drainage Line (2/24/2015)
www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150224_01-e.pdf

5. Briefing to Fishermen's Association in Fukushima Prefecture Regarding Contaminated Water Issues (2/25/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150225_05-j.pdf

6. Unit 1 Reactor Building 4th Floor Inspection by Technical Committee of Niigata Prefecture (2/21/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150221_06-j.pdf

7. Third IAEA Review of Fukushima Daiichi Decommissioning Roadmap (2/17/2015)
https://www.iaea.org/newscenter/pressreleases/iaea-team-completed-third-review-japans-plans-decommission-fukushima
(photos)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150217_03-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 12, 2015 10:37 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 13, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 13, 2015 at 3 pm Eastern Standard Time
(**No Call Next Week**. Next call will be on **Fri, Feb. 27** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (2/9/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4

http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_02.pdf

1-2. Water Level Management after Operation of Frozen-Soil Wall (summary)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_03.pdf

1-3. Water Level Management after Operation of Frozen-Soil Wall (reference information)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_08.pdf

2. Installation of Muon Detectors for Fuel Debris Detection at Unit 1 (2/9/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248057_6844.html
(photos)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150209_01-e.pdf

3. *"The Great Race: The Global Quest for the Car of the Future"*
http://amzn.com/B00LD1OP0Q
This book features TEPCO's current Chief Nuclear Officer, Takafumi Anegawa, as a visionary who jump started Japan's electric vehicle industry.

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 4 Dec 2014 21:35:51 -0500
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 5 at 3pm EST
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 5th, 2014 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Dec. 12** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Contaminated Water Countermeasures Committee (11/13/2014)
(only in Japanese)
1-1. Status of Contaminated Water Countermeasures and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_03-j.pdf

1-2. Recent Topics at 1F
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_04-j.pdf

1-3. Task Force on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_06-j.pdf

1-4. Demonstration Test for High-performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_07-j.pdf

1-5. Task Force on Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_08-j.pdf

1-6. Study on Shallow Ground Disposal of Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_09-j.pdf

1-7. Status of Contaminated Water Treatment Technology Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_10-j.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (11/25/2014)
(only in Japanese)
2-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_03-j.pdf

2-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_04-j.pdf

2-3. Procedure for Closure of Frozen Soil Wall

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_05-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (11/27/2014)
(only in Japanese)

3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_05-j.pdf

3-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_07-j.pdf

3-4. Environmental Radion Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_08-j.pdf

3-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_10-j.pdf

3-6. 3D Laser Scanning in Unit 1 Torus Room
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_11-j.pdf

3-7. Solid Radioactive Waste Treatment and Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_12-j.pdf

3-8. Progress on Emergency Safety Enhancement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_14-j.pdf

4. Introduction of ICP-MS Method Allowing Quicker Measurement of Sr-90 in Water
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141127_01-e.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji

Sent: Monday, November 24, 2014 10:51 AM
Subject: NO CALL THIS WEEK [TEPCO Weekly Fukushima Update Call] Next on Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Due to unavoidable change in schedule, I will have to **cancel the call planned for tomorrow (Tue, Nov. 25**.)
Next call will be on **Fri, Dec. 5th** at 3 PM.

Apologies for any inconvenience this may cause you.
Feel free to contact me should you have any questions.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, November 12, 2014 7:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Nov. 13 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, Nov. 13, 2014 at 3 pm Eastern Standard Time
(**No call next week.** Next call will be on **TUE, Nov. 25** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Reactor Building Cover Roof Panel Removal (11/10/2014)
http://photo.tepco.co.jp/en/date/2014/201411-e/141110-01e.html

2. TEPCO's Statement on Detection of Trace Amounts of Cs-134 Off U.S. West Coast (11/11/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243939_5892.html

2.1 Woods Hole Oceanographic Institution's Press Release
http://www.whoi.edu/news-release/Fukushima-detection

2.2 Discussion Board on the New REDDIT Journal of Science

http://www.reddit.com/r/science/comments/2lusz5/science_ama_series_im_ken_buesseler_an/?limit=500

3. Radioactivity in Seawater Near Fukushima Daiichi (11/12/2014)

http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

3.1 Inside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/intake_canal_map-e.pdf

3.2 Outside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/seawater_map-e.pdf

4. Summary Status of Decommissioning Roadmap--English Translation (9/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140925_01-e.pdf

5. Large-Scale Emergency Drill at Kashiwazaki Kariwa NPS (11/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/kk-np/info/tohoku/2014/pdf/26110702.pdf

(photos)
http://photo.tepco.co.jp/en/date/2014/201411-e/141111-01e.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, November 06, 2014 7:36 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Nov. 7 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Nov. 7, 2014 at 3 pm Eastern Standard Time
(Next call will be on **THU, Nov. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (10/30/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_05-j.pdf

1-3. Preparation for Unit 3 Containment Vessel Internal Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_06-j.pdf

1-4. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_08-j.pdf

1-6. Improvement of Work Environment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_10-j.pdf

1-8. R&D Related to Core Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_11-j.pdf

1-9. Storage of Solid Radioactive Waste
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (10/31/2014)
(only in Japanese)
2-1. Waterproofing Connection between Underground Seawater Piping Trench and Turbine Building
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_01.pdf

2-2. Testing of Subdrain Water Treatment Facility
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_02.pdf

2-3. Increase in Radioactivity at Unit 1 Discharge Canal
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_03.pdf

2-4. Effectiveness of Groundwater Bypass System
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_05.pdf

2-5. Use of Dry Storage Casks at Fukushima Daiichi
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_06.pdf

3. Completion of Transferring Spent Fuels from Unit 4 SFP (11/6/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141106_07-j.pdf

4. Nuclear Safety Reform Plan--2014 Q2 Progress Report (11/5/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243826_5892.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, October 29, 2014 6:56 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Oct. 30 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, Oct. 30, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Nov. 7** at 3 pm Eastern Standard Time.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (10/27/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141027_03-j.pdf

1-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141027_04-j.pdf

2. Fukushima Fishermen's Association Meeting (10/29/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141029_07-j.pdf

3. "FORMER U.S. NUCLEAR CHIEF DALE KLEIN CITES FUKUSHIMA PROGRESS,CHALLENGES TEPCO TO DEEPEN SAFETY CULTURE, ESTABLISH KPI'S" (10/29/2014)
Speech at the American Chamber of Commerce in Japan
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243683_5892.html

3-1. Overview of the Seven Water Treatment Facilities at 1F
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141016_04-e.pdf

3-2. Activities of TEPCO's Nuclear Reform Monitoring Committee Members
http://www.nrmc.jp/en/news/detail/index-e.html#date_20141029-103000

4. "On the Brink: The Inside Story of Fukushima Daiichi" (10/7/2014)
Long-awaited English translation of the book that vividly describes the human element of the accident.
http://www.amazon.com/dp/4902075547/?tag=kurodahanpres-20

5. "Fukushima Update" (Sept.-Oct. 2014)
Attached file is a pdf copy of the Nuclear Plant Journal article reprinted and distributed with permission.

All the best,
Kenji

----- Original Message -----

From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 09, 2014 8:27 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 10 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Oct. 10, 2014 at 3 pm Eastern Daylight Time
(**No call next 2 weeks.** Next call will be on **Thu, Oct. 30** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **NRA Special Facilities Monitoring and Evaluation Committee (10/3/2014)**
(only in Japanese)
1-1. New Postulated Earthquake and Tsunami at Fukushima Daiichi and Risk Mitigation Measures
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141003_04-j.pdf

(page 3/42) Risk mitigation measures
(page 10/42) New postulated earthquake and tsunami results
(page 13/42) Various earthquakes that were considered
(page 25/42) Probability of exceedance for postulated earthquake
(page 28/42) Various tsunamis that were considered
(page 34/42) Probability of exceedance for postulated tsunami
(page 35/42) Risk evaluation and mitigation measures

1-2. Status of Isolating Units 2/3 Seawater Piping Trenches from Turbine Buildings
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141003_03-j.pdf

(page 4/38) Temperature reduction effect of ice injection into the trench
(page 5/38) Assumed water flow preventing formation of ice barrier
(page 18/38) Injection of grout and concrete to fill gap
(page 21/38) Transferring and processing accumulated water in the trench
(page 23/38) Backfilling the trench with anti-washout cement
(page 28/38) Schedule

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,

Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 02, 2014 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 3 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Oct. 3, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Oct. 10** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (9/22/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_03-j.pdf

1-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_04-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (9/25/2014)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_05-j.pdf

2-3. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_07-j.pdf

2-4. Environmental Radiation

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_08-j.pdf

2-5. Fuel Removal from SFPs
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_10-j.pdf

2-6. Unit 2 S/C Lower Outer Surface Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_11-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=x04s084o&catid=61699

2-7. Radioactive Waste Management
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_12-j.pdf

3. Investigation Status of ALPS Train B (9/29/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140929_04-j.pdf

4. Start Operation of Mobile Sr Removal System (10/2/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141002_06-j.pdf

5. Technical Cooperation Agreement with UK Sellafield Ltd. (9/30/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140930_04-e.pdf

6. "False Report on Fukushima: The Company Responds" (9/22/2014)
TEPCO President's Letter to the Editor of the NY Times
http://mobile.nytimes.com/2014/09/23/opinion/false-report-on-fukushima-the-company-responds.html?_r=0

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 11 Dec 2014 22:07:25 -0500
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 12 at 3pm EST
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 12th, 2014 at 3 pm Eastern Standard Time
(**No call next week**. Next call will be on **TUE, Dec. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Overview of Measures to Treat Contaminated Water
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

2. Explanation on Subdrain and Groundwater Drain Systems to the Fishermen's Association of Iwaki City (12/10/2014)
(only in Japanese)
2-1. Confirmation of Stable Performance in Removing Radionuclides from Subdrain and Groundwater Drain
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_06-j.pdf

2-2. Basic Concept of Operating the Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_07-j.pdf

2-3. Detection of High Concentration of Radioactivity from Subdrain Pits # 18/19 and Measures Taken
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_09-j.pdf

3. Approval by NRA on Design Modification to add Sr Removal Capability to SARRY (Cs Removal) System (12/11/2014)
(only in Japanese; 8.8 MB, 372 pages)
http://www.tepco.co.jp/cc/press/betu14_j/images/141211j0101.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company

Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 04, 2014 9:35 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 5th, 2014 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Dec. 12** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **Contaminated Water Countermeasures Committee (11/13/2014)**
(only in Japanese)
1-1. Status of Contaminated Water Countermeasures and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_03-j.pdf

1-2. Recent Topics at 1F
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_04-j.pdf

1-3. Task Force on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_06-j.pdf

1-4. Demonstration Test for High-performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_07-j.pdf

1-5. Task Force on Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_08-j.pdf

1-6. Study on Shallow Ground Disposal of Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_09-j.pdf

1-7. Status of Contaminated Water Treatment Technology Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_10-j.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (11/25/2014)
(only in Japanese)
2-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_03-j.pdf

2-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_04-j.pdf

2-3. Procedure for Closure of Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_05-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (11/27/2014)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_05-j.pdf

3-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_07-j.pdf

3-4. Environmental Radion Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_08-j.pdf

3-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_10-j.pdf

3-6. 3D Laser Scanning in Unit 1 Torus Room
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_11-j.pdf

3-7. Solid Radioactive Waste Treatment and Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_12-j.pdf

3-8. Progress on Emergency Safety Enhancement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_14-j.pdf

4. Introduction of ICP-MS Method Allowing Quicker Measurement of Sr-90 in Water
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141127_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, November 24, 2014 10:51 AM
Subject: NO CALL THIS WEEK [TEPCO Weekly Fukushima Update Call] Next on Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Due to unavoidable change in schedule, I will have to **cancel the call planned for tomorrow (Tue, Nov. 25**.)
Next call will be on **Fri, Dec. 5th** at 3 PM.

Apologies for any inconvenience this may cause you.
Feel free to contact me should you have any questions.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, November 12, 2014 7:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Nov. 13 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, Nov. 13, 2014 at 3 pm Eastern Standard Time
(**No call next week**. Next call will be on **TUE, Nov. 25** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Reactor Building Cover Roof Panel Removal (11/10/2014)
http://photo.tepco.co.jp/en/date/2014/201411-e/141110-01e.html

2. TEPCO's Statement on Detection of Trace Amounts of Cs-134 Off U.S. West Coast (11/11/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243939_5892.html

2.1 Woods Hole Oceanographic Institution's Press Release
http://www.whoi.edu/news-release/Fukushima-detection

2.2 Discussion Board on the New REDDIT Journal of Science

http://www.reddit.com/r/science/comments/2lusz5/science_ama_series_im_ken_buesseleran/?limit=500

3. Radioactivity in Seawater Near Fukushima Daiichi (11/12/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

3.1 Inside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/intake_canal_map-e.pdf

3.2 Outside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/seawater_map-e.pdf

4. Summary Status of Decommissioning Roadmap--English Translation (9/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140925_01-e.pdf

5. Large-Scale Emergency Drill at Kashiwazaki Kariwa NPS (11/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/kk-np/info/tohoku/2014/pdf/26110702.pdf

(photos)
http://photo.tepco.co.jp/en/date/2014/201411-e/141111-01e.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, November 06, 2014 7:36 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Nov. 7 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Nov. 7, 2014 at 3 pm Eastern Standard Time
(Next call will be on **THU, Nov. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (10/30/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_05-j.pdf

1-3. Preparation for Unit 3 Containment Vessel Internal Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_06-j.pdf

1-4. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_08-j.pdf

1-6. Improvement of Work Environment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_09-j.pdf

1-7. Spent Fuel Pool Issues

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_10-j.pdf

1-8. R&D Related to Core Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_11-j.pdf

1-9. Storage of Solid Radioactive Waste
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (10/31/2014)
(only in Japanese)
2-1. Waterproofing Connection between Underground Seawater Piping Trench and Turbine Building
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_01.pdf

2-2. Testing of Subdrain Water Treatment Facility
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_02.pdf

2-3. Increase in Radioactivity at Unit 1 Discharge Canal
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_03.pdf

2-4. Effectiveness of Groundwater Bypass System
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_05.pdf

2-5. Use of Dry Storage Casks at Fukushima Daiichi
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_06.pdf

3. Completion of Transferring Spent Fuels from Unit 4 SFP (11/6/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141106_07-j.pdf

4. Nuclear Safety Reform Plan--2014 Q2 Progress Report (11/5/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243826_5892.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, October 29, 2014 6:56 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Oct. 30 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, **Oct. 30**, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Nov. 7** at 3 pm Eastern Standard Time.)

[call-in information] (Please record your name and organization when joining the call.)

call number: 718-354-1184
passcode: (b)(6)

[Major topics]

1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (10/27/2014)
(only in Japanese)

1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141027_03-j.pdf

1-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141027_04-j.pdf

2. Fukushima Fishermen's Association Meeting (10/29/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141029_07-j.pdf

3. "FORMER U.S. NUCLEAR CHIEF DALE KLEIN CITES FUKUSHIMA PROGRESS,CHALLENGES TEPCO TO DEEPEN SAFETY CULTURE, ESTABLISH KPI'S" (10/29/2014)
Speech at the American Chamber of Commerce in Japan
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243683_5892.html

3-1. Overview of the Seven Water Treatment Facilities at 1F
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141016_04-e.pdf

3-2. Activities of TEPCO's Nuclear Reform Monitoring Committee Members
http://www.nrmc.jp/en/news/detail/index-e.html#date_20141029-103000

4. "On the Brink: The Inside Story of Fukushima Daiichi" (10/7/2014)
Long-awaited English translation of the book that vividly describes the human element of the accident.
http://www.amazon.com/dp/4902075547/?tag=kurodahanpres-20

5. "Fukushima Update" (Sept.-Oct. 2014)
Attached file is a pdf copy of the Nuclear Plant Journal article reprinted and distributed with permission.

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 5 Feb 2015 21:24:13 -0500
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 6, 2015 at 3pm EST
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **Feb. 6**, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (1/30/2015)
(only in Japanese)
1-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_03-j.pdf

1-2. Wind Velocity Simulation Inside Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_04-j.pdf

1-3. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_07-j.pdf
(page 6/116) ALPS Status
(page 10/116) Various Water Treatment Systems
(page 19/116) Filling Up Seawater Piping Trenches
(page 38/116) Subdrain System
(page 41/116) Frozen Soil Wall
(page 85/116) Radioactivity in Units 1-3 Discharge Canal

2. Causes of Significant Occupational Safety Issues at 1F/2F/KK and Countermeasures (2/3/2015)
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu15_j/images/150202j0301.pdf

3. Nuclear Safety Reform Plan 2014 Q3 Progress Report (2/3/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247946_6844.html

4. IAEA OSART Preparatory Meeting at Kashiwazaki Kariwa (2/2~5/2015)
(only in Japanese)
http://www.tepco.co.jp/kk-np/data/publication/pdf/2014/270205.pdf

5. Removal of Highly Contaminated Water Inside Seawater Piping Trenches (1/28/2015)
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=iwz87j2v&catid=69631

6. TEPCO Official English YouTube

https://www.youtube.com/user/OfficialTEPCOen

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 29, 2015 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 30, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 30, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 6** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **Working-level Meeting of Decommissioning & Contaminated Water Issues Team (1/29/2015)**
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_05-j.pdf
(English translation as of 12/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141225_01-e.pdf

1-3. Retrieval of Thermocouple Installed in Unit 2 RPV Bottom via SLC Line
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_08-j.pdf

1-6. Work Condition Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_10-j.pdf

1-8. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_11-j.pdf

1-9. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_12-j.pdf

1-10. Status Update of Study on Alternate Core Debris Retrieval Methods (METI)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_14-j.pdf

1-11. Strategic Plan and Risk Mitigation (Nuclear Damage Compensation and Decommissioning Facilitation Corporation)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_15-j.pdf

2. Updated Schedule on Completion of Contaminated Water Treatment (1/23/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150123_02-e.pdf

3. Occupational Safety Corrective Actions (1/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150126_01-e.pdf

4. National Academy of Sciences Fukushima Lessons Learned Committee Phase 2 #3 (1/29/2015)
http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=7732
Attached is a compact version of TEPCO's presentation.
Let me know if you would like to receive the original sized file.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji (mobile)
To: Tateiwa, Kenji
Sent: Thursday, January 22, 2015 10:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 23, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 23, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 30** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)

call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Briefing Materials for Fishermen's Association of Iwaki City (1/16/2015)
(only in Japanese)
1-1. Addition of Sr-Removal Capability to KURION and SARRY Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150119_03-j.pdf
1-2. Illustration of Contaminated Water Removal Process from Underground Piping Trenches
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_10-j.pdf

1-3. Treated Water Discharge Criteria for Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_07-j.pdf

2. Contract Worker Dies After Falling Into Rainwater Receiving Tank at Fukushima Daiichi (1/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150119_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 15, 2015 8:41 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST

Nuclear Sector Colleagues,

Happy New Year!
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 16, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (12/25/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

(English translation as of 11/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141127_01-e.pdf

1-3. Shortening the Length of Circulating Water Cooling System Loop
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_08-j.pdf

1-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

1-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_11-j.pdf

1-8. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (12/26/2014)
(only in Japanese)
2-1. Status of Filling Up Underground Seawater Piping Trenches
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_01.pdf

2-2. Measures to Achieve Incremental Effective Dose Limit at Site Boundary
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_03.pdf

2-3. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_05.pdf

2-4. Leakage of ALPS-Treated Water from J6 Tank Farm
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_06.pdf

3. IAEA to Review Fukushima Daiichi Decommissioning and Kashiwazaki Kariwa Operational Safety (1/7/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247076_6844.html

4. Figures and Video Clips Describing Various Water Management Measures
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

5. Overview of Fukushima Daiichi Accident and Lessons Learned (33 MB)
http://www.tepco.co.jp/en/decommision/accident/images/outline01.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, December 22, 2014 7:59 PM
Subject: [TEPCO Weekly Fukushima Update Call] TUE, Dec. 23 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
TUE, Dec. 23, 2014 at 3 pm Eastern Standard Time
(**No call next two weeks**. Next call will be on **Fri, Jan. 16, 2015** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (12/19/2014)
(only in Japanese)
1-1. Removal of Cs and Sr from Seawater, etc.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_03-j.pdf

1-2. Unit 1 Reactor Building Refueling Floor Inspection Results
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_05-j.pdf

1-3. Applicability of Plastic Scintillation Fiber (PSF) to Detect Minor Leakage from Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_07-j.pdf

1-4. Leakage of ALPS-Treated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_08-j.pdf

1-5. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_09-j.pdf

2. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool (12/22/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

2-1. Video Clip Summarizing Path to Success (6 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w220b15k&catid=61795

2-2. Video Message from Mr. Hirose, TEPCO's President (5 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w785h9cj&catid=61783

2-3. Explanation Slides (only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141222_04-j.pdf

Happy holidays to you all!

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 12 Feb 2015 22:37:40 -0500
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 13, 2015 at 3pm EST
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 13, 2015 at 3 pm Eastern Standard Time
(**No Call Next Week**. Next call will be on **Fri, Feb. 27** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (2/9/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_02.pdf

1-2. Water Level Management after Operation of Frozen-Soil Wall (summary)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_03.pdf

1-3. Water Level Management after Operation of Frozen-Soil Wall (reference information)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_08.pdf

2. Installation of Muon Detectors for Fuel Debris Detection at Unit 1 (2/9/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248057_6844.html
(photos)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150209_01-e.pdf

3. *"The Great Race: The Global Quest for the Car of the Future"*
http://amzn.com/B00LD1OP0Q
This book features TEPCO's current Chief Nuclear Officer, Takafumi Anegawa, as a visionary who jump started Japan's electric vehicle industry.

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office

2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 05, 2015 9:24 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 6, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 6, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (1/30/2015)
(only in Japanese)
1-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_03-j.pdf

1-2. Wind Velocity Simulation Inside Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_04-j.pdf

1-3. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_07-j.pdf
(page 6/116) ALPS Status
(page 10/116) Various Water Treatment Systems
(page 19/116) Filling Up Seawater Piping Trenches
(page 38/116) Subdrain System
(page 41/116) Frozen Soil Wall
(page 85/116) Radioactivity in Units 1-3 Discharge Canal

2. Causes of Significant Occupational Safety Issues at 1F/2F/KK and Countermeasures (2/3/2015)
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu15_j/images/150202j0301.pdf

3. Nuclear Safety Reform Plan 2014 Q3 Progress Report (2/3/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247946_6844.html

4. IAEA OSART Preparatory Meeting at Kashiwazaki Kariwa (2/2~5/2015)
(only in Japanese)
http://www.tepco.co.jp/kk-np/data/publication/pdf/2014/270205.pdf

5. Removal of Highly Contaminated Water Inside Seawater Piping Trenches (1/28/2015)

(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=iwz87j2v&catid=69631

6. TEPCO Official English YouTube
https://www.youtube.com/user/OfficialTEPCOen

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 29, 2015 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 30, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 30, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 6** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (1/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_05-j.pdf
(English translation as of 12/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141225_01-e.pdf

1-3. Retrieval of Thermocouple Installed in Unit 2 RPV Bottom via SLC Line

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_08-j.pdf

1-6. Work Condition Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_10-j.pdf

1-8. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_11-j.pdf

1-9. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_12-j.pdf

1-10. Status Update of Study on Alternate Core Debris Retrieval Methods (METI)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_14-j.pdf

1-11. Strategic Plan and Risk Mitigation (Nuclear Damage Compensation and Decommissioning Facilitation Corporation)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_15-j.pdf

2. Updated Schedule on Completion of Contaminated Water Treatment (1/23/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150123_02-e.pdf

3. Occupational Safety Corrective Actions (1/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150126_01-e.pdf

4. National Academy of Sciences Fukushima Lessons Learned Committee Phase 2 #3 (1/29/2015)
http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=7732
Attached is a compact version of TEPCO's presentation.
Let me know if you would like to receive the original sized file.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji (mobile)
To: Tateiwa, Kenji
Sent: Thursday, January 22, 2015 10:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 23, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 23, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 30** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Briefing Materials for Fishermen's Association of Iwaki City (1/16/2015)
(only in Japanese)
1-1. Addition of Sr-Removal Capability to KURION and SARRY Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150119_03-j.pdf
1-2. Illustration of Contaminated Water Removal Process from Underground Piping Trenches
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_10-j.pdf

1-3. Treated Water Discharge Criteria for Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_07-j.pdf

2. Contract Worker Dies After Falling Into Rainwater Receiving Tank at Fukushima Daiichi (1/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150119_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 15, 2015 8:41 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST

Nuclear Sector Colleagues,

Happy New Year!
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 16, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]

1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (12/25/2014)
(only in Japanese)

1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf
(English translation as of 11/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141127_01-e.pdf

1-3. Shortening the Length of Circulating Water Cooling System Loop
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_08-j.pdf

1-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

1-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_11-j.pdf

1-8. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (12/26/2014)
(only in Japanese)

2-1. Status of Filling Up Underground Seawater Piping Trenches
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_01.pdf

2-2. Measures to Achieve Incremental Effective Dose Limit at Site Boundary
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_03.pdf

2-3. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_05.pdf

2-4. Leakage of ALPS-Treated Water from J6 Tank Farm
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_06.pdf

3. IAEA to Review Fukushima Daiichi Decommissioning and Kashiwazaki Kariwa Operational Safety (1/7/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247076_6844.html

4. Figures and Video Clips Describing Various Water Management Measures
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

5. Overview of Fukushima Daiichi Accident and Lessons Learned (33 MB)
http://www.tepco.co.jp/en/decommision/accident/images/outline01.pdf

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 26 Feb 2015 21:50:13 -0500
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 27, 2015 at 3pm EST
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **Feb. 27**, 2015 at 3 pm Eastern Standard Time
(**No Call Next Week**. Next call will be on **Fri, March 13** at 3 pm **EDT**.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (2/23/2015)
(only in Japanese)
1-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_04-j.pdf

1-2. Dismantling Plan for Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_05-j.pdf

1-3. Occupational Safety Corrective Actions
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_06-j.pdf

1-4. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_12-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (2/26/2015)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_05-j.pdf
(English translation as of 1/29/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150129_01-e.pdf

2-3. Re-insertion of Thermocouple into Unit 2 RPV Bottom via SLC Line
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_06-j.pdf

2-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_07-j.pdf

2-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_08-j.pdf

2-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_10-j.pdf

2-7. Preparation for Fuel Debris Removal (3D Laser Scanning, Muon Tomography)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_11-j.pdf

2-8. D&D-Related R&D Progress and Future Plans
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_13-j.pdf

2-9. Selection of Technologies to Undergo Tritium-Separation Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_14-j.pdf

2-10. Establishment of Global Decommissioning Joint Research Center
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_15-j.pdf

3. Temporary Increase in Radioactivity in Downstream of "B and C" Drainage Line (2/24/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248327_6844.html

4. Unit 2 Reactor Building Truck Bay Door Roof Likely Source of Radioactivity in "K" Drainage Line (2/24/2015)
www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150224_01-e.pdf

5. Briefing to Fishermen's Association in Fukushima Prefecture Regarding Contaminated Water Issues (2/25/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150225_05-j.pdf

6. Unit 1 Reactor Building 4th Floor Inspection by Technical Committee of Niigata Prefecture (2/21/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150221_06-j.pdf

7. Third IAEA Review of Fukushima Daiichi Decommissioning Roadmap (2/17/2015)
https://www.iaea.org/newscenter/pressreleases/iaea-team-completed-third-review-japans-plans-decommission-fukushima
(photos)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150217_03-e.pdf

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(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 12, 2015 10:37 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 13, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 13, 2015 at 3 pm Eastern Standard Time
(**No Call Next Week.** Next call will be on **Fri, Feb. 27** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **NRA Special Facilities Monitoring and Evaluation Committee (2/9/2015)**
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_02.pdf

1-2. Water Level Management after Operation of Frozen-Soil Wall (summary)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_03.pdf

1-3. Water Level Management after Operation of Frozen-Soil Wall (reference information)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_08.pdf

2. Installation of Muon Detectors for Fuel Debris Detection at Unit 1 (2/9/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248057_6844.html
(photos)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150209_01-e.pdf

3. *"The Great Race: The Global Quest for the Car of the Future"*
http://amzn.com/B00LD1OP0Q
This book features TEPCO's current Chief Nuclear Officer, Takafumi Anegawa, as a visionary who jump started Japan's electric vehicle industry.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 05, 2015 9:24 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 6, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **Feb. 6**, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (1/30/2015)
(only in Japanese)
1-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_03-j.pdf

1-2. Wind Velocity Simulation Inside Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_04-j.pdf

1-3. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_07-j.pdf
(page 6/116) ALPS Status
(page 10/116) Various Water Treatment Systems
(page 19/116) Filling Up Seawater Piping Trenches
(page 38/116) Subdrain System
(page 41/116) Frozen Soil Wall
(page 85/116) Radioactivity in Units 1-3 Discharge Canal

2. Causes of Significant Occupational Safety Issues at 1F/2F/KK and Countermeasures (2/3/2015)
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu15_j/images/150202j0301.pdf

3. Nuclear Safety Reform Plan 2014 Q3 Progress Report (2/3/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247946_6844.html

4. IAEA OSART Preparatory Meeting at Kashiwazaki Kariwa (2/2~5/2015)
(only in Japanese)
http://www.tepco.co.jp/kk-np/data/publication/pdf/2014/270205.pdf

5. Removal of Highly Contaminated Water Inside Seawater Piping Trenches (1/28/2015)
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=iwz87j2v&catid=69631

6. TEPCO Official English YouTube
https://www.youtube.com/user/OfficialTEPCOen

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 29, 2015 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 30, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 30, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 6** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (1/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_05-j.pdf
(English translation as of 12/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141225_01-e.pdf

1-3. Retrieval of Thermocouple Installed in Unit 2 RPV Bottom via SLC Line
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_08-j.pdf

1-6. Work Condition Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_10-j.pdf

1-8. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_11-j.pdf

1-9. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_12-j.pdf

1-10. Status Update of Study on Alternate Core Debris Retrieval Methods (METI)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_14-j.pdf

1-11. Strategic Plan and Risk Mitigation (Nuclear Damage Compensation and Decommissioning Facilitation Corporation)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_15-j.pdf

2. Updated Schedule on Completion of Contaminated Water Treatment (1/23/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150123_02-e.pdf

3. Occupational Safety Corrective Actions (1/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150126_01-e.pdf

4. National Academy of Sciences Fukushima Lessons Learned Committee Phase 2 #3 (1/29/2015)
http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=7732
Attached is a compact version of TEPCO's presentation.
Let me know if you would like to receive the original sized file.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji (mobile)
To: Tateiwa, Kenji
Sent: Thursday, January 22, 2015 10:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 23, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 23, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 30** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Briefing Materials for Fishermen's Association of Iwaki City (1/16/2015)

(only in Japanese)

1-1. Addition of Sr-Removal Capability to KURION and SARRY Systems

http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150119_03-j.pdf

1-2. Illustration of Contaminated Water Removal Process from Underground Piping Trenches

http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_10-j.pdf

1-3. Treated Water Discharge Criteria for Subdrain and Groundwater Drain Systems

http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_07-j.pdf

2. Contract Worker Dies After Falling Into Rainwater Receiving Tank at Fukushima Daiichi (1/19/2015)

http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150119_01-e.pdf

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 15 Jan 2015 20:41:55 -0500
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST
Importance: Normal

Nuclear Sector Colleagues,

Happy New Year!
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 16, 2015 at 2 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (12/25/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf
(English translation as of 11/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141127_01-e.pdf

1-3. Shortening the Length of Circulating Water Cooling System Loop
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_08-j.pdf

1-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

1-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_11-j.pdf

1-8. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (12/26/2014)
(only in Japanese)
2-1. Status of Filling Up Underground Seawater Piping Trenches
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_01.pdf

2-2. Measures to Achieve Incremental Effective Dose Limit at Site Boundary
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_03.pdf

2-3. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_05.pdf

2-4. Leakage of ALPS-Treated Water from J6 Tank Farm
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_06.pdf

3. IAEA to Review Fukushima Daiichi Decommissioning and Kashiwazaki Kariwa Operational Safety (1/7/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247076_6844.html

4. Figures and Video Clips Describing Various Water Management Measures
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

5. Overview of Fukushima Daiichi Accident and Lessons Learned (33 MB)
http://www.tepco.co.jp/en/decommision/accident/images/outline01.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, December 22, 2014 7:59 PM
Subject: [TEPCO Weekly Fukushima Update Call] TUE, Dec. 23 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
TUE, Dec. 23, 2014 at 3 pm Eastern Standard Time
(**No call next two weeks**. Next call will be on **Fri, Jan. 16, 2015** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (12/19/2014)
(only in Japanese)
1-1. Removal of Cs and Sr from Seawater, etc.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_03-j.pdf

1-2. Unit 1 Reactor Building Refueling Floor Inspection Results
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_05-j.pdf

1-3. Applicability of Plastic Scintillation Fiber (PSF) to Detect Minor Leakage from Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_07-j.pdf

1-4. Leakage of ALPS-Treated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_08-j.pdf

1-5. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_09-j.pdf

2. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool (12/22/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

2-1. Video Clip Summarizing Path to Success (6 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w220b15k&catid=61795

2-2. Video Message from Mr. Hirose, TEPCO's President (5 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w785h9cj&catid=61783

2-3. Explanation Slides (only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141222_04-j.pdf

Happy holidays to you all!

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 11, 2014 10:07 PM
Subj[(b)(6)]O Weekly Fukushima Update Call] Fri, Dec. 12 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 12th, 2014 at 3 pm Eastern Standard Time
(**No call next week**. Next call will be on **TUE, Dec. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Overview of Measures to Treat Contaminated Water
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

2. Explanation on Subdrain and Groundwater Drain Systems to the Fishermen's Association of Iwaki City (12/10/2014)
(only in Japanese)
2-1. Confirmation of Stable Performance in Removing Radionuclides from Subdrain and Groundwater Drain
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_06-j.pdf

2-2. Basic Concept of Operating the Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_07-j.pdf

2-3. Detection of High Concentration of Radioactivity from Subdrain Pits # 18/19 and Measures Taken
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_09-j.pdf

3. Approval by NRA on Design Modification to add Sr Removal Capability to SARRY (Cs Removal) System (12/11/2014)
(only in Japanese; 8.8 MB, 372 pages)
http://www.tepco.co.jp/cc/press/betu14_j/images/141211j0101.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 04, 2014 9:35 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 5th, 2014 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Dec. 12** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Contaminated Water Countermeasures Committee (11/13/2014)
(only in Japanese)
1-1. Status of Contaminated Water Countermeasures and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_03-j.pdf

1-2. Recent Topics at 1F
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_04-j.pdf

1-3. Task Force on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_06-j.pdf

1-4. Demonstration Test for High-performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_07-j.pdf

1-5. Task Force on Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_08-j.pdf

1-6. Study on Shallow Ground Disposal of Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_09-j.pdf

1-7. Status of Contaminated Water Treatment Technology Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_10-j.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (11/25/2014)
(only in Japanese)

2-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_03-j.pdf

2-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_04-j.pdf

2-3. Procedure for Closure of Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_05-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (11/27/2014)
(only in Japanese)

3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_05-j.pdf

3-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_07-j.pdf

3-4. Environmental Radion Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_08-j.pdf

3-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_10-j.pdf

3-6. 3D Laser Scanning in Unit 1 Torus Room
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_11-j.pdf

3-7. Solid Radioactive Waste Treatment and Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_12-j.pdf

3-8. Progress on Emergency Safety Enhancement

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_14-j.pdf

4. Introduction of ICP-MS Method Allowing Quicker Measurement of Sr-90 in Water
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141127_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, November 24, 2014 10:51 AM
Subject: NO CALL THIS WEEK [TEPCO Weekly Fukushima Update Call] Next on Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Due to unavoidable change in schedule, I will have to **cancel the call planned for tomorrow (Tue, Nov. 25**.)
Next call will be on **Fri, Dec. 5th** at 3 PM.

Apologies for any inconvenience this may cause you.
Feel free to contact me should you have any questions.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, November 12, 2014 7:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Nov. 13 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, Nov. 13, 2014 at 3 pm Eastern Standard Time
(**No call next week.** Next call will be on **TUE, Nov. 25** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **Unit 1 Reactor Building Cover Roof Panel Removal (11/10/2014)**
http://photo.tepco.co.jp/en/date/2014/201411-e/141110-01e.html

2. TEPCO's Statement on Detection of Trace Amounts of Cs-134 Off U.S. West Coast (11/11/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243939_5892.html

2.1 Woods Hole Oceanographic Institution's Press Release
http://www.whoi.edu/news-release/Fukushima-detection

2.2 Discussion Board on the New REDDIT Journal of Science

http://www.reddit.com/r/science/comments/2lusz5/science_ama_series_im_ken_buesseler_an/?limit=500

3. Radioactivity in Seawater Near Fukushima Daiichi (11/12/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

3.1 Inside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/intake_canal_map-e.pdf

3.2 Outside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/seawater_map-e.pdf

4. Summary Status of Decommissioning Roadmap--English Translation (9/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140925_01-e.pdf

5. Large-Scale Emergency Drill at Kashiwazaki Kariwa NPS (11/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/kk-np/info/tohoku/2014/pdf/26110702.pdf

(photos)
http://photo.tepco.co.jp/en/date/2014/201411-e/141111-01e.html

All the best,
Kenji

From: Tateiwa, Kenji (mobile)
Sent: 22 Jan 2015 22:09:56 -0500
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 23, 2015 at 3pm EST
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 23, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 30** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Briefing Materials for Fishermen's Association of Iwaki City (1/16/2015)
(only in Japanese)
1-1. Addition of Sr-Removal Capability to KURION and SARRY Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150119_03-j.pdf
1-2. Illustration of Contaminated Water Removal Process from Underground Piping Trenches
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_10-j.pdf

1-3. Treated Water Discharge Criteria for Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_07-j.pdf

2. Contract Worker Dies After Falling Into Rainwater Receiving Tank at Fukushima Daiichi (1/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150119_01-e.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji

To: Tateiwa, Kenji
Sent: Thursday, January 15, 2015 8:41 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST

Nuclear Sector Colleagues,

Happy New Year!
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 16, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (12/25/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf
(English translation as of 11/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141127_01-e.pdf

1-3. Shortening the Length of Circulating Water Cooling System Loop
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_08-j.pdf

1-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

1-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_11-j.pdf

1-8. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (12/26/2014)
(only in Japanese)
2-1. Status of Filling Up Underground Seawater Piping Trenches
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_01.pdf

2-2. Measures to Achieve Incremental Effective Dose Limit at Site Boundary
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_03.pdf

2-3. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_05.pdf

2-4. Leakage of ALPS-Treated Water from J6 Tank Farm
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_06.pdf

3. IAEA to Review Fukushima Daiichi Decommissioning and Kashiwazaki Kariwa Operational Safety (1/7/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247076_6844.html

4. Figures and Video Clips Describing Various Water Management Measures
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

5. Overview of Fukushima Daiichi Accident and Lessons Learned (33 MB)
http://www.tepco.co.jp/en/decommision/accident/images/outline01.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, December 22, 2014 7:59 PM
Subject: [TEPCO Weekly Fukushima Update Call] TUE, Dec. 23 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
TUE, Dec. 23, 2014 at 3 pm Eastern Standard Time
(**No call next two weeks**. Next call will be on **Fri, Jan. 16, 2015** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (12/19/2014)**
(only in Japanese)
1-1. Removal of Cs and Sr from Seawater, etc.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_03-j.pdf

1-2. Unit 1 Reactor Building Refueling Floor Inspection Results
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_05-j.pdf

1-3. Applicability of Plastic Scintillation Fiber (PSF) to Detect Minor Leakage from Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_07-j.pdf

1-4. Leakage of ALPS-Treated Water

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_08-j.pdf

1-5. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_09-j.pdf

2. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool (12/22/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

2-1. Video Clip Summarizing Path to Success (6 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w220b15k&catid=61795

2-2. Video Message from Mr. Hirose, TEPCO's President (5 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w785h9cj&catid=61783

2-3. Explanation Slides (only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141222_04-j.pdf

Happy holidays to you all!

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 11, 2014 10:07 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 12 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 12th, 2014 at 3 pm Eastern Standard Time
(**No call next week**. Next call will be on **TUE, Dec. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Overview of Measures to Treat Contaminated Water
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

2. Explanation on Subdrain and Groundwater Drain Systems to the Fishermen's Association of Iwaki City (12/10/2014)
(only in Japanese)
2-1. Confirmation of Stable Performance in Removing Radionuclides from Subdrain and Groundwater Drain
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_06-j.pdf

2-2. Basic Concept of Operating the Subdrain and Groundwater Drain Systems

http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_07-j.pdf

2-3. Detection of High Concentration of Radioactivity from Subdrain Pits # 18/19 and Measures Taken
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_09-j.pdf

3. Approval by NRA on Design Modification to add Sr Removal Capability to SARRY (Cs Removal) System (12/11/2014)
(only in Japanese; 8.8 MB, 372 pages)
http://www.tepco.co.jp/cc/press/betu14_j/images/141211j0101.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 04, 2014 9:35 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 5th, 2014 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Dec. 12** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Contaminated Water Countermeasures Committee (11/13/2014)
(only in Japanese)
1-1. Status of Contaminated Water Countermeasures and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_03-j.pdf

1-2. Recent Topics at 1F
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_04-j.pdf

1-3. Task Force on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_06-j.pdf

1-4. Demonstration Test for High-performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_07-j.pdf

1-5. Task Force on Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_08-j.pdf

1-6. Study on Shallow Ground Disposal of Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_09-j.pdf

1-7. Status of Contaminated Water Treatment Technology Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_10-j.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (11/25/2014)
(only in Japanese)
2-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_03-j.pdf

2-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_04-j.pdf

2-3. Procedure for Closure of Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_05-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (11/27/2014)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_05-j.pdf

3-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_07-j.pdf

3-4. Environmental Radion Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_08-j.pdf

3-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_10-j.pdf

3-6. 3D Laser Scanning in Unit 1 Torus Room
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_11-j.pdf

3-7. Solid Radioactive Waste Treatment and Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_12-j.pdf

3-8. Progress on Emergency Safety Enhancement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_14-j.pdf

4. Introduction of ICP-MS Method Allowing Quicker Measurement of Sr-90 in Water
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141127_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji

Sent: Monday, November 24, 2014 10:51 AM
Subject: NO CALL THIS WEEK [TEPCO Weekly Fukushima Update Call] Next on Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Due to unavoidable change in schedule, I will have to **cancel the call planned for tomorrow (Tue, Nov. 25**.)
Next call will be on **Fri, Dec. 5th** at 3 PM.

Apologies for any inconvenience this may cause you.
Feel free to contact me should you have any questions.

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 29 Jan 2015 20:53:29 -0500
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 30, 2015 at 3pm EST
Attachments: Fukushima Spent Fuel Issues@NAS_01292015_c.pdf
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 30, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 6** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (1/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_05-j.pdf
(English translation as of 12/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141225_01-e.pdf

1-3. Retrieval of Thermocouple Installed in Unit 2 RPV Bottom via SLC Line
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_08-j.pdf

1-6. Work Condition Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_10-j.pdf

1-8. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_11-j.pdf

1-9. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_12-j.pdf

1-10. Status Update of Study on Alternate Core Debris Retrieval Methods (METI)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_14-j.pdf

1-11. Strategic Plan and Risk Mitigation (Nuclear Damage Compensation and Decommissioning Facilitation Corporation)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_15-j.pdf

2. Updated Schedule on Completion of Contaminated Water Treatment (1/23/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150123_02-e.pdf

3. Occupational Safety Corrective Actions (1/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150126_01-e.pdf

4. National Academy of Sciences Fukushima Lessons Learned Committee Phase 2 #3 (1/29/2015)
http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=7732
Attached is a compact version of TEPCO's presentation.
Let me know if you would like to receive the original sized file.

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji (mobile)
To: Tateiwa, Kenji
Sent: Thursday, January 22, 2015 10:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 23, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 23, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 30** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **Briefing Materials for Fishermen's Association of Iwaki City (1/16/2015)**
(only in Japanese)
1-1. Addition of Sr-Removal Capability to KURION and SARRY Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150119_03-j.pdf
1-2. Illustration of Contaminated Water Removal Process from Underground Piping Trenches
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_10-j.pdf

1-3. Treated Water Discharge Criteria for Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_07-j.pdf

2. Contract Worker Dies After Falling Into Rainwater Receiving Tank at Fukushima Daiichi (1/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150119_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 15, 2015 8:41 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST

Nuclear Sector Colleagues,

Happy New Year!
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 16, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **Working-level Meeting of Decommissioning & Contaminated Water Issues Team (12/25/2014)**
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf
(English translation as of 11/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141127_01-e.pdf

1-3. Shortening the Length of Circulating Water Cooling System Loop

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_08-j.pdf

1-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

1-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_11-j.pdf

1-8. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (12/26/2014)
(only in Japanese)
2-1. Status of Filling Up Underground Seawater Piping Trenches
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_01.pdf

2-2. Measures to Achieve Incremental Effective Dose Limit at Site Boundary
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_03.pdf

2-3. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_05.pdf

2-4. Leakage of ALPS-Treated Water from J6 Tank Farm
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_06.pdf

3. IAEA to Review Fukushima Daiichi Decommissioning and Kashiwazaki Kariwa Operational Safety (1/7/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247076_6844.html

4. Figures and Video Clips Describing Various Water Management Measures
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

5. Overview of Fukushima Daiichi Accident and Lessons Learned (33 MB)
http://www.tepco.co.jp/en/decommision/accident/images/outline01.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, December 22, 2014 7:59 PM
Subject: [TEPCO Weekly Fukushima Update Call] TUE, Dec. 23 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
TUE, Dec. 23, 2014 at 3 pm Eastern Standard Time
(**No call next two weeks**. Next call will be on **Fri, Jan. 16, 2015** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (12/19/2014)
(only in Japanese)
1-1. Removal of Cs and Sr from Seawater, etc.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_03-j.pdf

1-2. Unit 1 Reactor Building Refueling Floor Inspection Results
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_05-j.pdf

1-3. Applicability of Plastic Scintillation Fiber (PSF) to Detect Minor Leakage from Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_07-j.pdf

1-4. Leakage of ALPS-Treated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_08-j.pdf

1-5. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_09-j.pdf

2. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool (12/22/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

2-1. Video Clip Summarizing Path to Success (6 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w220b15k&catid=61795

2-2. Video Message from Mr. Hirose, TEPCO's President (5 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w785h9cj&catid=61783

2-3. Explanation Slides (only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141222_04-j.pdf

Happy holidays to you all!

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 11, 2014 10:07 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 12 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 12th, 2014 at 3 pm Eastern Standard Time
(**No call next week**. Next call will be on **TUE, Dec. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Overview of Measures to Treat Contaminated Water
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

2. Explanation on Subdrain and Groundwater Drain Systems to the Fishermen's Association of Iwaki City (12/10/2014)
(only in Japanese)
2-1. Confirmation of Stable Performance in Removing Radionuclides from Subdrain and Groundwater Drain
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_06-j.pdf

2-2. Basic Concept of Operating the Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_07-j.pdf

2-3. Detection of High Concentration of Radioactivity from Subdrain Pits # 18/19 and Measures Taken
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_09-j.pdf

3. Approval by NRA on Design Modification to add Sr Removal Capability to SARRY (Cs Removal) System (12/11/2014)
(only in Japanese; 8.8 MB, 372 pages)
http://www.tepco.co.jp/cc/press/betu14_j/images/141211j0101.pdf

All the best,
Kenji

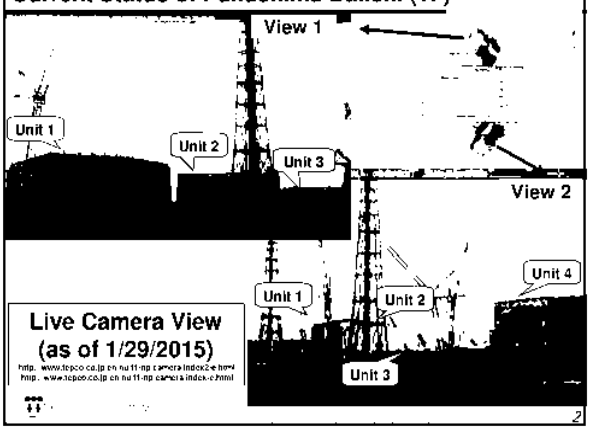
Spent Fuel and Spent Fuel Storage Facilities at Fukushima Daiichi

The National Academies
"Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants: Phase 2"
Meeting #3

Washington, DC
January 29th, 2015

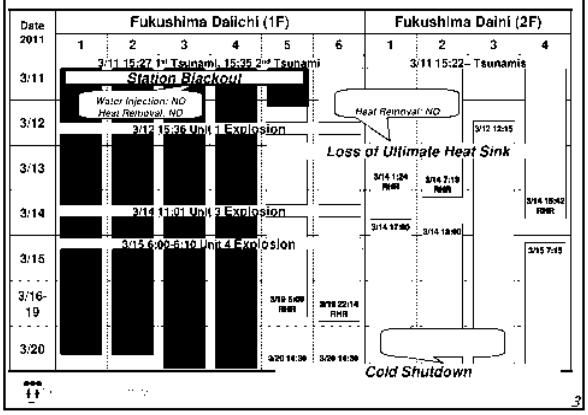
Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company, Washington Office
tateiwa.kenji@tepco.co.jp

Current Status of Fukushima Daiichi (1F)



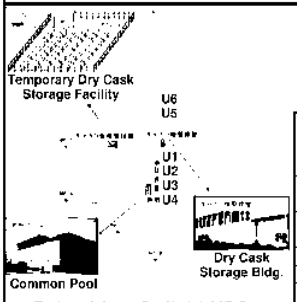
2

Overview of the 10-Unit Simultaneous Accidents



3

Spent Fuel Storage Facilities: Overview

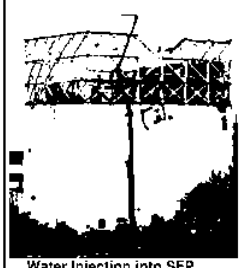


Unit	As of 3/11/2011			12/22/2014
	Spent Fuels	New Fuels	Decay Heat (MW)	Total # of Fuels
1	292	100	0.18	392
2	587	28	0.62	615
3	514	52	0.54	566
4	1,331	204	2.26	0
5	946	48	1.01	994
6	876	64	0.87	1,884
Common Pool	6,375	0	1.13	6,799
Dry Cask Storage	408	0	-	0
Temp. Dry Cask Storage	-	-	-	2,930

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

4

Unit 1 Spent Fuel Pool: Water Injection



Water Injection into SFP with Concrete Pumper

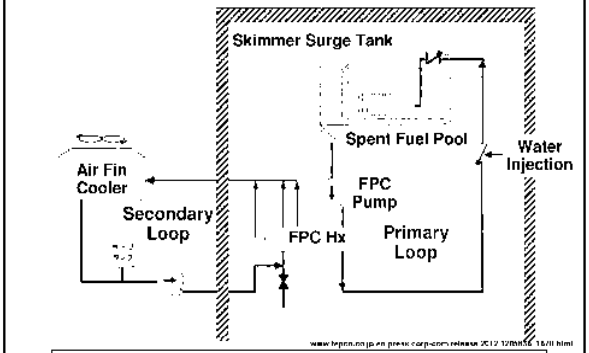
Date (2011)	Injection Volume (ton)	Source	Injection Method
3/31	90	Fresh Water	Concrete Pumper
5/20	60		
5/22	90		
5/28	5		Fuel Pool Cooling (FPC) System
5/29	168		
6/5	15		
7/5	75		
8/5	75		
8/10	10		
8/10	Closed Cycle Cooling		

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205958_1870.html

Injected only fresh water (no seawater)

5

Unit 1 SFP: Closed-Cycle Cooling

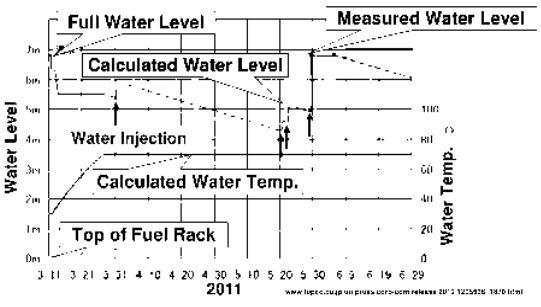


http://www.tepco.co.jp/en/press/corp-com/release/2012/1205958_1870.html

Stable closed-cycle cooling from 8/10/2011

6

Unit 1 SFP: Reconstruction of Events



Water level highly unlikely to have dropped close to top of fuel rack

7

Unit 1 SFP: Water Chemistry

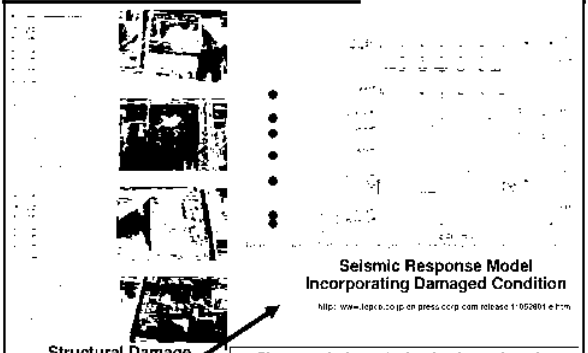
Radio Nuclide	Half Life	Concentration (Bq/cm³)			
		Unit 1 Skimmer Surge Tank		*Unit 1 SFP*	*Unit 1 T/B*
		6/22/2011	8/19/2011	*2/11/2011*	*3/26/2011*
Cs-134	2 years	12,000	18,000	*ND*	*1.2E5*
Cs-137	30 years	14,000	23,000	*0.078*	*1.3E5*
I-131	8 days	68	ND	*ND*	*1.5E5*

	6/22/2011	7/17/2012
Chloride (ppm)	4.4	5.0

- I-131 most likely to have originated from reactor, not SFP (all fuels >1 year after shutdown)
- Injection of hydrazine for microbes prevention

8

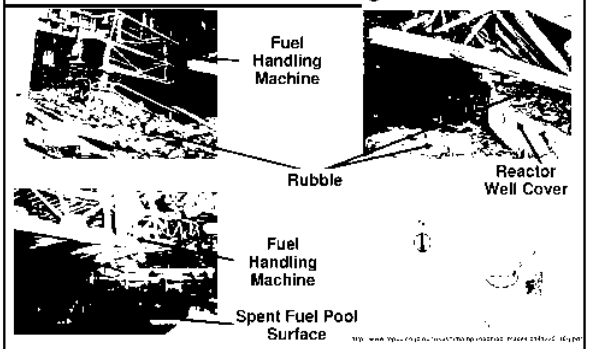
Unit 1 SFP: Structural Integrity Assessment



Shear strain from design-basis earthquake confirmed to be within safety limit (5/28/2011)

9

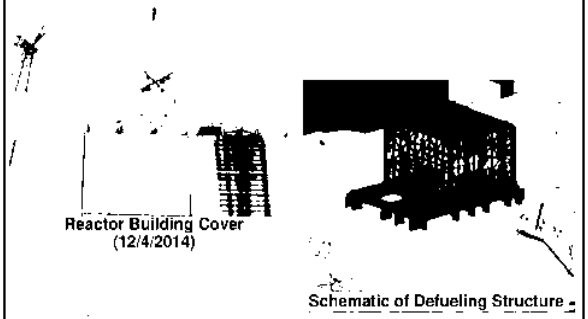
Unit 1 SFP: Condition of Refueling Floor



Fuel handling machine and overhead crane do not seem to have dropped into SFP (Nov. 2014)

10

Unit 1 SFP: Next Step



Reactor building cover to be dismantled to prepare for defueling

11

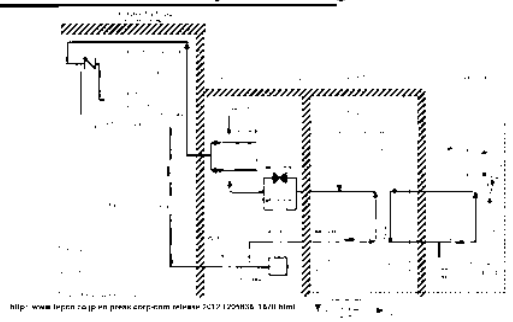
Unit 2 Spent Fuel Pool: Water Injection

Date (2011)	Injection Volume (ton)	Source	Injection Method
3/20	40	Seawater	
3/22	18		
3/25	30		
3/29	15-30	Fresh Water	Fuel Pool Cooling System
3/30	<20		
4/1	70		
4/4	70		
4/7	36		
4/10	50		
4/13	50		
4/16	45		
4/19	47		
4/22	50		
4/25	38		
4/28	43		
5/2	55		
5/6	58		
5/10	56		
5/14	56		
5/18	53		
5/22	56		
5/26	53		
5/30	53		
5/31	Closed Cycle Cooling		

FPC system utilized for water injection

12

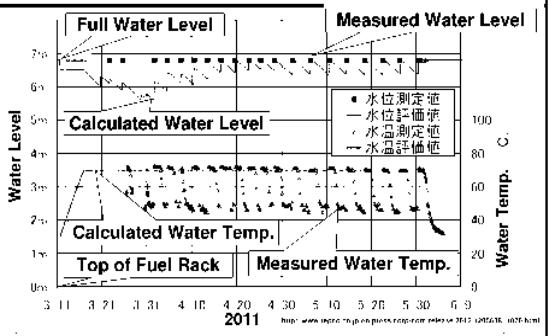
Unit 2 SFP: Closed-Cycle Cooling



- Stable closed-cycle cooling from 5/31/2011
- Injection of hydrazine for anti-corrosion and microbe prevention

13

Unit 2 SFP: Reconstruction of Events



Water level highly unlikely to have dropped close to top of fuel rack

14

Unit 2 SFP: Water Chemistry

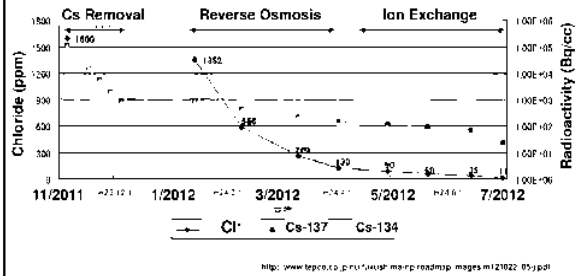
Radio Nuclide	Half Life	Concentration (Bq/cm³)			
		Unit 2 Skimmer Surge Tank		*Unit 2 SFP*	*Unit 2 T/B*
		4/16/2011	8/19/2011	*2/10/2011*	*3/27/2011*
Cs-134	2 years	160,000	110,000	*ND*	*3.1E6*
Cs-137	30 years	150,000	110,000	*0.28*	*3.0E6*
I-131	8 days	4,100	ND	*ND*	*1.3E7*

	4/16/2011	11/15/2011	4/2/2012	8/30/2012
Chloride (ppm)	1100	1600	130	14

I-131 most likely to have originated from reactor, not spent fuel (all fuels >7 months after shutdown)

15

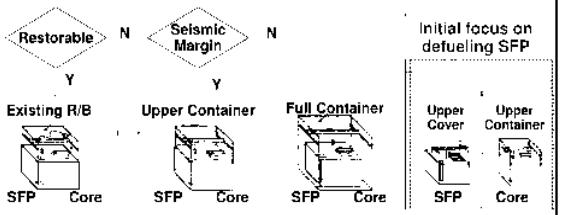
Unit 2 SFP: Water Chemistry (cont'd)



Water quality steadily improved

16

Unit 2 SFP: Next Step



Defueling strategy to be determined after path for core debris retrieval becomes clearer

17

Unit 3 Spent Fuel Pool: Water Injection

Various attempts to inject water

Date (2011)	Injection Volume (ton)	Source	Injection Method
3/17	30	Seawater	Helicopter
3/17	44		
3/17	30	Fresh Water	Water Cannon
3/18	40		
3/18	2		
3/19	60		
3/19	2430		Fire Truck
3/20	1137		
3/22	150	Seawater	
3/23	35		FPC
3/24	120		Fire Truck
3/25	450		
3/27	100		Concrete Pumper
3/29	100		
3/31	105		
4/2	75		
4/4	20		
4/7	70		
4/9	75		
4/10	80		
4/12	35		
4/14	25		
4/18	30		
4/22	50	Fresh Water	
4/26	47.5		
5/6	60		
5/9	80		FPC
5/16	100		
5/24	100		
5/28	50		
6/1	40		
6/5	60		
6/9	55		
5/13	42		
5/17	49		
6/26	45		
6/27	60		
6/29	30	w/ Boron	
6/30		Closed Cycle Cooling	

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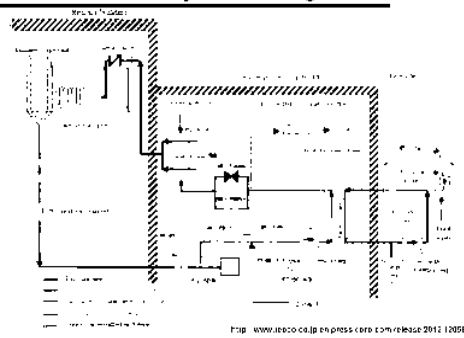
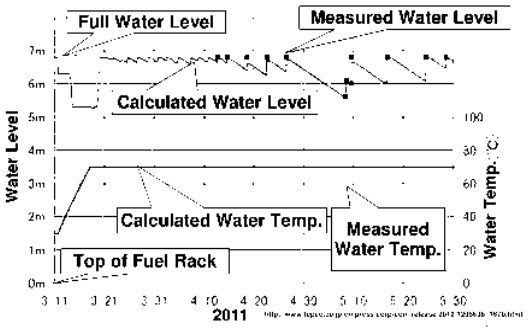
Unit 3 SFP: Closed-Cycle Cooling



Stable closed-cycle cooling from 6/30/2011

19

Unit 3 SFP: Reconstruction of Events



Water level highly unlikely to have dropped close to top of fuel rack

20

Unit 3 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm³)				
		Unit 3 SFP			*Unit 3 SFP*	*Unit 3 T/B*
		5/8/2011	7/7/2011	8/19/2011	*3/2/2011*	*4/22/2011*
Cs-134	2 years	140,000	94,000	74,000	*ND*	*1,500,000*
Cs-136	13 days	1,600	ND	ND	*ND*	*14,000*
Cs-137	30 years	150,000	110,000	87,000	*ND*	*1,600,000*
I-131	8 days	11,000	ND	ND	*ND*	*660,000*

	5/8/2011	4/5/2012	6/23/2012	8/30/2012
Chloride (ppm)	2400	1600	130	73

- I-131 and Cs-136 most likely to have originated from reactor, not SFP (all fuels >10 months after shutdown)
- Injection of boric acid to neutralize alkalinity from concrete rubble
- Injection of hydrazine for anti-corrosion and microbe prevention

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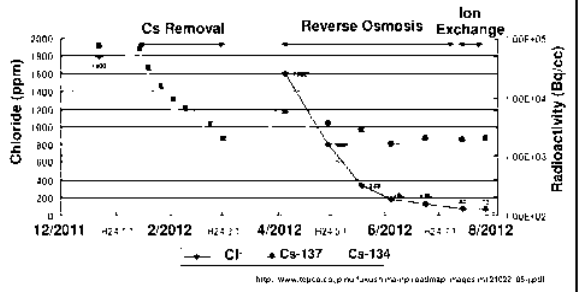
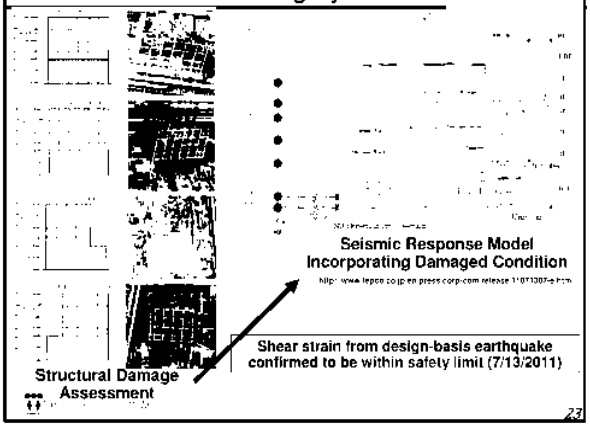
Unit 3 SFP: Water Chemistry (cont'd)



Water quality steadily improved

22

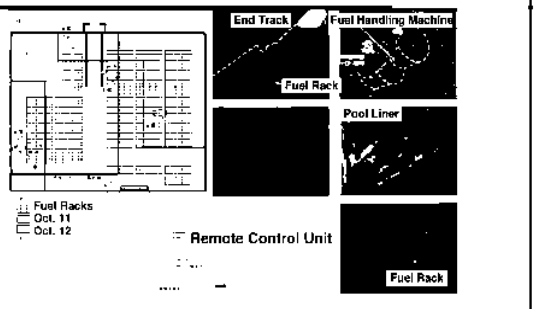
Unit 3 SFP: Structural Integrity Assessment



Shear strain from design-basis earthquake confirmed to be within safety limit (7/13/2011)

23

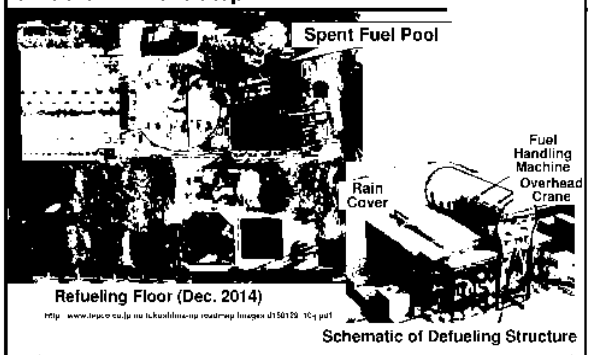
Unit 3 SFP: Rubble Removal



Information on rubble in SFP obtained by remote-controlled underwater camera (Oct. 2012)

24

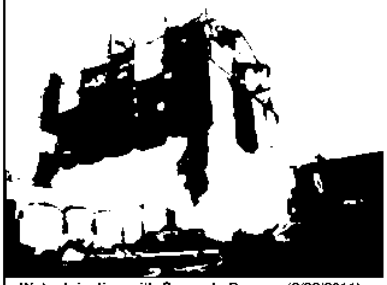
Unit 3 SFP: Next Step



Removing rubble from SFP in preparation for defueling

25

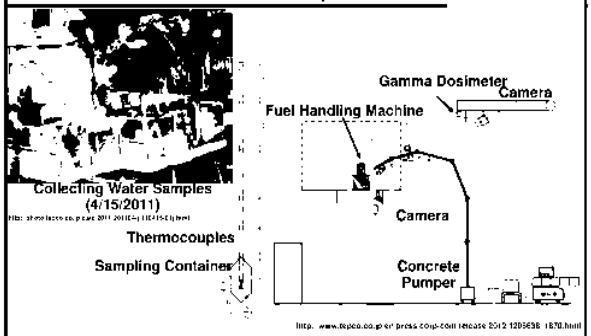
Unit 4 Spent Fuel Pool: Water Injection



Injection of seawater and fresh water from Mach 20 using water cannons, concrete pumpers, etc. until July 31, 2011

26

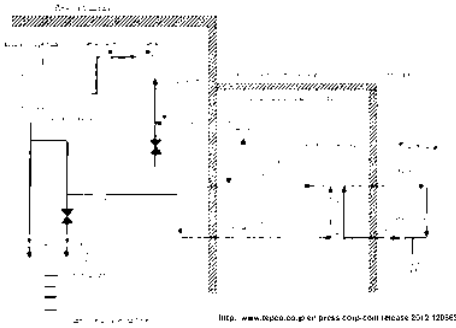
Unit 4 SFP: Water Level/Temp. Measurement



Concrete pumper used to measure SFP water level/temperature and collect water samples

27

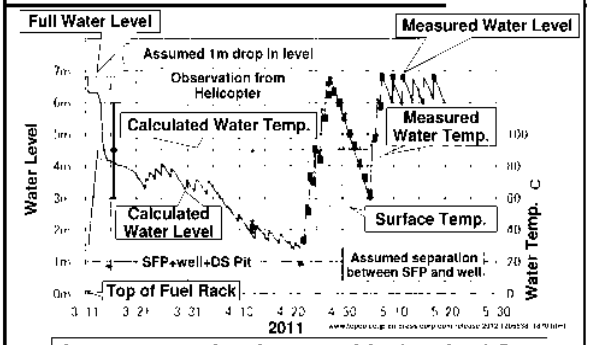
Unit 4 SFP: Closed-Cycle Cooling



Stable closed-cycle cooling from 7/31/2011

28

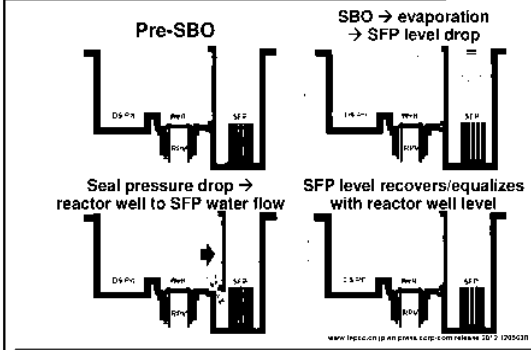
Unit 4 SFP: Reconstruction of Events



Lowest water level at top of fuel rack +1.5 m at around April 20, 2011

29

Unit 4 SFP: Reconstruction of Events (cont'd)



Water from reactor well flowed into SFP during the event

30

Unit 4 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm³)					
		Unit 4 SFP				*Unit 4 SFP*	*Unit 4 T/B*
		4/12/2011	4/28/2011	5/7/2011	8/20/2011	*3/4/2011*	*3/24/2011*
Cs-134	2 years	88	49	56	44	*ND*	*31*
Cs-137	30 years	93	55	67	61	*0.13*	*32*
I-131	8 days	220	27	16	ND	*ND*	*360*

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

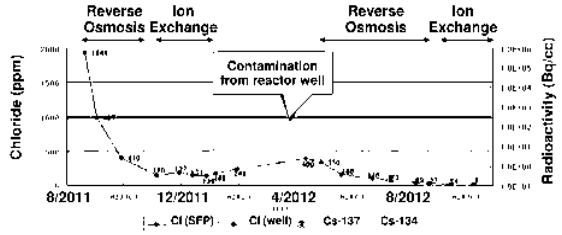
	4/12/2011	8/20/2011	11/29/2011	9/16/2012
Chloride (ppm)	6000	1944	197	24

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

- I-131 most likely to have originated from other reactors, not SFP (all fuels >4 months after shutdown)
- Injection of hydrazine for anti-corrosion and microbe prevention

31

Unit 4 SFP: Water Chemistry (cont'd)



http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

Water quality steadily improved

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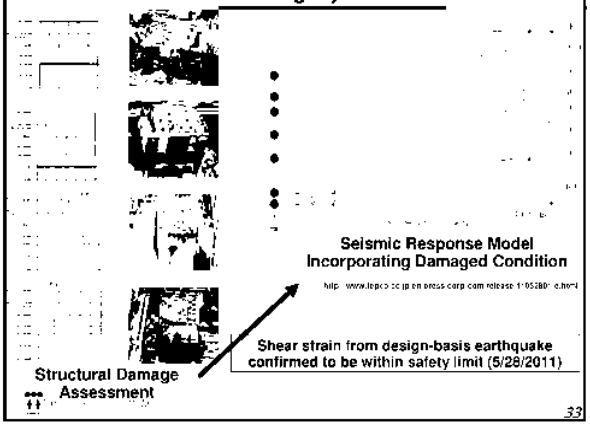
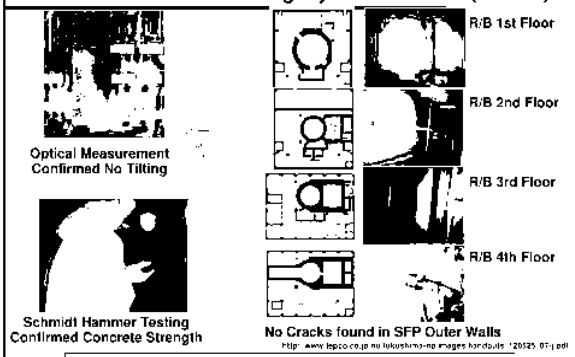
Unit 4 SFP: Structural Integrity Assessment



33

Unit 4 SFP: Structural Integrity Assessment (cont'd)

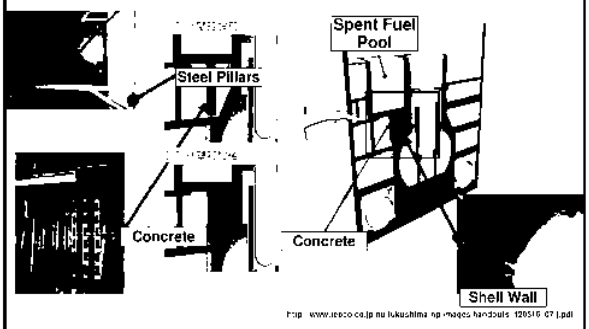


http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120525_07-j.pdf

Quarterly structural integrity inspection found no issues (since 5/25/2012)

34

Unit 4 SFP: Structural Integrity Reinforcement

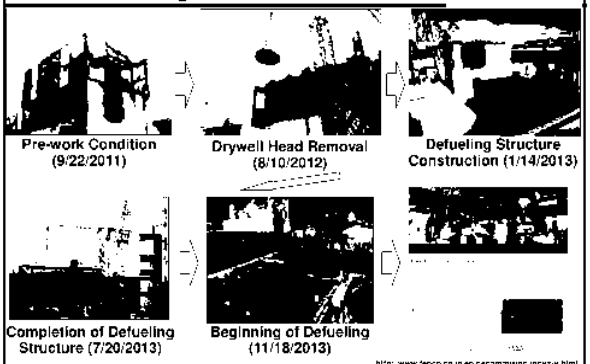


http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120516_07-j.pdf

Additional seismic margin by 20% (7/30/2011)

35

Unit 4 SFP: Progress To Date



http://www.tepco.co.jp/en/decommission/index-e.html

Successful removal of all fuels from SFP (12/22/2014)

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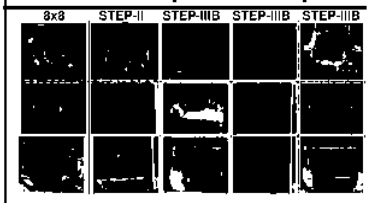
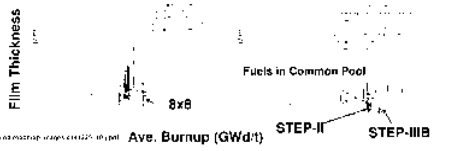
Unit 4 SFP: Inspection of Spent Fuels



Visual Inspection

Oxidization Film Thickness Measurement



Inspection of five spent fuels from Unit 4 SFP showed no abnormalities (Nov. 2014)

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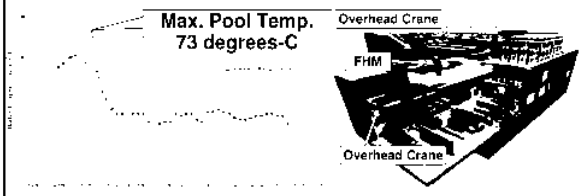
Common Pool



- 3/18/2011: Confirmed pool water level
- 3/24/2011: Pool cooling restored

Radio Nuclide	Half Life	Concentration (Bq/cm³) Common Pool	
		5/13/2011	2/10/2011
Cs-134	2 years	0.17	ND
Cs-137	30 years	1.2	ND
I-131	8 days	ND	ND

http: www.tepco.co.jp en press corp-com release 2012 1205638_1870.html

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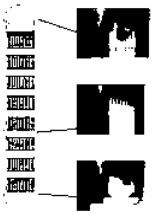
Dry Cask Storage Facility



Inspection results of all 9 dry casks showed no abnormalities (5/30/2013)

No Damage of Fuel Bundles or Basket

http: www.meti.go.jp earthquake nuclear pdf 130830 130830_03gg.pdf

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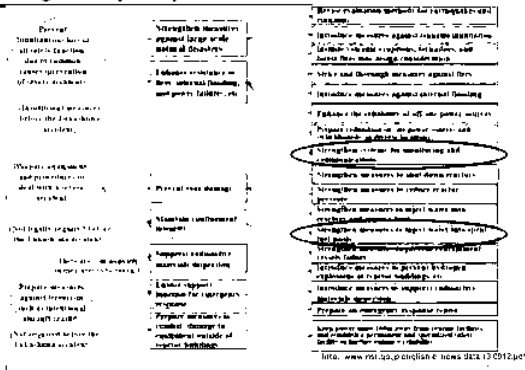
New Regulatory Requirements

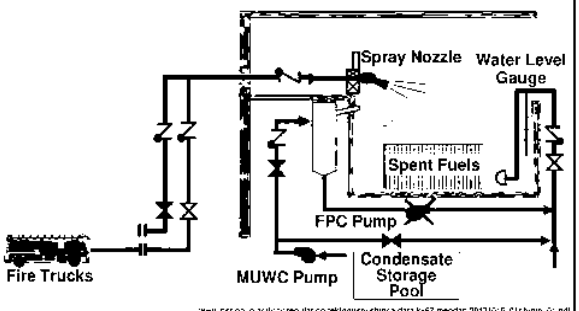


http: www.nsr.go.jp english e_news data 130912.pdf

Japan Nuclear Regulation Authority enacted new regulatory requirements effective July 2013

40

Safety Enhancements at Kashiwazaki Kariwa NPS

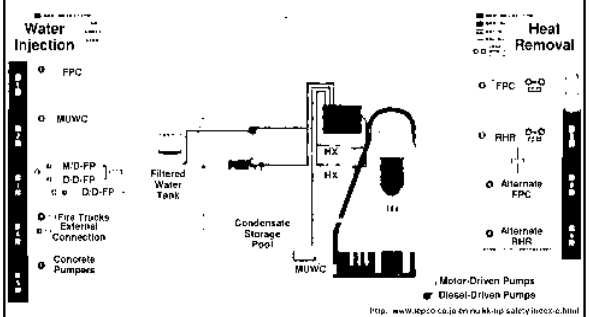


http: www.nsr.go.jp archive nsr regulation_of_nuclear_facilities data 0047_03_01.pdf

Fixed and flexible alternate injection systems with multiple backup power and water sources

41

Safety Enhancements at Kashiwazaki Kariwa NPS (cont'd)

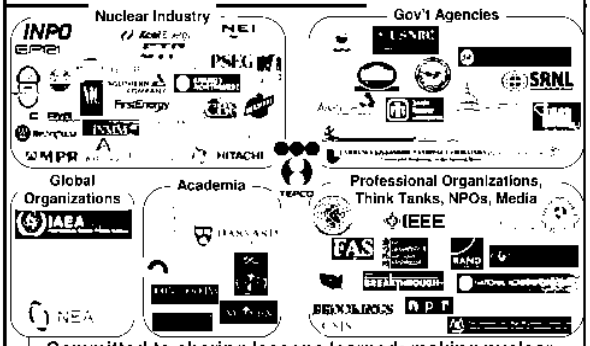


http: www.tepco.co.jp en nu kk-hp safety index-e.html

Multiple layers of defense (only showing safety measures related to SFP)

42

TEPCO's Post-Accident Activities in the U.S.



Committed to sharing lessons learned; making nuclear power plants safer; carrying out decommissioning safely

→ Hosting Weekly Update Teleconferences

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References

- **TEPCO Website on Decommissioning Status**
  http: www.tepco.co.jp en decommission index-e.html
- **TEPCO Internal Investigation Committee Report (6/20/2012)**
  http: www.tepco.co.jp en press corp-com release 2012 1205638_1870.html
  - ✓ **Main Body**
    http: www.tepco.co.jp en press corp-com release betu12_e images 120620e0104.pdf
  - ✓ **Attachment**
    http: www.tepco.co.jp en press corp-com release betu12_e images 120620e0106.pdf
- **IRID Symposium (7/18/2014)**
  http: www.irid.or.jp en reports symposium
  - **Current Status of Fukushima Daiichi**
    http: irid.or.jp wp-content uploads 2014 07 Sympo Masuda E.pdf
  - **R&D Projects Related to Fuel Debris Retrieval**
    http: irid.or.jp wp-content uploads 2014 07 Sympo SSuzuki E.pdf

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From: Tateiwa, Kenji
Sent: 4 Jun 2015 22:21:05 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, June 5, 2015 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, June 5, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, June 19** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (5/22/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/data/000107869.pdf

1-2. Water Collected on Lid of High-Intensity Container Inside a Box Culvert
http://www.nsr.go.jp/data/000108101.pdf

1-3. Groundwater Inflow Mitigation Measures and Water Level Management
http://www.nsr.go.jp/data/000107730.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (5/25/2015)
(only in Japanese)
2-1. Water Contamination Monitoring Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_03-j.pdf

2-2. Status of Unit 1 Reactor Building Cover Dismantling
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_04-j.pdf

2-3. Status Report on Identification of Risk Factors Related to Off-site Radiological Impact
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_07-j.pdf

2-4. Preparation for Disclosure of All Radiological Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_08-j.pdf

2-5. Status Report on Various Issues (146 pages, 19 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150525_13-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (5/28/2015)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_05-j.pdf
(English translation as of 4/30/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150430_01-e.pdf

3-3. Unit 1 Drywell Water Level Measurement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_06-j.pdf

3-4. Contaminated Water Treatment *(file size: 11 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_07-j.pdf

3-5. Environmental Radiation Issues *(file size: 15 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_08-j.pdf

3-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_10-j.pdf

3-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_11-j.pdf

3-8. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_12-j.pdf

3-9. Draft Revision of Mid-to-Long Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150528_13-j.pdf

4. Leakage of Contaminated Water from Transfer Hose (6/1/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150601_06-j.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, May 21, 2015 9:21 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 22, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, May 22, 2015 at 3pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, June 5** at 3pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. IAEA Peer Review Mission Report #3 (5/14/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150514_01-e.pdf

"IAEA Issues Report on Fukushima Decommissioning Review" (IAEA Press Release)
https://www.iaea.org/newscenter/pressreleases/iaea-issues-report-fukushima-decommissioning-review

2. Fukushima Nuclear Accident Unresolved Issues Progress Report # 3 (5/20/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1250927_6844.html

(English Summary)
http://www.tepco.co.jp/en/press/corp-com/release/betu15_e/images/150520e0101.pdf

(Japanese Full Report: 503 pages, 27 MB)
http://www.tepco.co.jp/cc/press/betu15_j/images/150520j0102.pdf

3. High-Level Meeting of Decommissioning & Contaminated Water Issues Team (5/21/2015)
(only in Japanese)
3-1. Basic Policy regarding the Mid-and-Long-Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150521_05-j.pdf

3-2. Straw Man for the Mid-and-Long-Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150521_06-j.pdf

3-3. Enhanced Coordination on R&D Activities for Decommissioning and Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150521_03-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, May 07, 2015 9:07 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 8, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, May 8, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week.** Next call will be on **Fri, May 22** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Drywell Internal Investigation by Transforming Robots: Summary of Findings (4/30/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150430_01-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (4/30/2015)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_05-j.pdf
(English translation as of 3/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150326_01-e.pdf

2-3. Contaminated Water Treatment *(file size: 14 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_07-j.pdf

2-4. Environmental Radiation Issues *(file size: 17 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_08-j.pdf

2-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_10-j.pdf

2-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_11-j.pdf

2-7. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_12-j.pdf

2-8. NDF's 2015 Technical Strategy Plan in Preparation for Revising the Mid-to-Long Term Decommissioning Roadmap *(file size: 18 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_14-j.pdf

2-9. Identification of Risk Factors Related to Off-site Radiological Impact
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_15-j.pdf

2-10. Preparation for Disclosing All Radiological Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_16-j.pdf

2-11. Government-Funded Demonstration Testing Results for 5 Contaminated Water Treatment Systems

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_17-j.pdf

3. Test Operation of Brine Circulation for Frozen Soil Wall (4/30/2015)
http://photo.tepco.co.jp/en/date/2015/201504-e/150430-02e.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, April 23, 2015 10:42 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, April 24, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **April 24**, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, May 8** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Drywell Internal Investigation by Transforming Robots (4/10~19/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249780_6844.html

(April 10 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150413_01-e.pdf
(video clip for April 10)
http://photo.tepco.co.jp/en/date/2015/201504-e/150413-01e.html

(April 15 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150416_01-e.pdf
(video clip for April 15)
http://photo.tepco.co.jp/en/date/2015/201504-e/150416-01e.html

(April 16 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150417_01-e.pdf
(video clip for April 16)
http://photo.tepco.co.jp/en/date/2015/201504-e/150417-01e.html

(April 18-19 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150420_01-e.pdf
(video clip for April 18-19)

http://photo.tepco.co.jp/en/date/2015/201504-e/150420-01e.html

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (4/13/2015)
(only in Japanese)

2-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_04-j.pdf

2-2. Preparation for Dismantling Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_05-j.pdf

2-3. Outdoor Cable Fire
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_11-j.pdf

2-4. Status Report on Identification of Risk Factors Related to Off-site Radiological Impact
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_12-j.pdf

2-5. New Framework and Organization Related to Disclosure of All Radiological Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_13-j.pdf

2-6. NDF's Draft 2015 Technical Strategy Plan in Preparation for Revising the Mid-to-Long Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_15-j.pdf

2-7. Draft Straw Man for the Revised Mid-to-Long Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_18-j.pdf

2-8. Status Report on Various Issues (155 pages, 13.3 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_19-j.pdf

3. NRA Special Facilities Monitoring and Evaluation Committee (4/22/2015)
(only in Japanese)

3-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/data/000104663.pdf

3-2. Water Collected on Lid of High-Intensity Container Inside a Box Culvert
http://www.nsr.go.jp/data/000104664.pdf

3-3. Groundwater Inflow Mitigation Measures and Water Level Management
http://www.nsr.go.jp/data/000104677.pdf

3-4. Reduction of Radioactivity in Drainage Channels
http://www.nsr.go.jp/data/000104668.pdf

4. Inadvertent Stop of Drainage Pumps at K Drainage Channel--Now Restored (4/21, 23/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249920_6844.html
(Detailed Info)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150421_01-e.pdf

5. IAEA Delegation Visit to Fukushima Daiichi (4/19/2015)
http://photo.tepco.co.jp/en/date/2015/201504-e/150421-01e.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, April 08, 2015 8:25 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, April 9, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, April 9, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, April 24** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 3 Shield Plug in Front of Containment Vessel Equipment Hatch: Assumed Cause of Movement (3/30/2015)
Shield plug could have moved due to pressure differential between containment vessel and reactor building when R/B hydrogen explosion occurred.
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150330_04-j.pdf

2. Unit 3 Spent Fuel Pool Gate Condition (4/6/2015)

Visual inspection found no significant impact to one of the two layers of gates (G1) maintaining water-tightness of pool.
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150406_04-j.pdf

3. Crawler Robot to Investigate Inside Unit 1 Drywell (4/6/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150406_01-e.pdf

4-1. Nuclear Safety Reform Plan: Quarterly Progress Report (3/30/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249285_6844.html

4-2. Full Report
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu15_j/images/150330j0102.pdf

4-3. TEPCO's Nuclear Reform Monitoring Committee
http://www.nrmc.jp/en/report/detail/1249278_5233.html

4-4. "Reviewing the Two Years of Nuclear Safety Reform"
http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/04/02/E-5.pdf

5-1. *"Trace Amounts of Fukushima Radioactivity Detected Along Shoreline of British Columbia"* (4/6/2015)
Press release by the Woods Hole Oceanographic Institution.
http://www.whoi.edu/news-release/fukushima-ucluelet

5-2. TEPCO's Sea Water Sampling Data
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

5-3. TEPCO's Seawater Monitoring Plan (4/1/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150401_06-j.pdf

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 12 Mar 2015 20:50:07 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, March 13, 2015 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **March 13**, 2015 at 3 pm Eastern **Daylight** Time
(**No Call Next Week**. Next call will be on **Fri, March 27** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (3/2/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_05-j.pdf

1-2. Measures to Reduce Radioactivity in "K" Drainage Line
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_06-j.pdf

1-3. Investigation on Temporary Increase in Radioactivity in Downstream of "B and C" Drainage Line
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_07-j.pdf

1-4. Water Level Management after Operation of Frozen-Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_08-j.pdf

2. Rain Water Level Drop in Outer Weir of H4 Area Tank (3/12/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150312_04-j.pdf

3. New Disclosure Policy and Independent Audit in Light of Recent Drainage Water Issue (3/6/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248564_6844.html

4. TEPCO President's Remarks on 4th Anniversary of Great East Japan Earthquake (3/11/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248663_6844.html

5. "Nuclear Energy in Japan Since Fukushima " (2/17/2015)
TEPCO's presentation at the Platts Nuclear Energy Conference.
http://www.platts.com/IM.Platts.Content/ProductsServices/ConferenceandEvents/2015/pc509/presentations/Kenji_Tateiwa.pdf

6. "Estimated Amount of Radioactive Materials Released into the Air by the Fukushima Daiichi NPS Accident" (3/10/2015)
TEPCO's presentation at the US NRC Regulatory Information Conference (RIC.)

https://ric.nrc-gateway.gov/docs/abstracts/tateiwak-t5-hv-r1.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 26, 2015 10:50 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 27, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 27, 2015 at 3 pm Eastern Standard Time
(**No Call Next Week.** Next call will be on **Fri, March 13** at 3 pm **EDT**.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (2/23/2015)
(only in Japanese)
1-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_04-j.pdf

1-2. Dismantling Plan for Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_05-j.pdf

1-3. Occupational Safety Corrective Actions
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_06-j.pdf

1-4. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_12-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (2/26/2015)
(only in Japanese)

2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_05-j.pdf
(English translation as of 1/29/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150129_01-e.pdf

2-3. Re-insertion of Thermocouple into Unit 2 RPV Bottom via SLC Line
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_06-j.pdf

2-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_07-j.pdf

2-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_08-j.pdf

2-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_10-j.pdf

2-7. Preparation for Fuel Debris Removal (3D Laser Scanning, Muon Tomography)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_11-j.pdf

2-8. D&D-Related R&D Progress and Future Plans
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_13-j.pdf

2-9. Selection of Technologies to Undergo Tritium-Separation Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_14-j.pdf

2-10. Establishment of Global Decommissioning Joint Research Center
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_15-j.pdf

3. Temporary Increase in Radioactivity in Downstream of "B and C" Drainage Line (2/24/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248327_6844.html

4. Unit 2 Reactor Building Truck Bay Door Roof Likely Source of Radioactivity in "K" Drainage Line (2/24/2015)
www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150224_01-e.pdf

5. Briefing to Fishermen's Association in Fukushima Prefecture Regarding Contaminated Water Issues (2/25/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150225_05-j.pdf

6. Unit 1 Reactor Building 4th Floor Inspection by Technical Committee of Niigata Prefecture (2/21/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150221_06-j.pdf

7. Third IAEA Review of Fukushima Daiichi Decommissioning Roadmap (2/17/2015)
https://www.iaea.org/newscenter/pressreleases/iaea-team-completed-third-review-japans-plans-decommission-fukushima

(photos)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150217_03-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 12, 2015 10:37 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 13, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 13, 2015 at 3 pm Eastern Standard Time
(**No Call Next Week.** Next call will be on **Fri, Feb. 27** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (2/9/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_02.pdf

1-2. Water Level Management after Operation of Frozen-Soil Wall (summary)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_03.pdf

1-3. Water Level Management after Operation of Frozen-Soil Wall (reference information)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_08.pdf

2. Installation of Muon Detectors for Fuel Debris Detection at Unit 1 (2/9/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248057_6844.html
(photos)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150209_01-e.pdf

3. *"The Great Race: The Global Quest for the Car of the Future"*
http://amzn.com/B00LD1OP0Q
This book features TEPCO's current Chief Nuclear Officer, Takafumi Anegawa, as a visionary who jump started Japan's electric vehicle industry.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji

Sent: Thursday, February 05, 2015 9:24 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 6, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 6, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (1/30/2015)
(only in Japanese)
1-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_03-j.pdf

1-2. Wind Velocity Simulation Inside Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_04-j.pdf

1-3. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_07-j.pdf
(page 6/116) ALPS Status
(page 10/116) Various Water Treatment Systems
(page 19/116) Filling Up Seawater Piping Trenches
(page 38/116) Subdrain System
(page 41/116) Frozen Soil Wall
(page 85/116) Radioactivity in Units 1-3 Discharge Canal

2. Causes of Significant Occupational Safety Issues at 1F/2F/KK and Countermeasures (2/3/2015)
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu15_j/images/150202j0301.pdf

3. Nuclear Safety Reform Plan 2014 Q3 Progress Report (2/3/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247946_6844.html

4. IAEA OSART Preparatory Meeting at Kashiwazaki Kariwa (2/2~5/2015)
(only in Japanese)
http://www.tepco.co.jp/kk-np/data/publication/pdf/2014/270205.pdf

5. Removal of Highly Contaminated Water Inside Seawater Piping Trenches (1/28/2015)
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=iwz87j2v&catid=69631

6. TEPCO Official English YouTube
https://www.youtube.com/user/OfficialTEPCOen

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 29, 2015 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 30, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **Jan. 30**, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 6** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (1/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_05-j.pdf
(English translation as of 12/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141225_01-e.pdf

1-3. Retrieval of Thermocouple Installed in Unit 2 RPV Bottom via SLC Line
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_07-j.pdf

1-5. Environmental Radiation Issues

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_08-j.pdf

1-6. Work Condition Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_10-j.pdf

1-8. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_11-j.pdf

1-9. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_12-j.pdf

1-10. Status Update of Study on Alternate Core Debris Retrieval Methods (METI)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_14-j.pdf

1-11. Strategic Plan and Risk Mitigation (Nuclear Damage Compensation and Decommissioning Facilitation Corporation)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_15-j.pdf

2. Updated Schedule on Completion of Contaminated Water Treatment (1/23/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150123_02-e.pdf

3. Occupational Safety Corrective Actions (1/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150126_01-e.pdf

4. National Academy of Sciences Fukushima Lessons Learned Committee Phase 2 #3 (1/29/2015)
http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=7732
Attached is a compact version of TEPCO's presentation.
Let me know if you would like to receive the original sized file.

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 26 Mar 2015 20:53:14 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, March 27, 2015 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **March 27**, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **THU, April 9** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Muon Tomography Preliminary Results (3/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150319_01-e.pdf

2. Contaminated Water Committee (3/17/2015)
(only in Japanese)
2-1. Studies Related to Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150317_07-j.pdf

2-2. Studies Related to High-Performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150317_08-j.pdf

3. NRA Special Facilities Monitoring and Evaluation Committee (3/25/2015)
(only in Japanese)
3-1. "K" Drainage Line Investigation and Actions
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150325_04-j.pdf

3-2. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150325_08-j.pdf

4. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (3/26/2015)
(only in Japanese)
4-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_04-j.pdf

4-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_05-j.pdf
(English translation as of 2/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150226_01-e.pdf

4-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_07-j.pdf

4-4. Environmental Radiation Issues *(large file size: 56 MB)*

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_08-j.pdf

4-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_10-j.pdf

4-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_11-j.pdf

4-7. Radioactive Waste Processing (Radionuclide Analyses of Samples Taken from Units 1-3 R/B)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_12-j.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, March 12, 2015 8:50 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, March 13, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, March 13, 2015 at 3 pm Eastern **Daylight** Time
(**No Call Next Week**. Next call will be on **Fri, March 27** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **NRA Special Facilities Monitoring and Evaluation Committee (3/2/2015)**
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_05-j.pdf

1-2. Measures to Reduce Radioactivity in "K" Drainage Line
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_06-j.pdf

1-3. Investigation on Temporary Increase in Radioactivity in Downstream of "B and C" Drainage Line
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_07-j.pdf

1-4. Water Level Management after Operation of Frozen-Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_08-j.pdf

2. Rain Water Level Drop in Outer Weir of H4 Area Tank (3/12/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150312_04-j.pdf

3. New Disclosure Policy and Independent Audit in Light of Recent Drainage Water Issue (3/6/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248564_6844.html

4. TEPCO President's Remarks on 4th Anniversary of Great East Japan Earthquake (3/11/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248663_6844.html

5. "Nuclear Energy in Japan Since Fukushima " (2/17/2015)
TEPCO's presentation at the Platts Nuclear Energy Conference.
http://www.platts.com/IM.Platts.Content/ProductsServices/ConferenceandEvents/2015/pc509/presentations/Kenji_Tateiwa.pdf

6. "Estimated Amount of Radioactive Materials Released into the Air by the Fukushima Daiichi NPS Accident" (3/10/2015)
TEPCO's presentation at the US NRC Regulatory Information Conference (RIC.)
https://ric.nrc-gateway.gov/docs/abstracts/tateiwak-t5-hv-r1.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 26, 2015 10:50 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 27, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 27, 2015 at 3 pm Eastern Standard Time
(**No Call Next Week.** Next call will be on **Fri, March 13** at 3 pm **EDT**.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]

1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (2/23/2015)
(only in Japanese)

1-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_04-j.pdf

1-2. Dismantling Plan for Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_05-j.pdf

1-3. Occupational Safety Corrective Actions
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_06-j.pdf

1-4. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_12-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (2/26/2015)
(only in Japanese)

2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_05-j.pdf
(English translation as of 1/29/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150129_01-e.pdf

2-3. Re-insertion of Thermocouple into Unit 2 RPV Bottom via SLC Line
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_06-j.pdf

2-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_07-j.pdf

2-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_08-j.pdf

2-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_10-j.pdf

2-7. Preparation for Fuel Debris Removal (3D Laser Scanning, Muon Tomography)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_11-j.pdf

2-8. D&D-Related R&D Progress and Future Plans
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_13-j.pdf

2-9. Selection of Technologies to Undergo Tritium-Separation Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_14-j.pdf

2-10. Establishment of Global Decommissioning Joint Research Center
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_15-j.pdf

3. Temporary Increase in Radioactivity in Downstream of "B and C" Drainage Line (2/24/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248327_6844.html

4. Unit 2 Reactor Building Truck Bay Door Roof Likely Source of Radioactivity in "K" Drainage Line (2/24/2015)
www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150224_01-e.pdf

5. Briefing to Fishermen's Association in Fukushima Prefecture Regarding Contaminated Water Issues (2/25/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150225_05-j.pdf

6. Unit 1 Reactor Building 4th Floor Inspection by Technical Committee of Niigata Prefecture (2/21/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150221_06-j.pdf

7. Third IAEA Review of Fukushima Daiichi Decommissioning Roadmap (2/17/2015)
https://www.iaea.org/newscenter/pressreleases/iaea-team-completed-third-review-japans-plans-decommission-fukushima
(photos)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150217_03-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 12, 2015 10:37 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 13, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 13, 2015 at 3 pm Eastern Standard Time
(**No Call Next Week.** Next call will be on **Fri, Feb. 27** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (2/9/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_02.pdf

1-2. Water Level Management after Operation of Frozen-Soil Wall (summary)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_03.pdf

1-3. Water Level Management after Operation of Frozen-Soil Wall (reference information)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_08.pdf

2. Installation of Muon Detectors for Fuel Debris Detection at Unit 1 (2/9/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248057_6844.html
(photos)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150209_01-e.pdf

3. *"The Great Race: The Global Quest for the Car of the Future"*
http://amzn.com/B00LD1OP0Q
This book features TEPCO's current Chief Nuclear Officer, Takafumi Anegawa, as a visionary who jump started Japan's electric vehicle industry.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 05, 2015 9:24 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 6, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 6, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (1/30/2015)
(only in Japanese)
1-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_03-j.pdf

1-2. Wind Velocity Simulation Inside Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_04-j.pdf

1-3. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_07-j.pdf
(page 6/116) ALPS Status
(page 10/116) Various Water Treatment Systems
(page 19/116) Filling Up Seawater Piping Trenches
(page 38/116) Subdrain System
(page 41/116) Frozen Soil Wall
(page 85/116) Radioactivity in Units 1-3 Discharge Canal

2. Causes of Significant Occupational Safety Issues at 1F/2F/KK and Countermeasures (2/3/2015)

(only in Japanese)
http://www.tepco.co.jp/cc/press/betu15_j/images/150202j0301.pdf

3. Nuclear Safety Reform Plan 2014 Q3 Progress Report (2/3/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247946_6844.html

4. IAEA OSART Preparatory Meeting at Kashiwazaki Kariwa (2/2~5/2015)
(only in Japanese)
http://www.tepco.co.jp/kk-np/data/publication/pdf/2014/270205.pdf

5. Removal of Highly Contaminated Water Inside Seawater Piping Trenches (1/28/2015)
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=iwz87j2v&catid=69631

6. TEPCO Official English YouTube
https://www.youtube.com/user/OfficialTEPCOen

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 7 May 2015 21:07:11 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 8, 2015 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, May 8, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, May 22** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Drywell Internal Investigation by Transforming Robots: Summary of Findings (4/30/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150430_01-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (4/30/2015)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_05-j.pdf
(English translation as of 3/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150326_01-e.pdf

2-3. Contaminated Water Treatment *(file size: 14 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_07-j.pdf

2-4. Environmental Radiation Issues *(file size: 17 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_08-j.pdf

2-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_10-j.pdf

2-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_11-j.pdf

2-7. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_12-j.pdf

2-8. NDF's 2015 Technical Strategy Plan in Preparation for Revising the Mid-to-Long Term Decommissioning Roadmap *(file size: 18 MB)*

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_14-j.pdf

2-9. Identification of Risk Factors Related to Off-site Radiological Impact
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_15-j.pdf

2-10. Preparation for Disclosing All Radiological Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_16-j.pdf

2-11. Government-Funded Demonstration Testing Results for 5 Contaminated Water Treatment Systems
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_17-j.pdf

3. Test Operation of Brine Circulation for Frozen Soil Wall (4/30/2015)
http://photo.tepco.co.jp/en/date/2015/201504-e/150430-02e.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, April 23, 2015 10:42 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, April 24, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, April 24, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week.** Next call will be on **Fri, May 8** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]

1. **Unit 1 Drywell Internal Investigation by Transforming Robots (4/10~19/2015)**
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249780_6844.html

(April 10 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150413_01-e.pdf
(video clip for April 10)
http://photo.tepco.co.jp/en/date/2015/201504-e/150413-01e.html

(April 15 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150416_01-e.pdf
(video clip for April 15)
http://photo.tepco.co.jp/en/date/2015/201504-e/150416-01e.html

(April 16 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150417_01-e.pdf
(video clip for April 16)
http://photo.tepco.co.jp/en/date/2015/201504-e/150417-01e.html

(April 18-19 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150420_01-e.pdf
(video clip for April 18-19)
http://photo.tepco.co.jp/en/date/2015/201504-e/150420-01e.html

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (4/13/2015)
(only in Japanese)
2-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_04-j.pdf

2-2. Preparation for Dismantling Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_05-j.pdf

2-3. Outdoor Cable Fire
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_11-j.pdf

2-4. Status Report on Identification of Risk Factors Related to Off-site Radiological Impact
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_12-j.pdf

2-5. New Framework and Organization Related to Disclosure of All Radiological Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_13-j.pdf

2-6. NDF's Draft 2015 Technical Strategy Plan in Preparation for Revising the Mid-to-Long Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_15-j.pdf

2-7. Draft Straw Man for the Revised Mid-to-Long Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_18-j.pdf

2-8. Status Report on Various Issues (155 pages, 13.3 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_19-j.pdf

3. NRA Special Facilities Monitoring and Evaluation Committee (4/22/2015)
(only in Japanese)
3-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/data/000104663.pdf

3-2. Water Collected on Lid of High-Intensity Container Inside a Box Culvert
http://www.nsr.go.jp/data/000104664.pdf

3-3. Groundwater Inflow Mitigation Measures and Water Level Management
http://www.nsr.go.jp/data/000104677.pdf

3-4. Reduction of Radioactivity in Drainage Channels
http://www.nsr.go.jp/data/000104668.pdf

4. Inadvertent Stop of Drainage Pumps at K Drainage Channel--Now Restored (4/21, 23/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249920_6844.html
(Detailed Info)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150421_01-e.pdf

5. IAEA Delegation Visit to Fukushima Daiichi (4/19/2015)
http://photo.tepco.co.jp/en/date/2015/201504-e/150421-01e.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, April 08, 2015 8:25 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, April 9, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, April 9, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week.** Next call will be on **Fri, April 24** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 3 Shield Plug in Front of Containment Vessel Equipment Hatch: Assumed Cause of Movement (3/30/2015)
Shield plug could have moved due to pressure differential between containment vessel and reactor building when R/B hydrogen explosion occurred.
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150330_04-j.pdf

2. Unit 3 Spent Fuel Pool Gate Condition (4/6/2015)
Visual inspection found no significant impact to one of the two layers of gates (G1) maintaining water-tightness of pool.
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150406_04-j.pdf

3. Crawler Robot to Investigate Inside Unit 1 Drywell (4/6/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150406_01-e.pdf

4-1. Nuclear Safety Reform Plan: Quarterly Progress Report (3/30/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249285_6844.html

4-2. Full Report
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu15_j/images/150330j0102.pdf

4-3. TEPCO's Nuclear Reform Monitoring Committee
http://www.nrmc.jp/en/report/detail/1249278_5233.html

4-4. "Reviewing the Two Years of Nuclear Safety Reform"
http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/04/02/E-5.pdf

5-1. *"Trace Amounts of Fukushima Radioactivity Detected Along Shoreline of British Columbia"* (4/6/2015)
Press release by the Woods Hole Oceanographic Institution.
http://www.whoi.edu/news-release/fukushima-ucluelet

5-2. TEPCO's Sea Water Sampling Data
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

5-3. TEPCO's Seawater Monitoring Plan (4/1/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150401_06-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, March 26, 2015 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, March 27, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, March 27, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **THU, April 9** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Muon Tomography Preliminary Results (3/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150319_01-e.pdf

2. Contaminated Water Committee (3/17/2015)
(only in Japanese)
2-1. Studies Related to Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150317_07-j.pdf

2-2. Studies Related to High-Performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150317_08-j.pdf

3. NRA Special Facilities Monitoring and Evaluation Committee (3/25/2015)
(only in Japanese)
3-1. "K" Drainage Line Investigation and Actions
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150325_04-j.pdf

3-2. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150325_08-j.pdf

4. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (3/26/2015)
(only in Japanese)
4-1. Plant Status

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_04-j.pdf

4-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_05-j.pdf
(English translation as of 2/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150226_01-e.pdf

4-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_07-j.pdf

4-4. Environmental Radiation Issues *(large file size: 56 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_08-j.pdf

4-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_10-j.pdf

4-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_11-j.pdf

4-7. Radioactive Waste Processing (Radionuclide Analyses of Samples Taken from Units 1-3 R/B)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_12-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, March 12, 2015 8:50 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, March 13, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **March 13**, 2015 at 3 pm Eastern **Daylight** Time
(**No Call Next Week**. Next call will be on **Fri, March 27** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (3/2/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_05-j.pdf

1-2. Measures to Reduce Radioactivity in "K" Drainage Line

http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_06-j.pdf

1-3. Investigation on Temporary Increase in Radioactivity in Downstream of "B and C" Drainage Line
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_07-j.pdf

1-4. Water Level Management after Operation of Frozen-Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_08-j.pdf

2. Rain Water Level Drop in Outer Weir of H4 Area Tank (3/12/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150312_04-j.pdf

3. New Disclosure Policy and Independent Audit in Light of Recent Drainage Water Issue (3/6/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248564_6844.html

4. TEPCO President's Remarks on 4th Anniversary of Great East Japan Earthquake (3/11/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248663_6844.html

5. "Nuclear Energy in Japan Since Fukushima " (2/17/2015)
TEPCO's presentation at the Platts Nuclear Energy Conference.
http://www.platts.com/IM.Platts.Content/ProductsServices/ConferenceandEvents/2015/pc509/presentations/Kenji_Tateiwa.pdf

6. "Estimated Amount of Radioactive Materials Released into the Air by the Fukushima Daiichi NPS Accident" (3/10/2015)
TEPCO's presentation at the US NRC Regulatory Information Conference (RIC.)
https://ric.nrc-gateway.gov/docs/abstracts/tateiwak-t5-hv-r1.pdf

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 21 May 2015 21:21:54 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 22, 2015 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **May 22**, 2015 at 3pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, June 5** at 3pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. IAEA Peer Review Mission Report #3 (5/14/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150514_01-e.pdf

"IAEA Issues Report on Fukushima Decommissioning Review" (IAEA Press Release)
https://www.iaea.org/newscenter/pressreleases/iaea-issues-report-fukushima-decommissioning-review

2. Fukushima Nuclear Accident Unresolved Issues Progress Report # 3 (5/20/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1250927_6844.html

(English Summary)
http://www.tepco.co.jp/en/press/corp-com/release/betu15_e/images/150520e0101.pdf

(Japanese Full Report: 503 pages, 27 MB)
http://www.tepco.co.jp/cc/press/betu15_j/images/150520j0102.pdf

3. High-Level Meeting of Decommissioning & Contaminated Water Issues Team (5/21/2015)
(only in Japanese)
3-1. Basic Policy regarding the Mid-and-Long-Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150521_05-j.pdf

3-2. Straw Man for the Mid-and-Long-Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150521_06-j.pdf

3-3. Enhanced Coordination on R&D Activities for Decommissioning and Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/t150521_03-j.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, May 07, 2015 9:07 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, May 8, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, May 8, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, May 22** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Drywell Internal Investigation by Transforming Robots: Summary of Findings (4/30/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150430_01-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (4/30/2015)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_05-j.pdf
(English translation as of 3/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150326_01-e.pdf

2-3. Contaminated Water Treatment *(file size: 14 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_07-j.pdf

2-4. Environmental Radiation Issues *(file size: 17 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_08-j.pdf

2-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_10-j.pdf

2-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_11-j.pdf

2-7. Radioactive Waste Processing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_12-j.pdf

2-8. NDF's 2015 Technical Strategy Plan in Preparation for Revising the Mid-to-Long Term Decommissioning Roadmap *(file size: 18 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_14-j.pdf

2-9. Identification of Risk Factors Related to Off-site Radiological Impact
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_15-j.pdf

2-10. Preparation for Disclosing All Radiological Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_16-j.pdf

2-11. Government-Funded Demonstration Testing Results for 5 Contaminated Water Treatment Systems
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150430_17-j.pdf

3. Test Operation of Brine Circulation for Frozen Soil Wall (4/30/2015)
http://photo.tepco.co.jp/en/date/2015/201504-e/150430-02e.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, April 23, 2015 10:42 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, April 24, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, April 24, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week.** Next call will be on **Fri, May 8** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Drywell Internal Investigation by Transforming Robots (4/10~19/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249780_6844.html

(April 10 Results)

http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150413_01-e.pdf

(video clip for April 10)
http://photo.tepco.co.jp/en/date/2015/201504-e/150413-01e.html

(April 15 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150416_01-e.pdf

(video clip for April 15)
http://photo.tepco.co.jp/en/date/2015/201504-e/150416-01e.html

(April 16 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150417_01-e.pdf

(video clip for April 16)
http://photo.tepco.co.jp/en/date/2015/201504-e/150417-01e.html

(April 18-19 Results)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150420_01-e.pdf

(video clip for April 18-19)
http://photo.tepco.co.jp/en/date/2015/201504-e/150420-01e.html

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (4/13/2015)
(only in Japanese)

2-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_04-j.pdf

2-2. Preparation for Dismantling Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_05-j.pdf

2-3. Outdoor Cable Fire
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_11-j.pdf

2-4. Status Report on Identification of Risk Factors Related to Off-site Radiological Impact
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_12-j.pdf

2-5. New Framework and Organization Related to Disclosure of All Radiological Data
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_13-j.pdf

2-6. NDF's Draft 2015 Technical Strategy Plan in Preparation for Revising the Mid-to-Long Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_15-j.pdf

2-7. Draft Straw Man for the Revised Mid-to-Long Term Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_18-j.pdf

2-8. Status Report on Various Issues (155 pages, 13.3 MB)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150413_19-j.pdf

3. NRA Special Facilities Monitoring and Evaluation Committee (4/22/2015)
(only in Japanese)
3-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/data/000104663.pdf

3-2. Water Collected on Lid of High-Intensity Container Inside a Box Culvert
http://www.nsr.go.jp/data/000104664.pdf

3-3. Groundwater Inflow Mitigation Measures and Water Level Management
http://www.nsr.go.jp/data/000104677.pdf

3-4. Reduction of Radioactivity in Drainage Channels
http://www.nsr.go.jp/data/000104668.pdf

4. Inadvertent Stop of Drainage Pumps at K Drainage Channel--Now Restored (4/21, 23/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249920_6844.html
(Detailed Info)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150421_01-e.pdf

5. IAEA Delegation Visit to Fukushima Daiichi (4/19/2015)
http://photo.tepco.co.jp/en/date/2015/201504-e/150421-01e.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, April 08, 2015 8:25 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, April 9, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, April 9, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week.** Next call will be on **Fri, April 24** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 3 Shield Plug in Front of Containment Vessel Equipment Hatch: Assumed Cause of Movement (3/30/2015)
Shield plug could have moved due to pressure differential between containment vessel and reactor building when R/B hydrogen explosion occurred.
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150330_04-j.pdf

2. Unit 3 Spent Fuel Pool Gate Condition (4/6/2015)
Visual inspection found no significant impact to one of the two layers of gates (G1) maintaining water-tightness of pool.
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150406_04-j.pdf

3. Crawler Robot to Investigate Inside Unit 1 Drywell (4/6/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150406_01-e.pdf

4-1. Nuclear Safety Reform Plan: Quarterly Progress Report (3/30/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249285_6844.html

4-2. Full Report
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu15_j/images/150330j0102.pdf

4-3. TEPCO's Nuclear Reform Monitoring Committee
http://www.nrmc.jp/en/report/detail/1249278_5233.html

4-4. "Reviewing the Two Years of Nuclear Safety Reform"
http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/04/02/E-5.pdf

5-1. *"Trace Amounts of Fukushima Radioactivity Detected Along Shoreline of British Columbia"* (4/6/2015)
Press release by the Woods Hole Oceanographic Institution.
http://www.whoi.edu/news-release/fukushima-ucluelet

5-2. TEPCO's Sea Water Sampling Data
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

5-3. TEPCO's Seawater Monitoring Plan (4/1/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150401_06-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, March 26, 2015 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, March 27, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, March 27, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **THU, April 9** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Muon Tomography Preliminary Results (3/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150319_01-e.pdf

2. Contaminated Water Committee (3/17/2015)
(only in Japanese)
2-1. Studies Related to Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150317_07-j.pdf

2-2. Studies Related to High-Performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150317_08-j.pdf

3. NRA Special Facilities Monitoring and Evaluation Committee (3/25/2015)
(only in Japanese)
3-1. "K" Drainage Line Investigation and Actions
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150325_04-j.pdf

3-2. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150325_08-j.pdf

4. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (3/26/2015)
(only in Japanese)
4-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_04-j.pdf

4-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_05-j.pdf

(English translation as of 2/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150226_01-e.pdf

4-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_07-j.pdf

4-4. Environmental Radiation Issues *(large file size: 56 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_08-j.pdf

4-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_10-j.pdf

4-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_11-j.pdf

4-7. Radioactive Waste Processing (Radionuclide Analyses of Samples Taken from Units 1-3 R/B)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_12-j.pdf

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 6 Nov 2014 19:36:11 -0500
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Nov. 7 at 3 pm EST
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Nov. 7, 2014 at 3 pm Eastern Standard Time
(Next call will be on **THU, Nov. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (10/30/2014)
(only in Japanese)

1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_05-j.pdf

1-3. Preparation for Unit 3 Containment Vessel Internal Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_06-j.pdf

1-4. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_08-j.pdf

1-6. Improvement of Work Environment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_10-j.pdf

1-8. R&D Related to Core Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_11-j.pdf

1-9. Storage of Solid Radioactive Waste
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (10/31/2014)
(only in Japanese)

2-1. Waterproofing Connection between Underground Seawater Piping Trench and Turbine Building
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_01.pdf

2-2. Testing of Subdrain Water Treatment Facility
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_02.pdf

2-3. Increase in Radioactivity at Unit 1 Discharge Canal
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_03.pdf

2-4. Effectiveness of Groundwater Bypass System
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_05.pdf

2-5. Use of Dry Storage Casks at Fukushima Daiichi
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_06.pdf

3. Completion of Transferring Spent Fuels from Unit 4 SFP (11/6/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141106_07-j.pdf

4. Nuclear Safety Reform Plan--2014 Q2 Progress Report (11/5/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243826_5892.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, October 29, 2014 6:56 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Oct. 30 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]

THU, **Oct. 30**, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Nov. 7** at 3 pm Eastern Standard Time.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (10/27/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141027_03-j.pdf

1-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141027_04-j.pdf

2. Fukushima Fishermen's Association Meeting (10/29/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141029_07-j.pdf

3. "FORMER U.S. NUCLEAR CHIEF DALE KLEIN CITES FUKUSHIMA PROGRESS,CHALLENGES TEPCO TO DEEPEN SAFETY CULTURE, ESTABLISH KPI'S" (10/29/2014)
Speech at the American Chamber of Commerce in Japan
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243683_5892.html

3-1. Overview of the Seven Water Treatment Facilities at 1F
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141016_04-e.pdf

3-2. Activities of TEPCO's Nuclear Reform Monitoring Committee Members
http://www.nrmc.jp/en/news/detail/index-e.html#date_20141029-103000

4. "On the Brink: The Inside Story of Fukushima Daiichi" (10/7/2014)
Long-awaited English translation of the book that vividly describes the human element of the accident.
http://www.amazon.com/dp/4902075547/?tag=kurodahanpres-20

5. "Fukushima Update" (Sept.-Oct. 2014)
Attached file is a pdf copy of the Nuclear Plant Journal article reprinted and distributed with permission.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 09, 2014 8:27 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 10 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Oct. 10, 2014 at 3 pm Eastern Daylight Time
(**No call next 2 weeks.** Next call will be on **Thu, Oct. 30** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (10/3/2014)
(only in Japanese)
1-1. New Postulated Earthquake and Tsunami at Fukushima Daiichi and Risk Mitigation Measures
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141003_04-j.pdf

(page 3/42) Risk mitigation measures
(page 10/42) New postulated earthquake and tsunami results
(page 13/42) Various earthquakes that were considered
(page 25/42) Probability of exceedance for postulated earthquake
(page 28/42) Various tsunamis that were considered
(page 34/42) Probability of exceedance for postulated tsunami
(page 35/42) Risk evaluation and mitigation measures

1-2. Status of Isolating Units 2/3 Seawater Piping Trenches from Turbine Buildings
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141003_03-j.pdf

(page 4/38) Temperature reduction effect of ice injection into the trench
(page 5/38) Assumed water flow preventing formation of ice barrier
(page 18/38) Injection of grout and concrete to fill gap
(page 21/38) Transferring and processing accumulated water in the trench
(page 23/38) Backfilling the trench with anti-washout cement
(page 28/38) Schedule

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----

From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 02, 2014 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 3 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Oct. 3, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Oct. 10** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (9/22/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_03-j.pdf

1-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_04-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (9/25/2014)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_05-j.pdf

2-3. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_07-j.pdf

2-4. Environmental Radiation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_08-j.pdf

2-5. Fuel Removal from SFPs
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_10-j.pdf

2-6. Unit 2 S/C Lower Outer Surface Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_11-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=x04s084o&catid=61699

2-7. Radioactive Waste Management
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_12-j.pdf

3. Investigation Status of ALPS Train B (9/29/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140929_04-j.pdf

4. Start Operation of Mobile Sr Removal System (10/2/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141002_06-j.pdf

5. Technical Cooperation Agreement with UK Sellafield Ltd. (9/30/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140930_04-e.pdf

6. "False Report on Fukushima: The Company Responds" (9/22/2014)
TEPCO President's Letter to the Editor of the NY Times
http://mobile.nytimes.com/2014/09/23/opinion/false-report-on-fukushima-the-company-responds.html?_r=0

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 18, 2014 9:38 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 19 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **Sept. 19**, 2014 at 3 pm Eastern Daylight Time
(**No call next week.** Next call will be on **Fri, Oct. 3** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Fukushima Prefectural Conference on Decommissioning (9/10/2014)
(only in Japanese)
1- 1. Radioactivity Dispersion Mitigation Measures for Unit 1 Reactor Building Cover Dismantling
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_01-j.pdf

1-2. Improvements of Work Environment at Fukushima Daiichi
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_02-j.pdf

1-3. Status on Contaminated Water Issues and Actions Taken
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_03-j.pdf

2. Hot Test Run Begins for Additional ALPS (9/17/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1242012_5892.html

(reference material)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140911_04-e.pdf

3. Japan Times article on the vivid account of Fukushima Daiichi first responders

3-1. "Workers grappled with darkness at start of Fukushima nuclear crisis"
http://www.japantimes.co.jp/news/2014/09/02/national/workers-grappled-darkness-start-fukushima-nuclear-crisis/#.VAeHZLywaEJ

3-2. "Response stymied by loss of electricity"
http://www.japantimes.co.jp/news/2014/09/02/national/response-stymied-loss-electricity/#.VAeLSbywaEI

3-3. "Fukushima workers tried to save reactor 1 through venting"
http://www.japantimes.co.jp/news/2014/09/02/national/workers-tried-save-reactor-1-venting/#.VAeLBbywaEI

3-4. "Hydrogen explosion left Fukushima No. 1 workers sure they would die"
http://www.japantimes.co.jp/news/2014/09/10/national/hydrogen-explosion-left-fukushima-no-1-workers-sure-they-would-die/#.VBJFfGR_t8k

3-5. "Fukushima No. 2 scrambled to avoid same fate as sister site Fukushima No. 1"
http://www.japantimes.co.jp/news/2014/09/10/national/fukushima-2-scrambled-avoid-fate-sister-site-fukushima-1/#.VBI_jmR_t8I

3-6. "Yoshida's call on seawater kept reactor cool as Tokyo dithered"
http://www.japantimes.co.jp/news/2014/09/14/national/yoshidas-call-seawater-kept-reactor-cool-tokyo-dithered/#.VBc--WR_t8I

3-7. "A melted shoe and a farewell letter in the dark"
http://www.japantimes.co.jp/news/2014/09/14/national/melted-shoe-farewell-letter-dark-fukushima-1/#.VBdGimR_t8I

3-8. "Responders cowed by explosion at reactor 3 building of Fukushima No. 1"
http://www.japantimes.co.jp/news/2014/09/14/national/responders-cowered-by-explosion-at-no-3-reactor-building/#.VBc-8GR_t8I

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 2 Oct 2014 20:53:46 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 3 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **Oct. 3**, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Oct. 10** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (9/22/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_03-j.pdf

1-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_04-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (9/25/2014)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_05-j.pdf

2-3. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_07-j.pdf

2-4. Environmental Radiation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_08-j.pdf

2-5. Fuel Removal from SFPs
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_10-j.pdf

2-6. Unit 2 S/C Lower Outer Surface Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_11-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=x04s084o&catid=61699

2-7. Radioactive Waste Management

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_12-j.pdf

3. Investigation Status of ALPS Train B (9/29/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140929_04-j.pdf

4. Start Operation of Mobile Sr Removal System (10/2/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141002_06-j.pdf

5. Technical Cooperation Agreement with UK Sellafield Ltd. (9/30/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140930_04-e.pdf

6. "False Report on Fukushima: The Company Responds" (9/22/2014)
TEPCO President's Letter to the Editor of the NY Times
http://mobile.nytimes.com/2014/09/23/opinion/false-report-on-fukushima-the-company-responds.html?_r=0

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 18, 2014 9:38 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 19 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 19, 2014 at 3 pm Eastern Daylight Time
(**No call next week.** Next call will be on **Fri, Oct. 3** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **Fukushima Prefectural Conference on Decommissioning (9/10/2014)**
(only in Japanese)
1- 1. Radioactivity Dispersion Mitigation Measures for Unit 1 Reactor Building Cover Dismantling
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_01-j.pdf

1-2. Improvements of Work Environment at Fukushima Daiichi
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_02-j.pdf

1-3. Status on Contaminated Water Issues and Actions Taken
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_03-j.pdf

2. Hot Test Run Begins for Additional ALPS (9/17/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1242012_5892.html
(reference material)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140911_04-e.pdf

3. Japan Times article on the vivid account of Fukushima Daiichi first responders
3-1. "Workers grappled with darkness at start of Fukushima nuclear crisis"
http://www.japantimes.co.jp/news/2014/09/02/national/workers-grappled-darkness-start-fukushima-nuclear-crisis/#.VAeHZLywaEJ

3-2. "Response stymied by loss of electricity"
http://www.japantimes.co.jp/news/2014/09/02/national/response-stymied-loss-electricity/#.VAeLSbywaEI

3-3. "Fukushima workers tried to save reactor 1 through venting"
http://www.japantimes.co.jp/news/2014/09/02/national/workers-tried-save-reactor-1-venting/#.VAeLBbywaEI

3-4. "Hydrogen explosion left Fukushima No. 1 workers sure they would die"
http://www.japantimes.co.jp/news/2014/09/10/national/hydrogen-explosion-left-fukushima-no-1-workers-sure-they-would-die/#.VBJFfGR_t8k

3-5. "Fukushima No. 2 scrambled to avoid same fate as sister site Fukushima No. 1"
http://www.japantimes.co.jp/news/2014/09/10/national/fukushima-2-scrambled-avoid-fate-sister-site-fukushima-1/#.VBI_jmR_t8l

3-6. "Yoshida's call on seawater kept reactor cool as Tokyo dithered"
http://www.japantimes.co.jp/news/2014/09/14/national/yoshidas-call-seawater-kept-reactor-cool-tokyo-dithered/#.VBc--WR_t8l

3-7. "A melted shoe and a farewell letter in the dark"
http://www.japantimes.co.jp/news/2014/09/14/national/melted-shoe-farewell-letter-dark-fukushima-1/#.VBdGimR_t8l

3-8. "Responders cowed by explosion at reactor 3 building of Fukushima No. 1"
http://www.japantimes.co.jp/news/2014/09/14/national/responders-cowered-by-explosion-at-no-3-reactor-building/#.VBc-8GR_t8l

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 11, 2014 11:17 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 12 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 12, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Sept. 19** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Completion of Sr-Immobilization Measure by Injection of Apatite/Zeolite/Gravel Mixture in Soil (9/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140911_06-j.pdf

2. Additional ALPS in Preparation for Hot Testing (9/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140911_08-j.pdf

3. Installation of Seawater Radioactivity Monitor and Status of Seabed Covering (9/11/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140911_07-j.pdf

4. Government Investigation Committee Testimony Transcripts of Former 1F Site Superintendent Yoshida and Others (9/11/2014)
(only in Japanese)
http://www.cas.go.jp/jp/genpatsujiko/hearing_koukai/hearing_list.html

5. "Asahi retracts article about Yoshida testimony that reported 'workers withdrew against order'" (9/11/2014)
http://ajw.asahi.com/article/behind_news/social_affairs/AJ201409110080

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Friday, September 05, 2014 12:22 AM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 5 at 3pm EDT
Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]

Fri, Sept. 5, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Sept. 12** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]

1. Inadvertent Drop of Fuel Handling Machine Console in Unit 3 SFP (9/1/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140901_04-j.pdf

(video)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=g3bg9917&catid=61785

2. Unit 2 S/C Lower Outer Surface Inspection Results (9/4/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140904_06-j.pdf

3. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (8/26/2014)
(only in Japanese)

3-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140826_03-j.pdf

3-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140826_04-j.pdf

4. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (8/28/2014)
(only in Japanese)

4-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_04-j.pdf

4-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_05-j.pdf

4-3. Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_07-j.pdf

4-4. Reduction of Radioactivity Release to the Environment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_08-j.pdf

4-5. Spent Fuel Pool Related Activities
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_10-j.pdf

4-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_11-j.pdf

4-7. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_12-j.pdf

4-8. Selection of Demonstration Testing of Tritium Separation Technologies
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_14-j.pdf

5. IRID Guideline of Requirement for Proposal on "the Feasibility Study of Essential Technologies for Internal RPV Investigation" (9/2/2014)
http://irid.or.jp/wp-content/uploads/2014/09/20140829_e.pdf

6. "The Unsung Heroes of Fukushima" (8/25/2014)
Commentary on Fukushima Daini by Professor Najmedin Meshkati (NAS Fukushima Committee Member)
http://www.japantimes.co.jp/opinion/2014/08/25/commentary/japan-commentary/unsung-heroes-fukushima/#.U_twmKOOrTp

7. "Workers grappled with darkness at start of Fukushima nuclear crisis" (9/2/2014)
Japan Times article on the vivid account of Fukushima Daiichi first responders.
http://www.japantimes.co.jp/news/2014/09/02/national/workers-grappled-darkness-start-fukushima-nuclear-crisis/#.VAZF_Kwj8wo

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji (mobile)
To: Tateiwa, Kenji
Sent: Thursday, August 21, 2014 8:18 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 22 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 22, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, Sept. 5** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Demonstration Testing of Underwater Robot for Inspecting Lower-outer Surface of Torus (8/18/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140818_03-j.pdf

2. Verification Testing of High-performance ALPS (8/18/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140818_07-j.pdf
(photos: 8/20/2014)
http://photo.tepco.co.jp/_1212/140820-01j.html

3. NRA Special Facilities Monitoring and Evaluation Committee (8/19/2014)
(only in Japanese)
3-1. Status of Seawater Piping Trench "Ice Barrier" and Mockup Testing of Grout Injection, etc.

http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_02-j.pdf

3-2. Estimated Release of Radioactivity Due to Unit 3 Reactor Building Rubble Removal
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_03-j.pdf

4. Construction Status of "Frozen Soil Wall" (8/21/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140821_05-j.pdf

5. Improved Process to Analyze Strontium-90 (8/19/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_05-j.pdf

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 9 Oct 2014 20:27:10 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 10 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **Oct. 10**, 2014 at 3 pm Eastern Daylight Time
(**No call next 2 weeks**. Next call will be on **Thu, Oct. 30** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (10/3/2014)
(only in Japanese)
1-1. New Postulated Earthquake and Tsunami at Fukushima Daiichi and Risk Mitigation Measures
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141003_04-j.pdf

(page 3/42) Risk mitigation measures
(page 10/42) New postulated earthquake and tsunami results
(page 13/42) Various earthquakes that were considered
(page 25/42) Probability of exceedance for postulated earthquake
(page 28/42) Various tsunamis that were considered
(page 34/42) Probability of exceedance for postulated tsunami
(page 35/42) Risk evaluation and mitigation measures

1-2. Status of Isolating Units 2/3 Seawater Piping Trenches from Turbine Buildings
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141003_03-j.pdf

(page 4/38) Temperature reduction effect of ice injection into the trench
(page 5/38) Assumed water flow preventing formation of ice barrier
(page 18/38) Injection of grout and concrete to fill gap
(page 21/38) Transferring and processing accumulated water in the trench
(page 23/38) Backfilling the trench with anti-washout cement
(page 28/38) Schedule

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs

Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 02, 2014 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 3 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Oct. 3, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Oct. 10** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (9/22/2014)**
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_03-j.pdf

1-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_04-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (9/25/2014)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_05-j.pdf

2-3. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_07-j.pdf

2-4. Environmental Radiation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_08-j.pdf

2-5. Fuel Removal from SFPs
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_10-j.pdf

2-6. Unit 2 S/C Lower Outer Surface Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_11-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=x04s084o&catid=61699

2-7. Radioactive Waste Management
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_12-j.pdf

3. Investigation Status of ALPS Train B (9/29/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140929_04-j.pdf

4. Start Operation of Mobile Sr Removal System (10/2/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141002_06-j.pdf

5. Technical Cooperation Agreement with UK Sellafield Ltd. (9/30/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140930_04-e.pdf

6. "False Report on Fukushima: The Company Responds" (9/22/2014)
TEPCO President's Letter to the Editor of the NY Times
http://mobile.nytimes.com/2014/09/23/opinion/false-report-on-fukushima-the-company-responds.html?_r=0

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 18, 2014 9:38 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 19 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 19, 2014 at 3 pm Eastern Daylight Time
(**No call next week.** Next call will be on **Fri, Oct. 3** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Fukushima Prefectural Conference on Decommissioning (9/10/2014)
(only in Japanese)
1- 1. Radioactivity Dispersion Mitigation Measures for Unit 1 Reactor Building Cover Dismantling
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_01-j.pdf

1-2. Improvements of Work Environment at Fukushima Daiichi
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_02-j.pdf

1-3. Status on Contaminated Water Issues and Actions Taken
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_03-j.pdf

2. Hot Test Run Begins for Additional ALPS (9/17/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1242012_5892.html
(reference material)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140911_04-e.pdf

3. Japan Times article on the vivid account of Fukushima Daiichi first responders
3-1. "Workers grappled with darkness at start of Fukushima nuclear crisis"
http://www.japantimes.co.jp/news/2014/09/02/national/workers-grappled-darkness-start-fukushima-nuclear-crisis/#.VAeHZLywaEJ

3-2. "Response stymied by loss of electricity"
http://www.japantimes.co.jp/news/2014/09/02/national/response-stymied-loss-electricity/#.VAeLSbywaEI

3-3. "Fukushima workers tried to save reactor 1 through venting"
http://www.japantimes.co.jp/news/2014/09/02/national/workers-tried-save-reactor-1-venting/#.VAeLBbywaEI

3-4. "Hydrogen explosion left Fukushima No. 1 workers sure they would die"
http://www.japantimes.co.jp/news/2014/09/10/national/hydrogen-explosion-left-fukushima-no-1-workers-sure-they-would-die/#.VBJFfGR_t8k

3-5. "Fukushima No. 2 scrambled to avoid same fate as sister site Fukushima No. 1"
http://www.japantimes.co.jp/news/2014/09/10/national/fukushima-2-scrambled-avoid-fate-sister-site-fukushima-1/#.VBI_jmR_t8I

3-6. "Yoshida's call on seawater kept reactor cool as Tokyo dithered"
http://www.japantimes.co.jp/news/2014/09/14/national/yoshidas-call-seawater-kept-reactor-cool-tokyo-dithered/#.VBc--WR_t8I

3-7. "A melted shoe and a farewell letter in the dark"
http://www.japantimes.co.jp/news/2014/09/14/national/melted-shoe-farewell-letter-dark-fukushima-1/#.VBdGimR_t8I

3-8. "Responders cowed by explosion at reactor 3 building of Fukushima No. 1"
http://www.japantimes.co.jp/news/2014/09/14/national/responders-cowered-by-explosion-at-no-3-reactor-building/#.VBc-8GR_t8I

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 11, 2014 11:17 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 12 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 12, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Sept. 19** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Completion of Sr-Immobilization Measure by Injection of Apatite/Zeolite/Gravel Mixture in Soil (9/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140911_06-j.pdf

2. Additional ALPS in Preparation for Hot Testing (9/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140911_08-j.pdf

3. Installation of Seawater Radioactivity Monitor and Status of Seabed Covering (9/11/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140911_07-j.pdf

4. Government Investigation Committee Testimony Transcripts of Former 1F Site Superintendent Yoshida and Others (9/11/2014)
(only in Japanese)
http://www.cas.go.jp/jp/genpatsujiko/hearing_koukai/hearing_list.html

5. "Asahi retracts article about Yoshida testimony that reported 'workers withdrew against order'" (9/11/2014)
http://ajw.asahi.com/article/behind_news/social_affairs/AJ201409110080

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Friday, September 05, 2014 12:22 AM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 5 at 3pm EDT
Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 5, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Sept. 12** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]

1. Inadvertent Drop of Fuel Handling Machine Console in Unit 3 SFP (9/1/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140901_04-j.pdf

(video)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=g3bg9917&catid=61785

2. Unit 2 S/C Lower Outer Surface Inspection Results (9/4/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140904_06-j.pdf

3. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (8/26/2014)
(only in Japanese)

3-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140826_03-j.pdf

3-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140826_04-j.pdf

4. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (8/28/2014)
(only in Japanese)

4-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_04-j.pdf

4-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_05-j.pdf

4-3. Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_07-j.pdf

4-4. Reduction of Radioactivity Release to the Environment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_08-j.pdf

4-5. Spent Fuel Pool Related Activities
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_10-j.pdf

4-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_11-j.pdf

4-7. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_12-j.pdf

4-8. Selection of Demonstration Testing of Tritium Separation Technologies
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_14-j.pdf

5. IRID Guideline of Requirement for Proposal on "the Feasibility Study of Essential Technologies for Internal RPV Investigation" (9/2/2014)
http://irid.or.jp/wp-content/uploads/2014/09/20140829_e.pdf

6. "The Unsung Heroes of Fukushima" (8/25/2014)

Commentary on Fukushima Daini by Professor Najmedin Meshkati (NAS Fukushima Committee Member)
http://www.japantimes.co.jp/opinion/2014/08/25/commentary/japan-commentary/unsung-heroes-fukushima/#.U_twmKOOrTp

7. "Workers grappled with darkness at start of Fukushima nuclear crisis" (9/2/2014)
Japan Times article on the vivid account of Fukushima Daiichi first responders.
http://www.japantimes.co.jp/news/2014/09/02/national/workers-grappled-darkness-start-fukushima-nuclear-crisis/#.VAZF_Kwj8wo

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 5 Sep 2014 00:22:56 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 5 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 5, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Sept. 12** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Inadvertent Drop of Fuel Handling Machine Console in Unit 3 SFP (9/1/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140901_04-j.pdf

(video)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=g3bg9917&catid=61785

2. Unit 2 S/C Lower Outer Surface Inspection Results (9/4/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140904_06-j.pdf

3. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (8/26/2014)
(only in Japanese)
3-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140826_03-j.pdf

3-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140826_04-j.pdf

4. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (8/28/2014)
(only in Japanese)
4-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_04-j.pdf

4-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_05-j.pdf

4-3. Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_07-j.pdf

4-4. Reduction of Radioactivity Release to the Environment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_08-j.pdf

4-5. Spent Fuel Pool Related Activities
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_10-j.pdf

4-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_11-j.pdf

4-7. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_12-j.pdf

4-8. Selection of Demonstration Testing of Tritium Separation Technologies
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_14-j.pdf

5. IRID Guideline of Requirement for Proposal on "the Feasibility Study of Essential Technologies for Internal RPV Investigation" (9/2/2014)
http://irid.or.jp/wp-content/uploads/2014/09/20140829_e.pdf

6. "The Unsung Heroes of Fukushima" (8/25/2014)
Commentary on Fukushima Daini by Professor Najmedin Meshkati (NAS Fukushima Committee Member)
http://www.japantimes.co.jp/opinion/2014/08/25/commentary/japan-commentary/unsung-heroes-fukushima/#.U_twmKOOrTp

7. "Workers grappled with darkness at start of Fukushima nuclear crisis" (9/2/2014)
Japan Times article on the vivid account of Fukushima Daiichi first responders.
http://www.japantimes.co.jp/news/2014/09/02/national/workers-grappled-darkness-start-fukushima-nuclear-crisis/#.VAZF_Kwj8wo

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http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji (mobile)
To: Tateiwa, Kenji
Sent: Thursday, August 21, 2014 8:18 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 22 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]

Fri, Aug. 22, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, Sept. 5** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Demonstration Testing of Underwater Robot for Inspecting Lower-outer Surface of Torus (8/18/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140818_03-j.pdf

2. Verification Testing of High-performance ALPS (8/18/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140818_07-j.pdf
(photos: 8/20/2014)
http://photo.tepco.co.jp/_1212/140820-01j.html

3. NRA Special Facilities Monitoring and Evaluation Committee (8/19/2014)
(only in Japanese)
3-1. Status of Seawater Piping Trench "Ice Barrier" and Mockup Testing of Grout Injection, etc.
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_02-j.pdf

3-2. Estimated Release of Radioactivity Due to Unit 3 Reactor Building Rubble Removal
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_03-j.pdf

4. Construction Status of "Frozen Soil Wall" (8/21/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140821_05-j.pdf

5. Improved Process to Analyze Strontium-90 (8/19/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_05-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, August 14, 2014 6:43 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 15 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 15, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 22** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Verification Testing of Subdrain Water Treatment Facility (8/11/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140811_04-e.pdf

2. Measures to Reduce Seawater Contamination (8/11/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140811_03-e.pdf

3. Difference between Ice Barrier of Trench and Frozen Soil Wall (8/5/2014)
(video clip)
https://www.youtube.com/watch?v=C6YSOrfS1Kc

4. Retiring Areva Water Treatment Facility (8/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140811_07-j.pdf

5. Construction Plan for Additional Solid Waste Storage Warehouse (8/13/2014)
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu14_j/images/140813j0209.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, August 07, 2014 5:16 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 8 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 8, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 15** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Plan Towards a Full-Scale Operation of the Multi-Nuclide Removal Facility (ALPS) (7/31/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140731_01-e.pdf

2. Unit 1 Reactor Building Cover to be Dismantled (8/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239910_5892.html

http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140801_01-e.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (7/31/2014)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_04-j.pdf
(page 6/8) Contaminated water storage volume trend.

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_05-j.pdf
(page 9/21) Seawater sampling results (inside the port)
(page 10/21) Seawater sampling results (outside the port)

3.3 Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_06-j.pdf
(page 3/300) Unit 1 RPV nitrogen purging from jet pump sensing line
(page 27/300) Construction status of frozen soil wall
(page 28/300) Status of ice barrier at Unit 2 seawater piping trench
(page 75/300) Estimated reduction of groundwater ingress by waterproofing HTI building
(page 121/300) Covering sea-bottom soil inside the port
(page 197/300) Unit 4 reactor building periodic integrity inspection results (9th)
(page 225/300) IRID development of PCV repair and waterproofing technologies
(page 260/300) IRID development of PCV internal investigation technologies
(page 272/300) IRID development of RPV internal investigation technologies
(page 282/300) IRID development of core debris criticality control technologies

4. Regulatory Approval for Subdrain Processing Facility and Verification Facility of Advanced ALPS (8/7/2014)
(only in Japanese)
http://www.tepco.co.jp/cc/press/2014/1240299_5851.html

5. Nuclear Safety Reform Plan FY2014-Q1 Progress Report (8/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239901_5892.html
(video message by Dr. Dale Klein, Chairman of TEPCO's Nuclear Reform Monitoring Committee)
http://www.nrmc.jp/en/report/detail/1239770_5233.html

6. Fukushima Nuclear Accident Unresolved Issues Progress Report # 2 (8/6/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1240140_5892.html
(English Summary)
http://www.tepco.co.jp/en/press/corp-com/release/betu14_e/images/140806e0101.pdf
(Japanese Full Report: 23 MB)
http://www.tepco.co.jp/cc/press/betu14_j/images/140806j0102.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, July 30, 2014 8:46 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, July 31 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, July 31, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 8** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 2 Torus Room Wall Survey (7/29/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140728_05-e.pdf
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=c24iaxhc&catid=61785

2. NRA Special Facilities Monitoring and Evaluation Committee (7/23/2014)
(only in Japanese)
2.1 Progress Status on Freezing of Units 2/3 Seawater Piping Trench Connection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_01.pdf

2.2 Unit 1 Reactor Building Dust Inhibition Measures During Cover Dismantling and Rubble Removal
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_02.pdf

2.3 Replacement of Fuel Rack in Common Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_03_01.pdf

2.4 Fuel Removal Plan for Unit 3 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0025_03_02.pdf

3. Contaminated Water Treatment Committee (7/25/2014)
(only in Japanese)
3.1 Risk Reduction Owing to Contaminated Water Measures
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_03-j.pdf

3.2 Status and Effectiveness of Groundwater Bypass
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_04-j.pdf

3.3 Tritium Concentration Increase in # 12 Groundwater Bypass Well
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_05-j.pdf

3.4 Task Force Studies on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_07-j.pdf

3.5 Test Results and Demonstration Status of Advanced Multi-Nuclide Removal System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_08-j.pdf

3.6 Tritium Task Force Discussions
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c140725_09-j.pdf

4. National Academy Sciences Fukushima Lessons Learned Report (7/24/2014)
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=18294
(TEPCO's Statement on the NAS Report)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239621_5892.html

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 11 Sep 2014 23:17:41 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 12 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 12, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Sept. 19** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Completion of Sr-Immobilization Measure by Injection of Apatite/Zeolite/Gravel Mixture in Soil (9/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140911_06-j.pdf

2. Additional ALPS in Preparation for Hot Testing (9/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140911_08-j.pdf

3. Installation of Seawater Radioactivity Monitor and Status of Seabed Covering (9/11/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140911_07-j.pdf

4. Government Investigation Committee Testimony Transcripts of Former 1F Site Superintendent Yoshida and Others (9/11/2014)
(only in Japanese)
http://www.cas.go.jp/jp/genpatsujiko/hearing_koukai/hearing_list.html

5. "Asahi retracts article about Yoshida testimony that reported 'workers withdrew against order'" (9/11/2014)
http://ajw.asahi.com/article/behind_news/social_affairs/AJ201409110080

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company

Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Friday, September 05, 2014 12:22 AM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 5 at 3pm EDT
Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 5, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Sept. 12** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Inadvertent Drop of Fuel Handling Machine Console in Unit 3 SFP (9/1/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140901_04-j.pdf

(video)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=g3bg9917&catid=61785

2. Unit 2 S/C Lower Outer Surface Inspection Results (9/4/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140904_06-j.pdf

3. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (8/26/2014)
(only in Japanese)
3-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140826_03-j.pdf

3-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140826_04-j.pdf

4. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (8/28/2014)
(only in Japanese)
4-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_04-j.pdf

4-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_05-j.pdf

4-3. Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_07-j.pdf

4-4. Reduction of Radioactivity Release to the Environment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_08-j.pdf

4-5. Spent Fuel Pool Related Activities
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_10-j.pdf

4-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_11-j.pdf

4-7. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_12-j.pdf

4-8. Selection of Demonstration Testing of Tritium Separation Technologies
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_14-j.pdf

5. IRID Guideline of Requirement for Proposal on "the Feasibility Study of Essential Technologies for Internal RPV Investigation" (9/2/2014)
http://irid.or.jp/wp-content/uploads/2014/09/20140829_e.pdf

6. "The Unsung Heroes of Fukushima" (8/25/2014)
Commentary on Fukushima Daini by Professor Najmedin Meshkati (NAS Fukushima Committee Member)
http://www.japantimes.co.jp/opinion/2014/08/25/commentary/japan-commentary/unsung-heroes-fukushima/#.U_twmKOOrTp

7. "Workers grappled with darkness at start of Fukushima nuclear crisis" (9/2/2014)
Japan Times article on the vivid account of Fukushima Daiichi first responders.
http://www.japantimes.co.jp/news/2014/09/02/national/workers-grappled-darkness-start-fukushima-nuclear-crisis/#.VAZF_Kwj8wo

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji (mobile)
To: Tateiwa, Kenji
Sent: Thursday, August 21, 2014 8:18 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 22 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 22, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, Sept. 5** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Demonstration Testing of Underwater Robot for Inspecting Lower-outer Surface of Torus (8/18/2014)

(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140818_03-j.pdf

2. Verification Testing of High-performance ALPS (8/18/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140818_07-j.pdf
(photos: 8/20/2014)
http://photo.tepco.co.jp/_1212/140820-01j.html

3. NRA Special Facilities Monitoring and Evaluation Committee (8/19/2014)
(only in Japanese)
3-1. Status of Seawater Piping Trench "Ice Barrier" and Mockup Testing of Grout Injection, etc.
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_02-j.pdf

3-2. Estimated Release of Radioactivity Due to Unit 3 Reactor Building Rubble Removal
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_03-j.pdf

4. Construction Status of "Frozen Soil Wall" (8/21/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140821_05-j.pdf

5. Improved Process to Analyze Strontium-90 (8/19/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_05-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, August 14, 2014 6:43 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 15 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 15, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 22** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Verification Testing of Subdrain Water Treatment Facility (8/11/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140811_04-e.pdf

2. Measures to Reduce Seawater Contamination (8/11/2014)

http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140811_03-e.pdf

3. Difference between Ice Barrier of Trench and Frozen Soil Wall (8/5/2014)
(video clip)
https://www.youtube.com/watch?v=C6YSOrfS1Kc

4. Retiring Areva Water Treatment Facility (8/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140811_07-j.pdf

5. Construction Plan for Additional Solid Waste Storage Warehouse (8/13/2014)
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu14_j/images/140813j0209.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, August 07, 2014 5:16 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 8 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 8, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 15** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Plan Towards a Full-Scale Operation of the Multi-Nuclide Removal Facility (ALPS) (7/31/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140731_01-e.pdf

2. Unit 1 Reactor Building Cover to be Dismantled (8/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239910_5892.html
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140801_01-e.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (7/31/2014)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_04-j.pdf
(page 6/8) Contaminated water storage volume trend.

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_05-j.pdf
(page 9/21) Seawater sampling results (inside the port)
(page 10/21) Seawater sampling results (outside the port)

3.3 Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140731_06-j.pdf
(page 3/300) Unit 1 RPV nitrogen purging from jet pump sensing line
(page 27/300) Construction status of frozen soil wall
(page 28/300) Status of ice barrier at Unit 2 seawater piping trench
(page 75/300) Estimated reduction of groundwater ingress by waterproofing HTI building
(page 121/300) Covering sea-bottom soil inside the port
(page 197/300) Unit 4 reactor building periodic integrity inspection results (9th)
(page 225/300) IRID development of PCV repair and waterproofing technologies
(page 260/300) IRID development of PCV internal investigation technologies
(page 272/300) IRID development of RPV internal investigation technologies
(page 282/300) IRID development of core debris criticality control technologies

4. Regulatory Approval for Subdrain Processing Facility and Verification Facility of Advanced ALPS (8/7/2014)
(only in Japanese)
http://www.tepco.co.jp/cc/press/2014/1240299_5851.html

5. Nuclear Safety Reform Plan FY2014-Q1 Progress Report (8/1/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1239901_5892.html
(video message by Dr. Dale Klein, Chairman of TEPCO's Nuclear Reform Monitoring Committee)
http://www.nrmc.jp/en/report/detail/1239770_5233.html

6. Fukushima Nuclear Accident Unresolved Issues Progress Report # 2 (8/6/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1240140_5892.html
(English Summary)
http://www.tepco.co.jp/en/press/corp-com/release/betu14_e/images/140806e0101.pdf
(Japanese Full Report: 23 MB)
http://www.tepco.co.jp/cc/press/betu14_j/images/140806j0102.pdf

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 18 Sep 2014 21:38:25 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 19 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **Sept. 19**, 2014 at 3 pm Eastern Daylight Time
(**No call next week**. Next call will be on **Fri, Oct. 3** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Fukushima Prefectural Conference on Decommissioning (9/10/2014)
(only in Japanese)
1- 1. Radioactivity Dispersion Mitigation Measures for Unit 1 Reactor Building Cover Dismantling
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_01-j.pdf

1-2. Improvements of Work Environment at Fukushima Daiichi
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_02-j.pdf

1-3. Status on Contaminated Water Issues and Actions Taken
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_03-j.pdf

2. Hot Test Run Begins for Additional ALPS (9/17/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1242012_5892.html
(reference material)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140911_04-e.pdf

3. Japan Times article on the vivid account of Fukushima Daiichi first responders
3-1. "Workers grappled with darkness at start of Fukushima nuclear crisis"
http://www.japantimes.co.jp/news/2014/09/02/national/workers-grappled-darkness-start-fukushima-nuclear-crisis/#.VAeHZLywaEJ

3-2. "Response stymied by loss of electricity"
http://www.japantimes.co.jp/news/2014/09/02/national/response-stymied-loss-electricity/#.VAeLSbywaEI

3-3. "Fukushima workers tried to save reactor 1 through venting"
http://www.japantimes.co.jp/news/2014/09/02/national/workers-tried-save-reactor-1-venting/#.VAeLBbywaEI

3-4. "Hydrogen explosion left Fukushima No. 1 workers sure they would die"
http://www.japantimes.co.jp/news/2014/09/10/national/hydrogen-explosion-left-fukushima-no-1-workers-sure-they-would-die/#.VBJFfGR_t8k

3-5. "Fukushima No. 2 scrambled to avoid same fate as sister site Fukushima No. 1"
http://www.japantimes.co.jp/news/2014/09/10/national/fukushima-2-scrambled-avoid-fate-sister-site-fukushima-1/#.VBI_jmR_t8I

3-6. "Yoshida's call on seawater kept reactor cool as Tokyo dithered"
http://www.japantimes.co.jp/news/2014/09/14/national/yoshidas-call-seawater-kept-reactor-cool-tokyo-dithered/#.VBc--WR_t8I

3-7. "A melted shoe and a farewell letter in the dark"
http://www.japantimes.co.jp/news/2014/09/14/national/melted-shoe-farewell-letter-dark-fukushima-1/#.VBdGimR_t8I

3-8. "Responders cowed by explosion at reactor 3 building of Fukushima No. 1"
http://www.japantimes.co.jp/news/2014/09/14/national/responders-cowered-by-explosion-at-no-3-reactor-building/#.VBc-8GR_t8I

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 11, 2014 11:17 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 12 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 12, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Sept. 19** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]

1. **Completion of Sr-Immobilization Measure by Injection of Apatite/Zeolite/Gravel Mixture in Soil (9/11/2014)**
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140911_06-j.pdf

2. Additional ALPS in Preparation for Hot Testing (9/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140911_08-j.pdf

3. Installation of Seawater Radioactivity Monitor and Status of Seabed Covering (9/11/2014)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140911_07-j.pdf

4. Government Investigation Committee Testimony Transcripts of Former 1F Site Superintendent Yoshida and Others (9/11/2014)
(only in Japanese)
http://www.cas.go.jp/jp/genpatsujiko/hearing_koukai/hearing_list.html

5. "Asahi retracts article about Yoshida testimony that reported 'workers withdrew against order'" (9/11/2014)
http://ajw.asahi.com/article/behind_news/social_affairs/AJ201409110080

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Friday, September 05, 2014 12:22 AM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 5 at 3pm EDT
Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 5, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Sept. 12** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Inadvertent Drop of Fuel Handling Machine Console in Unit 3 SFP (9/1/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140901_04-j.pdf

(video)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=g3bg9917&catid=61785

2. Unit 2 S/C Lower Outer Surface Inspection Results (9/4/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140904_06-j.pdf

3. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (8/26/2014)
(only in Japanese)
3-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140826_03-j.pdf

3-2. Response to Issues Raised at the Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140826_04-j.pdf

4. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (8/28/2014)
(only in Japanese)
4-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_04-j.pdf

4-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_05-j.pdf

4-3. Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_07-j.pdf

4-4. Reduction of Radioactivity Release to the Environment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_08-j.pdf

4-5. Spent Fuel Pool Related Activities
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_10-j.pdf

4-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_11-j.pdf

4-7. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_12-j.pdf

4-8. Selection of Demonstration Testing of Tritium Separation Technologies
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140828_14-j.pdf

5. IRID Guideline of Requirement for Proposal on "the Feasibility Study of Essential Technologies for Internal RPV Investigation" (9/2/2014)
http://irid.or.jp/wp-content/uploads/2014/09/20140829_e.pdf

6. "The Unsung Heroes of Fukushima" (8/25/2014)
Commentary on Fukushima Daini by Professor Najmedin Meshkati (NAS Fukushima Committee Member)
http://www.japantimes.co.jp/opinion/2014/08/25/commentary/japan-commentary/unsung-heroes-fukushima/#.U_twmKOOrTp

7. "Workers grappled with darkness at start of Fukushima nuclear crisis" (9/2/2014)
Japan Times article on the vivid account of Fukushima Daiichi first responders.
http://www.japantimes.co.jp/news/2014/09/02/national/workers-grappled-darkness-start-fukushima-nuclear-crisis/#.VAZF_Kwj8wo

All the best,
Kenji

----- Original Message -----

From: Tateiwa, Kenji (mobile)
To: Tateiwa, Kenji
Sent: Thursday, August 21, 2014 8:18 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 22 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 22, 2014 at 3 pm Eastern Daylight Time
(No call next week. Next call will be on **Fri, Sept. 5** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Demonstration Testing of Underwater Robot for Inspecting Lower-outer Surface of Torus (8/18/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140818_03-j.pdf

2. Verification Testing of High-performance ALPS (8/18/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140818_07-j.pdf
(photos: 8/20/2014)
http://photo.tepco.co.jp/_1212/140820-01j.html

3. NRA Special Facilities Monitoring and Evaluation Committee (8/19/2014)
(only in Japanese)
3-1. Status of Seawater Piping Trench "Ice Barrier" and Mockup Testing of Grout Injection, etc.
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_02-j.pdf

3-2. Estimated Release of Radioactivity Due to Unit 3 Reactor Building Rubble Removal
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_03-j.pdf

4. Construction Status of "Frozen Soil Wall" (8/21/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140821_05-j.pdf

5. Improved Process to Analyze Strontium-90 (8/19/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140819_05-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, August 14, 2014 6:43 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Aug. 15 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 15, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Aug. 22** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Verification Testing of Subdrain Water Treatment Facility (8/11/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140811_04-e.pdf

2. Measures to Reduce Seawater Contamination (8/11/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140811_03-e.pdf

3. Difference between Ice Barrier of Trench and Frozen Soil Wall (8/5/2014)
(video clip)
https://www.youtube.com/watch?v=C6YSOrfS1Kc

4. Retiring Areva Water Treatment Facility (8/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140811_07-j.pdf

5. Construction Plan for Additional Solid Waste Storage Warehouse (8/13/2014)
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu14_j/images/140813j0209.pdf

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 8 Apr 2015 20:25:01 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] THU, April 9, 2015 at 3pm EDT
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, April 9, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **Fri, April 24** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 3 Shield Plug in Front of Containment Vessel Equipment Hatch: Assumed Cause of Movement (3/30/2015)
Shield plug could have moved due to pressure differential between containment vessel and reactor building when R/B hydrogen explosion occurred.
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150330_04-j.pdf

2. Unit 3 Spent Fuel Pool Gate Condition (4/6/2015)
Visual inspection found no significant impact to one of the two layers of gates (G1) maintaining water-tightness of pool.
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150406_04-j.pdf

3. Crawler Robot to Investigate Inside Unit 1 Drywell (4/6/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150406_01-e.pdf

4-1. Nuclear Safety Reform Plan: Quarterly Progress Report (3/30/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1249285_6844.html

4-2. Full Report
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu15_j/images/150330j0102.pdf

4-3. TEPCO's Nuclear Reform Monitoring Committee
http://www.nrmc.jp/en/report/detail/1249278_5233.html

4-4. "Reviewing the Two Years of Nuclear Safety Reform"
http://www.nrmc.jp/en/report/detail/__icsFiles/afieldfile/2015/04/02/E-5.pdf

5-1. *"Trace Amounts of Fukushima Radioactivity Detected Along Shoreline of British Columbia"* (4/6/2015)
Press release by the Woods Hole Oceanographic Institution.
http://www.whoi.edu/news-release/fukushima-ucluelet

5-2. TEPCO's Sea Water Sampling Data
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

5-3. TEPCO's Seawater Monitoring Plan (4/1/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150401_06-j.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, March 26, 2015 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, March 27, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, March 27, 2015 at 3 pm Eastern Daylight Time
(**No Call Next Week**. Next call will be on **THU, April 9** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Muon Tomography Preliminary Results (3/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150319_01-e.pdf

2. Contaminated Water Committee (3/17/2015)
(only in Japanese)
2-1. Studies Related to Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150317_07-j.pdf

2-2. Studies Related to High-Performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150317_08-j.pdf

3. NRA Special Facilities Monitoring and Evaluation Committee (3/25/2015)
(only in Japanese)
3-1. "K" Drainage Line Investigation and Actions
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150325_04-j.pdf

3-2. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150325_08-j.pdf

4. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (3/26/2015)
(only in Japanese)
4-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_04-j.pdf

4-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_05-j.pdf
(English translation as of 2/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150226_01-e.pdf

4-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_07-j.pdf

4-4. Environmental Radiation Issues *(large file size: 56 MB)*
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_08-j.pdf

4-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_10-j.pdf

4-6. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_11-j.pdf

4-7. Radioactive Waste Processing (Radionuclide Analyses of Samples Taken from Units 1-3 R/B)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150326_12-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, March 12, 2015 8:50 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, March 13, 2015 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, March 13, 2015 at 3 pm Eastern **Daylight** Time
(**No Call Next Week.** Next call will be on **Fri, March 27** at 3 pm EDT.)

[call-in information] (Please record your name and organization when joining the call.)

call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (3/2/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_05-j.pdf

1-2. Measures to Reduce Radioactivity in "K" Drainage Line
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_06-j.pdf

1-3. Investigation on Temporary Increase in Radioactivity in Downstream of "B and C" Drainage Line
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_07-j.pdf

1-4. Water Level Management after Operation of Frozen-Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150304_08-j.pdf

2. Rain Water Level Drop in Outer Weir of H4 Area Tank (3/12/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150312_04-j.pdf

3. New Disclosure Policy and Independent Audit in Light of Recent Drainage Water Issue (3/6/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248564_6844.html

4. TEPCO President's Remarks on 4th Anniversary of Great East Japan Earthquake (3/11/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248663_6844.html

5. "Nuclear Energy in Japan Since Fukushima " (2/17/2015)
TEPCO's presentation at the Platts Nuclear Energy Conference.
http://www.platts.com/IM.Platts.Content/ProductsServices/ConferenceandEvents/2015/pc509/presentations/Kenji_Tateiwa.pdf

6. "Estimated Amount of Radioactive Materials Released into the Air by the Fukushima Daiichi NPS Accident" (3/10/2015)
TEPCO's presentation at the US NRC Regulatory Information Conference (RIC.)
https://ric.nrc-gateway.gov/docs/abstracts/tateiwak-t5-hv-r1.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 26, 2015 10:50 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 27, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]

Fri, Feb. 27, 2015 at 3 pm Eastern Standard Time
(**No Call Next Week**. Next call will be on **Fri, March 13** at 3 pm **EDT**.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]

1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (2/23/2015)
(only in Japanese)

1-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_04-j.pdf

1-2. Dismantling Plan for Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_05-j.pdf

1-3. Occupational Safety Corrective Actions
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_06-j.pdf

1-4. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150223_12-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (2/26/2015)
(only in Japanese)

2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_05-j.pdf
(English translation as of 1/29/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150129_01-e.pdf

2-3. Re-insertion of Thermocouple into Unit 2 RPV Bottom via SLC Line
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_06-j.pdf

2-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_07-j.pdf

2-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_08-j.pdf

2-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_10-j.pdf

2-7. Preparation for Fuel Debris Removal (3D Laser Scanning, Muon Tomography)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_11-j.pdf

2-8. D&D-Related R&D Progress and Future Plans
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_13-j.pdf

2-9. Selection of Technologies to Undergo Tritium-Separation Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_14-j.pdf

2-10. Establishment of Global Decommissioning Joint Research Center
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150226_15-j.pdf

3. Temporary Increase in Radioactivity in Downstream of "B and C" Drainage Line (2/24/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248327_6844.html

4. Unit 2 Reactor Building Truck Bay Door Roof Likely Source of Radioactivity in "K" Drainage Line (2/24/2015)
www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150224_01-e.pdf

5. Briefing to Fishermen's Association in Fukushima Prefecture Regarding Contaminated Water Issues (2/25/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150225_05-j.pdf

6. Unit 1 Reactor Building 4th Floor Inspection by Technical Committee of Niigata Prefecture (2/21/2015)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150221_06-j.pdf

7. Third IAEA Review of Fukushima Daiichi Decommissioning Roadmap (2/17/2015)
https://www.iaea.org/newscenter/pressreleases/iaea-team-completed-third-review-japans-plans-decommission-fukushima
(photos)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150217_03-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 12, 2015 10:37 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 13, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 13, 2015 at 3 pm Eastern Standard Time
(**No Call Next Week**. Next call will be on **Fri, Feb. 27** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (2/9/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_02.pdf

1-2. Water Level Management after Operation of Frozen-Soil Wall (summary)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_03.pdf

1-3. Water Level Management after Operation of Frozen-Soil Wall (reference information)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_08.pdf

2. Installation of Muon Detectors for Fuel Debris Detection at Unit 1 (2/9/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248057_6844.html
(photos)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150209_01-e.pdf

3. *"The Great Race: The Global Quest for the Car of the Future"*
http://amzn.com/B00LD1OP0Q
This book features TEPCO's current Chief Nuclear Officer, Takafumi Anegawa, as a visionary who jump started Japan's electric vehicle industry.

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 12 Nov 2014 19:09:24 -0500
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] THU, Nov. 13 at 3 pm EST
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, **Nov. 13**, 2014 at 3 pm Eastern Standard Time
(**No call next week**. Next call will be on **TUE, Nov. 25** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Reactor Building Cover Roof Panel Removal (11/10/2014)
http://photo.tepco.co.jp/en/date/2014/201411-e/141110-01e.html

2. TEPCO's Statement on Detection of Trace Amounts of Cs-134 Off U.S. West Coast (11/11/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243939_5892.html

2.1 Woods Hole Oceanographic Institution's Press Release
http://www.whoi.edu/news-release/Fukushima-detection

2.2 Discussion Board on the New REDDIT Journal of Science

http://www.reddit.com/r/science/comments/2lusz5/science_ama_series_im_ken_buesseler_an/?limit=500

3. Radioactivity in Seawater Near Fukushima Daiichi (11/12/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

3.1 Inside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/intake_canal_map-e.pdf

3.2 Outside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/seawater_map-e.pdf

4. Summary Status of Decommissioning Roadmap--English Translation (9/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140925_01-e.pdf

5. Large-Scale Emergency Drill at Kashiwazaki Kariwa NPS (11/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/kk-np/info/tohoku/2014/pdf/26110702.pdf

(photos)
http://photo.tepco.co.jp/en/date/2014/201411-e/141111-01e.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, November 06, 2014 7:36 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Nov. 7 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Nov. 7, 2014 at 3 pm Eastern Standard Time
(Next call will be on **THU, Nov. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (10/30/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_05-j.pdf

1-3. Preparation for Unit 3 Containment Vessel Internal Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_06-j.pdf

1-4. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_08-j.pdf

1-6. Improvement of Work Environment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_10-j.pdf

1-8. R&D Related to Core Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_11-j.pdf

1-9. Storage of Solid Radioactive Waste
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (10/31/2014)
(only in Japanese)
2-1. Waterproofing Connection between Underground Seawater Piping Trench and Turbine Building
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_01.pdf

2-2. Testing of Subdrain Water Treatment Facility
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_02.pdf

2-3. Increase in Radioactivity at Unit 1 Discharge Canal
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_03.pdf

2-4. Effectiveness of Groundwater Bypass System
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_05.pdf

2-5. Use of Dry Storage Casks at Fukushima Daiichi
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_06.pdf

3. Completion of Transferring Spent Fuels from Unit 4 SFP (11/6/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141106_07-j.pdf

4. Nuclear Safety Reform Plan--2014 Q2 Progress Report (11/5/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243826_5892.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, October 29, 2014 6:56 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Oct. 30 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, Oct. 30, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Nov. 7** at 3 pm Eastern Standard Time.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (10/27/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141027_03-j.pdf

1-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141027_04-j.pdf

2. Fukushima Fishermen's Association Meeting (10/29/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141029_07-j.pdf

3. "FORMER U.S. NUCLEAR CHIEF DALE KLEIN CITES FUKUSHIMA PROGRESS,CHALLENGES TEPCO TO DEEPEN SAFETY CULTURE, ESTABLISH KPI'S" (10/29/2014)
Speech at the American Chamber of Commerce in Japan
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243683_5892.html

3-1. Overview of the Seven Water Treatment Facilities at 1F
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141016_04-e.pdf

3-2. Activities of TEPCO's Nuclear Reform Monitoring Committee Members
http://www.nrmc.jp/en/news/detail/index-e.html#date_20141029-103000

4. "On the Brink: The Inside Story of Fukushima Daiichi" (10/7/2014)
Long-awaited English translation of the book that vividly describes the human element of the accident.
http://www.amazon.com/dp/4902075547/?tag=kurodahanpres-20

5. "Fukushima Update" (Sept.-Oct. 2014)
Attached file is a pdf copy of the Nuclear Plant Journal article reprinted and distributed with permission.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 09, 2014 8:27 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 10 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Oct. 10, 2014 at 3 pm Eastern Daylight Time
(**No call next 2 weeks.** Next call will be on **Thu, Oct. 30** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (10/3/2014)
(only in Japanese)
1-1. New Postulated Earthquake and Tsunami at Fukushima Daiichi and Risk Mitigation Measures
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141003_04-j.pdf

(page 3/42) Risk mitigation measures
(page 10/42) New postulated earthquake and tsunami results
(page 13/42) Various earthquakes that were considered
(page 25/42) Probability of exceedance for postulated earthquake
(page 28/42) Various tsunamis that were considered
(page 34/42) Probability of exceedance for postulated tsunami
(page 35/42) Risk evaluation and mitigation measures

1-2. Status of Isolating Units 2/3 Seawater Piping Trenches from Turbine Buildings
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141003_03-j.pdf

(page 4/38) Temperature reduction effect of ice injection into the trench
(page 5/38) Assumed water flow preventing formation of ice barrier
(page 18/38) Injection of grout and concrete to fill gap
(page 21/38) Transferring and processing accumulated water in the trench
(page 23/38) Backfilling the trench with anti-washout cement
(page 28/38) Schedule

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----

From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 02, 2014 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 3 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **Oct. 3**, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Oct. 10** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (9/22/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_03-j.pdf

1-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_04-j.pdf

2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (9/25/2014)
(only in Japanese)
2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_05-j.pdf

2-3. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_07-j.pdf

2-4. Environmental Radiation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_08-j.pdf

2-5. Fuel Removal from SFPs
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_10-j.pdf

2-6. Unit 2 S/C Lower Outer Surface Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_11-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=x04s084o&catid=61699

2-7. Radioactive Waste Management
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_12-j.pdf

3. Investigation Status of ALPS Train B (9/29/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140929_04-j.pdf

4. Start Operation of Mobile Sr Removal System (10/2/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141002_06-j.pdf

5. Technical Cooperation Agreement with UK Sellafield Ltd. (9/30/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140930_04-e.pdf

6. "False Report on Fukushima: The Company Responds" (9/22/2014)
TEPCO President's Letter to the Editor of the NY Times
http://mobile.nytimes.com/2014/09/23/opinion/false-report-on-fukushima-the-company-responds.html?_r=0

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 29 Oct 2014 19:56:25 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] THU, Oct. 30 at 3pm EDT
Attachments: Fukushima Update_Nuclear Plant Journal.pdf
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, Oct. 30, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Nov. 7** at 3 pm Eastern Standard Time.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (10/27/2014)
(only in Japanese)
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http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141029_07-j.pdf

3. "FORMER U.S. NUCLEAR CHIEF DALE KLEIN CITES FUKUSHIMA PROGRESS,CHALLENGES TEPCO TO DEEPEN SAFETY CULTURE, ESTABLISH KPI'S" (10/29/2014)
Speech at the American Chamber of Commerce in Japan
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243683_5892.html

3-1. Overview of the Seven Water Treatment Facilities at 1F
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141016_04-e.pdf

3-2. Activities of TEPCO's Nuclear Reform Monitoring Committee Members
http://www.nrmc.jp/en/news/detail/index-e.html#date_20141029-103000

4. "On the Brink: The Inside Story of Fukushima Daiichi" (10/7/2014)
Long-awaited English translation of the book that vividly describes the human element of the accident.
http://www.amazon.com/dp/4902075547/?tag=kurodahanpres-20

5. "Fukushima Update" (Sept.-Oct. 2014)

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http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 09, 2014 8:27 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 10 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Oct. 10, 2014 at 3 pm Eastern Daylight Time
(**No call next 2 weeks.** Next call will be on **Thu, Oct. 30** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
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passcode: (b)(6)

[Major topics]
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(only in Japanese)
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(page 3/42) Risk mitigation measures
(page 10/42) New postulated earthquake and tsunami results
(page 13/42) Various earthquakes that were considered
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(page 34/42) Probability of exceedance for postulated tsunami
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(page 4/38) Temperature reduction effect of ice injection into the trench
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(page 21/38) Transferring and processing accumulated water in the trench
(page 23/38) Backfilling the trench with anti-washout cement
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(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 02, 2014 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 3 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Oct. 3, 2014 at 3 pm Eastern Daylight Time
(Next call will be on **Fri, Oct. 10** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (9/22/2014)
(only in Japanese)
1-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_03-j.pdf

1-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l140922_04-j.pdf

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2-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_05-j.pdf

2-3. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_07-j.pdf

2-4. Environmental Radiation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_08-j.pdf

2-5. Fuel Removal from SFPs
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_10-j.pdf

2-6. Unit 2 S/C Lower Outer Surface Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_11-j.pdf
(video clip)
http://www.tepco.co.jp/tepconews/library/archive-j.html?video_uuid=x04s084o&catid=61699

2-7. Radioactive Waste Management
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d140925_12-j.pdf

3. Investigation Status of ALPS Train B (9/29/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_140929_04-j.pdf

4. Start Operation of Mobile Sr Removal System (10/2/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141002_06-j.pdf

5. Technical Cooperation Agreement with UK Sellafield Ltd. (9/30/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140930_04-e.pdf

6. "False Report on Fukushima: The Company Responds" (9/22/2014)
TEPCO President's Letter to the Editor of the NY Times
http://mobile.nytimes.com/2014/09/23/opinion/false-report-on-fukushima-the-company-responds.html?_r=0

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 18, 2014 9:38 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 19 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 19, 2014 at 3 pm Eastern Daylight Time
(**No call next week**. Next call will be on **Fri, Oct. 3** at 3 pm.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Fukushima Prefectural Conference on Decommissioning (9/10/2014)
(only in Japanese)
1- 1. Radioactivity Dispersion Mitigation Measures for Unit 1 Reactor Building Cover Dismantling
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_01-j.pdf

1-2. Improvements of Work Environment at Fukushima Daiichi
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_02-j.pdf

1-3. Status on Contaminated Water Issues and Actions Taken
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/e140910_03-j.pdf

2. Hot Test Run Begins for Additional ALPS (9/17/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1242012_5892.html
(reference material)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_140911_04-e.pdf

3. Japan Times article on the vivid account of Fukushima Daiichi first responders
3-1. "Workers grappled with darkness at start of Fukushima nuclear crisis"
http://www.japantimes.co.jp/news/2014/09/02/national/workers-grappled-darkness-start-fukushima-nuclear-crisis/#.VAeHZLywaEJ

3-2. "Response stymied by loss of electricity"
http://www.japantimes.co.jp/news/2014/09/02/national/response-stymied-loss-electricity/#.VAeLSbywaEI

3-3. "Fukushima workers tried to save reactor 1 through venting"
http://www.japantimes.co.jp/news/2014/09/02/national/workers-tried-save-reactor-1-venting/#.VAeLBbywaEI

3-4. "Hydrogen explosion left Fukushima No. 1 workers sure they would die"
http://www.japantimes.co.jp/news/2014/09/10/national/hydrogen-explosion-left-fukushima-no-1-workers-sure-they-would-die/#.VBJFfGR_t8k

3-5. "Fukushima No. 2 scrambled to avoid same fate as sister site Fukushima No. 1"
http://www.japantimes.co.jp/news/2014/09/10/national/fukushima-2-scrambled-avoid-fate-sister-site-fukushima-1/#.VBI_jmR_t8I

3-6. "Yoshida's call on seawater kept reactor cool as Tokyo dithered"
http://www.japantimes.co.jp/news/2014/09/14/national/yoshidas-call-seawater-kept-reactor-cool-tokyo-dithered/#.VBc--WR_t8l

3-7. "A melted shoe and a farewell letter in the dark"
http://www.japantimes.co.jp/news/2014/09/14/national/melted-shoe-farewell-letter-dark-fukushima-1/#.VBdGimR_t8l

3-8. "Responders cowed by explosion at reactor 3 building of Fukushima No. 1"
http://www.japantimes.co.jp/news/2014/09/14/national/responders-cowered-by-explosion-at-no-3-reactor-building/#.VBc-8GR_t8l

All the best,
Kenji

Fukushima Update *page 24*

Challenges to Plants *page 28*

Switching to Digital *page 30*

Benefits of Research *page 32*

Nuclear Plant Journal

An International Publication
Published in the United States

Plant Maintenance & SMRs

September-October, 2014
Volume 32 No. 5

Fukushima Update

By Kenji Tateiwa, Tokyo Electric Power Company

River Bend, USA

N: 0892-2055

A reprint from the September-October 2014 issue of Nuclear Plant Journal.

SO14.indd 1 10/20/2014 2:35:36 PM

Fukushima Update

By Kenji Tateiwa, Tokyo Electric Power Company.

Kenji Tateiwa

Kenji Tateiwa is Manager of Nuclear Power Programs at Tokyo Electric Power Company's (TEPCO) Washington Office, where he leads collaborative efforts with U.S. organizations.

Kenji received his BS and MS in nuclear engineering from Kyoto University. He began his career at TEPCO in 1996 at Fukushima Daini, then at the headquarters, specializing in severe accident analysis.

After receiving an MBA from Stanford, Kenji led TEPCO's involvement in the nuclear new build project at the South Texas Project site.

Kenji has coped with the Fukushima accident from day one, playing a key role as liaison between TEPCO and nuclear experts around the world.

An interview by Newal Agnihotri, Editor of Nuclear Plant Journal, at the American Nuclear Society Utility Working Conference in Amelia Island, Florida on August 11 ,2014.

1. *What is the radiation level in the town of Naraha, which is within the initial evacuation zone of 20 km-radius from the Fukushima Daiichi nuclear power plant?*

I lived in Naraha 15 years ago when I was working at TEPCO's Fukushima Daini nuclear power plant. When I visited Naraha this year in July. I saw a monitoring post in front of the local Tatsuta train station. It read 0.24 micro-Sievert per hour, which is slightly higher than what the natural background radiation in that area used to be prior to the accident. However. even if you were to stand there for an entire year. you would be exposed to 2.1 mSv (210 mrem), which is less than the worldwide average annual exposure from natural radiation. It is important to put the number into perspective so that people can make sensible decision of whether they need to be worried about radiation in that area. Restriction in Naraha has been gradually relaxed since the accident and currently people can stay in town during daytime. Reopening of the Tatsuta train station in June 2014 was a very positive event for the local community that is expecting complete lifting of the evacuation order and return of local residents sometime after spring of 2015.

2. *Does the public have a say in what happens regarding decontamination and decommissioning of Fukushima Daiichi?*

Yes, TEPCO is working closely with the Japanese government in ensuring that the local community has a say in the decisions we make at Fukushima Daiichi. For example, the groundwater bypass is a system that we built to pump up the groundwater before it becomes contaminated by getting in contact with the reactor buildings and the turbine buildings. We had been consulting with the local fishermen's association to obtain their consent in discharging the clean groundwater to the ocean, but that process had taken more than a year. We engaged them in numerous dialogues on how we are going to operate this system. how we are going to monitor the groundwater, and what would be the criteria for the radioactivity in the groundwater that would be allowed for discharge to the ocean, etc. We finally agreed on a criterion that is more stringent than the drinkable water standard of the World Health Organization. Because of the very understandable distrust towards TEPCO, it took a long time before we were finally given the green light to start pumping up the water and discharging it to the ocean.

3. *How is TEPCO taking advantage of the experience in Three Mile Island and Chernobyl?*

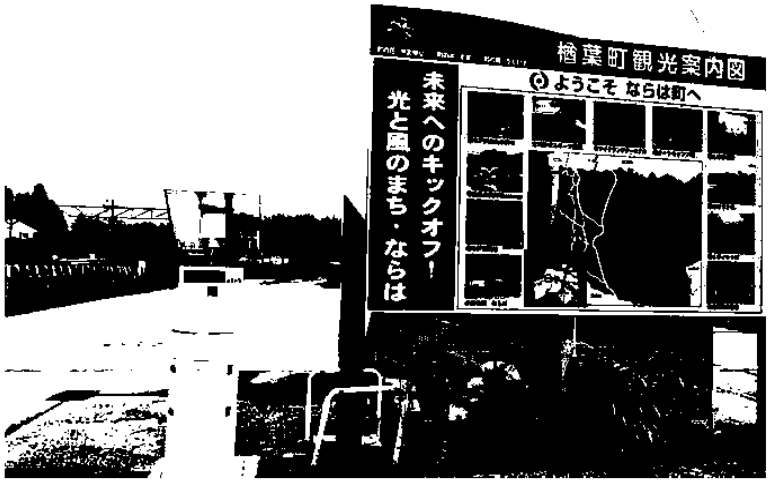
TEPCO has been working very closely with the experts in the US who have dealt with TMI, both from the government sector and the industry sector. For example, Lake Barrett, who was the Site Director for the US NRC at TMI during the recovery. is TEPCO's advisor on D&D efforts and so we interact with him frequently. Also we work closely with EPRI, that has accumulated invaluable knowledge related to technical aspects of the TMI accident. The U.S. has abundant experience in the field of decontamination and decommissioning other than that related to TMI. TEPCO is working closely with Savannah River National Laboratory located at the Savannah River Site and Pacific Northwest National Laboratory located at the Hanford Site. among other organizations in the field of D&D.

In addition, TEPCO has been tapping into the expertise of worldwide experts through the International Expert Group (IEG). The IEG currently advises the International Research Institute for Nuclear Decommissioning (IRID), but it was originally formed under the initiative of TEPCO. The IEG is comprised of experts from five countries: the US, UK, France, Russia, and Ukraine. TEPCO works in close collaboration with both IRID and IEG in order to learn lessons from the experiences in these countries, including that of Chernobyl.

4. *Is Unit 4 the lead unit in the Fukushima Daiichi efforts?*

Unit 4 is the lead in terms of removing fuels from the spent fuel pool. There have been concerns that the

SO14.indd 24 10/20/2014 2:35:37 PM



Radiation monitor in front of Tatsuta train station in Naraha town on 7/11/2014.

Unit 4 reactor building may be unstable because of damage incurred from the hydrogen explosion, and that it was unsafe to keep the 1,500+ fuel bundles in the spent fuel pool. TEPCO conducted structural analysis of the Unit 4 reactor building and, despite the fact that the visuals are terrible due to the explosion, we have confirmed that there is sufficient structural integrity remaining in the reactor building and the spent fuel pool to withstand a large earthquake. We also added 20% additional margin by reinforcing the floor of the spent fuel pool just in case. However, in order to address the public's concern we decided to remove the fuels from the Unit 4 spent fuel pool. The defueling structure was erected in November 2013, and as of September 2014, more than 75 % of the fuels have been transferred to the common pool located on site. All fuels from Unit 4 is planned to be removed by the end of 2014.

As for Units 1, 2, and 3, much progress has been made in investigating inside the reactor buildings and torus rooms utilizing various robots. For example, robots played an instrumental role in identifying water leakage locations in the torus room of Unit 1 recently. Rubble removal from the spent fuel pool of Unit 3 is underway in preparation for removing fuels from the spent fuel pool.

5. *Have any units at Fukushima Daini and Kashiwazaki Kariwa nuclear power station been approved by NRA for restart?*

No. Fukushima Daini and Kashiwazaki Kariwa are totally different stories. TEPCO has applied for the safety review of Kashiwazaki Kariwa Units 6 and 7, the Advanced BWRs (ABWR), to the Japanese regulator (NRA) back in September 2013. The NRA is currently reviewing our application to confirm compliance with the newly established safety standard. We will also have to obtain consent from the local government prior to restarting the units. As for Fukushima Daini, with four BWR reactors, we are maintaining core shutdown of the units and do not have clear plans for the future at this moment.

6. *Please explain the function of emergency response center.*

In 2007, the Chuetsu-Oki earthquake struck Kashiwazaki Kariwa. Although there was no safety significant issue at the plant, we encountered difficulty using the emergency response center at the site since the entrance door got deformed and workers could not get in.

Based on this lessons learned, TEPCO decided to build seismic isolation buildings to house the emergency response center at Fukushima Daiichi, Fukushima Daini, and Kashiwazaki Kariwa.

This turned out to be an excellent decision since at Fukushima Daiichi, the seismic isolation building became the only safe haven that people could respond from during the accident.

We have a system called the SPDS, the safety parameter display system, in our emergency response centers. SPDS provides all vital plant information for each unit that can be displayed (but not controlled) from the emergency response center. The control is all at the main control room for each unit. The emergency director and technical staff at the emergency response center will provide advice to the main control room for the shift operators to take necessary actions in the plant during emergency events.

Visit of US Ambassador to Fukushima Daiichi on 5/14/2014 (on the refueling floor of Unit 4).

SO14.indd 25 10/20/2014 2:35:40 PM

Currently at Fukushima Daiichi, since the main control rooms for Units 1, 2, 3, and 4 are nonfunctional, many of the control functions for the core cooling, water treatment, and other systems are located in the seismic isolation building.

7. *Is TEPCO keeping a log of all the lessons learned from Fukushima Daiichi accident?*

Absolutely. Among the abundant information on TEPCO's website, one of the most important reports is the TEPCO internal investigation report issued on June 20, 2012. It is a comprehensive compilation of the factual account plus lessons learned from the accident. It has been translated in English. There have also been many new findings since this report was issued and they are posted on our website as well. On August 6, 2014 the second progress report on unresolved issues was made public, in which we described in detail four major issues that we believe are important from a nuclear-safety point of view. One of the issues that is discussed in this report is the mechanism of Unit 3 RCIC (Reactor Core Isolation Cooling) that tripped on day 2 of the accident when there was DC power still available.

8. *Concluding remarks.*

It is TEPCO's responsibility to share accurate facts and the lessons learned from the accident at both Fukushima Daiichi and Fukushima Daini. We are trying our best to be transparent and open not only about information during the time of the accident but also information on what is currently unfolding at Fukushima Daiichi and actions that we are taking. However, I understand that for most people it is very challenging to sort through all the information. There is simply too much information and it is difficult to identify the important information from the not so important one. Also, there is the language issue (not all information is translated in English.) Therefore, part of my job in DC is to go through all of the information everyday and understand what's happening and then identify the information that I believe is most relevant to the US nuclear industry and share such information. Sharing information about Fukushima for the sake of enhancing nuclear safety is something, I feel personally passionate about. I truly appreciate all the people and organizations that have provided me with opportunities to share the story from TEPCO's perspective and allowed me to do what is right for the nuclear industry and the global community.

I have been hosting weekly teleconferences to inform people interested in this topic for the past two-and-a-half years. If there is anyone who wishes to learn more about Fukushima, please send me an email and I will be happy to add the person to my distribution list for the notification email that I send out prior to the call.

Contact: Kenji Tateiwa, Tokyo Electric Power Company, Washington Office, 2121 K Street, NW Suite 910, Washington, DC 20037: telephone: (202) 457-0790 (ext.)116, email: tateiwa.kenji@tepco.co.jp. ■

SO14.indd 26 10/20/2014 2:35:40 PM

From: Tateiwa, Kenji
Sent: 22 Dec 2014 19:59:51 -0500
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] TUE, Dec. 23 at 3pm EST
Importance: Normal

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
TUE, Dec. 23, 2014 at 3 pm Eastern Standard Time
(**No call next two weeks**. Next call will be on **Fri, Jan. 16, 2015** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (12/19/2014)
(only in Japanese)
1-1. Removal of Cs and Sr from Seawater, etc.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_03-j.pdf

1-2. Unit 1 Reactor Building Refueling Floor Inspection Results
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_05-j.pdf

1-3. Applicability of Plastic Scintillation Fiber (PSF) to Detect Minor Leakage from Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_07-j.pdf

1-4. Leakage of ALPS-Treated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_08-j.pdf

1-5. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_09-j.pdf

2. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool (12/22/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

2-1. Video Clip Summarizing Path to Success (6 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w220b15k&catid=61795

2-2. Video Message from Mr. Hirose, TEPCO's President (5 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w785h9cj&catid=61783

2-3. Explanation Slides (only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141222_04-j.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

Happy holidays to you all!

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 11, 2014 10:07 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 12 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 12th, 2014 at 3 pm Eastern Standard Time
(**No call next week**. Next call will be on **TUE, Dec. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. **Overview of Measures to Treat Contaminated Water**
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

2. Explanation on Subdrain and Groundwater Drain Systems to the Fishermen's Association of Iwaki City (12/10/2014)
(only in Japanese)
2-1. Confirmation of Stable Performance in Removing Radionuclides from Subdrain and Groundwater Drain
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_06-j.pdf

2-2. Basic Concept of Operating the Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_07-j.pdf

2-3. Detection of High Concentration of Radioactivity from Subdrain Pits # 18/19 and Measures Taken
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_09-j.pdf

3. Approval by NRA on Design Modification to add Sr Removal Capability to SARRY (Cs Removal) System (12/11/2014)
(only in Japanese; 8.8 MB, 372 pages)
http://www.tepco.co.jp/cc/press/betu14_j/images/141211j0101.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 04, 2014 9:35 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 5th, 2014 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Dec. 12** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Contaminated Water Countermeasures Committee (11/13/2014)
(only in Japanese)
1-1. Status of Contaminated Water Countermeasures and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_03-j.pdf

1-2. Recent Topics at 1F
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_04-j.pdf

1-3. Task Force on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_06-j.pdf

1-4. Demonstration Test for High-performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_07-j.pdf

1-5. Task Force on Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_08-j.pdf

1-6. Study on Shallow Ground Disposal of Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_09-j.pdf

1-7. Status of Contaminated Water Treatment Technology Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_10-j.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (11/25/2014)

(only in Japanese)

2-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_03-j.pdf

2-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_04-j.pdf

2-3. Procedure for Closure of Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_05-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (11/27/2014)
(only in Japanese)

3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_05-j.pdf

3-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_07-j.pdf

3-4. Environmental Radion Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_08-j.pdf

3-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_10-j.pdf

3-6. 3D Laser Scanning in Unit 1 Torus Room
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_11-j.pdf

3-7. Solid Radioactive Waste Treatment and Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_12-j.pdf

3-8. Progress on Emergency Safety Enhancement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_14-j.pdf

4. Introduction of ICP-MS Method Allowing Quicker Measurement of Sr-90 in Water
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141127_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, November 24, 2014 10:51 AM
Subject: NO CALL THIS WEEK [TEPCO Weekly Fukushima Update Call] Next on Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Due to unavoidable change in schedule, I will have to **cancel the call planned for tomorrow (Tue, Nov. 25**.)
Next call will be on **Fri, Dec. 5th** at 3 PM.

Apologies for any inconvenience this may cause you.
Feel free to contact me should you have any questions.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, November 12, 2014 7:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Nov. 13 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, Nov. 13, 2014 at 3 pm Eastern Standard Time
(**No call next week.** Next call will be on **TUE, Nov. 25** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Reactor Building Cover Roof Panel Removal (11/10/2014)
http://photo.tepco.co.jp/en/date/2014/201411-e/141110-01e.html

2. TEPCO's Statement on Detection of Trace Amounts of Cs-134 Off U.S. West Coast (11/11/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243939_5892.html

2.1 Woods Hole Oceanographic Institution's Press Release
http://www.whoi.edu/news-release/Fukushima-detection

2.2 Discussion Board on the New REDDIT Journal of Science

http://www.reddit.com/r/science/comments/2lusz5/science_ama_series_im_ken_buesseler_an/?limit=500

3. Radioactivity in Seawater Near Fukushima Daiichi (11/12/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

3.1 Inside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/intake_canal_map-e.pdf

3.2 Outside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/seawater_map-e.pdf

4. Summary Status of Decommissioning Roadmap--English Translation (9/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140925_01-e.pdf

5. Large-Scale Emergency Drill at Kashiwazaki Kariwa NPS (11/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/kk-np/info/tohoku/2014/pdf/26110702.pdf

(photos)
http://photo.tepco.co.jp/en/date/2014/201411-e/141111-01e.html

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, November 06, 2014 7:36 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Nov. 7 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Nov. 7, 2014 at 3 pm Eastern Standard Time
(Next call will be on **THU, Nov. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (10/30/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_05-j.pdf

1-3. Preparation for Unit 3 Containment Vessel Internal Investigation
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_06-j.pdf

1-4. Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_08-j.pdf

1-6. Improvement of Work Environment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_10-j.pdf

1-8. R&D Related to Core Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_11-j.pdf

1-9. Storage of Solid Radioactive Waste
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141030_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (10/31/2014)
(only in Japanese)
2-1. Waterproofing Connection between Underground Seawater Piping Trench and Turbine Building
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_01.pdf

2-2. Testing of Subdrain Water Treatment Facility
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_02.pdf

2-3. Increase in Radioactivity at Unit 1 Discharge Canal
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_03.pdf

2-4. Effectiveness of Groundwater Bypass System
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_05.pdf

2-5. Use of Dry Storage Casks at Fukushima Daiichi
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0028_06.pdf

3. Completion of Transferring Spent Fuels from Unit 4 SFP (11/6/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141106_07-j.pdf

4. Nuclear Safety Reform Plan--2014 Q2 Progress Report (11/5/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243826_5892.html

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 29 May 2015 15:11:51 -0400
To: Robert.o.ambrose@nasa.gov;brittany.N.Kimball@nasa.gov;Camper, Larry;Abu-Eid, Boby;judd@nuvisioneng.com;jrenshaw@epri.com;Sangimino, Donna-Marie;Rini, Brett;West, Steven;william.levitan@em.doe.gov;koi@k.u-tokyo.ac.jp;Parrott, Jack;Csontos, Aladar;Bernardo, Robert;Marksberry, Don;kamel.saidi@nist.gov;andrew.Szilagyi@em.doe.gov;philip.mattson@hq.dhs.gov;'Jacoff, Adam S.';Nicholson, Thomas
Subject: Use of Robotics at Fukushima Daiichi: Third Organizational Meeting for International Workshop on the Use of Robotics at Nuclear Facilities - Update
Importance: Normal

Tom and all,

Per our discussion during today's teleconference, please find below url for TEPCO's website on the use of robotics at Fukushima Daiichi.
http://www.tepco.co.jp/en/decommision/principles/robot/index-e.html

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW, Suite 910
Washington, DC 20037
tel: ·1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Nicholson, Thomas
To:'Jacoff, Adam S.' ; philip.mattson@hq.dhs.gov ; andrew.Szilagyi@em.doe.gov ; kamel.saidi@nist.gov ; Marksberry, Don ; Bernardo, Robert ; Csontos, Aladar ; Parrott, Jack ; koi@k.u-tokyo.ac.jp ; 'Tateiwa, Kenji' ; Bill Levitan (william.levitan@em.doe.gov) ; West, Steven ; Rini, Brett ; Sangimino, Donna-Marie ; jrenshaw@epri.com ; judd@nuvisioneng.com ; Abu-Eid, Boby ; Camper, Larry ; brittany.N.Kimball@nasa.gov ; Robert.o.ambrose@nasa.gov
Sent: Friday, May 29, 2015 12:17 PM
Subject: Third Organizational Meeting for International Workshop on the Use of Robotics at Nuclear Facilities - Update

Adam, Kam, Phil, Andy, Don, Bob, Al, Jack, Kenji, Bill, Jeremy, Laurie, Rob and Steve:

This is a reminder to join our next meeting via teleconferencing to further develop the subject workshop prospectus.

The call-in number is **1-888-677-0358** with passcode [redacted] followed by the # sign. (b)(6)

At our last meeting, we decided to have the subject workshop at the NIST auditorium on the afternoon of December1, and all day on December 2 and 3.

We also agreed to begin the workshop at 1:00 p.m. on Tuesday, December 1st with a tour of the NIST Robot Testing Facility (please see: http://www.nist.gov/el/isd/ms/roboticsbldg.cfm) later that afternoon.

I have attached a revised meeting agenda, and a revised draft workshop prospectus.

For the purpose of discussion, I have added both a survey form and completed form as an example for the proposed Catalogue of Robotics for Use at Nuclear Facilities.

For the moment the workshop sponsors identified are NIST, U.S. NRC, DHS and DOE. We would like to add others such as TEPCO, IRID, EPRI and the U.K. NDA.

Please send me any contacts you may have at NASA and DOD so that we can invite them to attend our next meeting.

Thanks ……. Tom

****
Thomas J. Nicholson, Senior Technical Advisor
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Mail Stop CSB 2-A07
11555 Rockville Pike
Rockville, MD 20852
Tel: (301) 251-7498
Fax: (301) 251-7422
E-mail: Thomas.Nicholson@nrc.gov
****

From: Tateiwa, Kenji
Sent: 29 Nov 2012 22:09:59 -0500
To: Norton, Charles
Cc: Reckley, William;Borchardt, Bill;Skeen, David;Monninger, John;Tateiwa, Kenji
Subject: Additional info: Fukushima-Daiichi Unit 4 Rx Building
Attachments: Integrity of 1F-4.pdf
Importance: Normal

Chuck,

Please find attached a summary information about integrity of Unit 4 reactor building.

We have just completed the 3rd period inspection of Unit 4 reactor building on Nov. 28.
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_121129_01-j.pdf

The above presentation material has not yet been translated in English, but it explains that no abnormality was found in inspection areas including tilting, bulging, cracks and concrete strength of the reactor building and SFP of Unit 4. Slide 10 will give you some idea of what it looks like on the refueling floor currently.

Hope this helps.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Norton, Charles
Cc: Reckley, William ; Borchardt, Bill ; Skeen, David ; Monninger, John
Sent: Tuesday, November 27, 2012 8:53 AM
Subject: Re: Fukushima-Daiichi Unit 4 Rx Building

Chuck,

Please find below a link to photos showing the condition of Unit 4 reactor building as of Oct. 16th (bottom 2 photos).
http://www.meti.go.jp/earthquake/nuclear/pdf/121022/121022_01w.pdf

As you noted, we have completed removing rubble from the refueling floor of Unit 4.
I will let you know if I find other recent photos.

You can see a live image of Daiichi units from the following link (Unit 4 can be seen in the bottom right; you should be able to get a better view during daytime in Japan):
http://www.tepco.co.jp/en/nu/f1-np/camera/index-e.html

John Monninger will be visiting the Daiichi site on Fri, Nov. 30 and my colleagues should be taking him to the Unit 4 refueling floor.
I will ask my colleagues to send you photos taken there.

Let me know if you have any other questions.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Norton, Charles
To: Reckley, William
Cc: Skeen, David ; Tateiwa, Kenji ; Borchardt, Bill
Sent: Tuesday, November 27, 2012 8:07 AM
Subject: RE: Fukushima-Daiichi Unit 4 Rx Building

Bill

The 5th floor of the reactor building is the refuel floor. On unit 4 TEPCO has removed everything above this level, cleaned up the rubble and is building a structure for removing the fuel from the spent fuel pool.

Kenji is having his information conference call this afternoon. I will ask if he can provide more recent photos and other information for Chairman Macfarlane's review prior to her visit.

Below are some photos that depict U4 conditions on August 24 of this year compared to September 24. The fifth floor is on top in these photos.

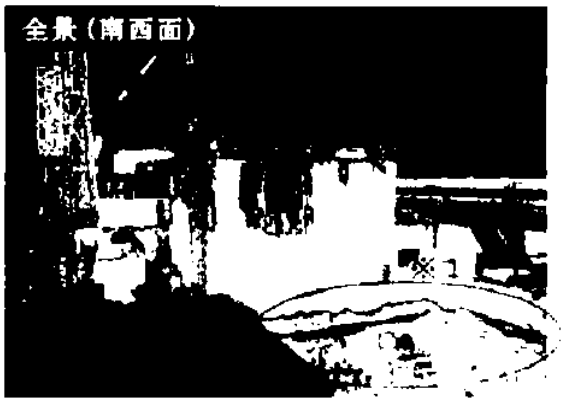
Below the photos is a depiction of the structure and apparatus for removing the fuel from the spent fuel pool.

Chuck Norton
US NRC JLD

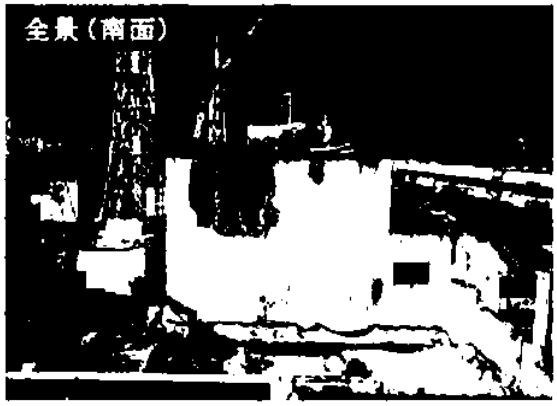
全景（南西面）

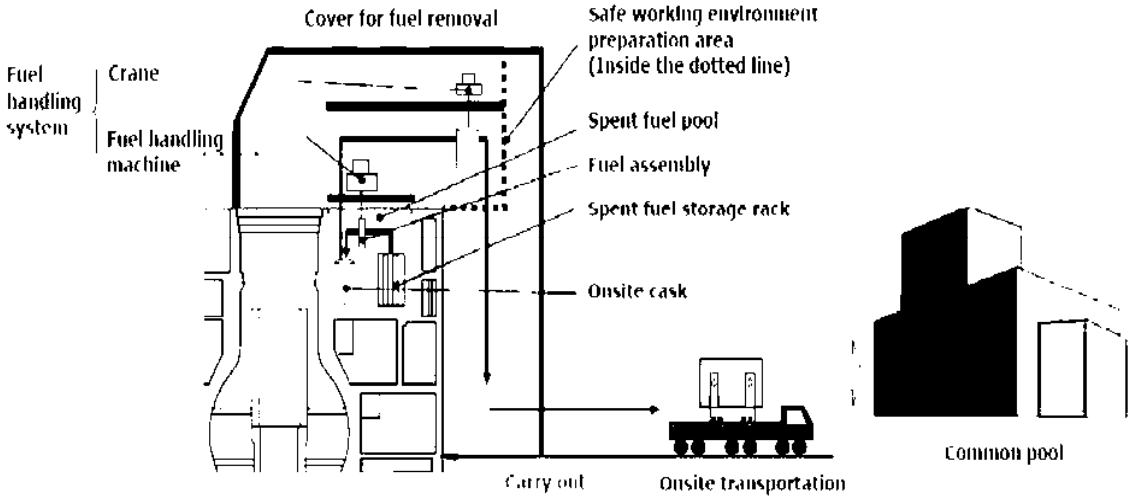
全景（南面）

全景（南西面）



全景（南面）





From: Reckley, William
Sent: Tuesday, November 27, 2012 7:44 AM
To: Norton, Charles
Subject: FW: Fukushima-Daiichi Unit 4 Rx Building

Can you look to see what info you have, and if necessary what info you might get from Tepco. Thanks

From: Skeen, David
Sent: Tuesday, November 27, 2012 6:46 AM
To: Reckley, William
Cc: Taylor, Robert
Subject: Fukushima-Daiichi Unit 4 Rx Building

Bill,

When I talked with Bill Borchardt yesterday, he showed me a draft itinerary for the Chairman's upcoming tour of the Fukushima site. It indicates that we will get a tour of the 5th floor of the Unit 4 Rx building.

Bill wanted to know if we could get any info on the equipment that would be expected to be on the 5th floor, so that we could explain to the Chairman what she is seeing during the tour.

Does Chuck Norton have any photos of the Unit 4 Rx building, or does he know what is typically found on the 5th floor of a BWR 4? Another thought would be to ask Chuck to pulse Kenji Tatiewa (our friendly TEPCO rep here in town), if Chuck doesn't have much info.

Please see what you can do to get some info by the end of next week.

Thanks!

The integrity evaluation of the Unit4 Reactor Building in the Fukushima Daiichi Nuclear Po

The upper part of the Unit 4 Reactor Building (R/B) was damaged by the hydrogen explosion, but **it has been verified the building, including the S sufficiently withstand an earthquake, even if another as the same strength as the Tohoku-Chihou-Taiheiyou-Oki Earthquake (JMA Seismi**

SFP has enough seismic resistance against big earthquake.

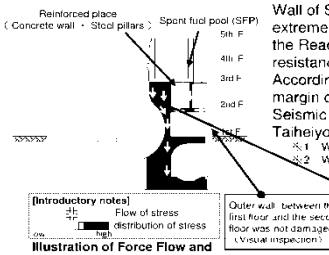
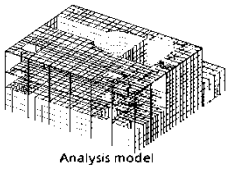


Illustration of Force Flow and distribution of SFP
(Cross-Section view of building)



Analysis model

Wall of SFP is extremely thick and whole pool is supported with the extremely thick wall, so that even if the outer wall and the floor of the Reactor Building are damaged, the pool has enough seismic resistance equivalent to that of before the hydrogen explosion. Accordingly, it was verified that the spent fuel pool has a sufficient margin of seismic resistance against the future big earthquake (JMA Seismic Intensity Scale 6+) equivalent to the Tohoku-Chihou-Taiheiyou-Oki Earthquake.

※1 Wall of SFP (reinforced concrete) : Thickness approx.140cm-185cm
※2 Wall supporting SFP (reinforced concrete) : Thickness approx.160cm-185cm

Shell wall (undamaged)

It was confirmed that the building, including the SFP, has a sufficient margin of seismic resistance against the future big earthquake (JMA Seismic Intensity Scale 6+) in the following conditions considered.

- Damaged condition
- Rubble removal from the upper side of the building
- Weight of fuel handling machine etc

Evaluation results of the seismic safety (・10・)

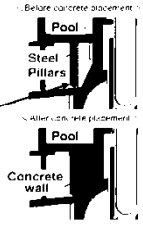
	Maximum shear strain ※3	Criterion value
North-south direction	0.15	4.0
East-west direction	0.16	

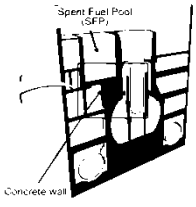
※3 Shear strain : The rate of the deformation to in-plane direction of wall

The bottom of the SFP was reinforced.

Support structure at the bottom of the SFP was installed. This increased the seismic safety margin more than 20 % to the vertical direction.

Photo After the installation of steel pillars (Before concrete placement)





Sectional view of R/B

※Concrete placement (red) after posts installation (green)

※ Photo June 15, 2011 (The completion of construction July 30,2011)

Margin rate※1 of antiplane shear strain※2 of the SFP Bottom

Before		After
143%	Over 20%	179%

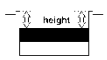
※1 Margin rate : Criterion value / Calculated shear strain
※2 antiplane shear force : stress to the direction where a floor is pushed

The structural integrity of SFP h by regular chec

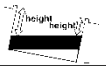
① Checking inclination of the building (measuremen

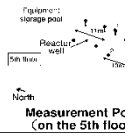
The distance between the water surface of the SFP and the flo and it was confirmed that the building has not tilted

1) **not tilted**
Almost same



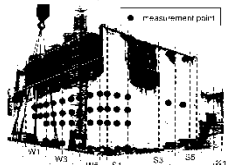
2) **tilted**
Not same



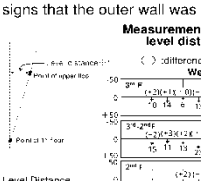


② Outer wall measurement

The fixed point was installed in the upper and lower sides of a was measured with optical apparatus. As a result, the measur almost same, and there were no signs that the outer wall was



Measurement point



※1: Level Distance between "point of 1st floor" and "point of upper floor"

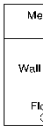
③ Visual inspection

Cracks of which the width exceeds 1mm or which have the possibility of rebar corrosion were not confirmed.

④ Concrete strength check

The concrete strength of SFP was measured by non-destructive test (Schmidt Hammer test) to confirm if it would meet design standard (22.1N/mm^2).

non-destructive test (Schmidt Hammer test)



The structure of Unit 4 Spent Fuel Pool (SFP) doesn't easily cause water leak

The pool inside is lined with stainless steel plate.

The SFP is made of reinforced concrete which has a thickness of approximately 140 - 185cm, and lined with 6mm-thick stainless steel plate. The pool is supported by a steel and concrete structure, mostly isolated from the 4th and 5th floor walls of Unit 4 Reactor Building, which has been damaged by the explosion.

There are no pipes or drainage holes that pass through the concrete structure of the pool.

The pool water is circulated by injecting from the top of the pool and collecting the flooded water from the upper edge of the pool which is sent to the Skimmer Surge Tank*. There are no pipes or drainage holes that pass through the concrete structure of the pool, either on the side or at the bottom of the pool.

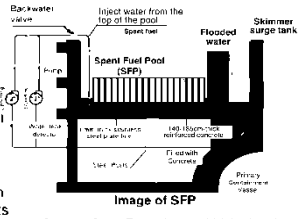


Image of SFP

Monitoring of the leak from SFP

The water level of the Skimmer Surge Tank* was continuously monitored, and the appropriate amount of water which evaporates from the pool was injected to the pool. Any water leakage can be detected as an abnormal water level fall at the Skimmer Surge Tank*, should the pipes get damaged.

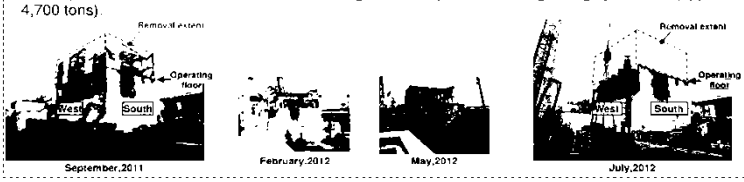
The structure of injection piping system prevents pool water from flowing out.

A backwater valve -which is not driven by motor, is installed in the pipe that injects water inside the pool. Should the pipe gets damaged, the backwater valve shuts down , preventing the pool water from flowing out.

* Skimmer Surge Tank : A tank which is placed to catch the flooded water from the SFP.

The rubble removal of the Reactor Building was completed.

The rubble removal at the top of the reactor building was completed on July 11, 2012. Now we are removing large apparatuses (the vessel head of primary containment vessel and reactor pressure vessel.) on the top floor from the end of July to October 2012. Seismic safety of the reactor building was improved more than before because the weight at the top of the building is largely reduced (approx. 4,700 tons).



September,2011 February,2012 May,2012 July,2012

Validity evaluation to a sufficient margin of seismic resistance.

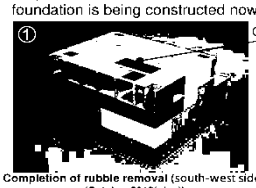
- Nuclear and Industrial Safety Agency confirmed that TEPCO's analysis results that the reactor building and the spent fuel pool have a sufficient margin of seismic resistance were reasonable. (May.30,2011)
- The hearing of academic expert's opinions (review) was hold. And TEPCO's analysis results and JNES's cross-check analysis results were explained. (Feb.16,2012)
- In addition, Japan Nuclear Energy Safety Organization as the third-party evaluated TEPCO's analysis results of seismic resistance. (Oct.28,2011)

※The above shows the validity check to the confirmatory result of margin of seismic resistance which the TEPCO released on May 28, 2011. In addition, also in the 2012 fiscal year, it is ending with presentation in the Nuclear Regulation Authority about the confirmatory result of margin of seismic resistance reflecting the newest situation.

< Action toward spent f

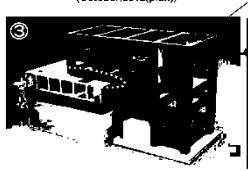
Moving Ahead with construction of

The cover for fuel removal is being installed to support fuel han environment, and to suppress any dispersion or diffusion of rad conjunction with the work of fuel removal. The construction sta foundation is being constructed now.



Completion of rubble removal (The 5th floor level)

Completion of rubble removal (south-west side) (October,2012(plan))

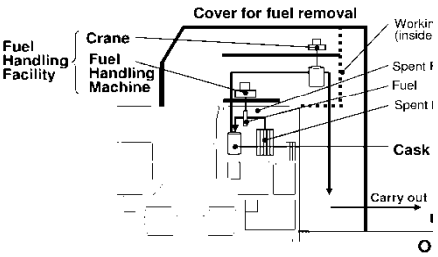


Installation of Crane Frame (south-west side)

[Introductory notes] : complete collapse : partial collapse

We steadily implement the spen

After construction of the cover for fuel removal, the transport o fuel to the site common pool after the condition of the fuel is ve more stable state. The target for the commencement of fuel re



From: Tateiwa, Kenji
Sent: 31 Jul 2015 22:47:05 +0900
To: tateiwa.kenji@tepco.co.jp
Subject: [External_Sender] Please reply to sign up [TEPCO Fukushima Update Call] Mon, Aug. 3, 2015 at 9am EDT/10pm JST

Friends and Colleagues,
I hope this email finds you well.
A month has passed since I made the transition from TEPCO's Washington DC office to the Tokyo HQ as Safety Engineering Group Manager of Fukushima Daiichi D&D Engineering Company.
I intend to resume the "Fukushima Update Call" that I had been hosting on a weekly-basis since early 2012 to update interested professionals (from the industry, government sector, academia, etc.) on the latest situation at Fukushima Daiichi.
I will be sending out email notification to participants prior to the call with links to the most important topics that I will verbally cover during the call.
I endeavor to host future calls on a monthly basis, with a target duration of about 30 minutes, including Q&A.
(Attached, FYI, is an email that I sent out last month from DC.)
Please reply to this email if you and/or your colleagues would like to be included in the distribution list for future calls.
Feel free to join the call whenever you find topics of interest to you.
I would also be happy to answer any questions separate from the call.
[Date/time]
Mon, August 3, 2015 at **9 am U.S. Eastern Daylight Time**
(Next call: Mon, Aug. 31 **at 9 am EDT**.)

[call-in information] (Please record your name and organization when joining the call.)
call number (New York): 718-354-1184
passcode: (b)(6)
Please let me know if any of you would like to join the call from other countries.
[Major topics]
1. Contaminated Water Treatment Committee (7/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_03-j.pdf
1-2. Progress of Contaminated Water Treatment and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_04-j.pdf
1-3. Frozen Soil Wall Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_05-j.pdf
1-4. High-Performance ALPS Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_06-j.pdf
1-5. Tritiated Water Taskforce
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c150729_07-j.pdf
2. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (7/30/2015)

(only in Japanese)

2-1. Plant Status

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_04-j.pdf

2-2. Summary Status of Decommissioning Roadmap (file size: 11 MB)

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_05-j.pdf

(English translation as of 6/25/2015)

http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d150625_01-e.pdf

2-3. Contaminated Water Issues (file size: 10 MB)

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_06-j.pdf

2-4. Spent Fuel Pool Issues (file size: 10 MB)

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_07-j.pdf

2-5. Preparation for Fuel Debris Removal

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_08-j.pdf

2-6. Radioactive Waste Processing

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_09-j.pdf

2-7. Circulating Water Core Cooling System

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_10-j.pdf

2-8. Environmental Radiation Issues (file size: 15 MB)

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_11-j.pdf

2-9. Work Environment Improvement

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_12-j.pdf

2-10. Summary of 1st Decommissioning R&D Collaboration Council (file size: 28 MB)

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150730_15-j.pdf

3. Completion of Removal of Highly-Contaminated Water from Seawater Piping Trenches (7/30/2015)

http://www.tepco.co.jp/en/press/corp-com/release/2015/1256382_6844.html

4. 160-page Presentation on Fukushima Accident (6/15/2015@Harvard University)

https://drive.google.com/file/d/0B3xzjqQbkug9aU9tX0FJS2pPenM/view?usp=sharing

** If you cannot display Japanese characters, please install the following font packs:*

http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,

Kenji

Kenji Tateiwa
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company, Inc.
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
office: +81-3-6373-4751
(b)(6) cell: [redacted]
tateiwa.kenji@tepco.co.jp

From: Tateiwa, Kenji
Sent: 26 Jun 2015 19:55:20 -0400
To: tateiwa.kenji@tepco.co.jp
Subject: [External_Sender] [Transition from DC to Tokyo] New Role in Decommissioning Safety

Dear Friends and Colleagues,
Today will be my last day working out of the Washington DC Office of TEPCO.
After spending 4 productive years in DC, I will be departing the U.S. on Sat, June 27 and start working at TEPCO's Tokyo HQ on July 1 as Safety Engineering Group Manager of Fukushima Daiichi Decontamination & Decommissioning Engineering Company.
Thank you for your continued support to TEPCO after the Fukushima Daiichi accident in March 2011.
We could not have made it thus far without all your support.
For your information, you can find my latest interview on the online Nuclear Plant Journal describing the current status of Fukushima Daiichi.
http://digitaleditions.nuclearplantjournal.com/MJ15/#32
Feel free to contact me should you have any questions related to Fukushima.
I look forward to keeping in touch.
All the best,
Kenji
p.s.
Please forgive my slow response in emails for the next few weeks while I make my transition back to Japan.
Kenji Tateiwa
email: tateiwa.kenji@tepco.co.jp
LinkedIn: https://www.linkedin.com/in/ktateiwa
----------]
(From Sep. 2011 to June 2015)
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
(From July 2015)
Safety Engineering Group Manager
Fukushima Daiichi D&D Engineering Company
Tokyo Electric Power Company
1-1-3 Uchisaiwai-cho, Chiyoda-ku
Tokyo, Japan
tel: +81-3-6373-4751

From: Tateiwa, Kenji
Sent: 7 May 2015 18:50:11 -0400
To: Skeen, David;Orders, William;Reckley, William;Norton, Charles;Marksberry, Don
Subject: [Fukushima Presentation at NRC - May 7, 2015] Slides, photo, and thank you
Attachments: Fukushima Accident@NRC_05072015.pdf, NRC-TEPCO.JPG
Importance: Normal

Dave, Bill, Don, and Chuck,

It was a great pleasure and honor having the opportunity to talk about a broad scope of topics related to the Fukushima accident with you and your colleagues at the NRC this morning.

It is always invigorating for me to interact with people like you who are motivated to learn from this accident in a serious manner.

Thank you also for the wonderful gifts and a tasty El Salvadoran lunch.

Please find attached the final version of my presentation.
You can find urls to all of the videos that I showed during my talk embedded in the slides.
Feel free to distribute this internally or externally of NRC.

Don,

About making today's video publicly available, it would be no problem without the Q&A session.
If you would like to include the Q&A session, I will probably have to run it through our headquarters.

William,

I am sorry to have missed you today.
Thank you very much for proposing to have me give a presentation at the NRC and making the necessary arrangement.

I look forward to keeping in touch with all of you even after I return to Japan.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW, Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)
----- Original Message -----
From: "Tateiwa, Kenji" <tateiwa.kenji@tepco.co.jp>
To: "Orders, William" <William.Orders@nrc.gov>
Cc: "Reckley, William" <William.Reckley@nrc.gov>

Sent: Thursday, May 07, 2015 7:44 AM
Subject: [Fukushima Presentation at NRC - May 7, 2015] Slides and Bio

> Bill,
>
> Please find below my bio and attached a copy of my presentation.
>
> Kenji Tateiwa is Manager of Nuclear Power Programs at TEPCO Washington Office, where he leads collaborative efforts with organizations in the U.S. to enhance the safety of nuclear facilities based on lessons learned from the Fukushima Daiichi nuclear accident and to promote safe decommissioning of the site.
> Kenji received his bachelor's and master's degrees in Nuclear Engineering from Kyoto University in Japan. He began his career at TEPCO in 1996 working at the Fukushima Daini Nuclear Power Station, then at the headquarters in the Nuclear Engineering Department, specializing in severe accident analysis and PRA. After receiving an MBA from the Stanford Graduate School of Business in 2004, Kenji led TEPCO's involvement (as technical advisor and potential equity investor) in the South Texas Project Units 3&4 nuclear new build project in the U.S.
> Kenji has coped with the Fukushima accident from day one, playing a key role as liaison between TEPCO and nuclear experts around the world, especially from the U.S. nuclear industry, who supported TEPCO in the face of the unprecedented disaster. Since his stint in Washington, DC in September 2011, he has shared first-hand account of the Fukushima accident and lessons learned on more than 190 occasions.
>
> See you soon.
>
> All the best,
> Kenji
> ---
> Kenji Tateiwa
> Manager, Nuclear Power Programs
> Tokyo Electric Power Company
> Washington Office
> 2121 K Street, NW Suite 910
> Washington, DC 20037
> tel: +1-202-457-0790 (ext.)116
> mobile: (b)(6)
>
> ----- Original Message -----
> From: Tateiwa, Kenji
> To: Reckley, William
> Cc: Orders, William
> Sent: Monday, May 04, 2015 10:39 AM
> Subject: Re: Presentation - May 7, 2015
>
>
> William,
>
> Yes, I will be at the NRC gate by 8:15 am on Thu, May 7th.
> Thank you for making arrangement for the parking lot.
>
> I will plan for a 90 minute session including Q&A.
> Please find attached a copy of the consent form.
>

> All the best,
> Kenji
> ----------
> Kenji Tateiwa
> Manager, Nuclear Power Programs
> Tokyo Electric Power Company
> Washington Office
> 2121 K Street, NW, Suite 910
> Washington, DC 20037
> tel: +1-202-457-0790 (ext.)116
> mobile: (b)(6)
>
> ----- Original Message -----
> From: Reckley, William
> To: 'tateiwa.kenji@tepco.co.jp'
> Cc: Orders, William
> Sent: Monday, May 04, 2015 8:53 AM
> Subject: Re: Presentation - May 7, 2015
>
> Kenji, would it possible for us to meet you at the NRC gate at about 8:15 to give us a little time to make sure everything is set up and working in the room?
>
> Sent from an NRC BlackBerry
> William Reckley
(b)(6)
>
>
> From: Reckley, William
> Sent: Friday, May 01, 2015 04:59 PM
> To: Tateiwa, Kenji <tateiwa.kenji@tepco.co.jp>
> Cc: Orders, William
> Subject: RE: Presentation - May 7, 2015
>
> We have arranged a space and someone will meet you at the gate behind our building .. Using your own laptop is fine. If you don't mind, we could plan on the 90 minute version - including questions.
>
> -----Original Message-----
> From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
> Sent: Thursday, April 30, 2015 9:02 AM
> To: Reckley, William
> Cc: Orders, William
> Subject: Re: Presentation - May 7, 2015
>
>
> William,
>
>
> Yes, I am ready for the presentation on Thu, May 7th.
>
> - I will be at the One White Flint Building at 8:30 am.
>
> - If you could arrange for a parking space, that would be much appreciated--I will be driving a grey Toyota Corolla (tag # MD 7BL8085).
>
> - I am currently preparing an updated presentation. If possible, I would like to use my own

laptop but I will also email the file to you when it is finalized.
>
> - I would like to play a short video clip with audio during me presentation. Could you arrange for a speaker that I can connect my laptop for sound?
>
> - I will sign the consent form and bring it with me on May 7th.
>
> - How much time would you like me to spend for my talk including Q&A--1 hour or 1.5 hours? I am completely flexible.
>
>
> Very much looking forward to talking to you and your colleagues at the NRC.
>
>
> All the best,
> Kenji
> ---
> Kenji Tateiwa
> Manager, Nuclear Power Programs
> Tokyo Electric Power Company
> Washington Office
> 2121 K Street, NW Suite 910
> Washington, DC 20037
> tel: +1-202-457-0790 (ext.)116
> mobile: (b)(6)
>
>
> ----- Original Message -----
> From: Reckley, William
> To: tateiwa.kenji@tepco.co.jp
> Cc: Orders, William
> Sent: Thursday, April 30, 2015 8:42 AM
> Subject: Presentation - May 7, 2015
>
> Kenji .. I just wanted to check in and make sure that we were still OK for next Thursday, May 7, 2015. We have a room in our training area for 9:00am on that day and are arranging for interested staff to attend. We can meet with you at about 8:30am at the entrance to the One White Flint Building, sign you in through security, and then walk over to the training center, which is our newer Three White Flint Building. Would you plan to drive up (we can secure you a parking space) or take the Metro? In addition, do you plan to use the presentation you previously emailed or do you have a revised presentation? If we can make sure we have the presentation you want to use, we will have it loaded and ready to go that Thursday morning. One last thing, attached is a form that we are required to provide in order for you to give permission for us to record the presentation. You can sign and return or we will have a copy ready next Thursday and can just have you sign it then. Thanks
>
> again for agreeing to do this and hopefully things are going well as your make your preparations for your return to Japan.
>
> William D. Reckley
>
> Japan Lessons Learned Project Directorate william.reckley@nrc.gov
>
> (301) 415-7490
>

Fukushima Nuclear Accident

~A TEPCO Nuclear Engineer's Perspective~

Briefing for the U.S. Nuclear Regulatory Commission

Rockville, Maryland
May 7th, 2015

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company, Washington Office
tateiwa.kenji@tepco.co.jp

TEPCO

Table of Contents

- My Background
- Overview of the Great East Japan Earthquake
- Accident Response at Fukushima Daiichi/Daini
- Lessons Learned/Nuclear Safety Reform
- Safety Enhancement at Kashiwazaki Kariwa
- Current Status of Fukushima Daiichi
- Decommissioning Roadmap/Global Collaboration
- Personal Thoughts

My Background

- **'90~'96: Kyoto University**

  BS/MS in Nuclear Engineering

- **'96~: TEPCO**

  '96~'00: **Fukushima Daini NPS**

  '00~'02: **Nuclear Engineering Dept., Tokyo-H/Q (severe accident analysis)**

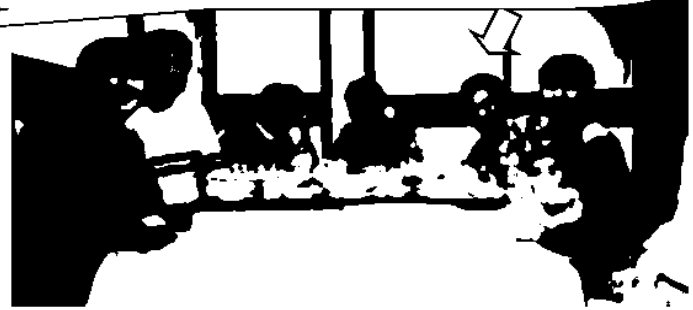
  '02~'04: **MBA, Stanford Graduate School of Business**

  '04~'05: **Nuclear Engineering Dept.**

  '05~'11: **International Affairs Dept.**

***Spent 9-y in NY/LA during childhood** ('73-'77, '81-'86)*

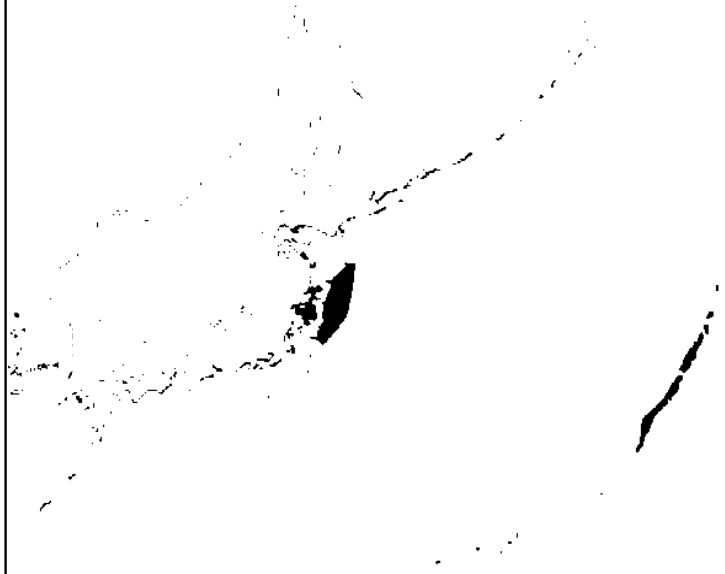
***TEPCO class of '96 in Naraha-town, Fukushima** (Jan. 2000)*



***Pursued "Nuclear Renaissance" in Texas** (June 2010)*

My Background (cont'd)

Then, everything changed…



http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=77331

Great East Japan Earthquake (March 11, 2011)

Mar.~Sept.'11: **Fukushima Response Int'l Team, Tokyo-H/Q**

Sept. '11~: **Washington DC Office**

My Post-Accident Activities

Press Release (Mar 11,2011)
Occurrence of a Specific Incident Stipulated in Article 10. Clause 1 of the Act on Special Measures Concerning Nuclear Emergency Preparedness(Fukushima Daiichi)

Today at approximately 2:46PM, turbines and reactors of Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station Unit 1 (Boiling Water Reactor, rated output 460 Megawatts) and Units 2 and 3 (Boiling Water Reactor, Rated Output 784 Megawatts) that had been operating at rated power automatically shutdown due to the Miyagiken-oki Earthquake.

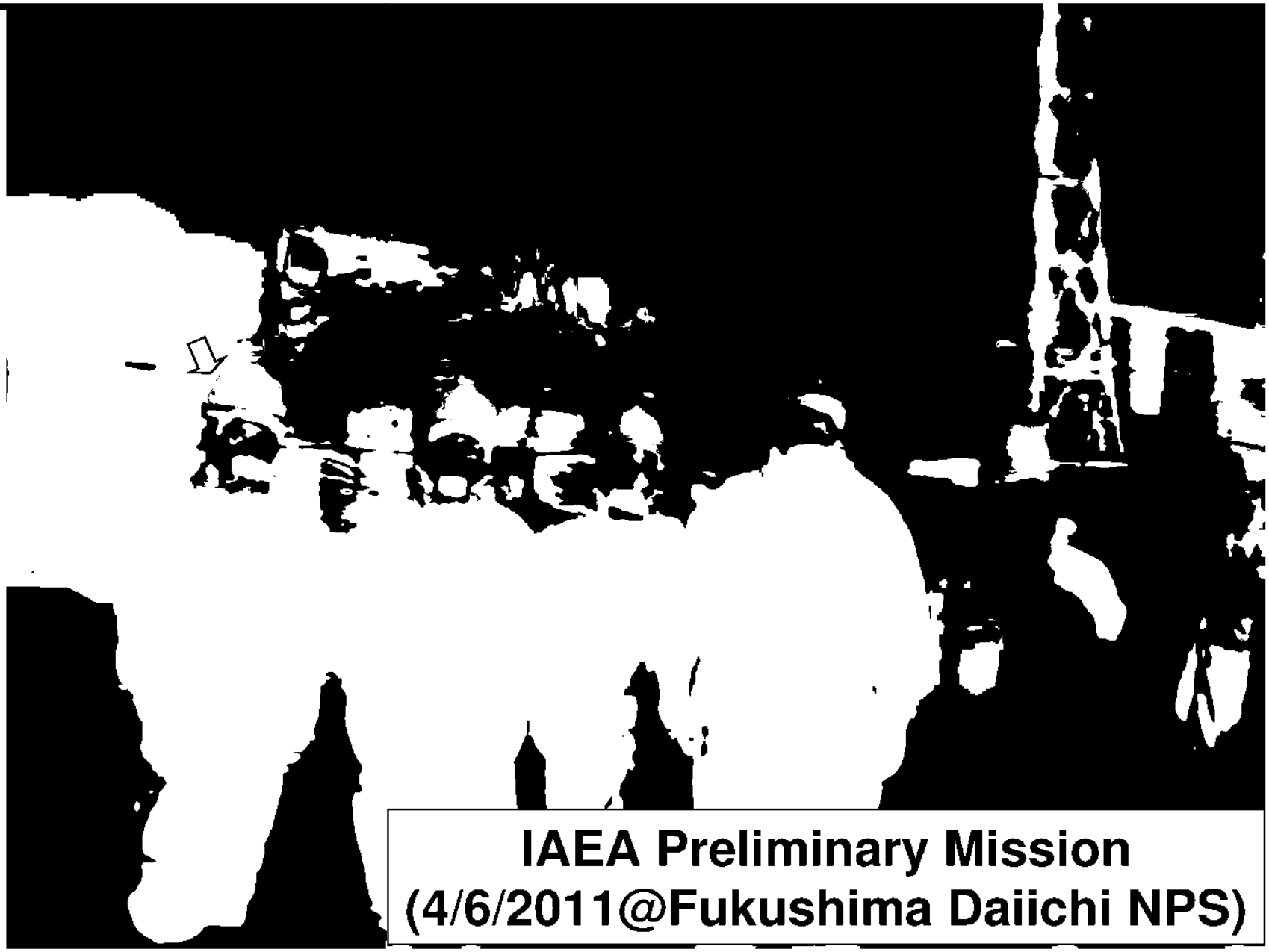
Translation of Press Releases (3/11/2011@Tokyo-H/Q)

Briefings at 15 Embassies in Tokyo (6/24/2011@Delegation of EU to Japan)

Meeting with U.S.-NRC, INPO, and Japan-NISA (3/27/2011@Tokyo-H/Q)

NRC: Nuclear Regulatory Commission
INPO: Institute of Nuclear Power Operations
NISA: Nuclear and Industrial Safety Agency

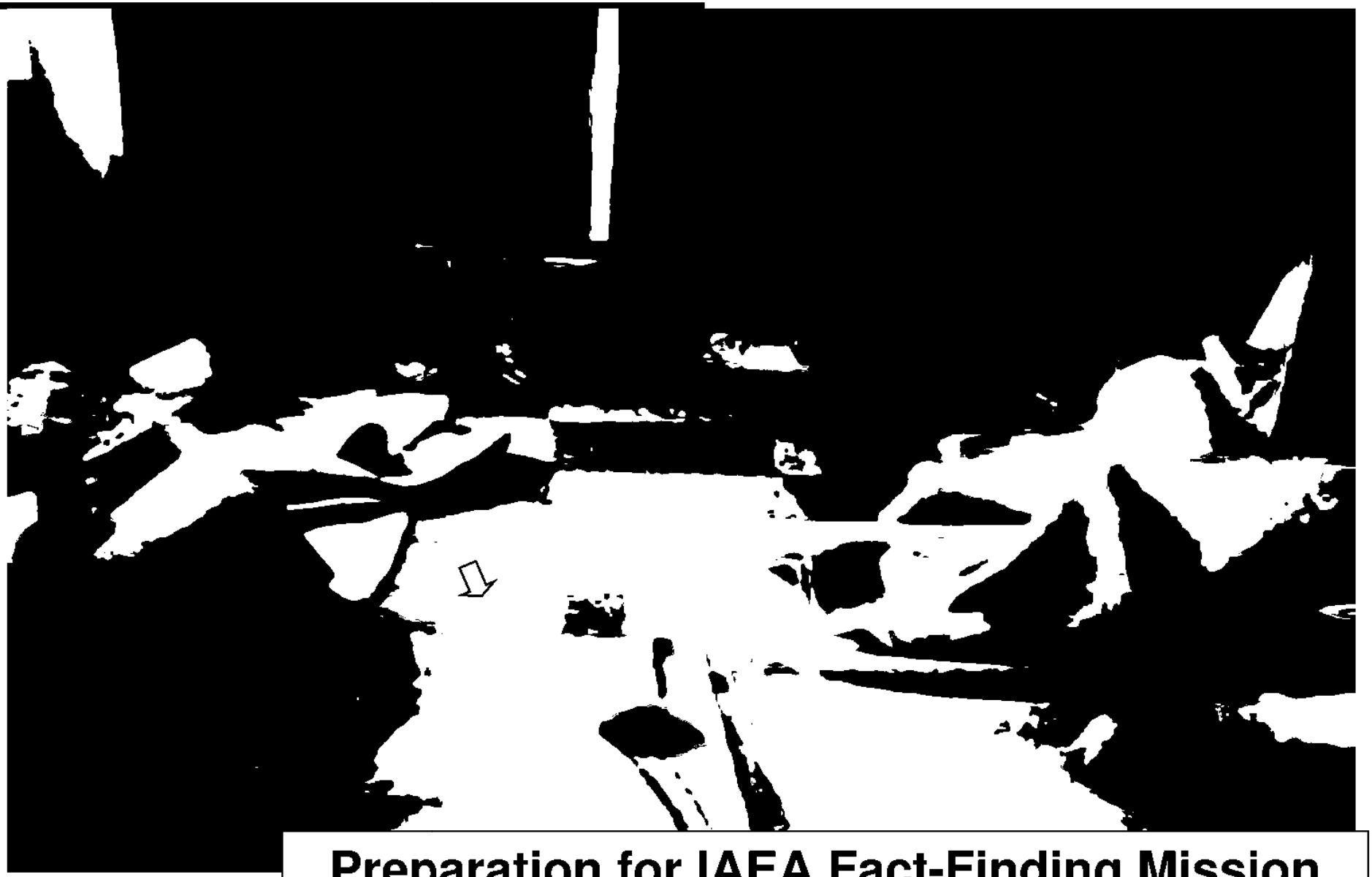
My Post-Accident Activities (cont'd)



IAEA Preliminary Mission
(4/6/2011@Fukushima Daiichi NPS)

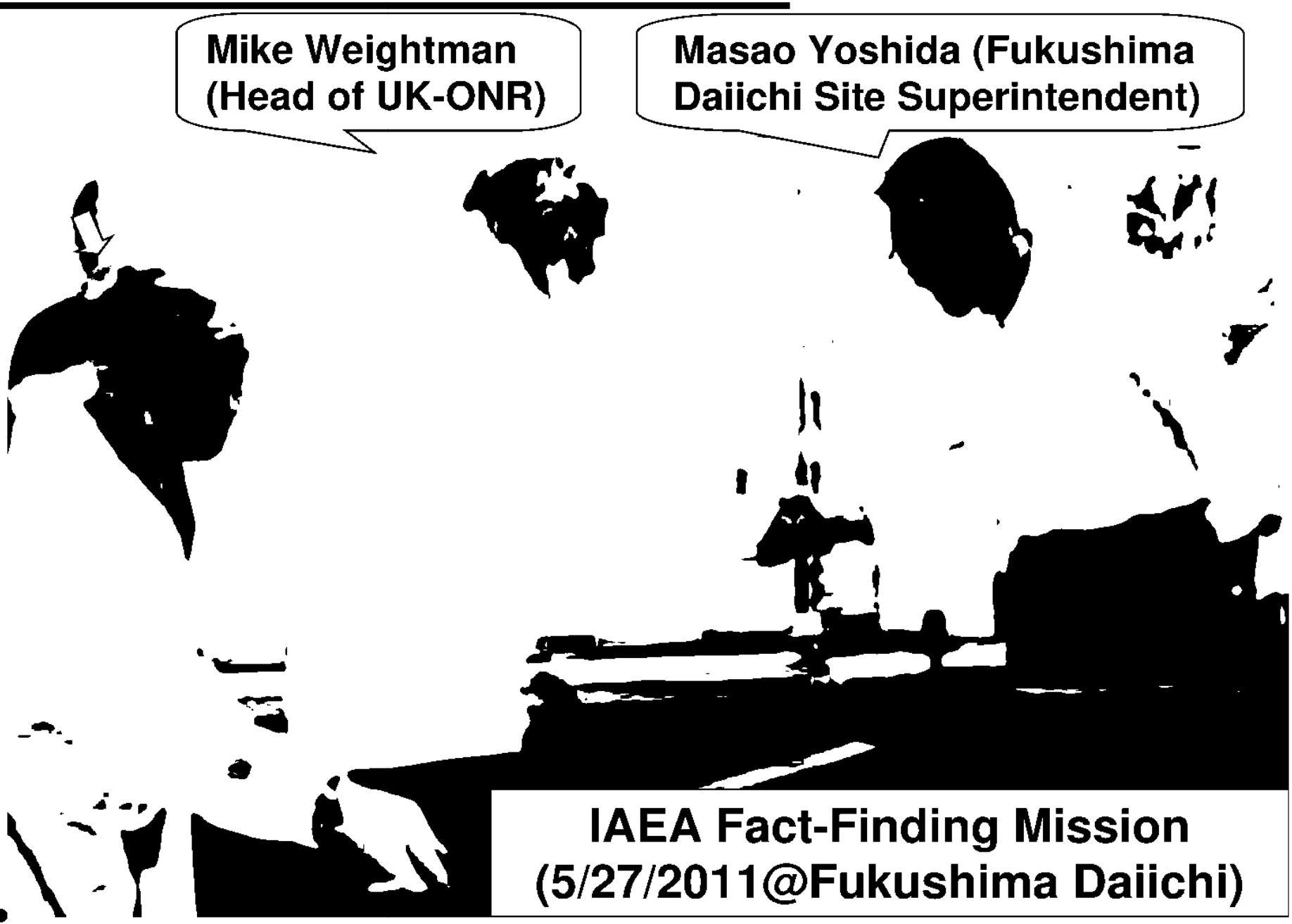
IAEA: International Atomic Energy Agency

My Post-Accident Activities (cont'd)



Preparation for IAEA Fact-Finding Mission (5/21/2011@Fukushima Daiichi "*Bedroom*")

My Post-Accident Activities (cont'd)



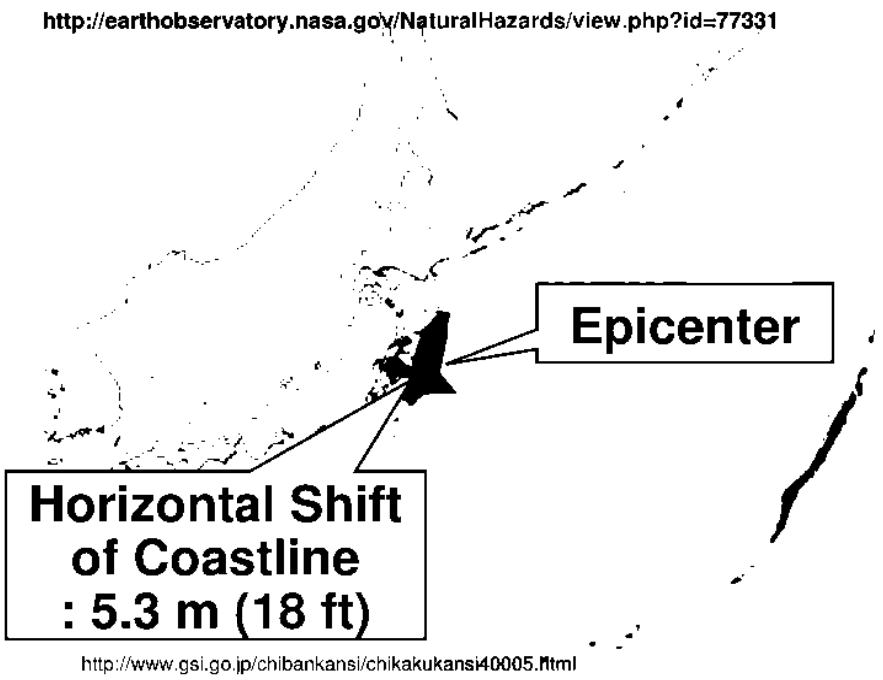
IAEA Fact-Finding Mission
(5/27/2011@Fukushima Daiichi)

My Post-Accident Activities (cont'd)

U.S. INPO-Led Industry Support Team (8/19/2011@Fukushima Daini)

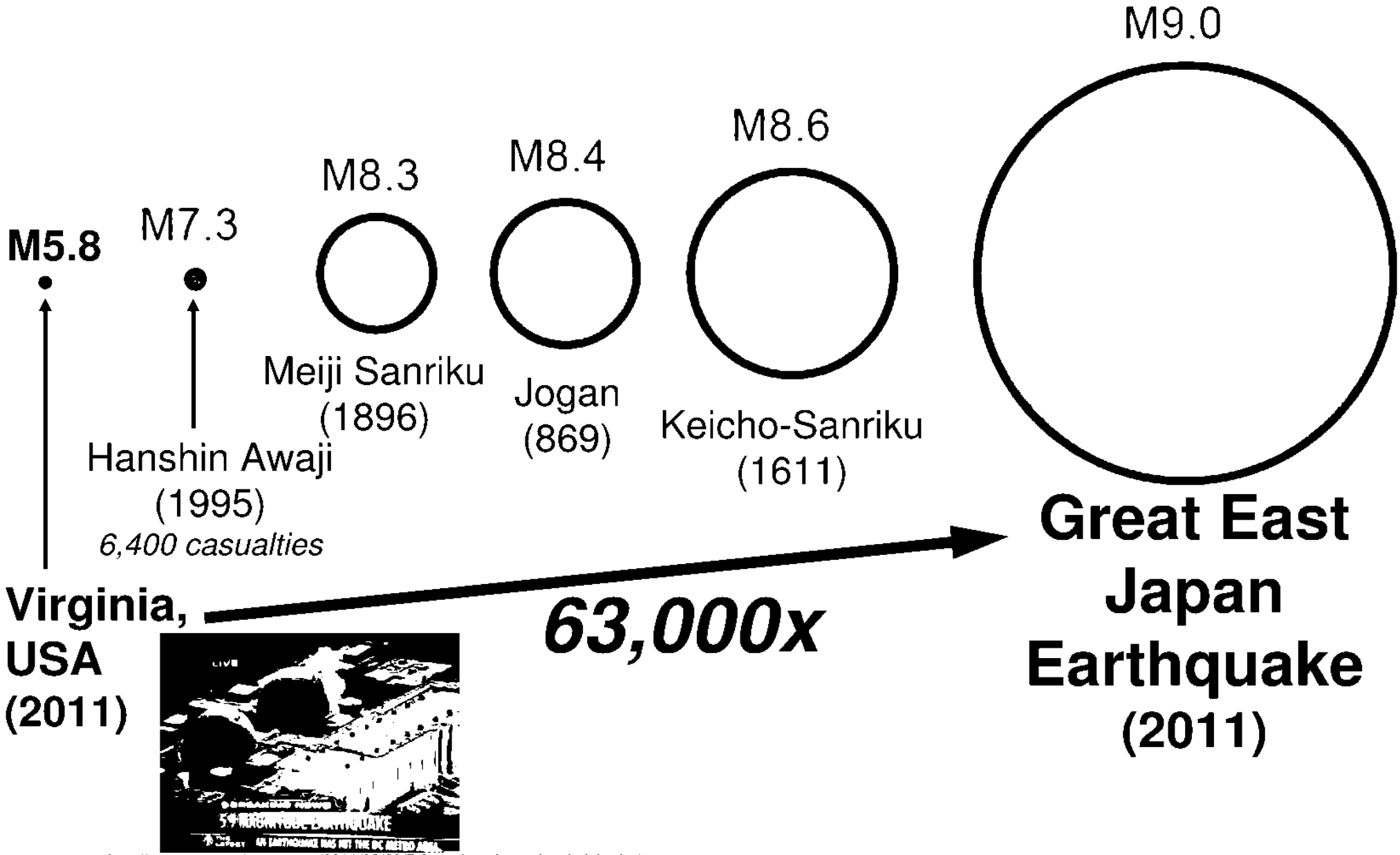
INPO: Institute of Nuclear Power Operations

Damage Due to Great East Japan Earthquake (GEJE)



- ***Largest earthquake (M9.0) and tsunami (M9.1) in recorded history of Japan***
- ***20+ m (66+ ft) tsunami run-up in coastline spanning 200 km (DC-Philly or LA-SD)***
- ***560 km^2 flooded (10x Manhattan)***
- ***19,000 dead/missing***

Comparison of Seismic Energy (Magnitude)



http://wcrnews.wordpress.com/2011/08/23/5-9-earthquake-rocks-virginia-d-c/

Impact of GEJE to TEPCO Facilities

Shutdown:

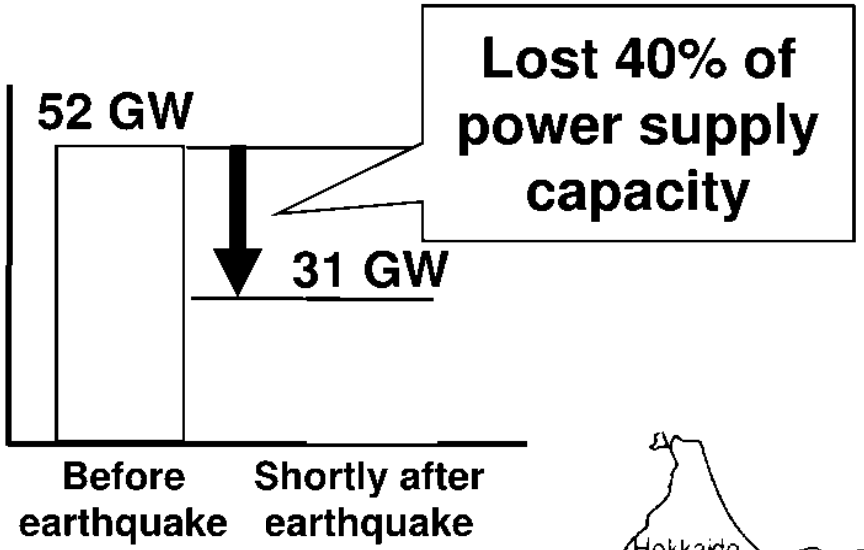
- Nuclear power: **7** units
- Thermal power: **12** units
- Hydro power: **25** units
- Substations: **8**

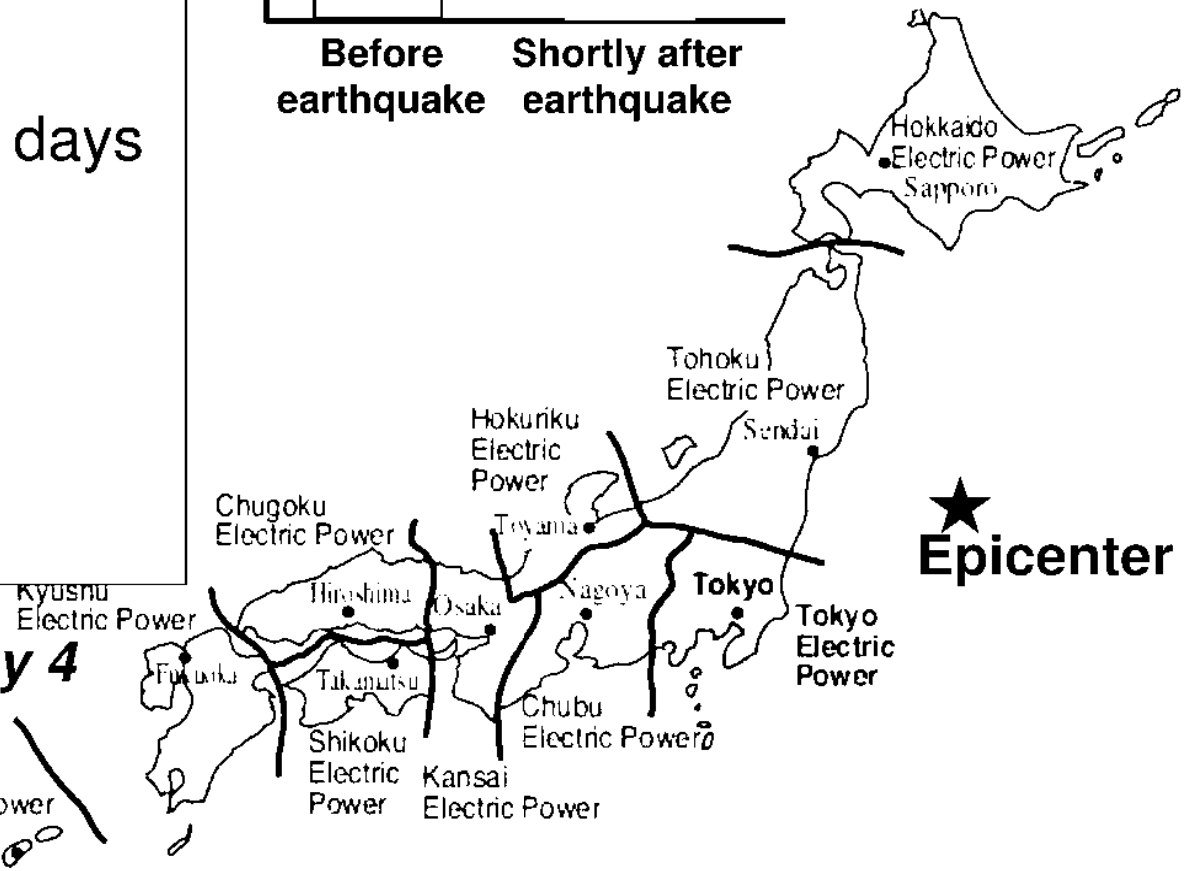
Power outage:

- **4 million households**
- Rolling blackout for 10 days

Massive interruption of infrastructure:

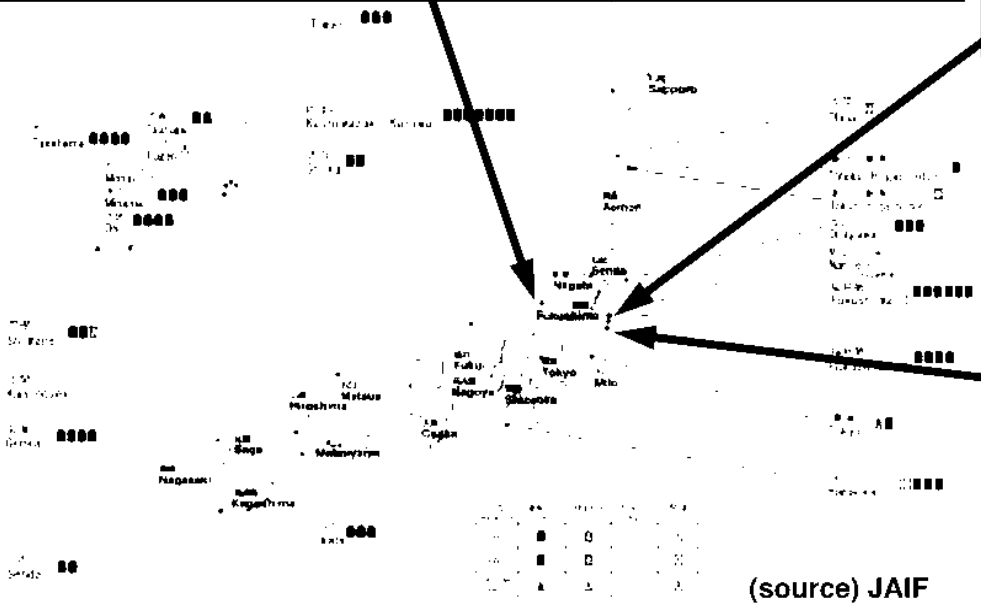
- Public transportation
- Telecommunication
- Food/water supply





Restored >99% of power by day 4

TEPCO's Nuclear Power Stations (17 BWR Units)



(source) JAIF

BWR: Boiling Water Reactor

Fukushima Daiichi (1F) and Daini (2F) NPS

Plant	Unit	Start of Operation	Reactor Type	Containment Type	Power Output (MWe)	Main Contractor	Pre-earthquake Status
1F	1	1971. 3	BWR-3	Mark-I	460	GE	Operating
	2	1974. 7	BWR-4	Mark-I	784	GE/Toshiba	Operating
	3	1976. 3	BWR-4	Mark-I	784	Toshiba	Operating
	4	1978.10	BWR-4	Mark-I	784	Hitachi	Outage Full core offloaded to spent fuel pool
	5	1978. 4	BWR-4	Mark-I	784	Toshiba	Outage
	6	1979.10	BWR-5	Mark-II	1,100	GE/Toshiba	Outage
2F	1	1982. 4	BWR-5	Mark-II	1,100	Toshiba	Operating
	2	1984. 2	BWR-5	Mark-II modified	1,100	Hitachi	Operating
	3	1985. 6	BWR-5	Mark-II modified	1,100	Toshiba	Operating
	4	1987. 8	BWR-5	Mark-II modified	1,100	Hitachi	Operating

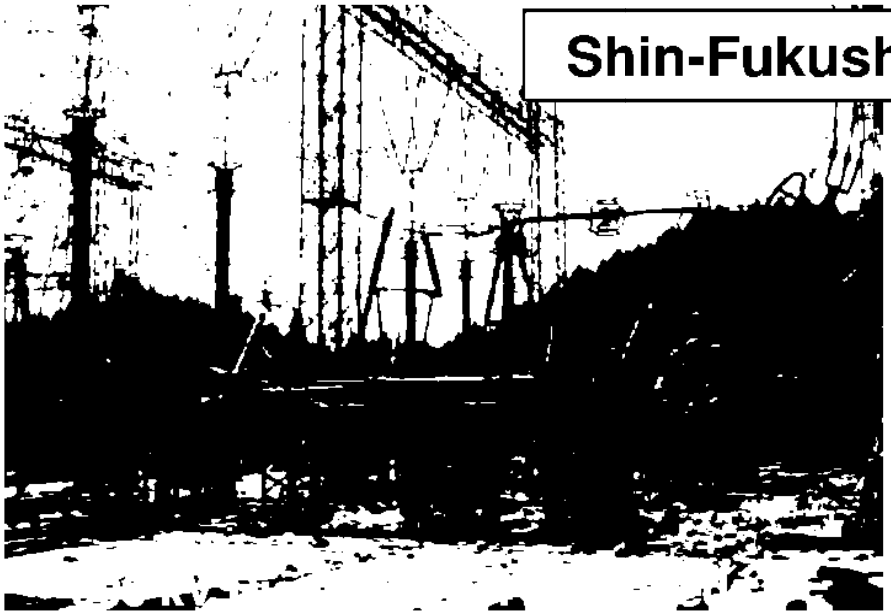
TEPCO Emergency Response Centers (ERC)

Tokyo H/Q

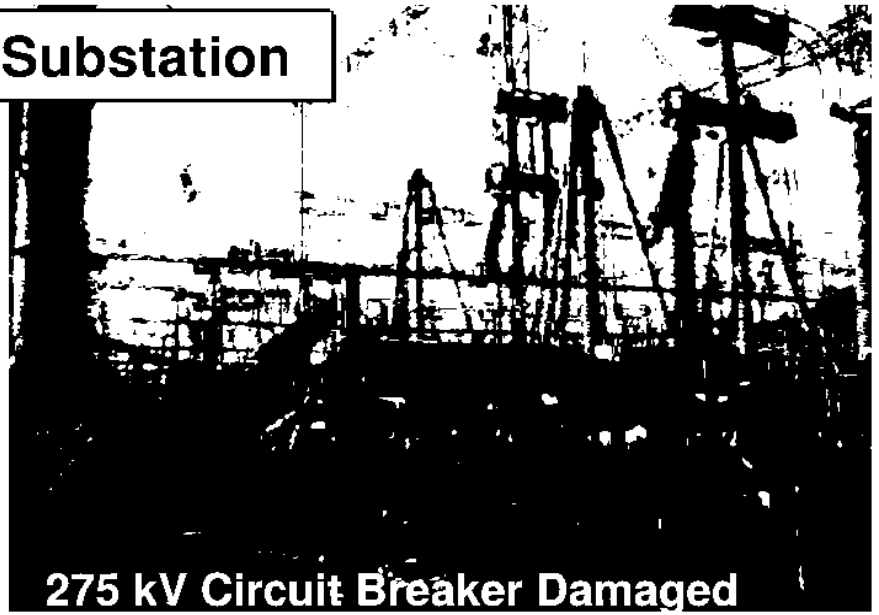
Video conference among multiple ERCs played instrumental role

Fukushima Daiichi

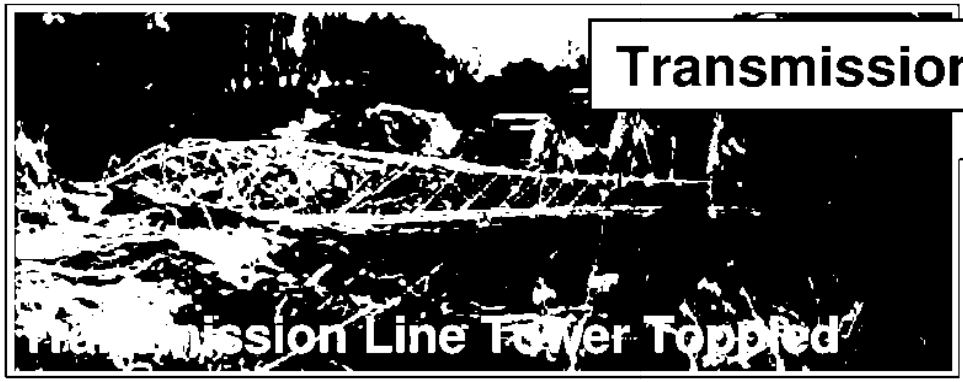
Impact of GEJE on Off-site Power to 1F/2F



Shin-Fukushima Substation

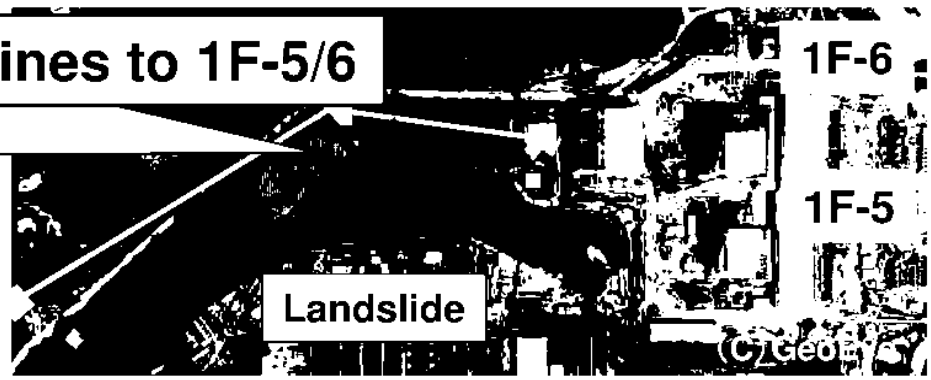


275 kV Circuit Breaker Damaged



Transmission Line Tower Toppled

Transmission Lines to 1F-5/6



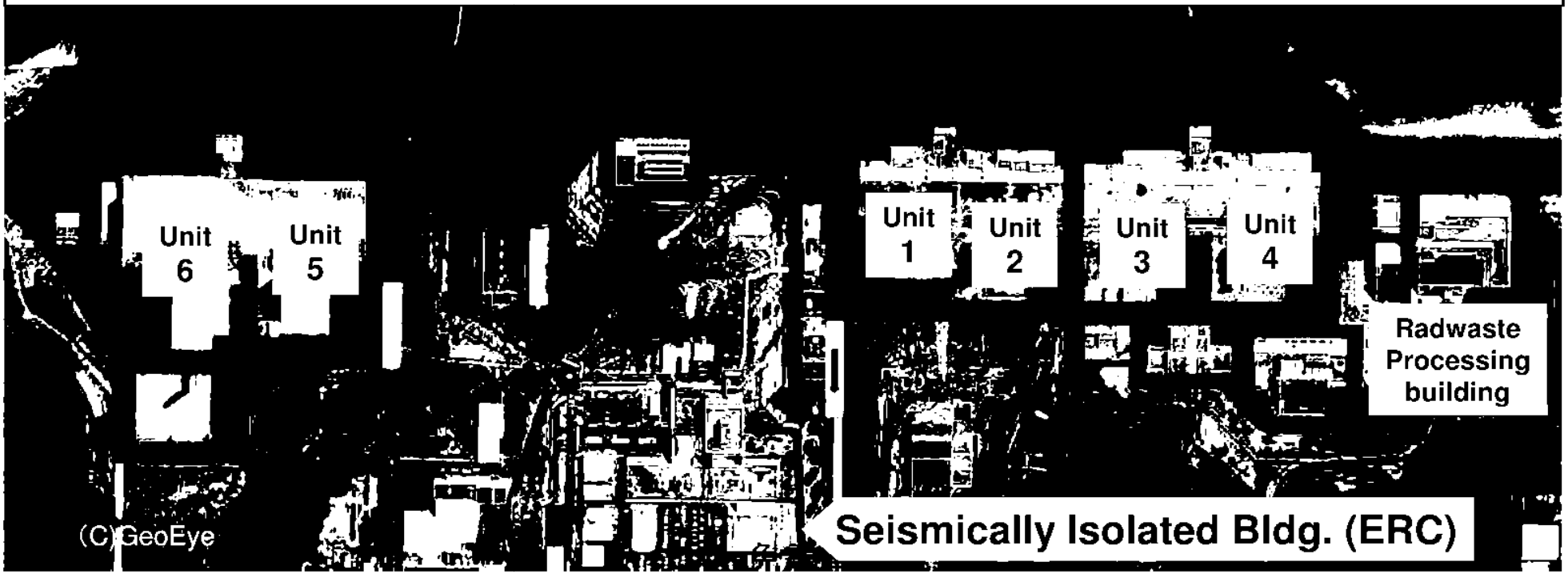
Damage at substation, collapse of transmission line tower, etc. led to:

- **Loss of all off-site power at 1F**
- **Loss of all but 1 line of off-site power at 2F**

However, all units at 1F/2F responded as designed after the earthquake

Impact of Earthquake/Tsunami at 1F

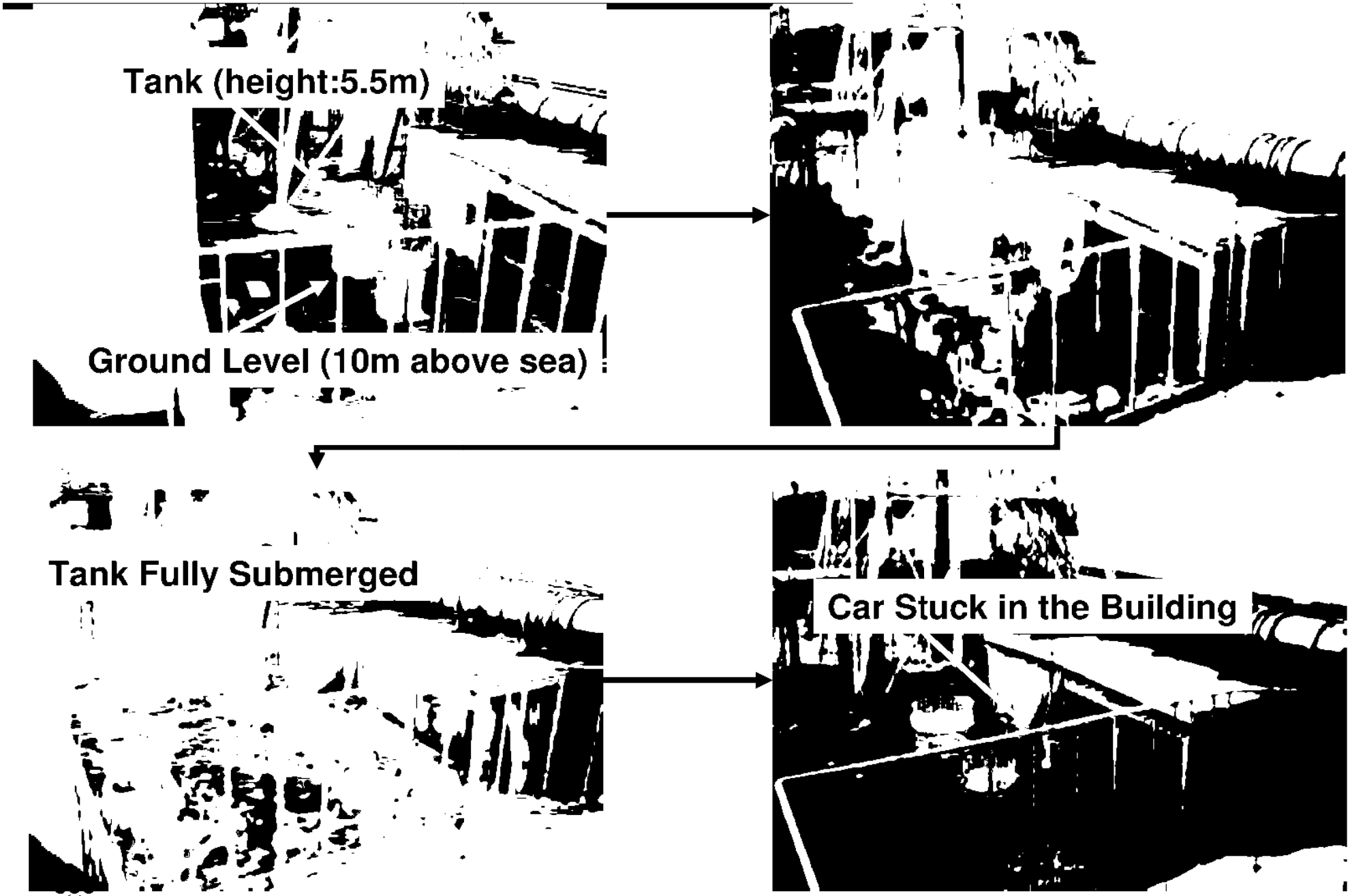
- **After the Earthquake (near design-basis):**
  - ✓Loss of all off-site power
  - ✓Plant responded as designed (automatic shutdown of operating units/startup of EDGs)
- **After the Tsunami (beyond design-basis):**
  - ✓Station Black Out (SBO) for 5 out of 6 units
  - ✓Loss of almost all safety system, instrumentation, lighting, etc.



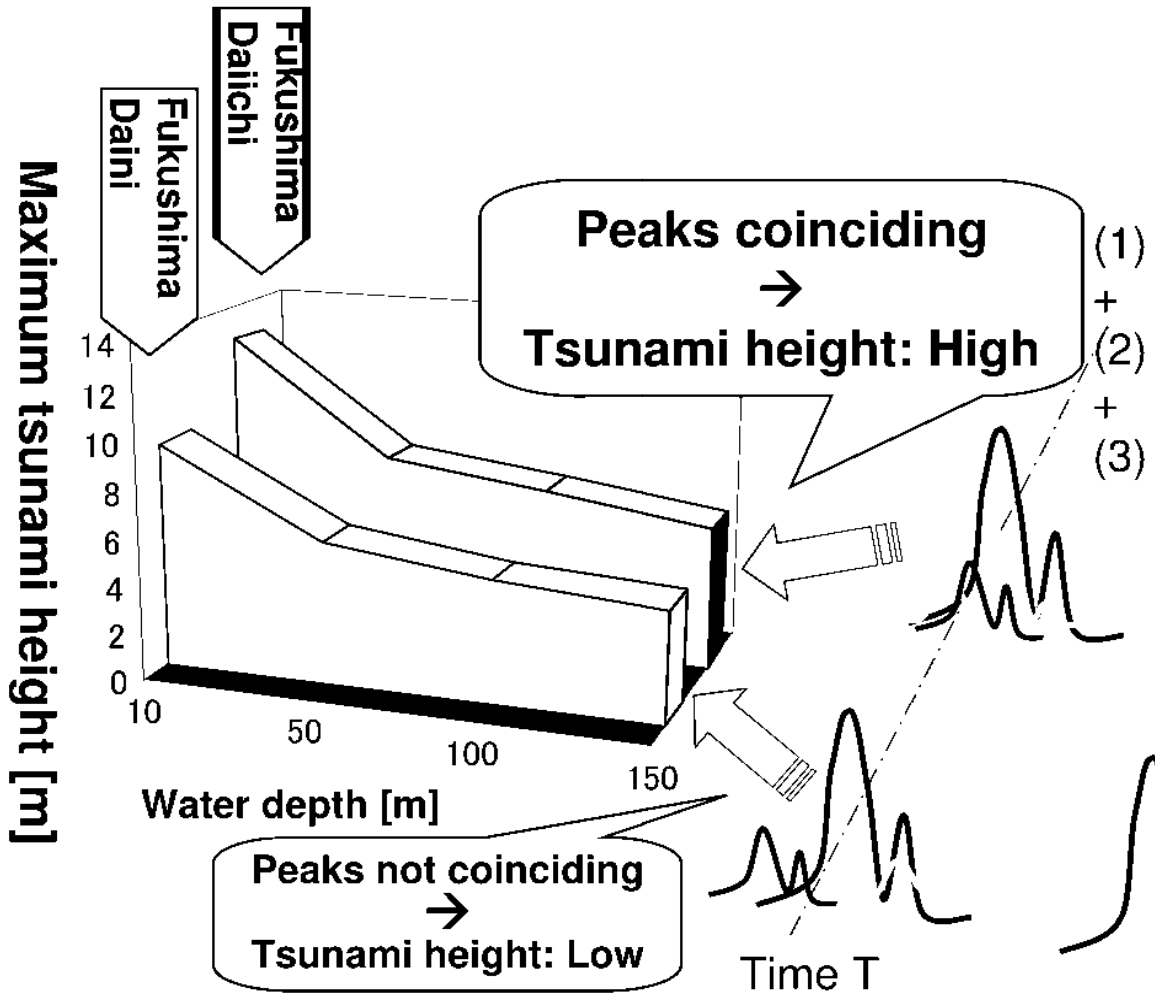
Tsunami at Fukushima Daiichi (1F)

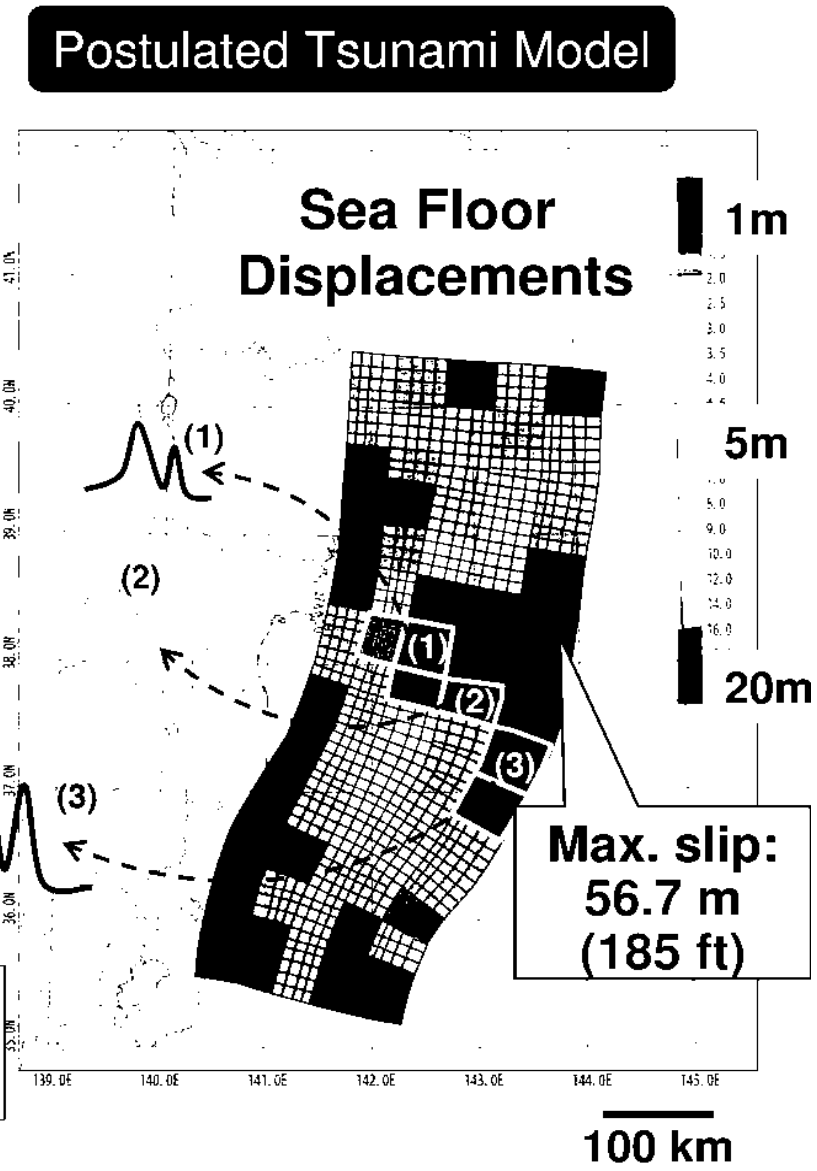
Estimated Tsunami Height:
13.1 m = 43 ft. (4-Story Bldg.)
4x historical-high and 2x design-basis

Tsunami at 1F (cont'd)



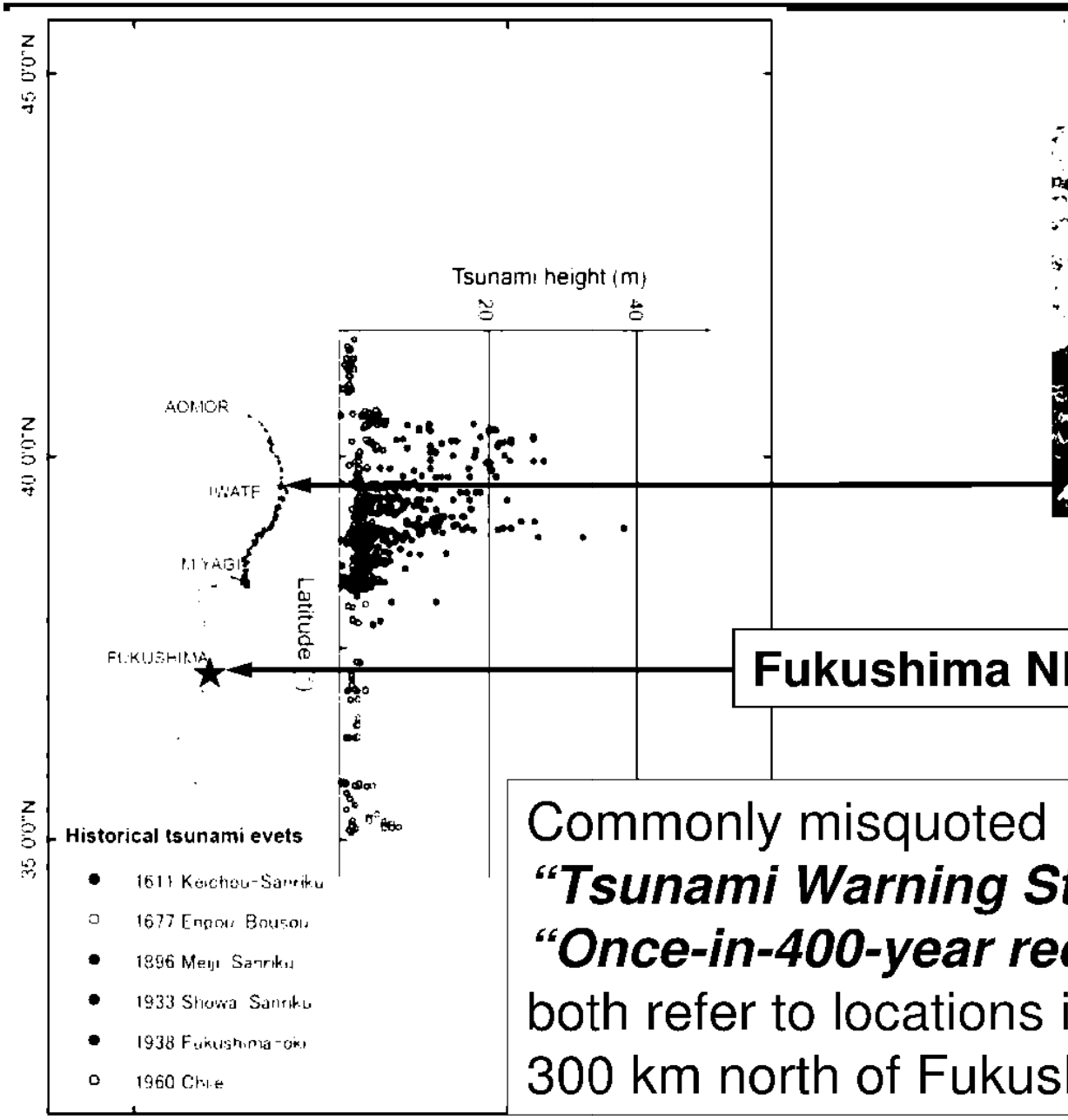
Amplification of Multiple Tsunami Waves Due to Large-scale Earthquake





No expert/institution predicted large-scale tsunami source of this magnitude

No Historical Evidence of Huge Tsunamis Near Fukushima NPSs



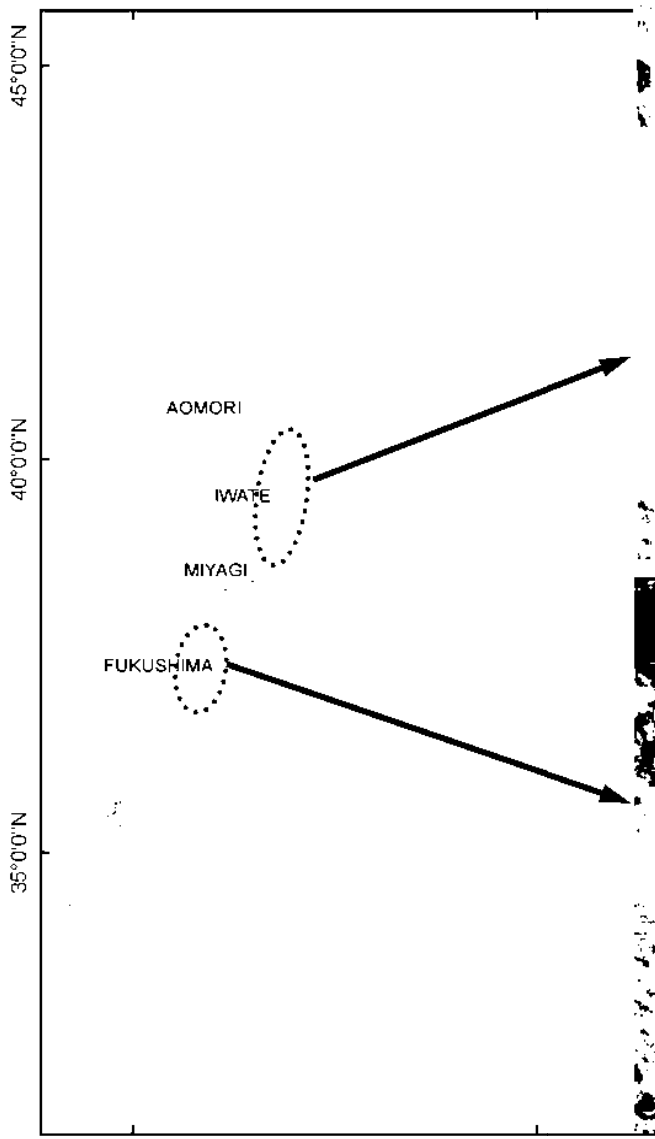
Tsunami Warning Stone
(Miyako, Iwate Pref.)

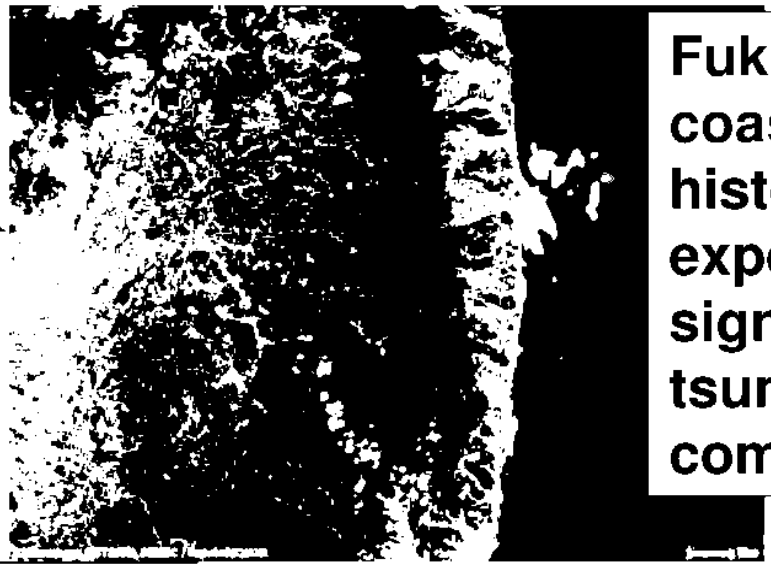
(source) http://blog.miyakomall.jp/2012/04/

Fukushima NPSs

Commonly misquoted
"Tsunami Warning Stone" and
"Once-in-400-year recurrence of 7-m tsunami"
both refer to locations in Iwate Prefecture,
300 km north of Fukushima NPS

Tsunami Height Heavily Dependent on Coastal Topography



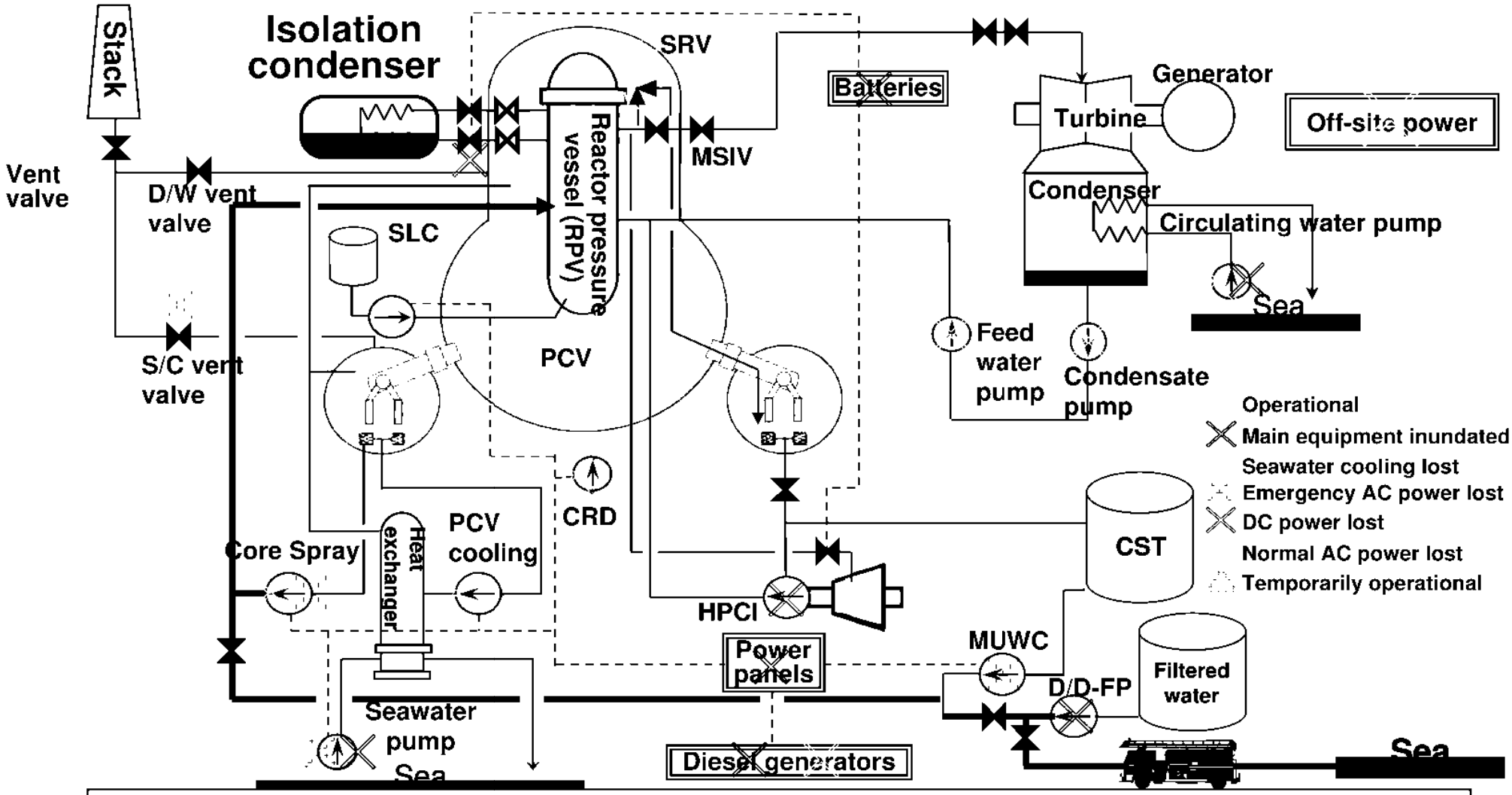


Iwate has deep-indented coastline that tends to magnify tsunami height

Fukushima has flat coastline and historically experienced significantly lower tsunami height compared to Iwate

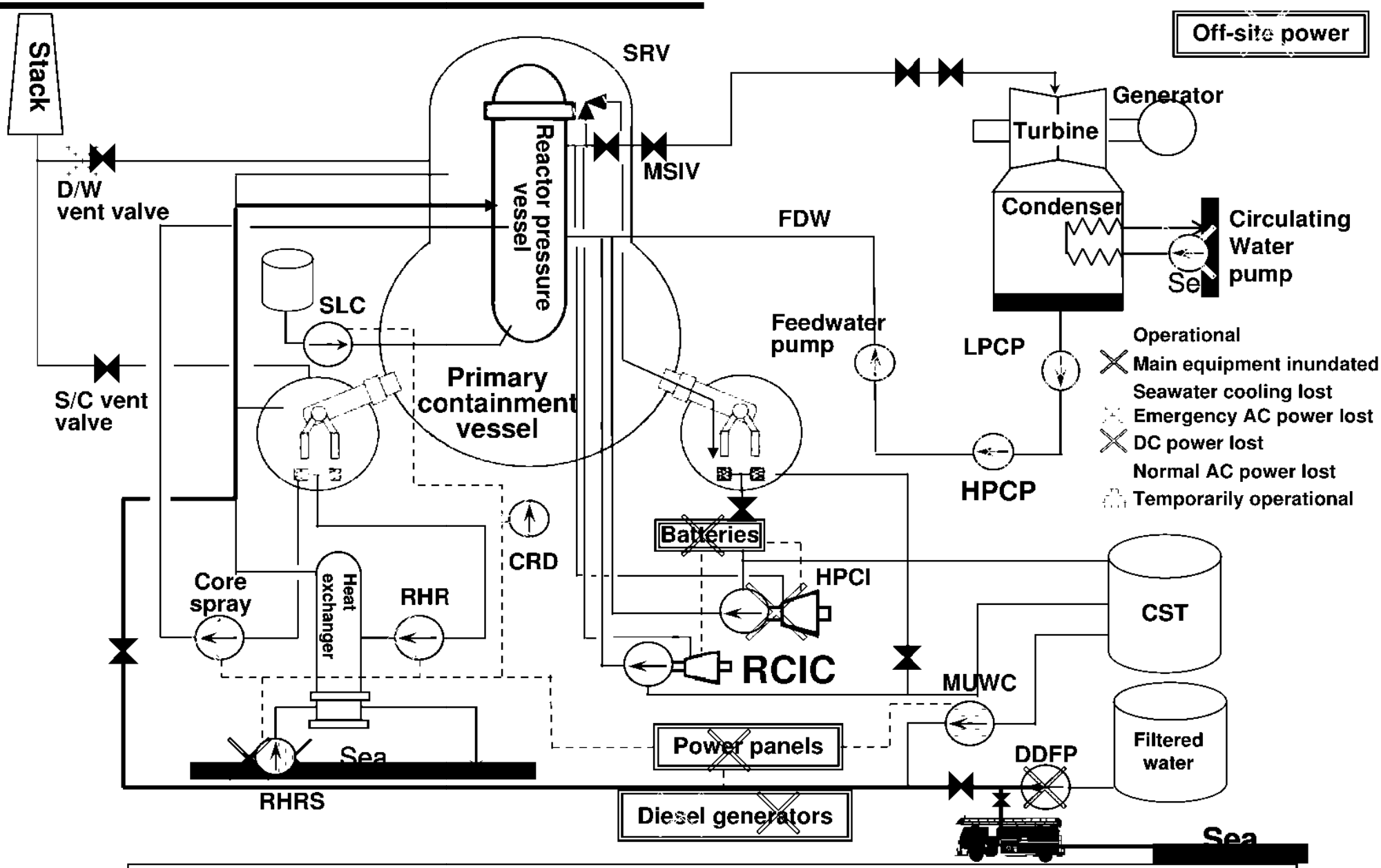
However, we should have been prepared for the unexpected

Plant Status After Tsunami (1F Unit 1: BWR-3/Mk-I)



- Reactor automatically shutdown after earthquake
- Loss of all AC/DC power + core cooling capability due to tsunami
- Core melt and Zr-water reaction led to H2 explosion in R/B
- Stabilization by sea water injection via fire trucks

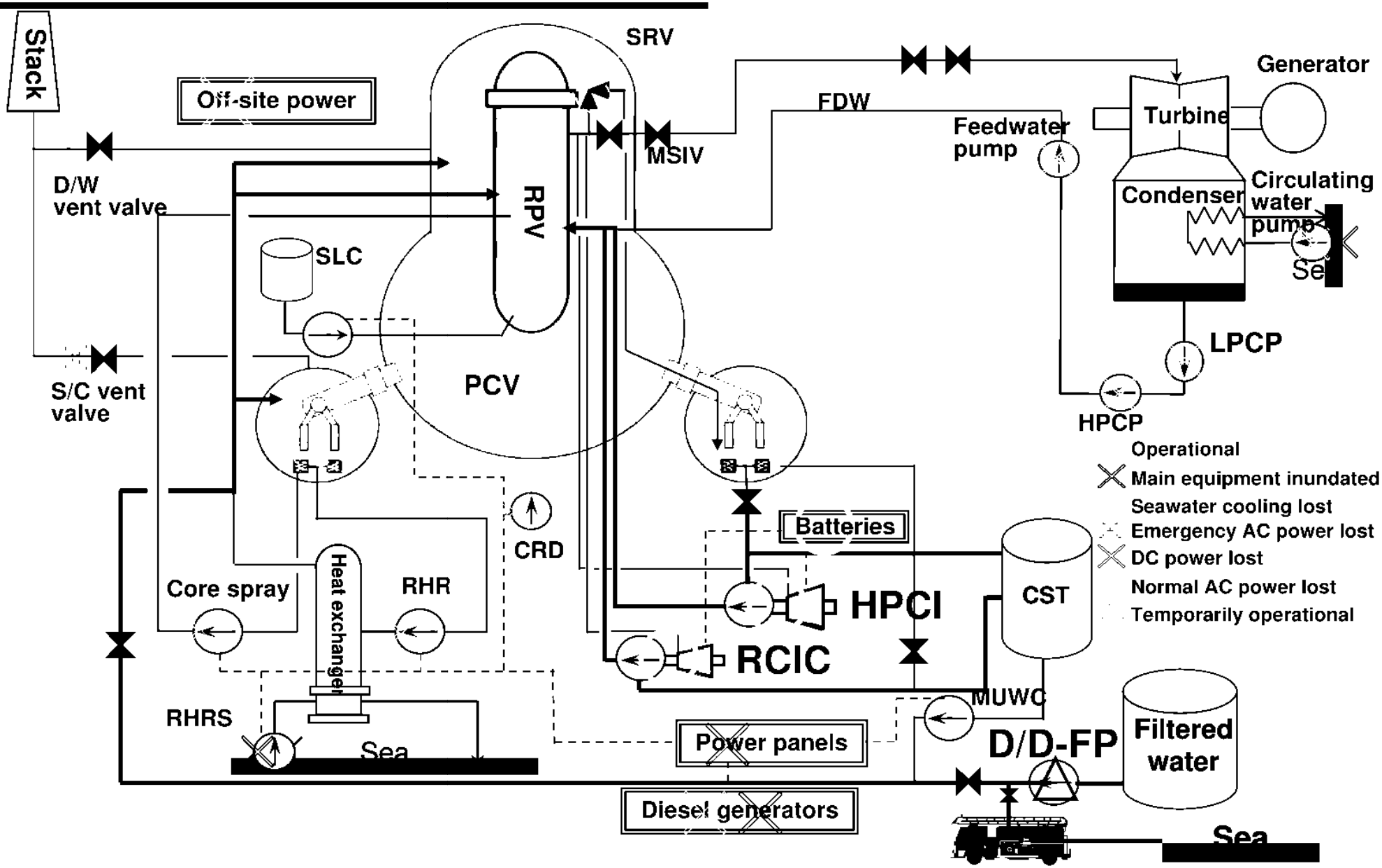
Plant Status After Tsunami (1F Unit 2 : BWR-4/Mk-I)



Turbine-driven RCIC continued to cool core for about 3 days

RCIC: Reactor Core Isolation Cooling

Plant Status After Tsunami (1F Unit 3 : BWR-4/Mk-I)



Turbine-driven RCIC and HPCI continued to cool the core for 1.5 d

HPCI: High Pressure Coolant Injection

Accident Response at 1F: In the Field

Roads damaged by earthquake

Continual aftershocks, tsunami alerts, open manholes, etc. exacerbated the situation

Roads blocked by tsunami debris

Accident Response at 1F: In the Main Control Room

Checked instrumentation in near-complete darkness

Supervised operation wearing full-face mask

Photos taken as "mementos"

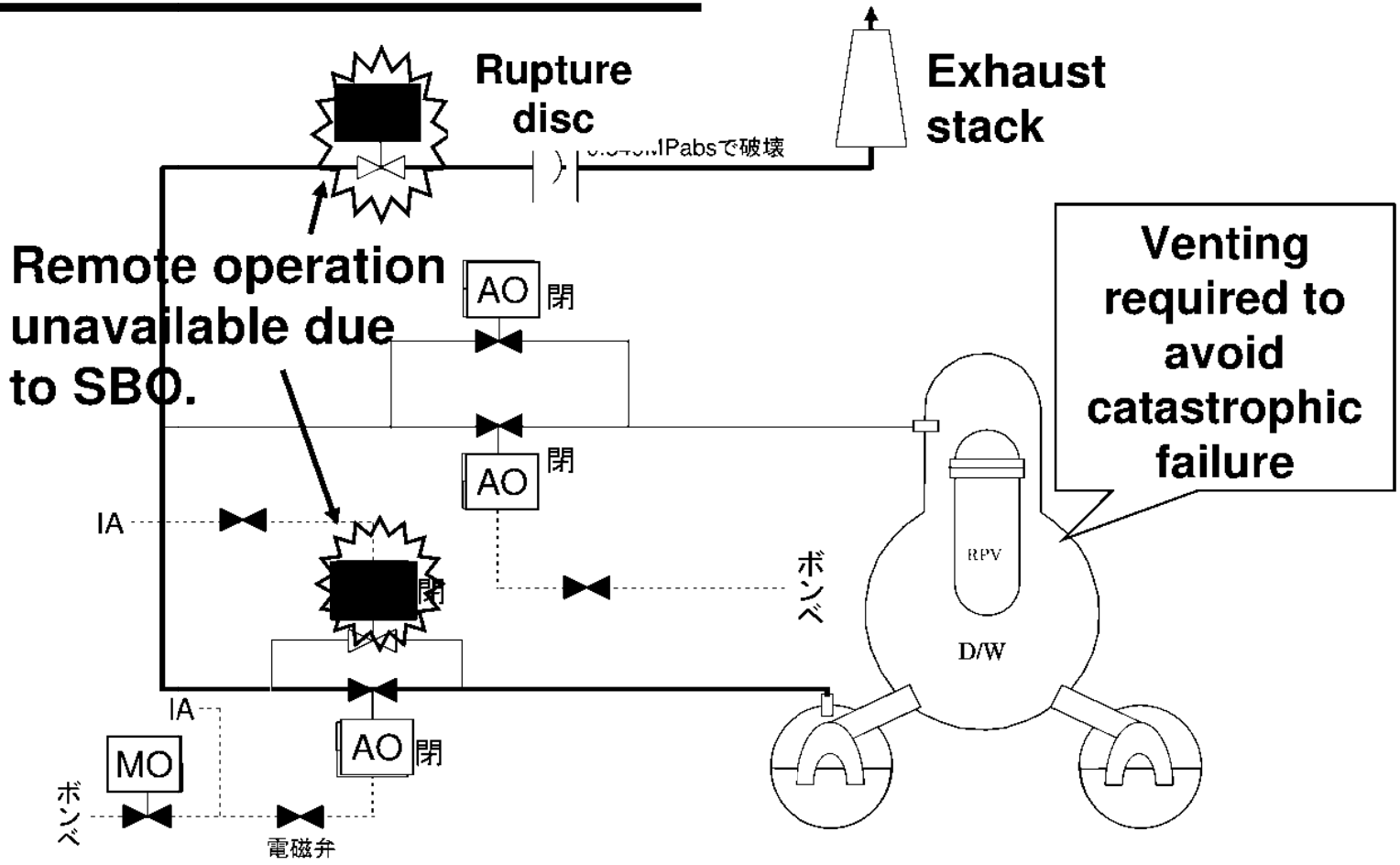
Brought in heavy batteries to restore instrumentations

Lack of: instrumentation, communication means, lighting, food, water, sleep, ...

Increase in: radiation level, fatigue, fear, despair, ...

→*Yet, operators stayed behind to carry through their duties*

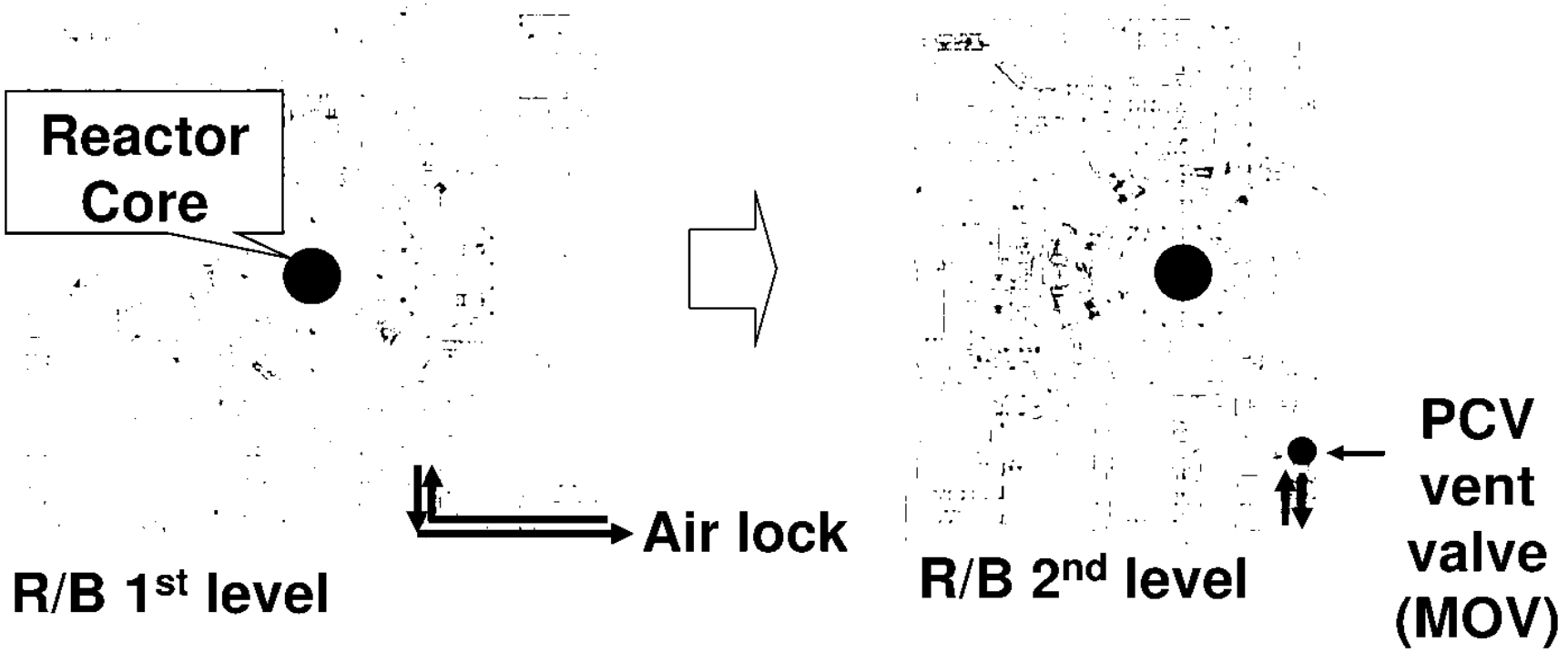
Accident Response at 1F: Unit 1 Containment Venting



- Six men formed 3 “last-resort teams” to manually open 2 valves in highly-radioactive area
- Core damage already progressing by this time (3/12 9:04-9:30)

MO: Motor Operated AO: Air Operated

Unit 1 Containment Venting (cont'd)

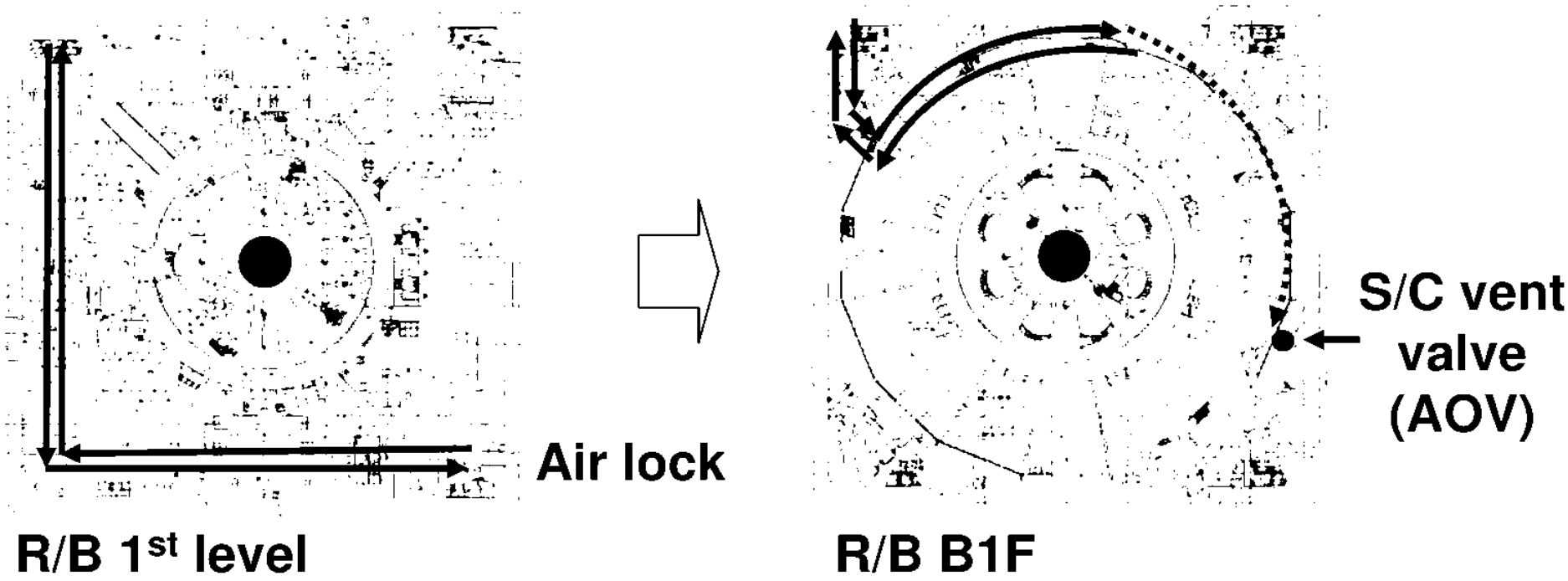


1st team's attempt to manually open PCV vent valve:

⇨ **Successful (3/12 9:15)**

PCV: Primary Containment Vessel
MOV: Motor Operated Valve
R/B: Reactor Building

Unit 1 Containment Venting (cont'd)



2nd team's attempt to manually open S/C vent valve:

Unsuccessful due to extremely high radiation

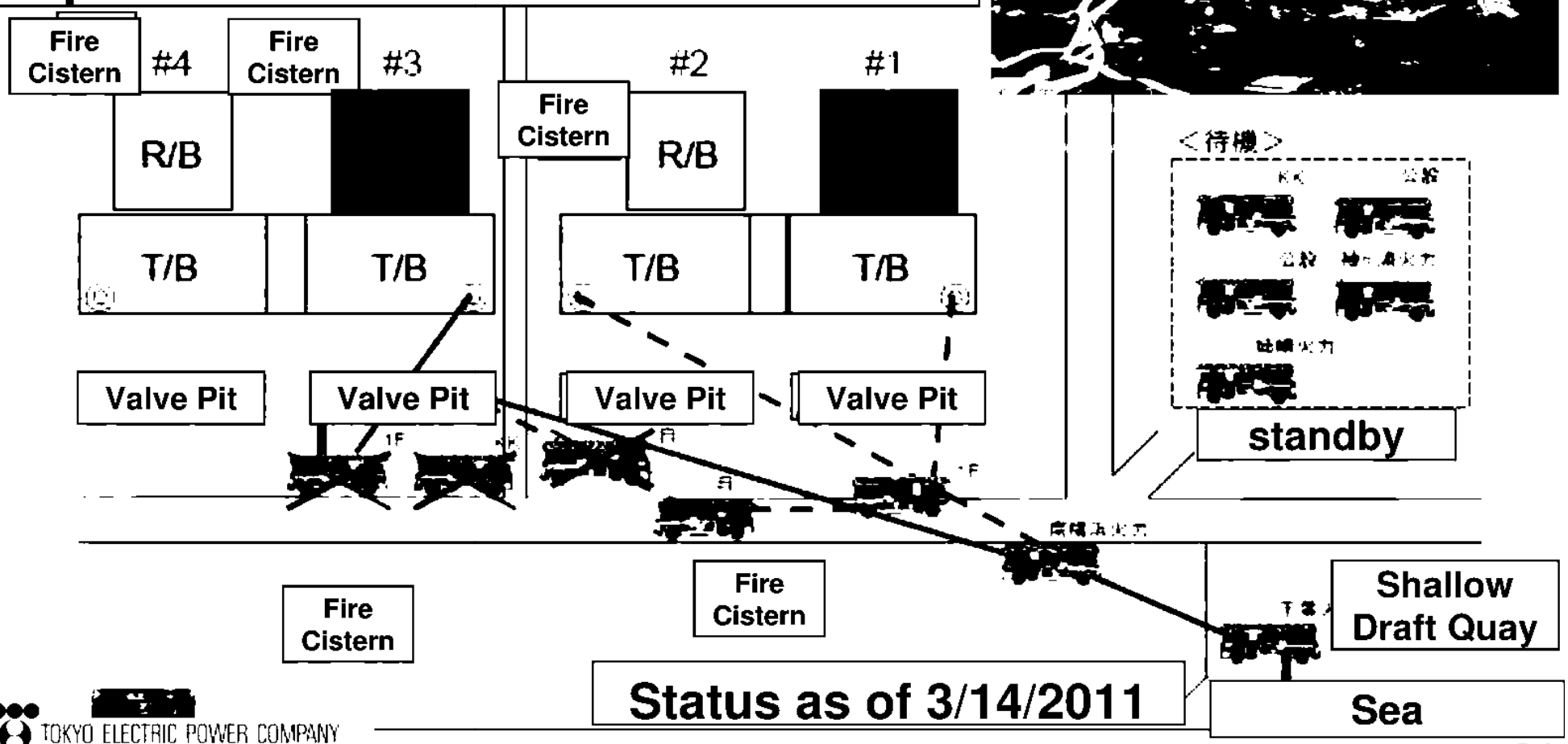
➡ **Operators exposed to 100+ mSv (10+ rem) (3/12 9:30)**

AOV eventually opened by remote operation (3/12 14:00)

S/C: Suppression Chamber
AOV: Air Operated Valve

Accident Response at 1F: Water Injection by Fire Trucks

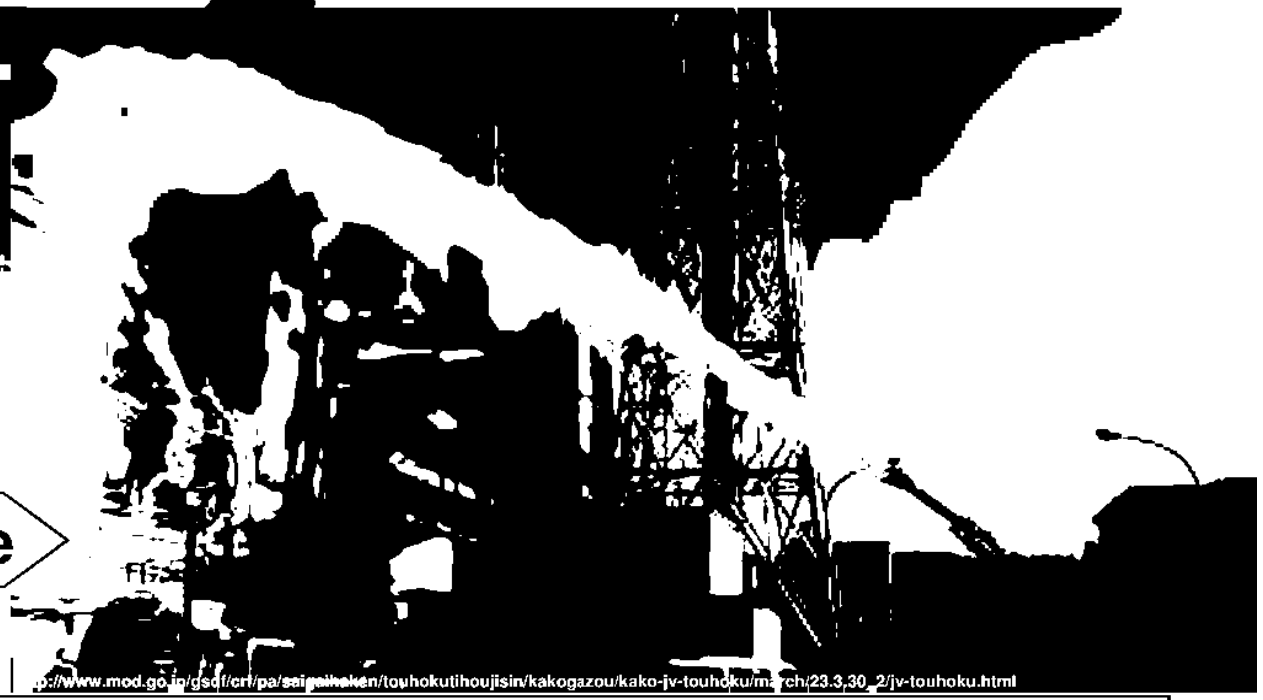
- Fire trucks played critical role in injecting water into reactors
- Fire brigade operated fire trucks amidst high radiation/successive explosions



Status as of 3/14/2011

Water Injection by Fire Trucks (Daytime)

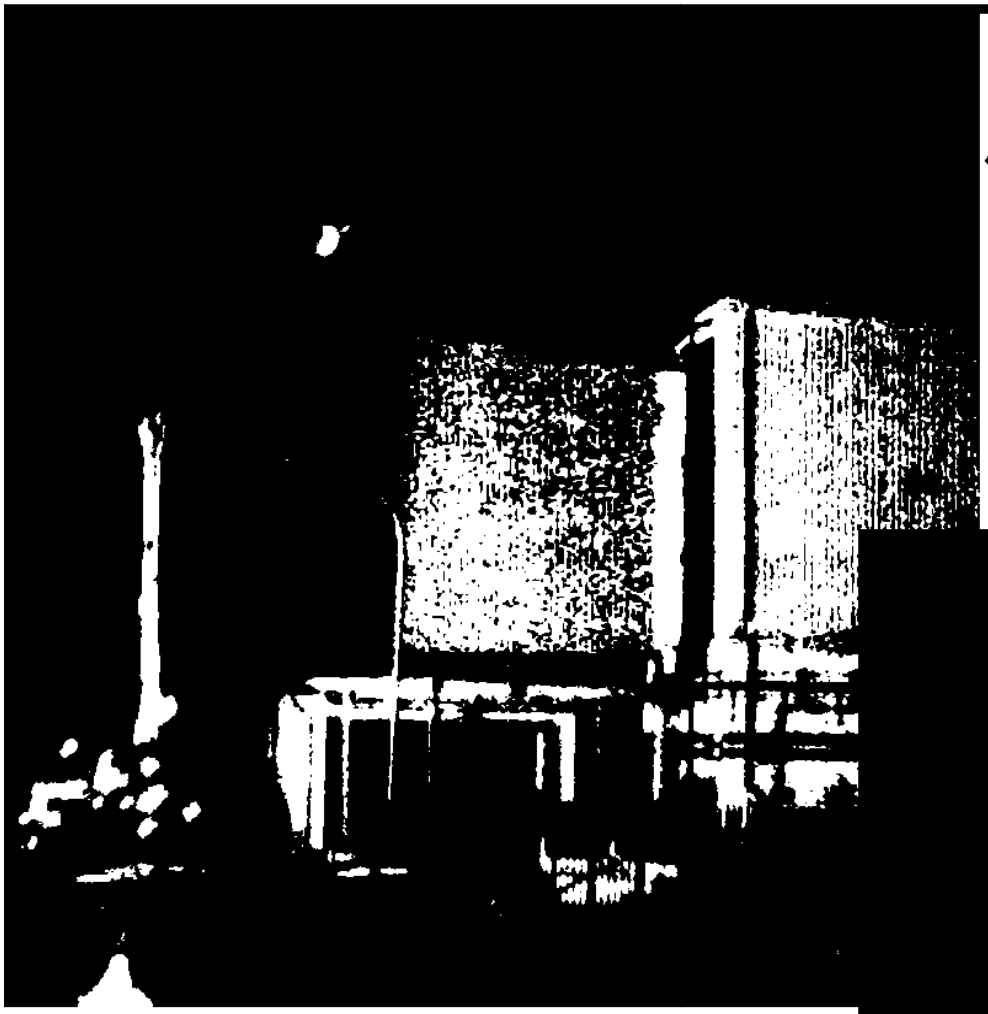
Tokyo Fire Department



Japan Self Defense Force

Complex inter-organizational coordination required

Water Injection by Fire Trucks (Nighttime)

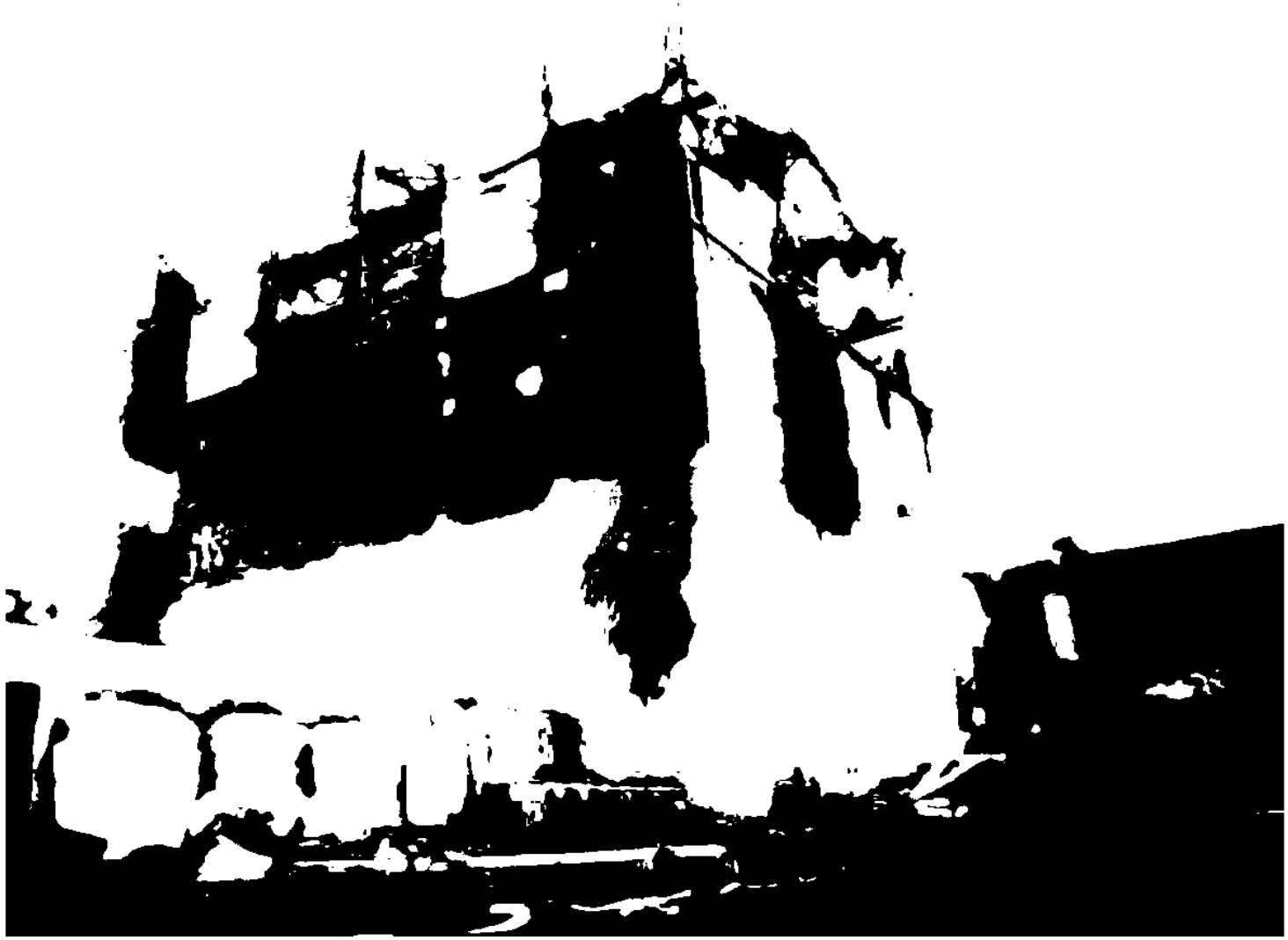


Tokyo Fire Department

Japan Self Defense Force

Around-the-clock response required

Water Injection by Concrete Pumpers



Steady water injection into Unit 4 spent fuel pool enabled by concrete pumpers from March 22, 2011

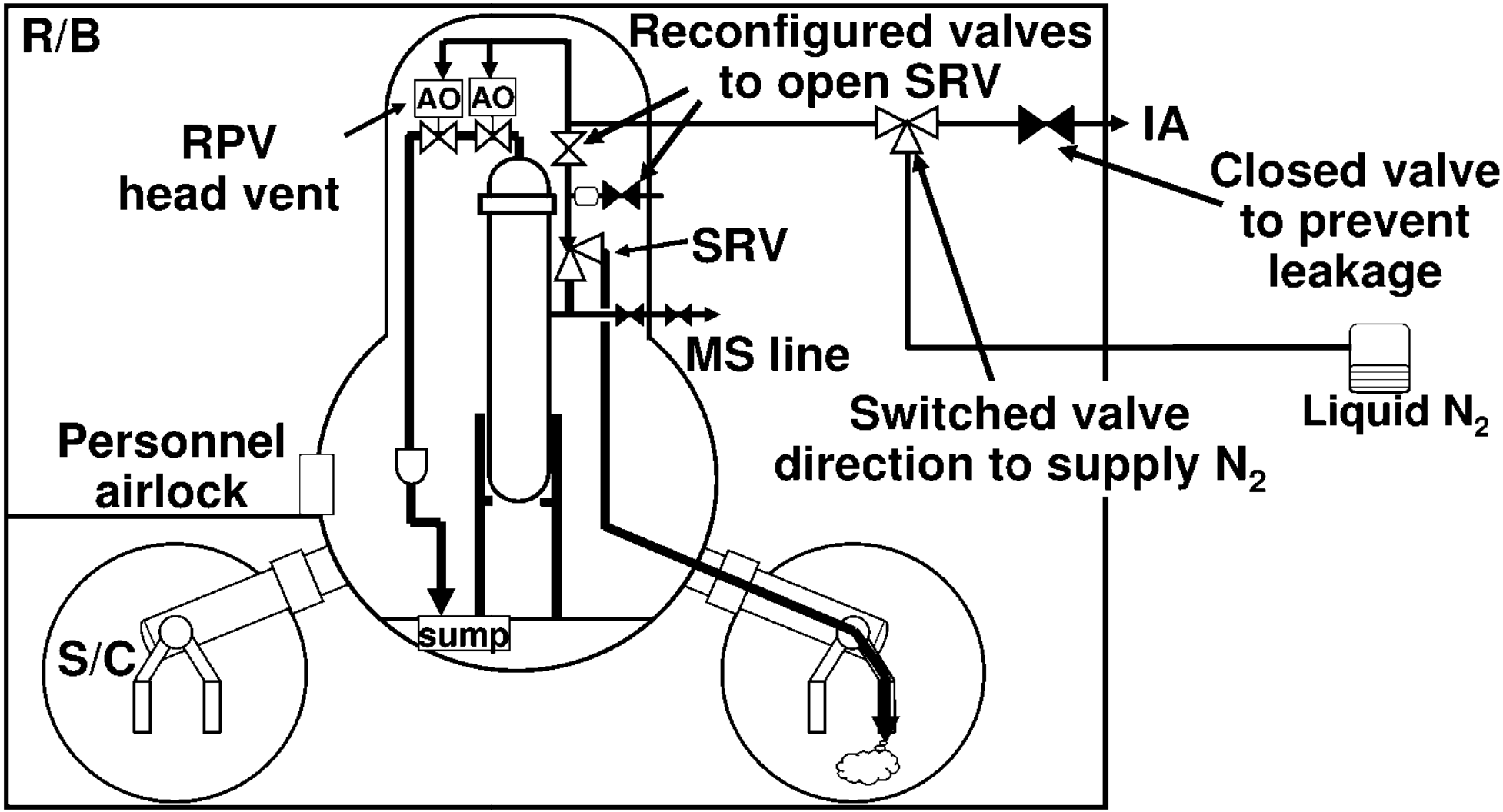
Response to Shutdown SBO at 1F Unit 5

Unit	COD	Reactor Type	Containment Type	Power Output (MWe)	Main Contractor	Pre-earthquake Status (3/11/2011)
1	1971. 3	BWR-3	Mark-I	460	GE	Operating
2	1974. 7	BWR-4	Mark-I	784	GE/Toshiba	Operating
3	1976. 3	BWR-4	Mark-I	784	Toshiba	Operating
4	1978.10	BWR-4	Mark-I	784	Hitachi	Outage Full core offloaded to SFP
5	1978. 4	BWR-4	Mark-I	784	Toshiba	Outage In preparation for restart
6	1979.10	BWR-5	Mark-II	1,100	GE/Toshiba	Outage

- Undergoing RPV hydrostatic testing
- RPV pressure: 7 MPa (= 1,015 psi)
- SRVs locked-out (unable to operate from MCR)
- Reactor water temp.: 90 C (194 F)
- SFP water temp.: 25 C (77 F)

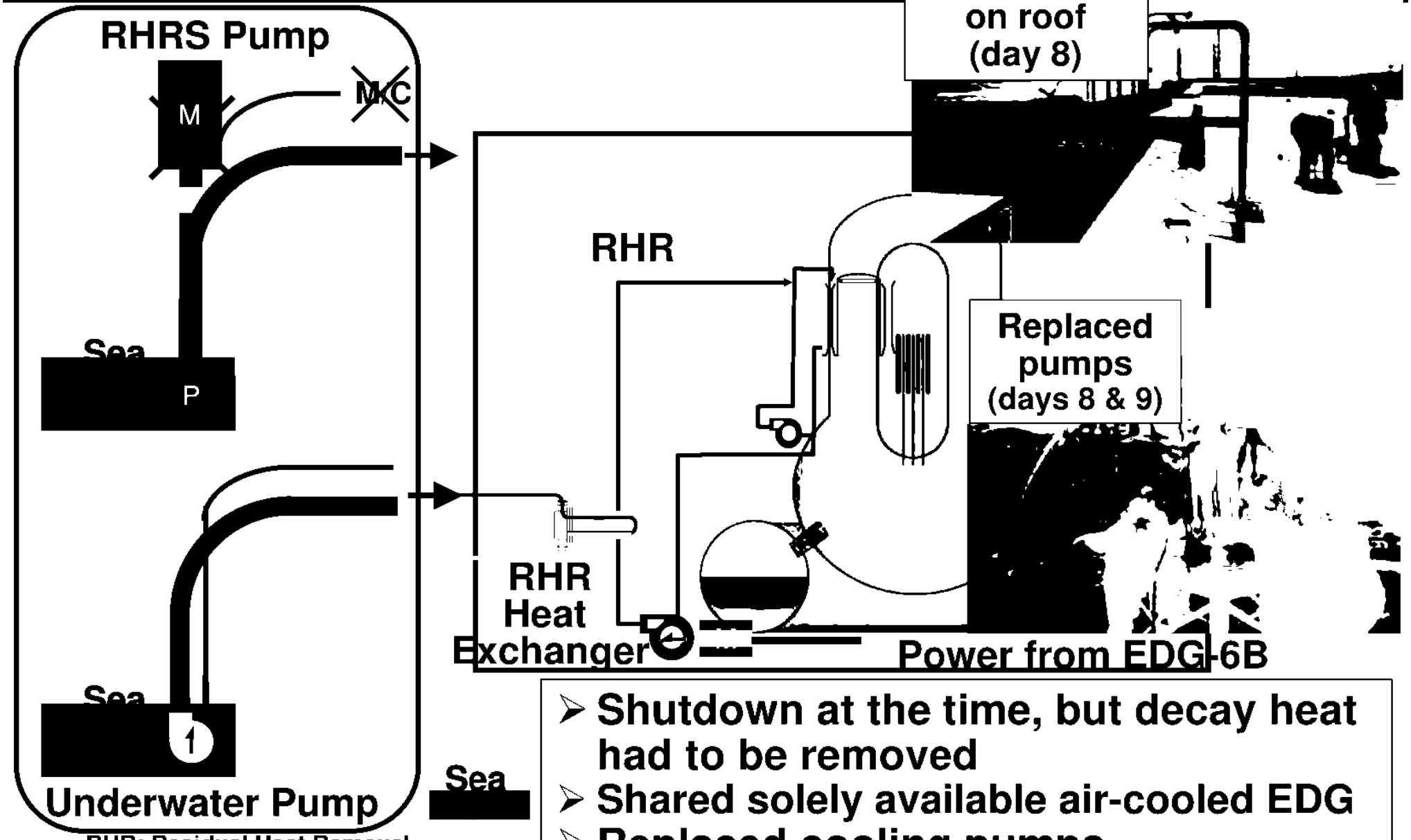
(Source) TEPCO Internal Investigation Committee Final Report
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Response to Shutdown SBO at 1F Unit 5 (cont'd)



- Manual valve operations in reactor building to open RPV vent valves (Day 2)
- Manual valve operations in drywell to open SRV (Day 4)

Saving 1F Units 5&6

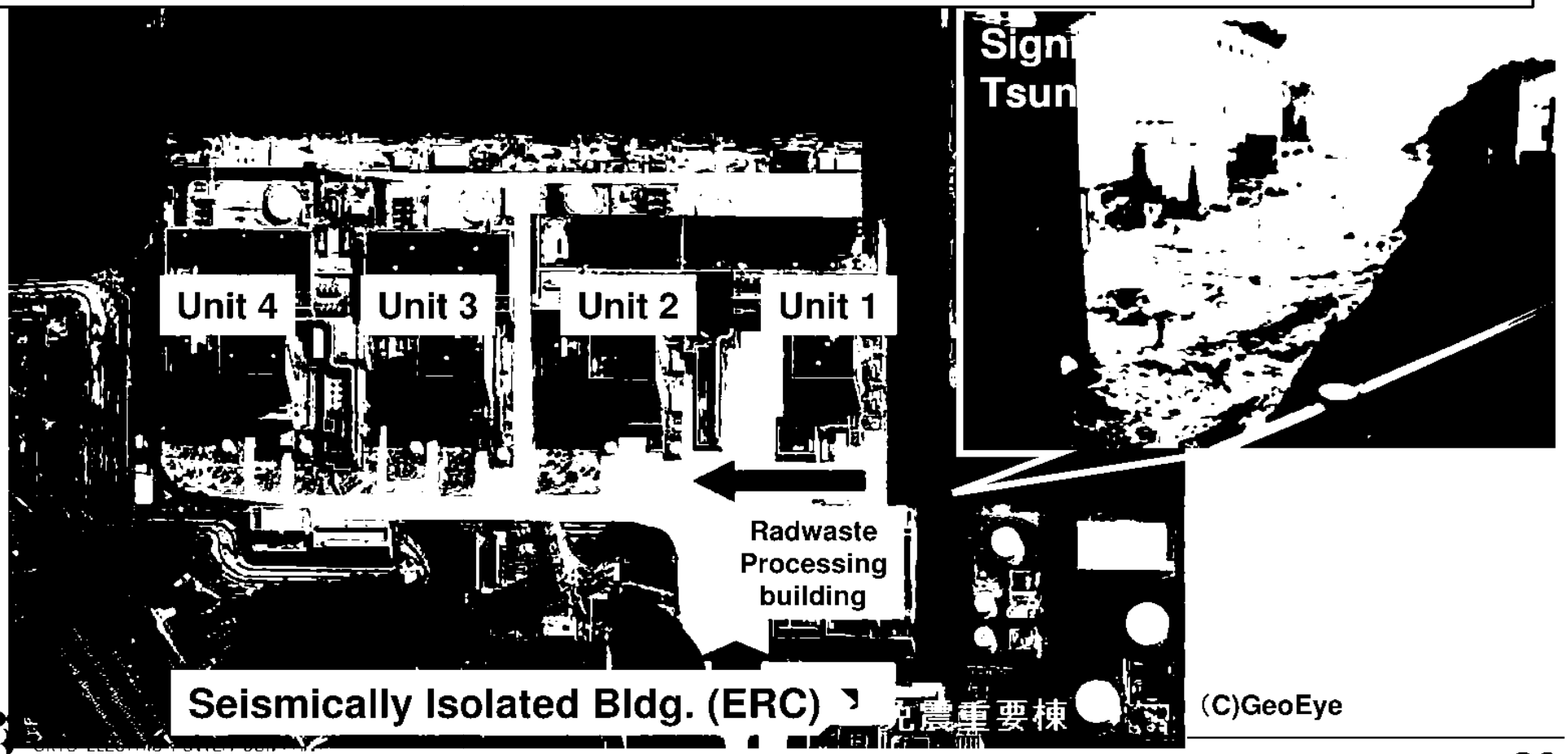


- Shutdown at the time, but decay heat had to be removed
- Shared solely available air-cooled EDG
- Replaced cooling pumps
- Achieved cold shutdown on day 10

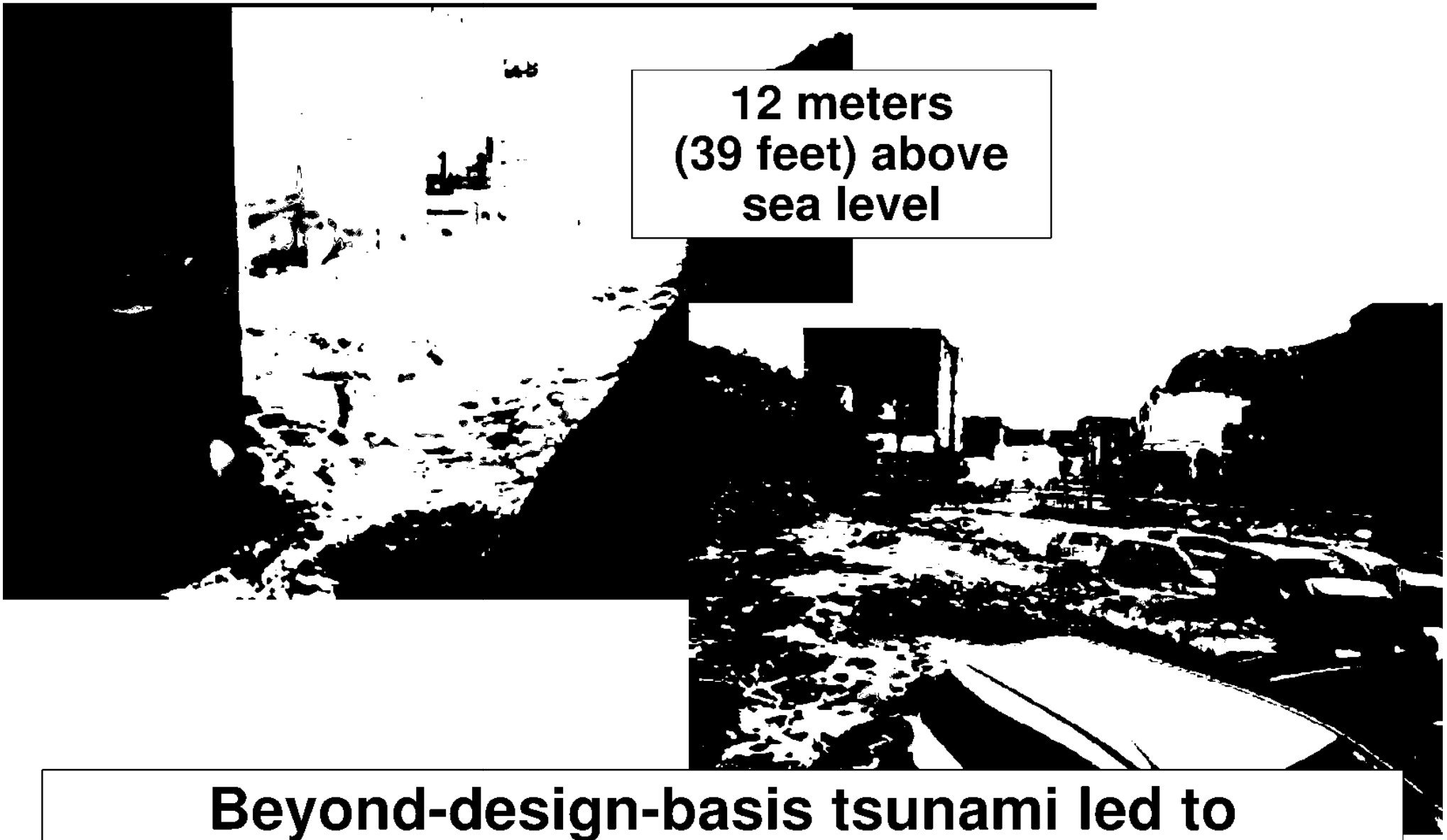
RHR: Residual Heat Removal
RHRS: Residual Heat Removal Seawater
EDG: Emergency Diesel Generator

Impact of Earthquake/Tsunami at 2F

- **After the Earthquake (smaller than design-basis):**
  - ✓Loss of all but one line of off-site power
  - ✓Plant responded as designed
- **After the Tsunami (beyond design-basis):**
  - ✓Loss of Ultimate Heat Sink for 3 out of 4 units

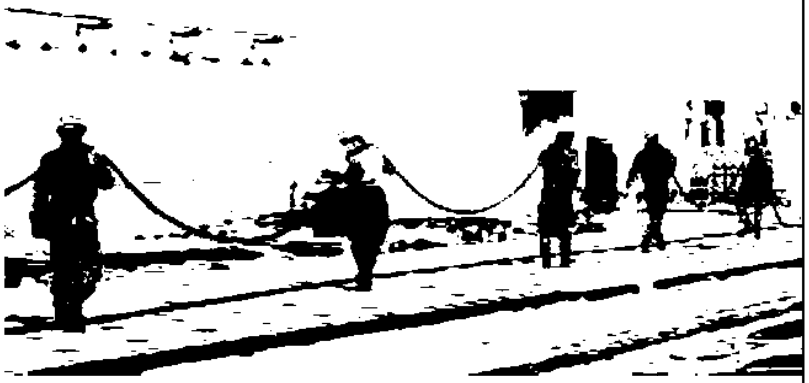


Tsunami at Fukushima Daini (2F)



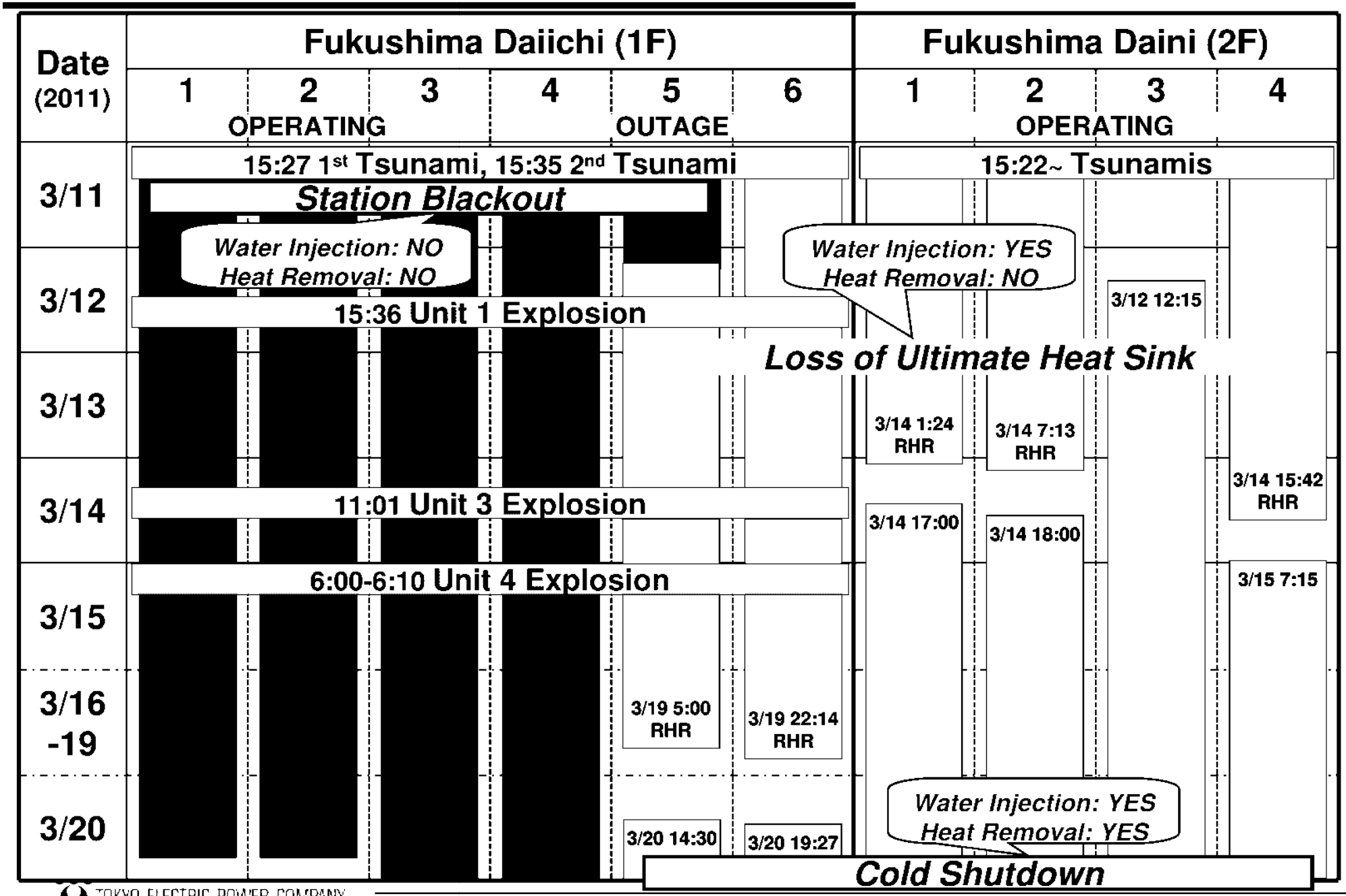
Beyond-design-basis tsunami led to loss of ultimate heat sink for 3 out of 4 units

Accident Response at 2F: Recovery from Tsunami

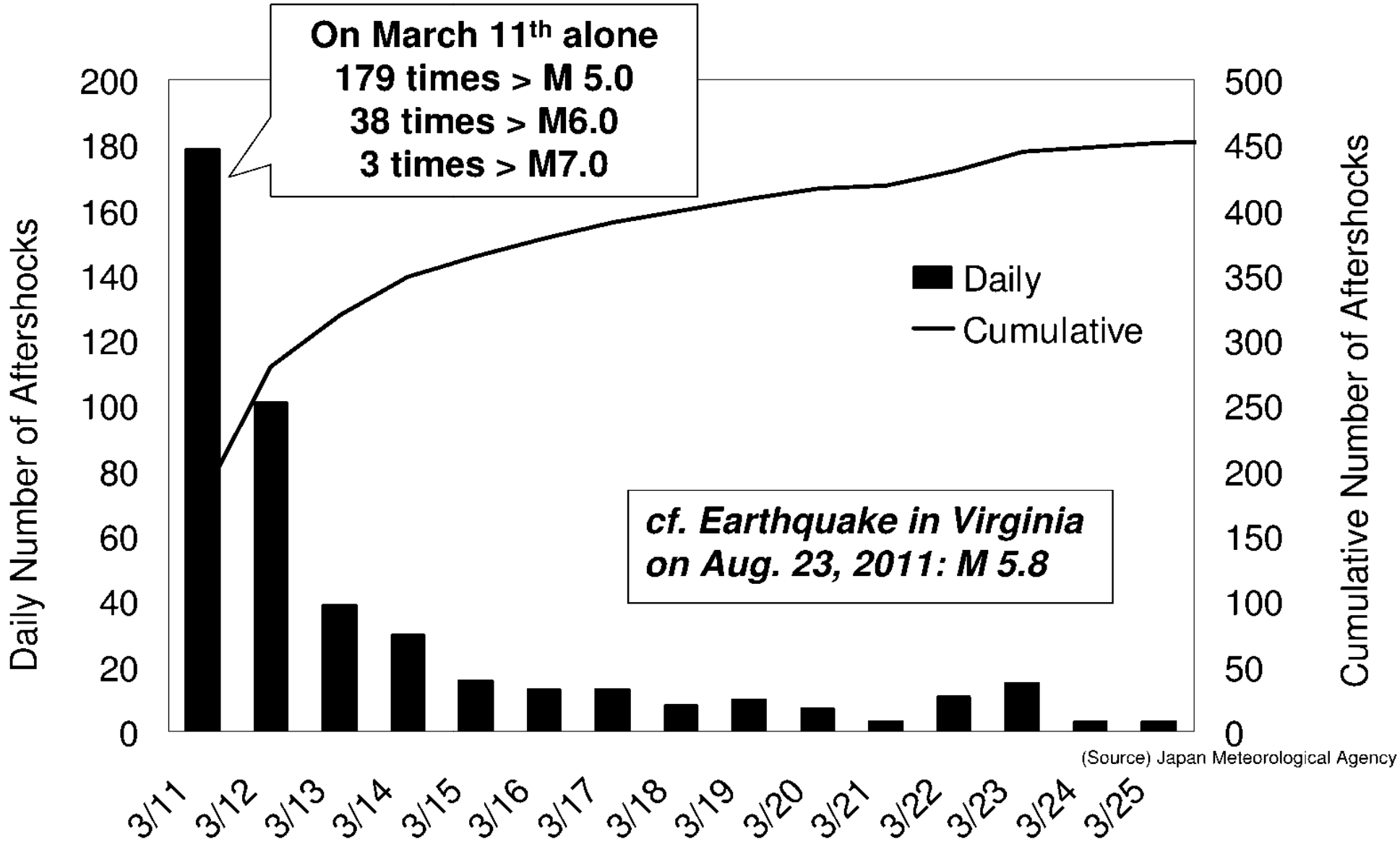


- Restored ultimate heat sink by:
  - ✓ Laying 9 km of heavy power cables by hand
  - ✓ Rapidly procuring and replacing motors
- Executed "FLEX On-The-Fly"
- Brought all 4 units to safe condition

Overview of the 10-Unit Simultaneous Accidents



Hundreds of Aftershocks Greater than M 5.0



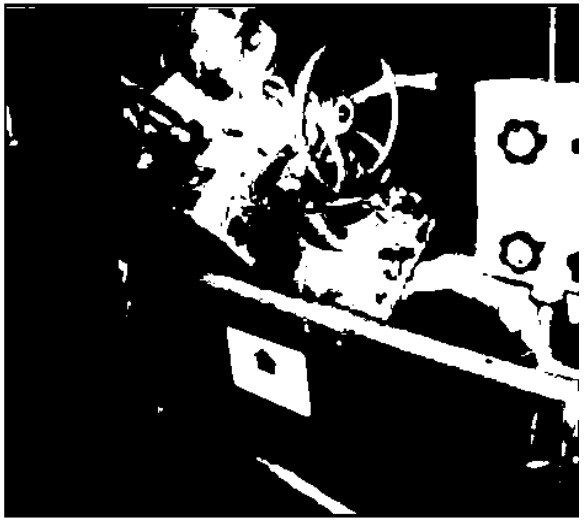
(Source) Japan Meteorological Agency

Visualization of earthquakes in 2011

http://www.youtube.com/watch?v=eKp5cA2sM28

Voices from the Field (First Responders at 1F)

- "In an attempt to check the status of Unit 4 D/G, I was trapped inside the security gate compartment. Soon the tsunami came and I was minutes away from being drowned, when my colleague smash opened the window and saved my life."
- "In total darkness, I could hear the unearthly sound of SRV dumping steam into the torus. I stepped on the torus to open the S/C spray valve, and my rubber boot melted."
- "Unit 3 could explode anytime soon, but it was my turn to go to the main control room. I called my dad and asked him to take good care of my wife and kids should I die."



Torus Room

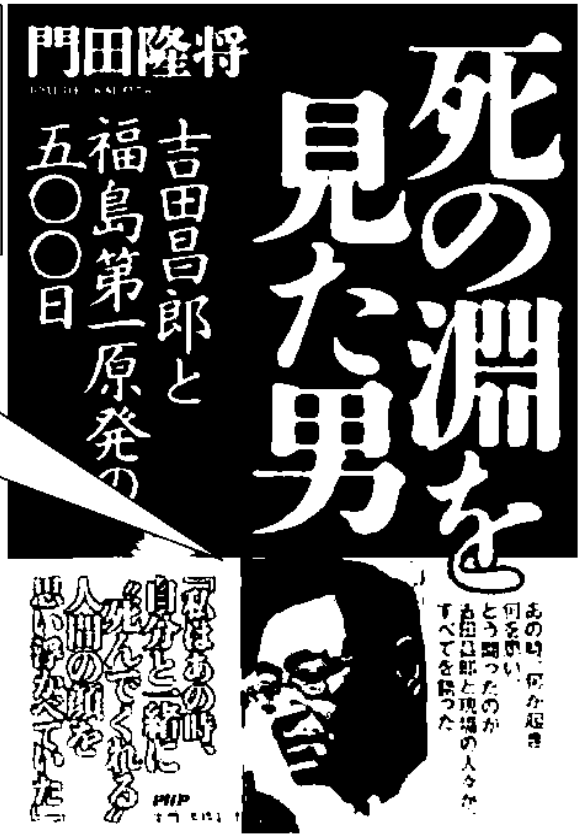
Unit 1 Main Control Room

Voices from the Field (First Responders at 1F) (cont'd)

"At that time, I was conjuring up faces of fellow colleagues who would die with me."
(Masao Yoshida, Site Superintendent)

"I was determined to stay behind to my death; however I was resolved to send my men back home alive."
(Ikuo Izawa, Shift Manager)

"Let me go and vent the containment.
I know where the valve is and I can run fast.
Let me protect the unit that I love."
(Kazuhiro Yoshida, Deputy Shift Manager)

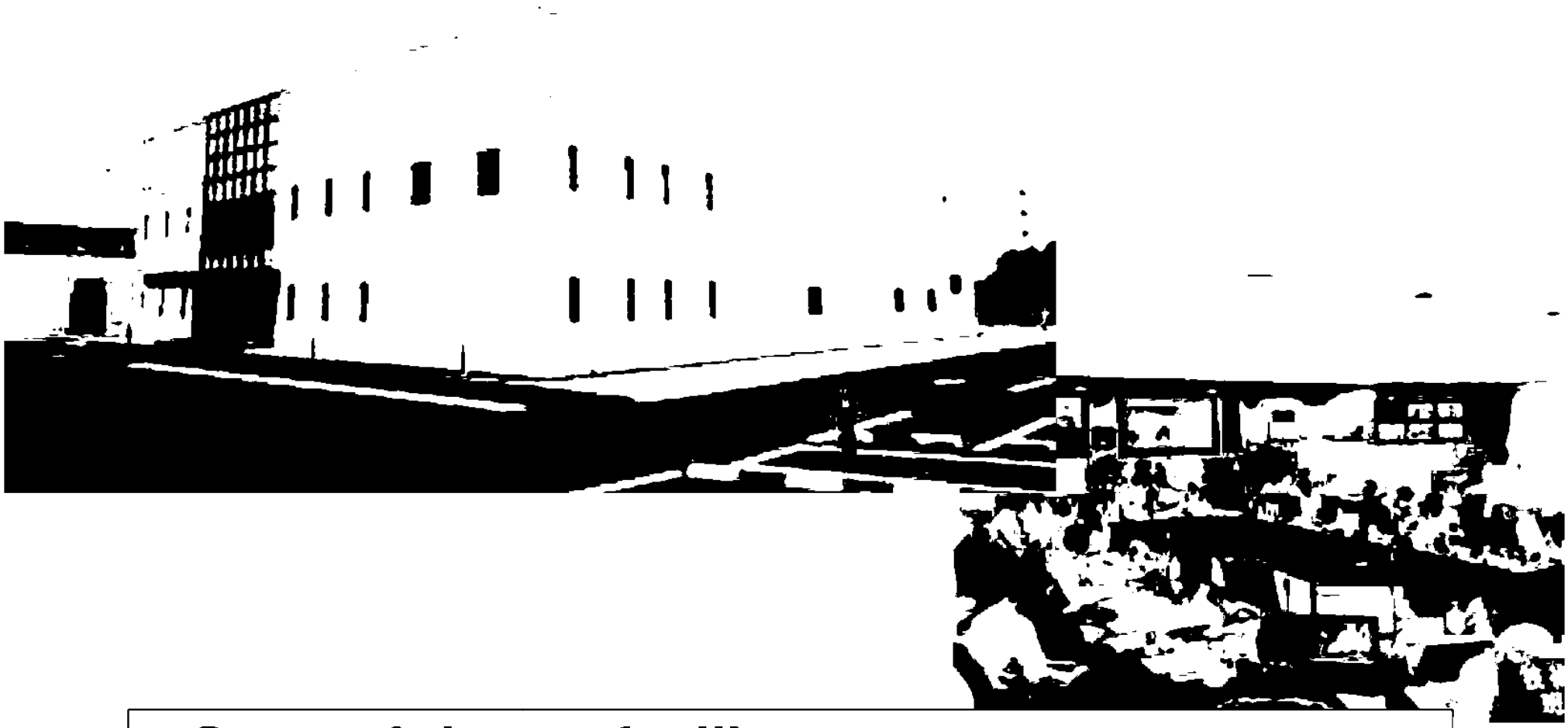


"On the Brink: The Inside Story of Fukushima Daiichi"

"Book reveals human drama in Fukushima No. 1 crisis"
The Japan Times 12/11/2012
http://www.japantimes.co.jp/news/2012/12/11/national/book-reveals-human-drama-in-fukushima-no-1-crisis/

→*Now available in English*
http://amzn.com/4902075547

Seismic Isolation Building: Sole Safe Haven at 1F



- State-of-the-art facility
- Built in response to the 2007 NCO Earthquake
- Completed in July 2010
- → *Played critical role during the 2011 accident*

Workers' Condition: Typical Meals at 1F

Meager ration during the accident (much less during the first week)

Hot instant noodle: a coveted delicacy

TEPCO Internal Investigation Committee Final Report

➢ Issued on June 20, 2012

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

"Tangible" Countermeasures

- Flood Protection
- High-pressure Injection System
- Depressurization System
- Low-pressure Injection System
- Heat Removal/Cooling System
- Power Supply for Instrumentation
- Post-Core Damage Mitigation
- Common Items
- Mid-to-Long Term Items

"Intangible" Countermeasures

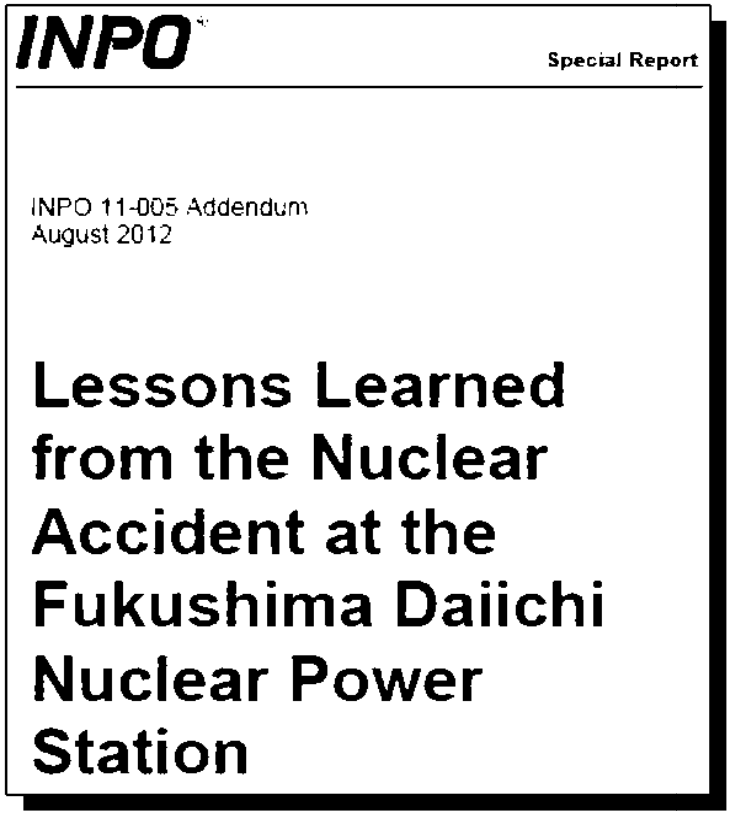
- Operational Measures in Relation to Tangible Modifications
- Emergency Preparedness
- Info. Dissemination and Sharing
- Roles and Responsibilities
- Information Disclosure
- Transportation of Resources
- Access Control
- Radiological Protection
- Plant Status Recognition
- Suggestions to the Government

Major Lessons Learned:

➢ Recognize large uncertainty in external events

➢ Prepare for the unexpected

INPO Lessons Learned Report (August 2012)



http://www.wano.info/Documents/Lessons%20Learned.pdf

Excerpts from

"*most significant operational lessons*"

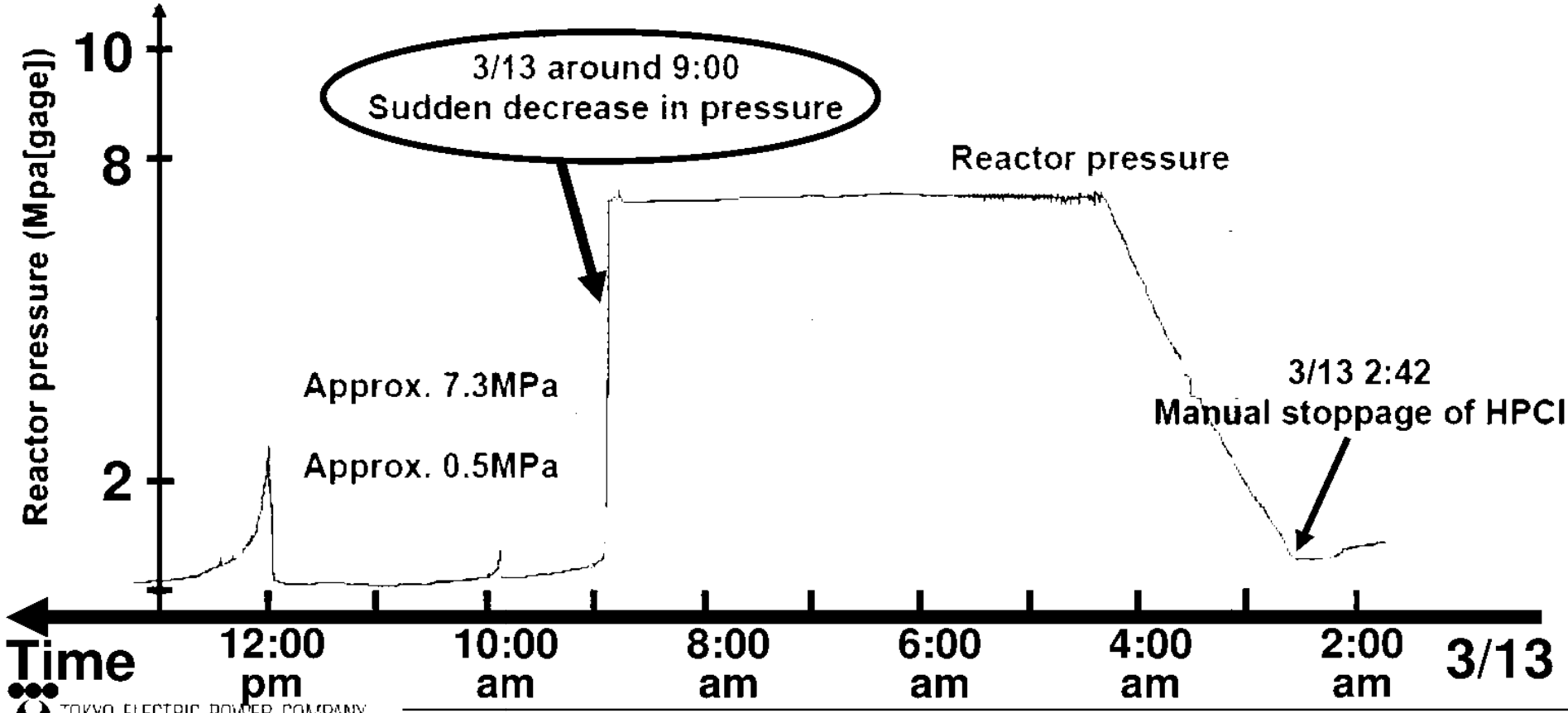
- Optimum accident management strategies and associated implementing procedures should be developed through **communications, engagement, and exchange of information among nuclear power plant operating organizations and reactor vendors**.
- Plans must address the immediate **emergency response needs for human resources, equipment, and facilities** in the first few hours of an event, as well as the need for a long-duration response capability.
- Emergency response strategies for extreme external events should **consider the traumatic human impact of such events on individual responders and leaders** and provide for appropriate training, assistance, and contingency plans.

INPO: Institute of Nuclear Power Operations

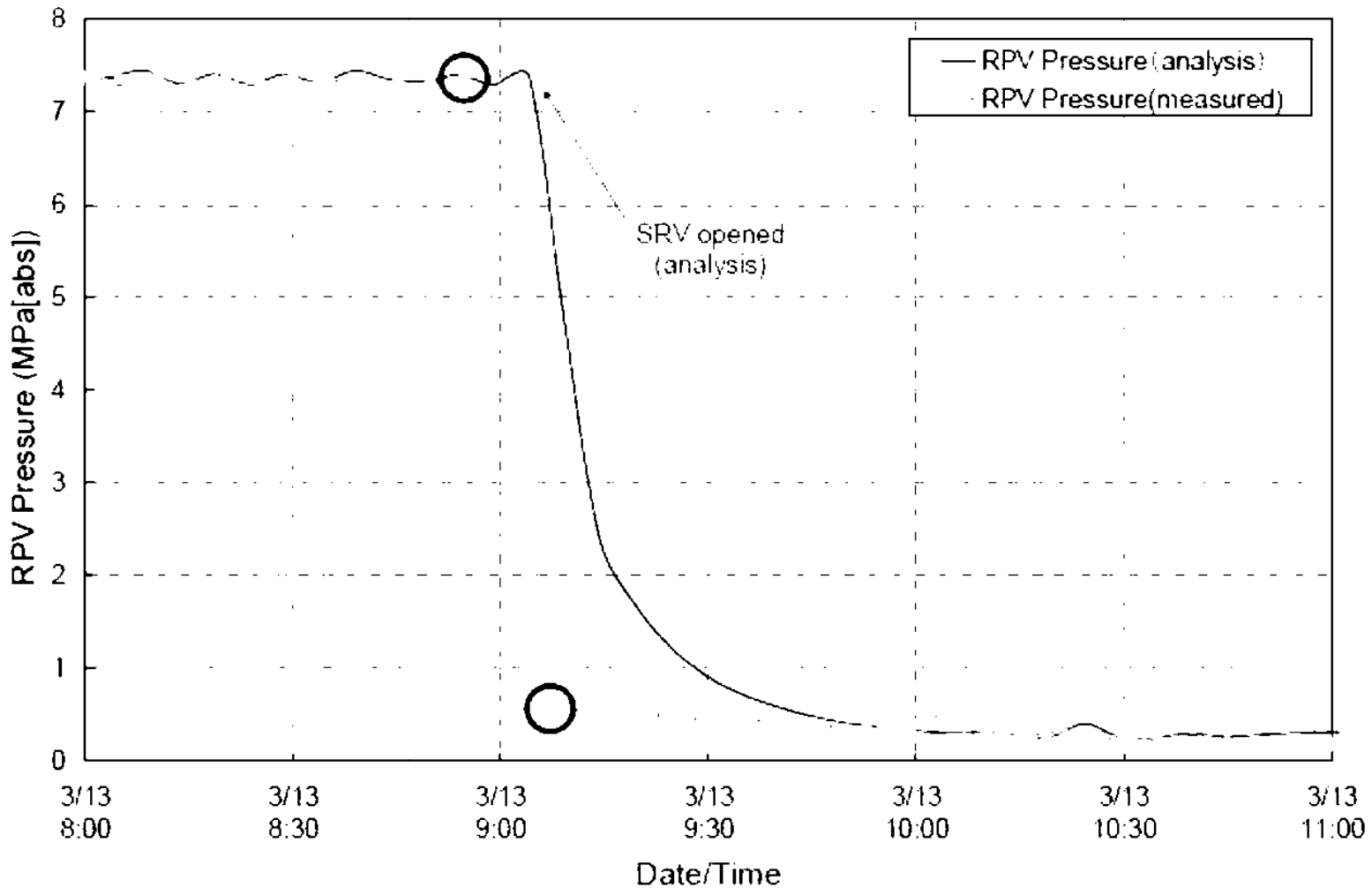
Follow-up Study on 1F Accident Unresolved Issues

- **1st Progress Report Issued on Dec. 13, 2013**
  http://www.tepco.co.jp/en/press/corp-com/release/2013/1233101_5130.html

Issue No. 3-6
Rapid depressurization of Unit 3 reactor pressure vessel on March 13, 2011

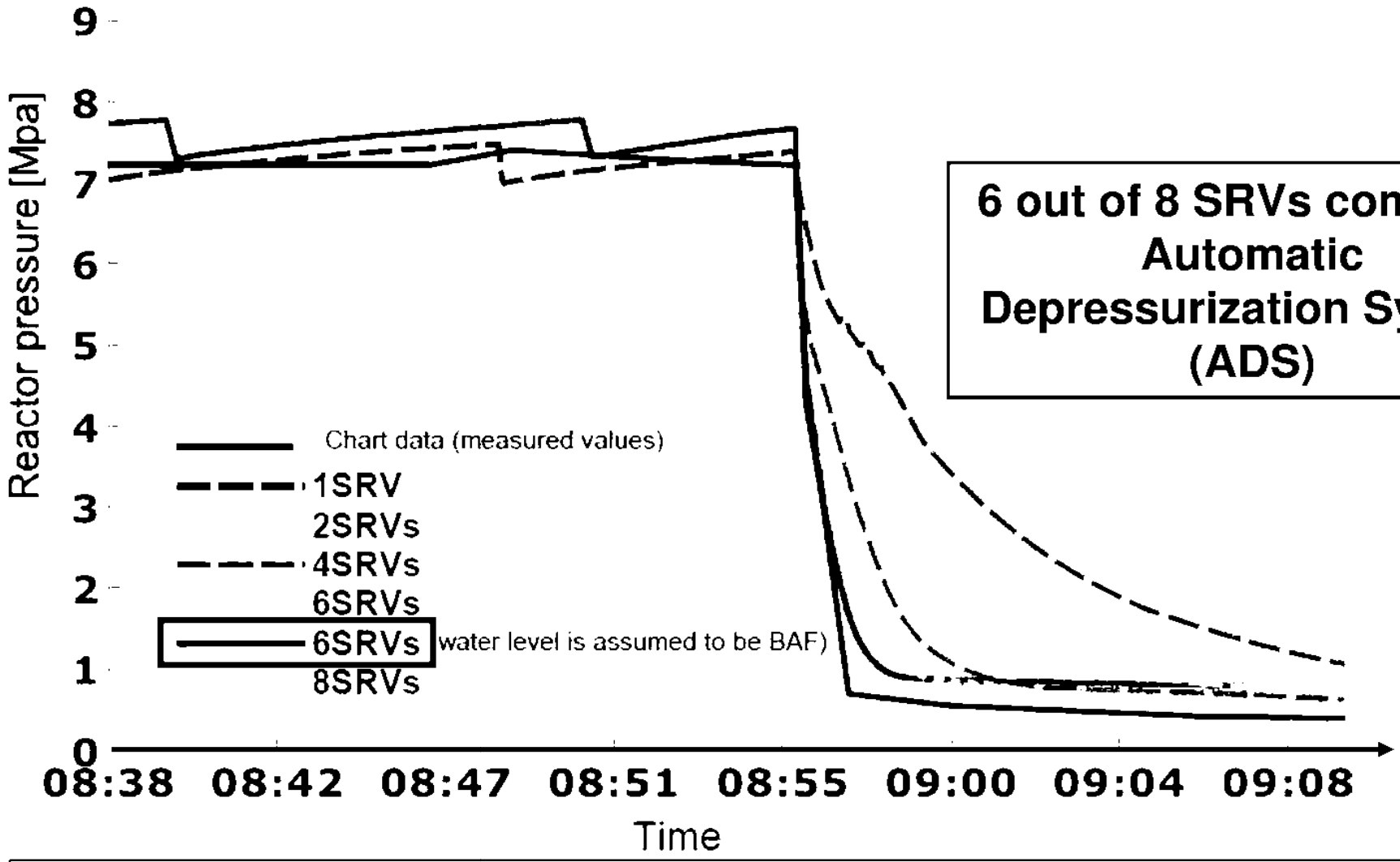


Unit 3 Depressurization Analysis: MAAP Code (March 2012)



Actual depressurization behavior could NOT be reproduced by opening 1 Safety Relief Valve (SRV)

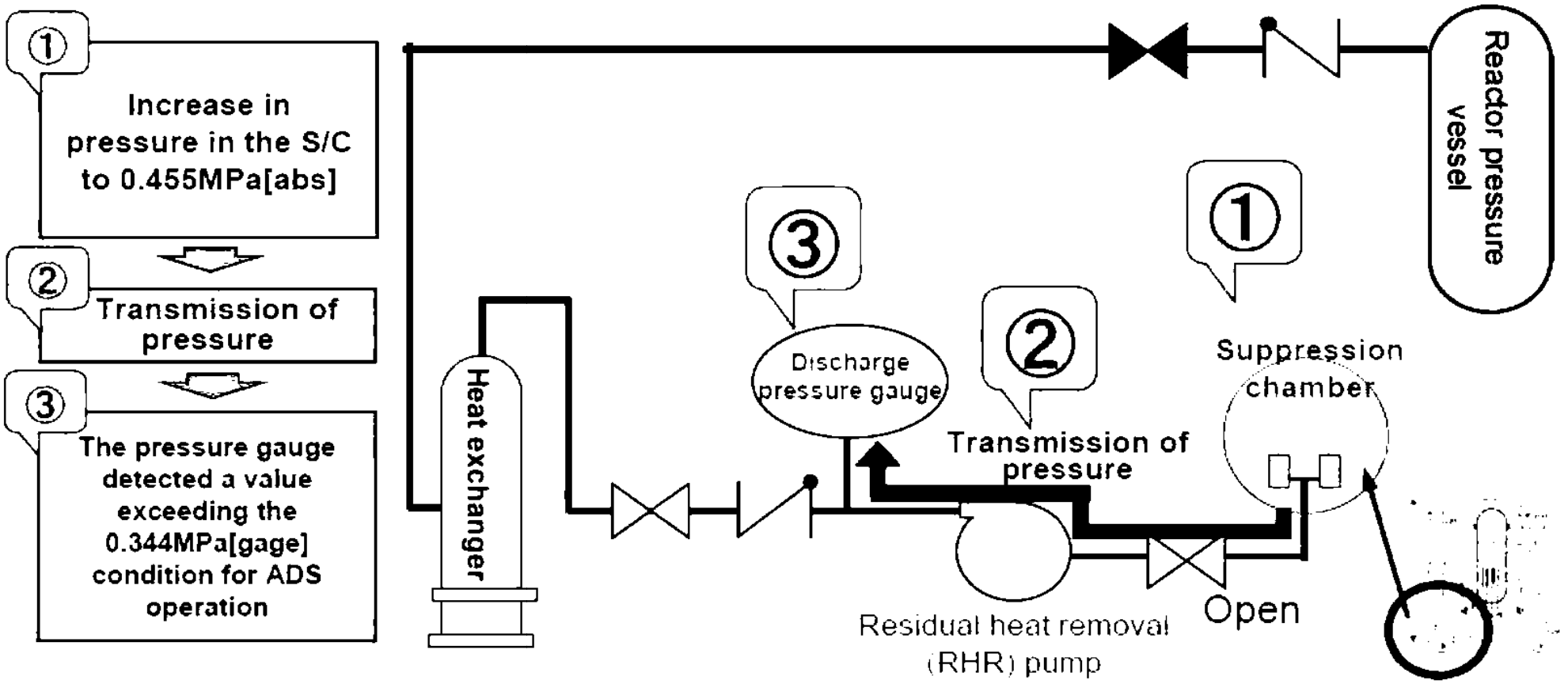
Unit 3 Depressurization Analysis: SAMPSON Code (Dec. 2013)



6 out of 8 SRVs comprise Automatic Depressurization System (ADS)

Actual depressurization behavior best reproduced by opening 6 SRVs (→ADS)

Possible Inadvertent Actuation of ADS



Rapid depressurization of Unit 3 RPV most likely caused by inadvertent ADS actuation; not by RPV breach

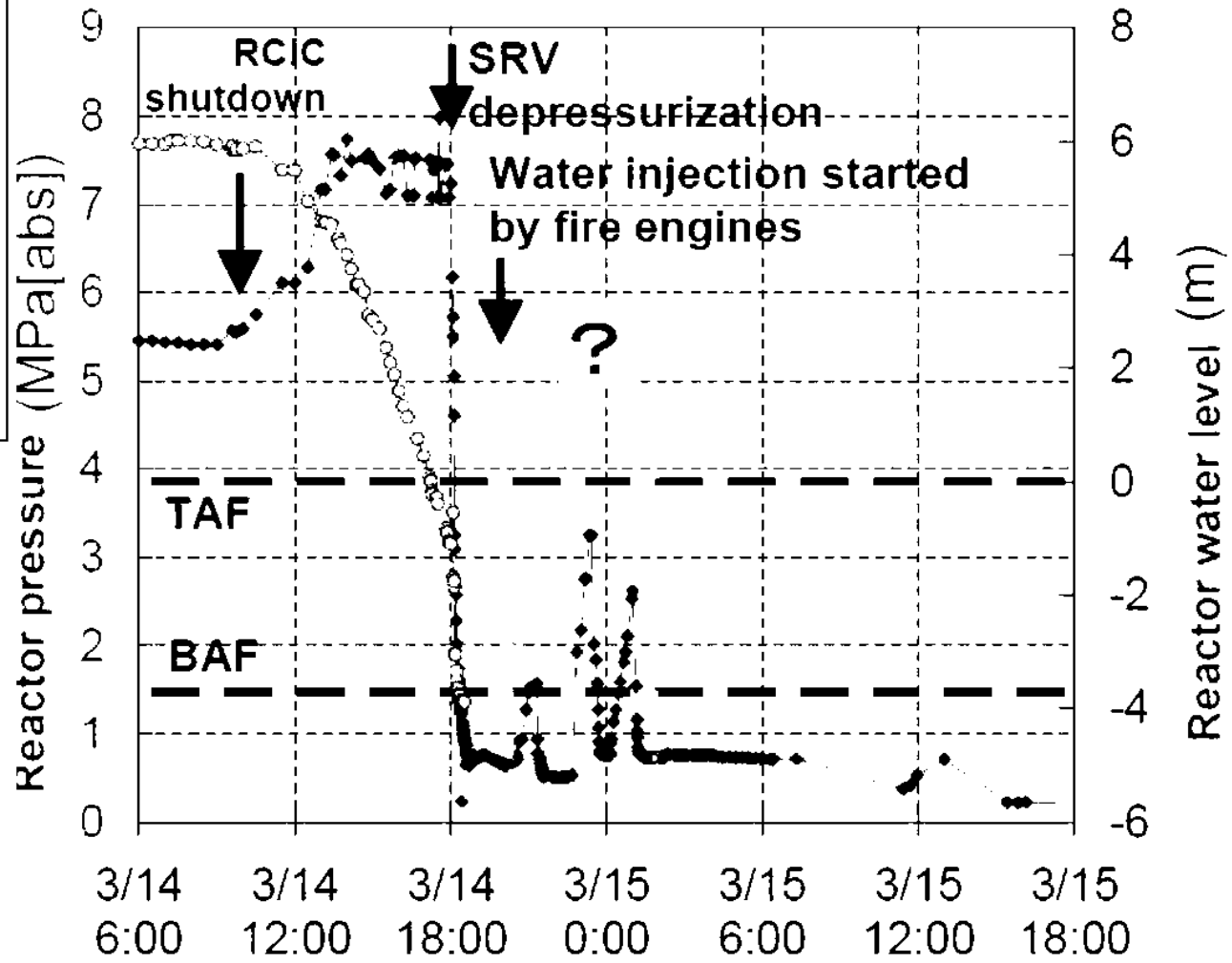
Follow-up Study on 1F Accident Unresolved Issues (cont'd)

➢ 2nd Progress Report Issued on Aug. 6, 2014

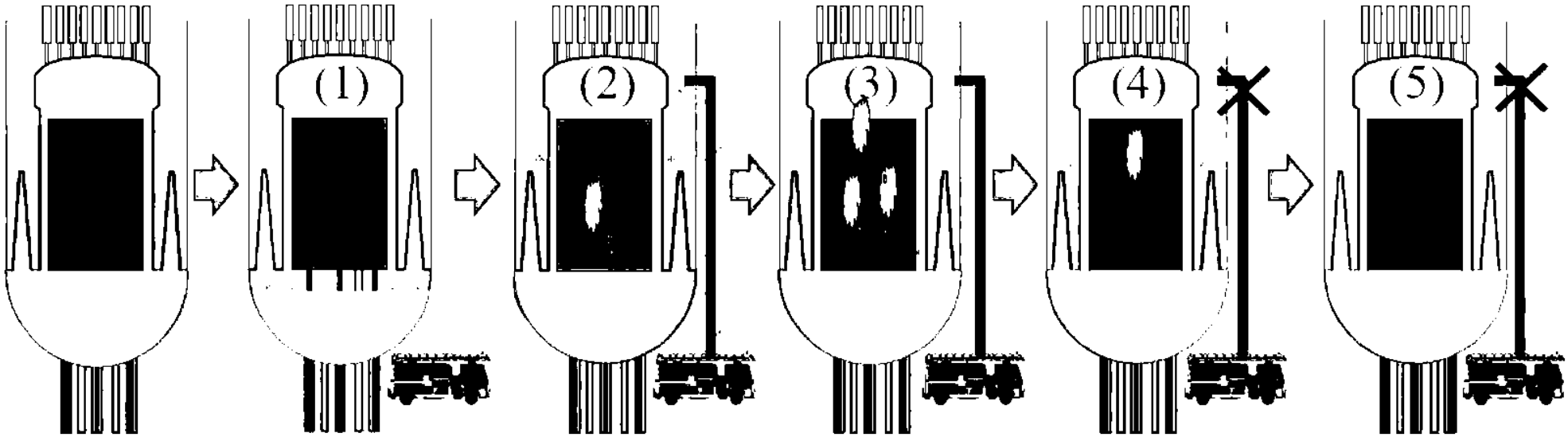
http://www.tepco.co.jp/en/press/corp-com/release/2014/1240140_5892.html

Issue No. 2-7

Unit 2 reactor pressure spikes after depressurization on March 14-15, 2011

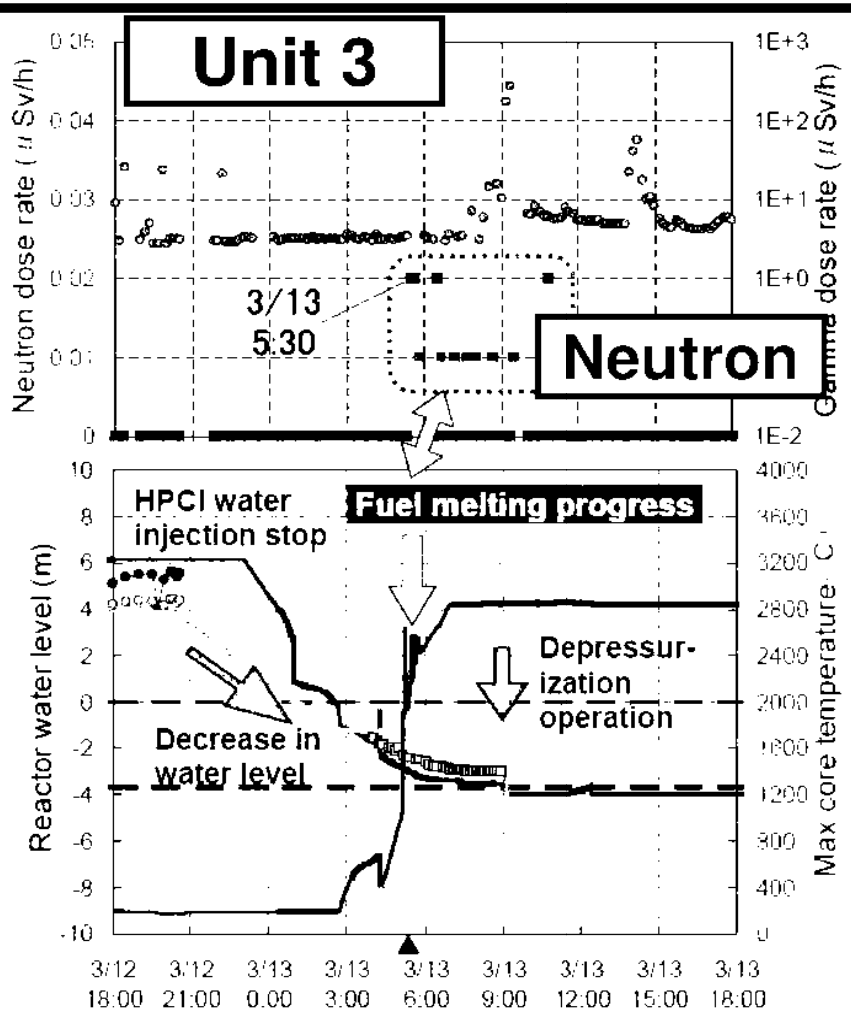


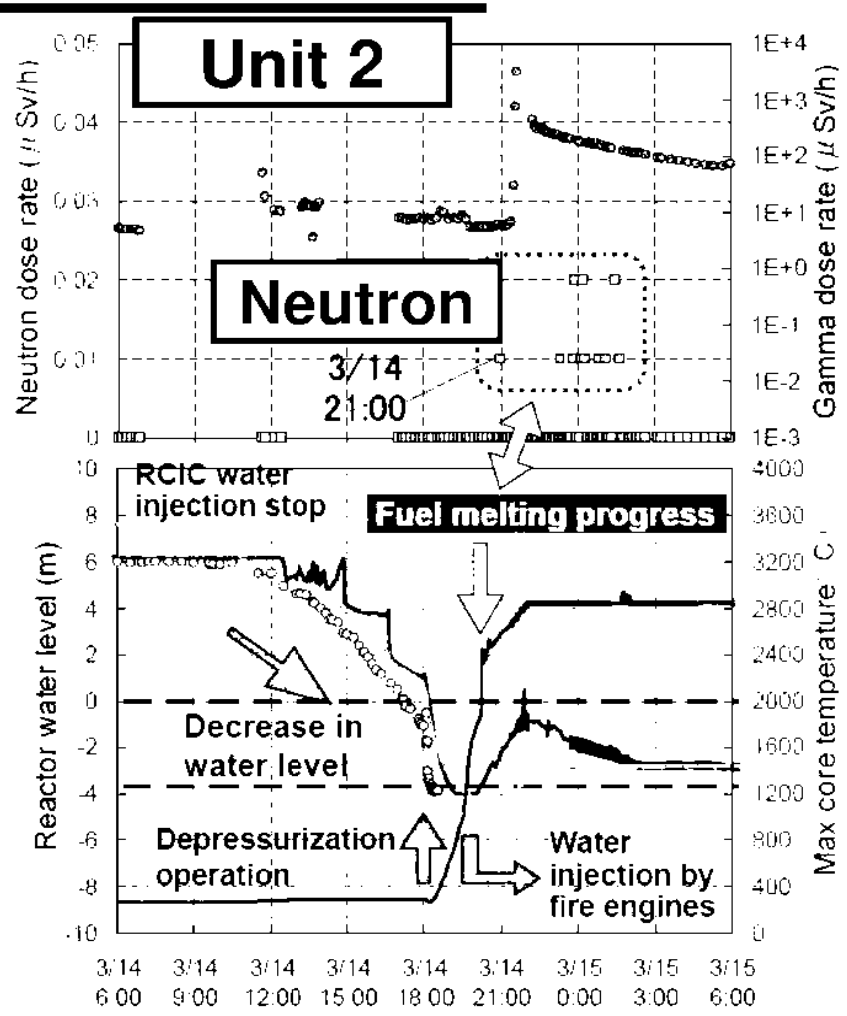
Unit 2 Reactor Pressure Spike Presumed Scenario



1. Depressurization causes flashing and core exposure
2. Water injection into hot core
3. Steam generation followed by metal-water reaction
4. Reactor pressure increase prohibits water injection
5. Steam generation ceases and pressure goes down

Neutron Detected at Main Gate on March 13-14, 2011





- **Timing of neutron detection at main gate coincides with estimated core melt of Units 3 and 2**
- **Neutron likely to have originated from spontaneous fission of actinides released during core melt**

TEPCO's Nuclear Safety Reform

TEPCO Board of Directors

Request

Proposal

Nuclear Reform Monitoring Committee

Supervision

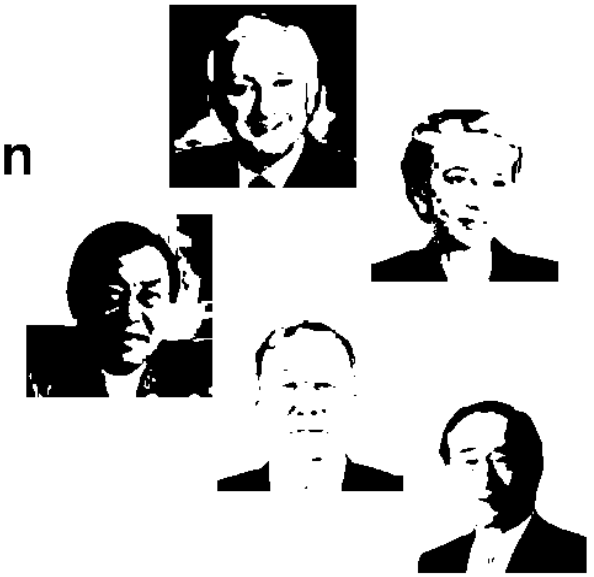
Dr. Dale Klein, Chairman
(Former Chairman, U.S. Nuclear Regulatory Commission)

Lady Barbara Judge, Deputy Chairman
(Former Chairman, U.K. Atomic Energy Authority)

Dr. Kenichi Ohmae, Member
(CEO, Business Breakthrough, Inc.)

Mr. Masafumi Sakurai, Member
(Former Superintendent Public Prosecutor)

Mr. Fumio Sudo, Member
(Chairman, TEPCO)



Observation

Reporting

Observation / Supervision

Reference
Reporting

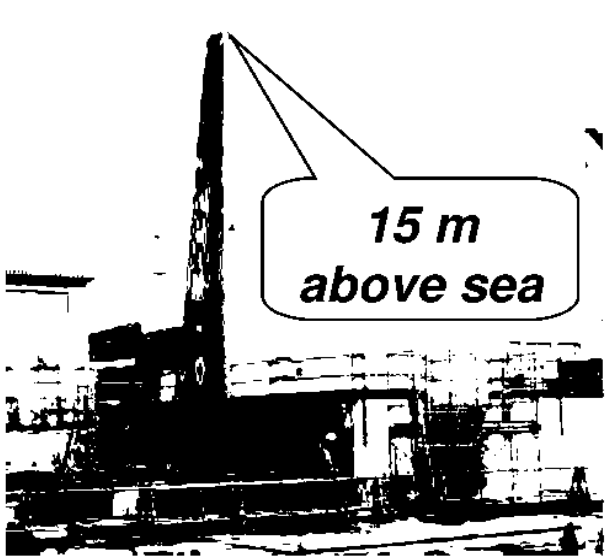
TEPCO Nuclear Reform Special Task force

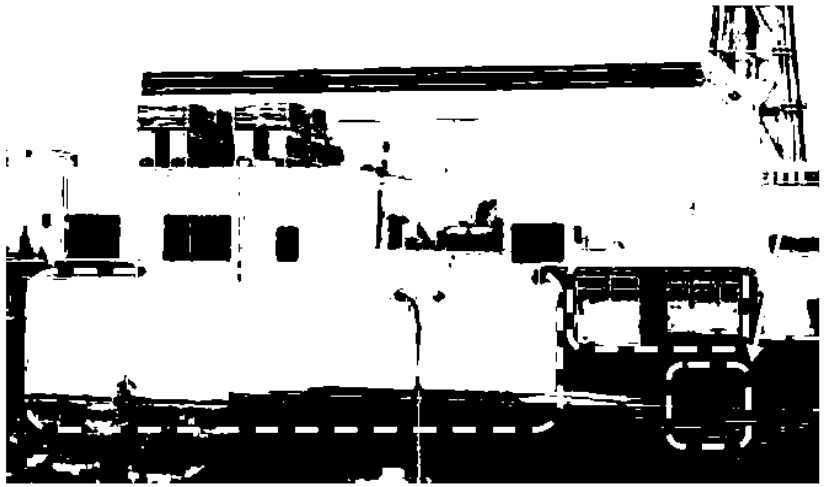
Execution

Naomi Hirose (President); **Takafumi Anegawa** (Chief Nuclear Officer)

Nuclear Safety Reform Plan issued in March 2013
→Actions to revamp provision for accidents: safety awareness, technical capabilities, communication skills, etc.

Safety Enhancement Measures at Kashiwazaki-Kariwa (KK) NPS

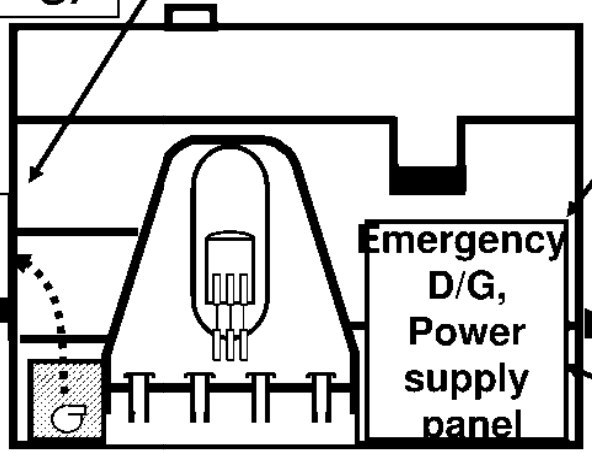


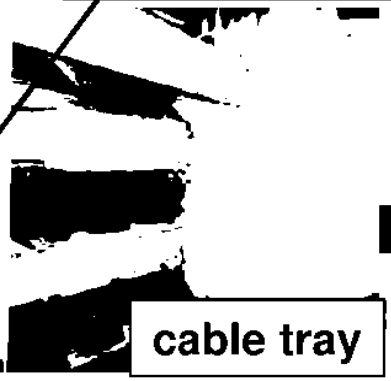


Sea wall (1.5 km long)

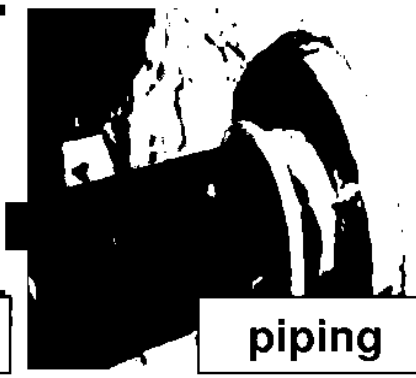
Tidal walls

Water-tight doors (~60 places)





cable tray



piping

Tidal boards

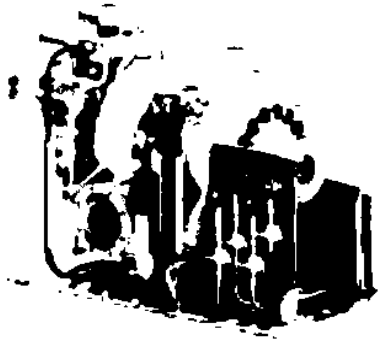
Waterproof treatment (~ 300 places)

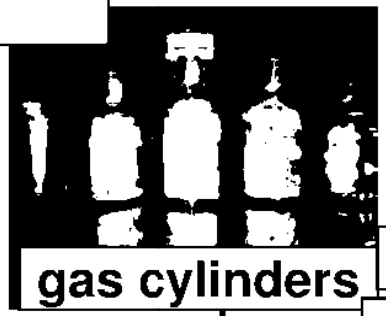
http://www.tepco.co.jp/kk-np/safety/index-j.html

Tsunami-induced Accident Prevention Measures

Safety Enhancement Measures at KK NPS (cont'd)

High Pressure Alternate Cooling System





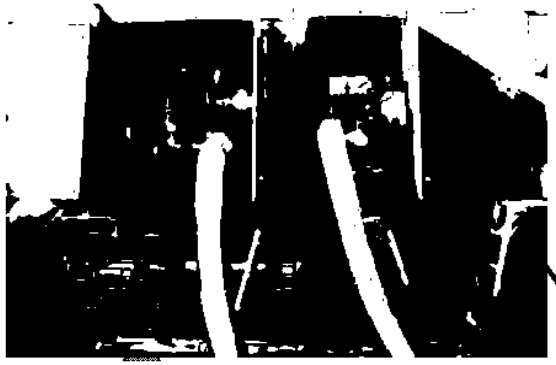
gas cylinders

Fire engines: 42

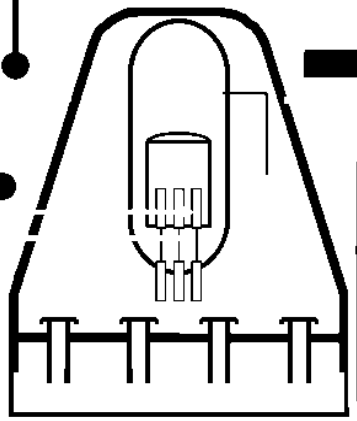
Gas Turbine Generators: 3

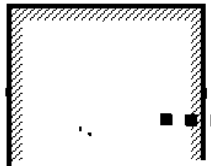
DC power

D/G trucks: 23



Alternative heat exchangers: 7



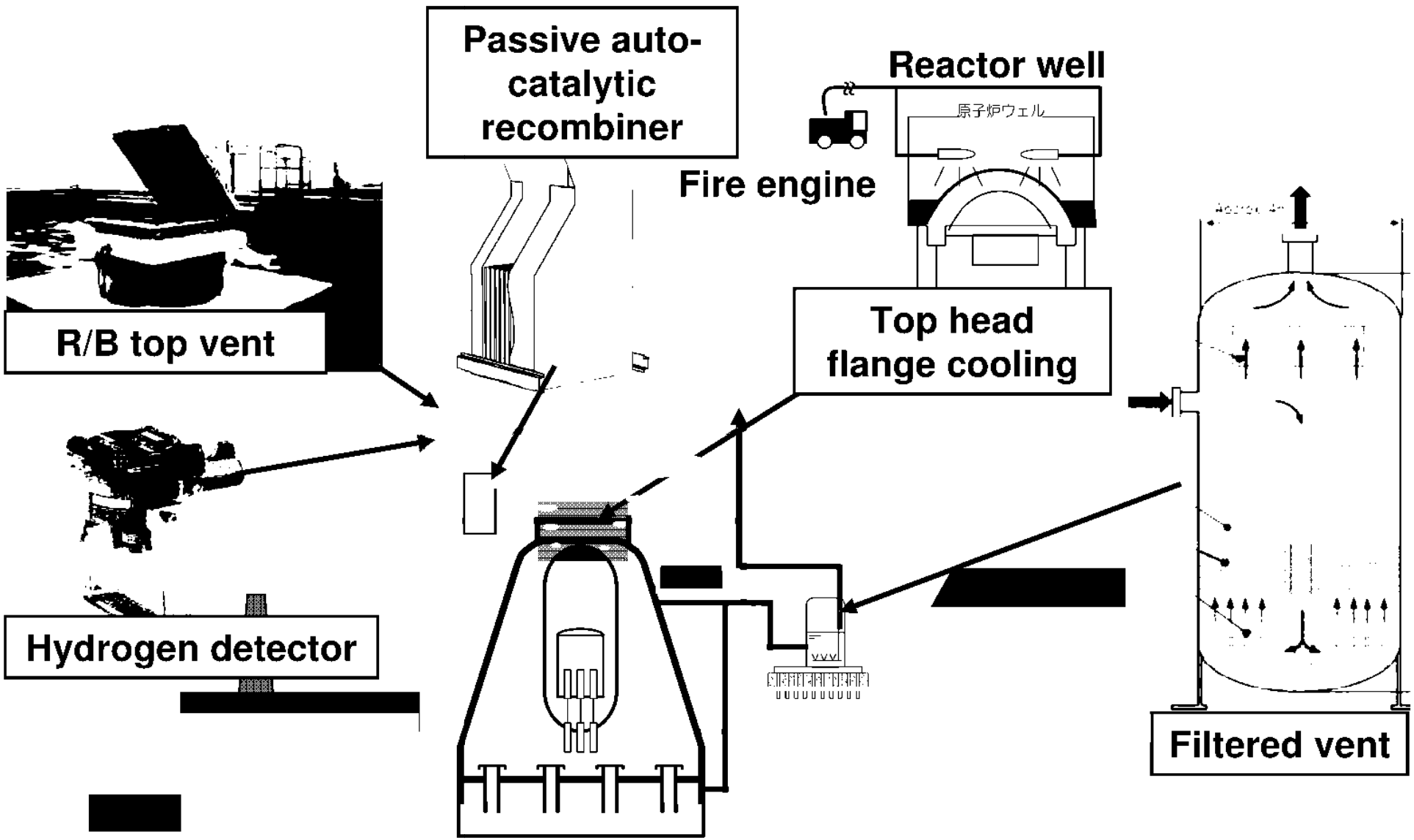


Emergency power supply

Fresh Water Reservoir: 20k ton

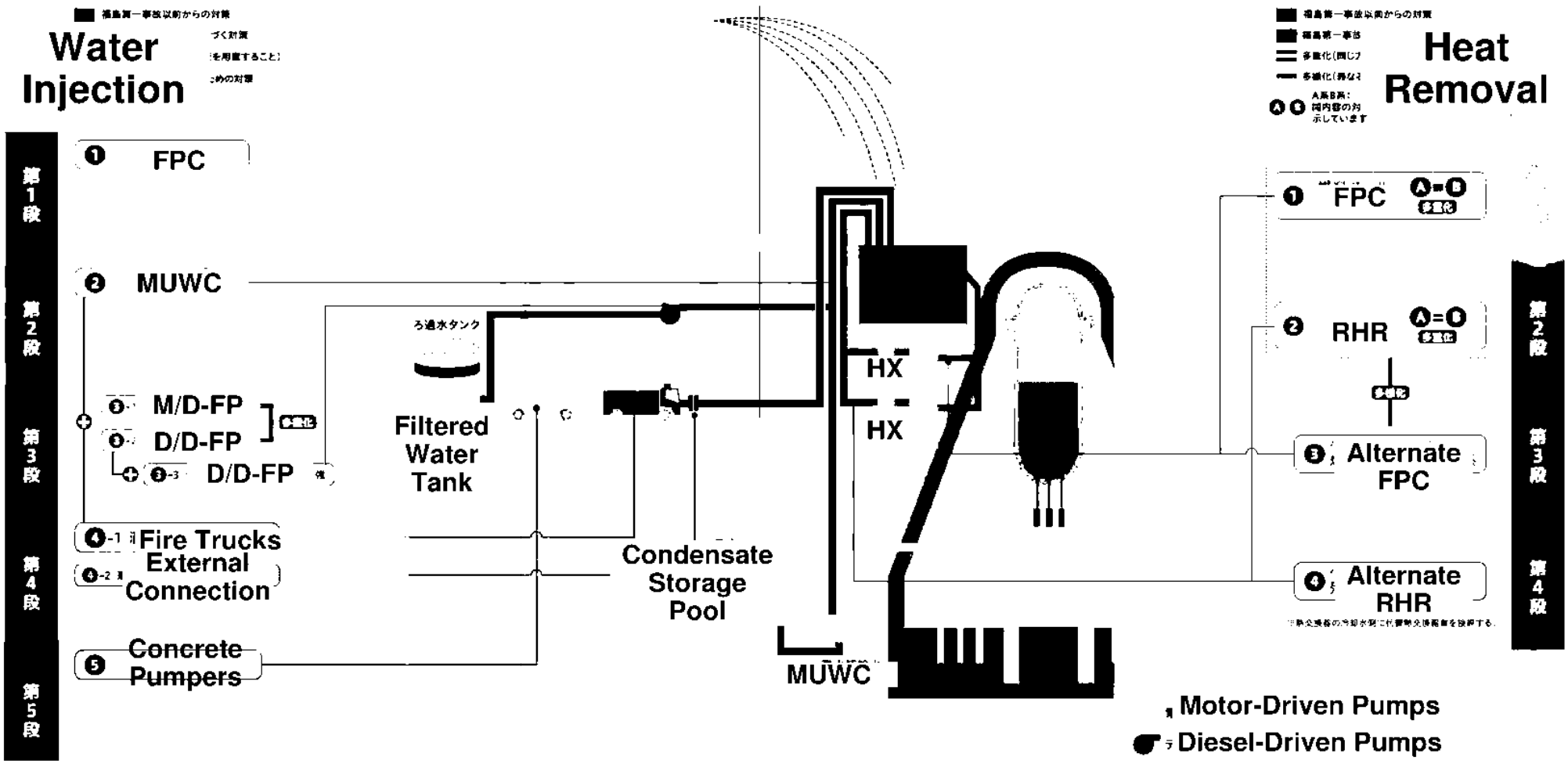
Core Damage Prevention Measures

Safety Enhancement Measures at KK NPS (cont'd)



Post Core Damage Mitigation Measures

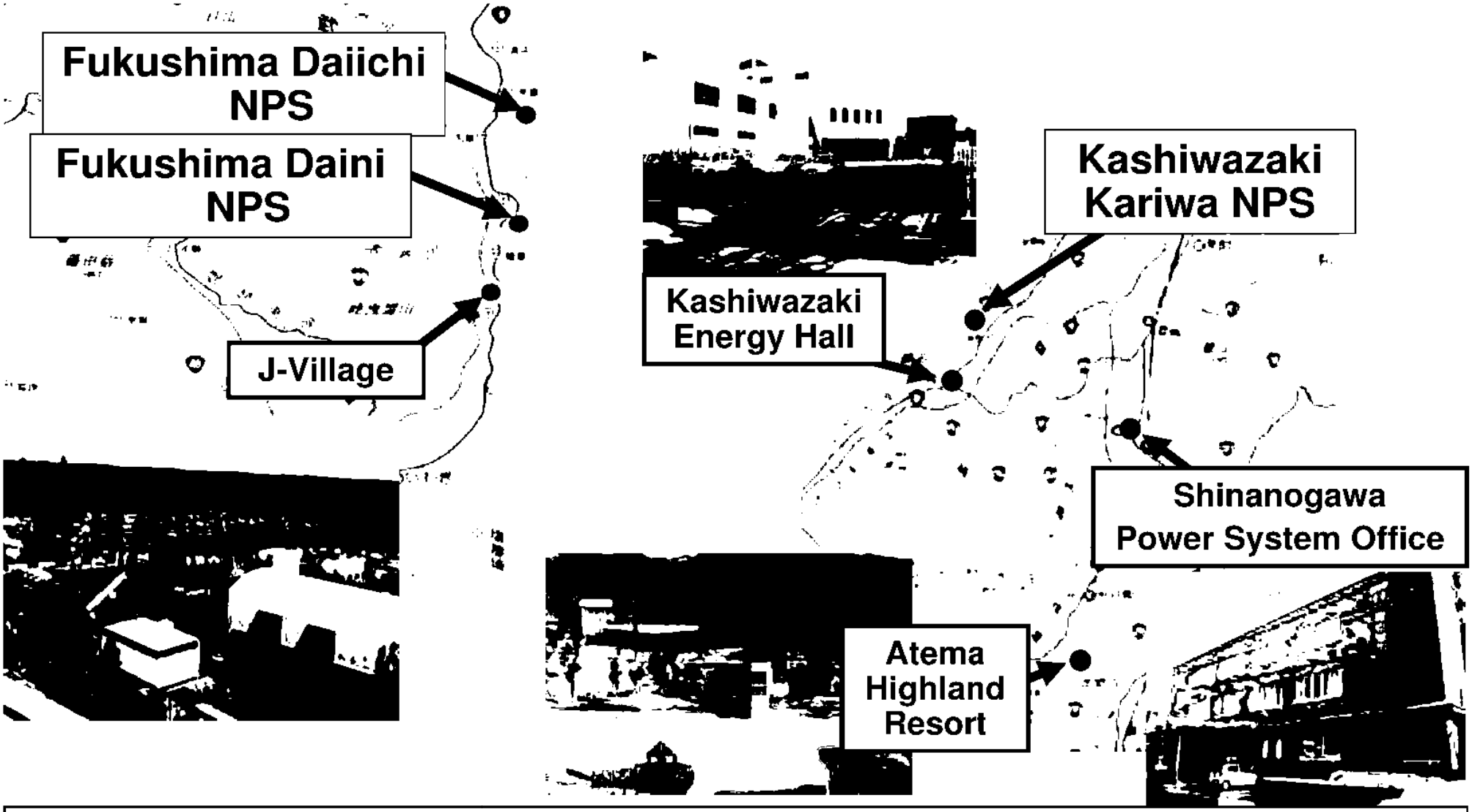
Safety Enhancement Measures at KK NPS (cont'd)



http://www.tepco.co.jp/en/nu/kk-np/safety/index-e.html

Spent Fuel Pool Cooling Measures

TEPCO Logistics Support Centers



- J-Village played instrumental role as an ad-hoc staging area
- Selection and preparation of multiple logistics support centers

TEPCO Logistics Support Centers (cont'd)

Stockpiling Food, Water, Fuel, etc.

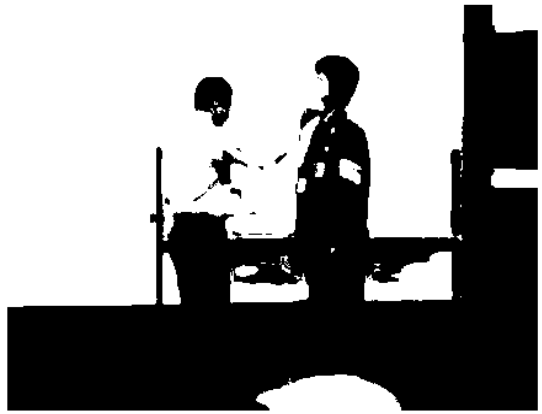
- Food/Water: 8-days supply of ERC personnel
- Diesel Fuel: 150-days for power trucks, fire trucks
- Procurement agreement with local fuel suppliers

Reinforcing Transportation System

- Transportation agreement with shipping companies
- Radiation protection education for drivers

Obtaining Special License

- Special license for large vehicles, trailers, cranes, etc.

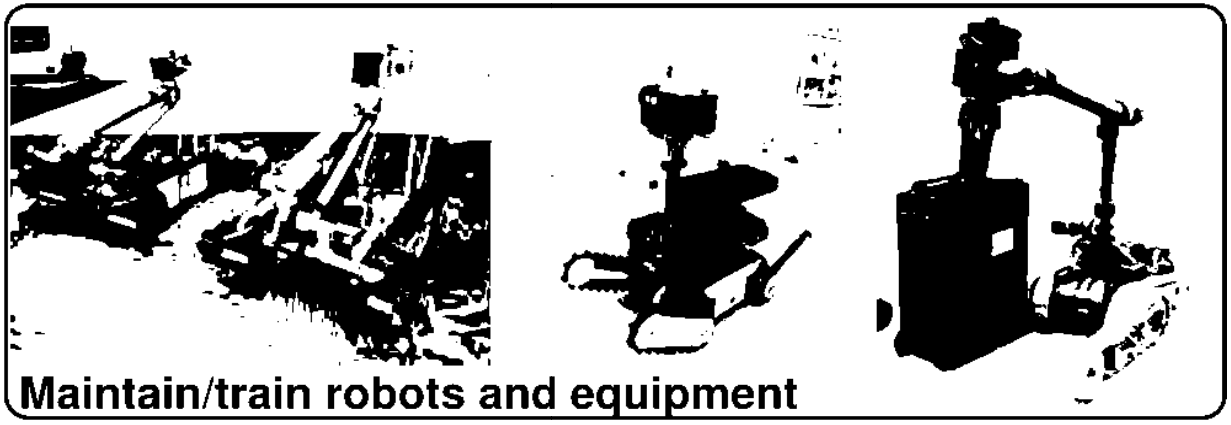


Conducting Radiation Protection Training

- Training received by more than 10,000 personnel

Nuclear Emergency Assistance Center (All Japan)

Support Facility (Fukui Prefecture)



Maintain/train robots and equipment

Request for Support

⇩

Dispatch Order

⇩

Plant Status Assessment

⇩

Assemble Personnel

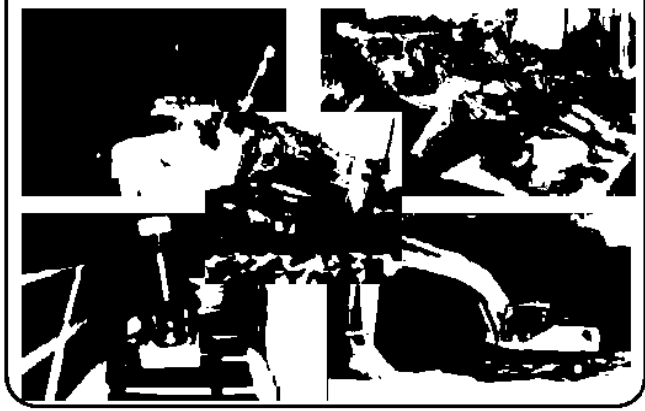
⇩

Load Equipment

⇩

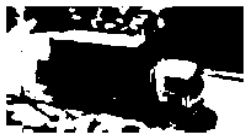
Affected Plant

High-dose Area

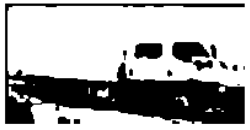


Radio Relay

Low-dose Area



Controller



⇔

Staging Area

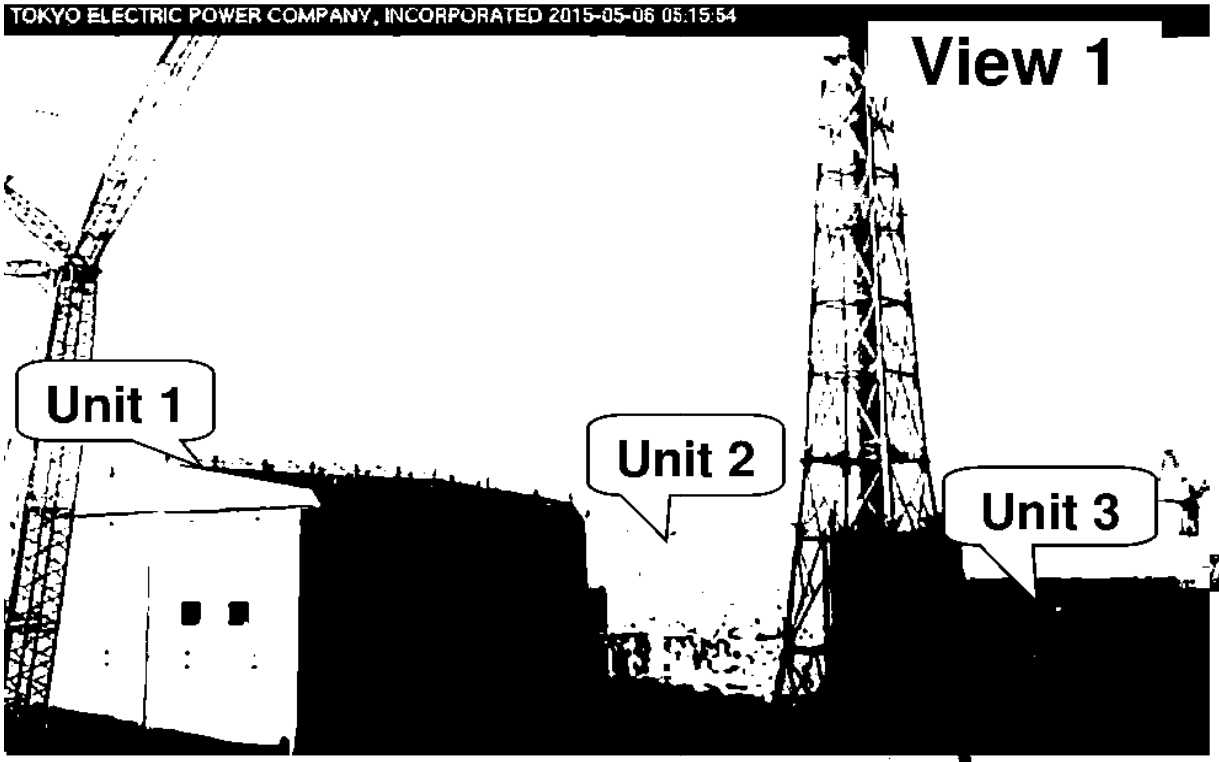
Equipment **Site commander**

Personnel **Fuel transport**

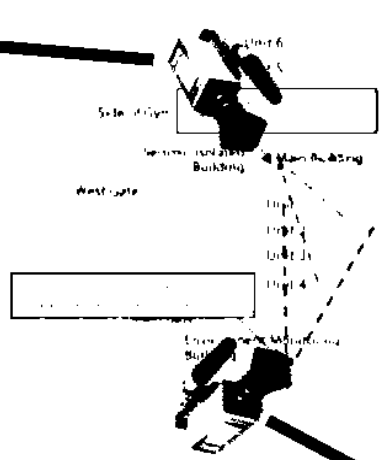
(source) FEPC/JAPC

- **Dedicated team formed within Japan Atomic Power Co. in 2013**
- **Full-scope facility to be established by 12 nuclear operators in 2015**

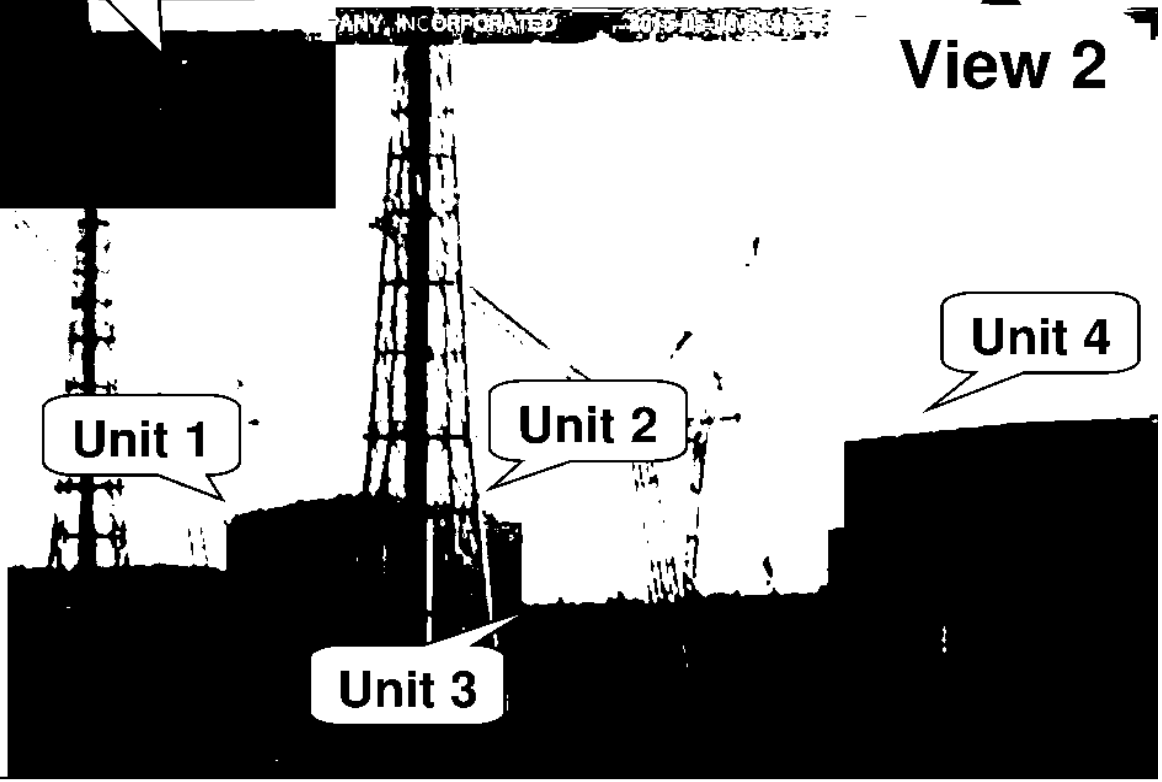
Current Status of Fukushima Daiichi (1F)



View 1



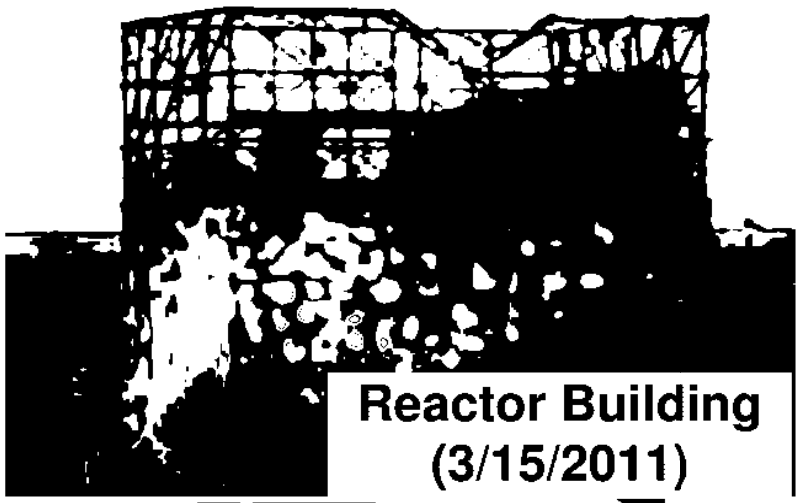
View 2



Live Camera View (as of 5/6/2015)

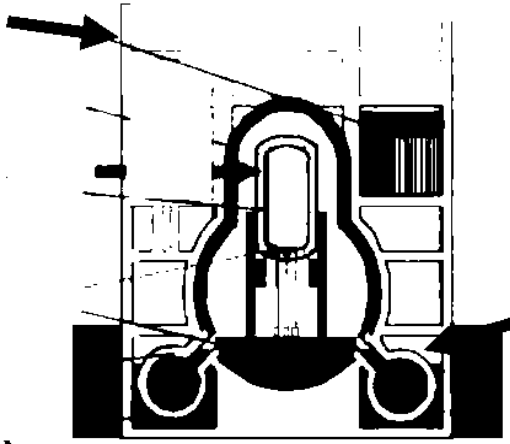
http://www.tepco.co.jp/en/nu/f1-np/camera/index2-e.html
http://www.tepco.co.jp/en/nu/f1-np/camera/index-e.html

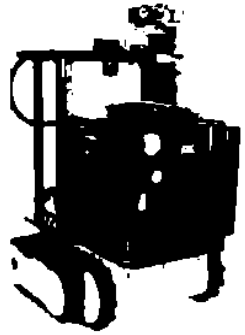
Progress Made at 1F Unit 1



Reactor Building
(3/15/2011)

Reactor Building Cover
(installed in Oct. 2011)





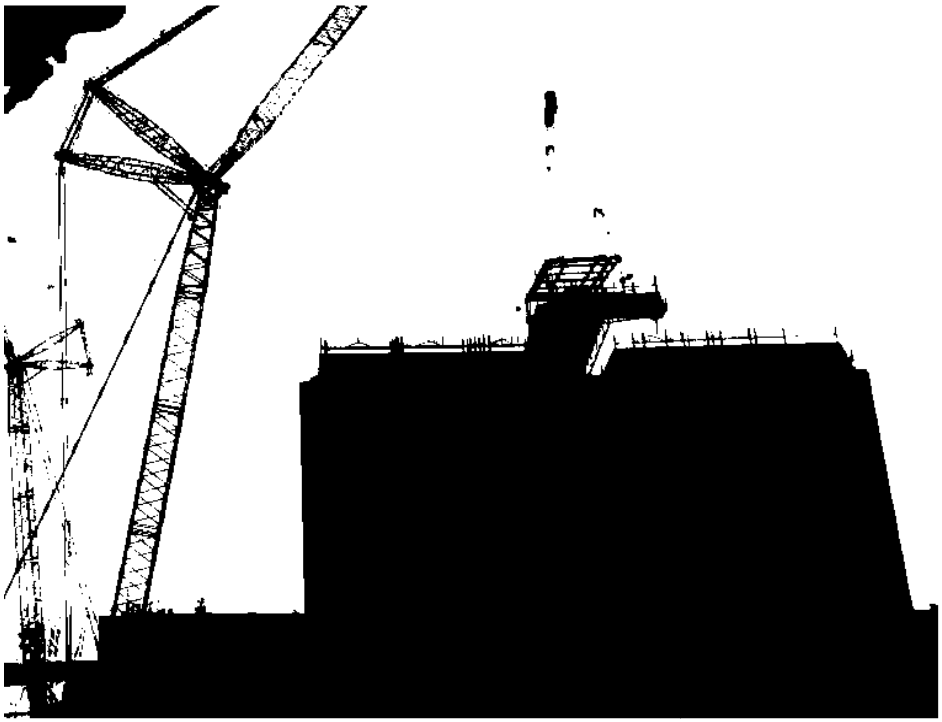
Torus Room (11/13/2013)
http://photo.tepco.co.jp/en/date/2013/201311-e/130313-04e.html

Torus Room (5/27/2014)
http://photo.tepco.co.jp/en/date/2014/201405-e/140527-01e.html

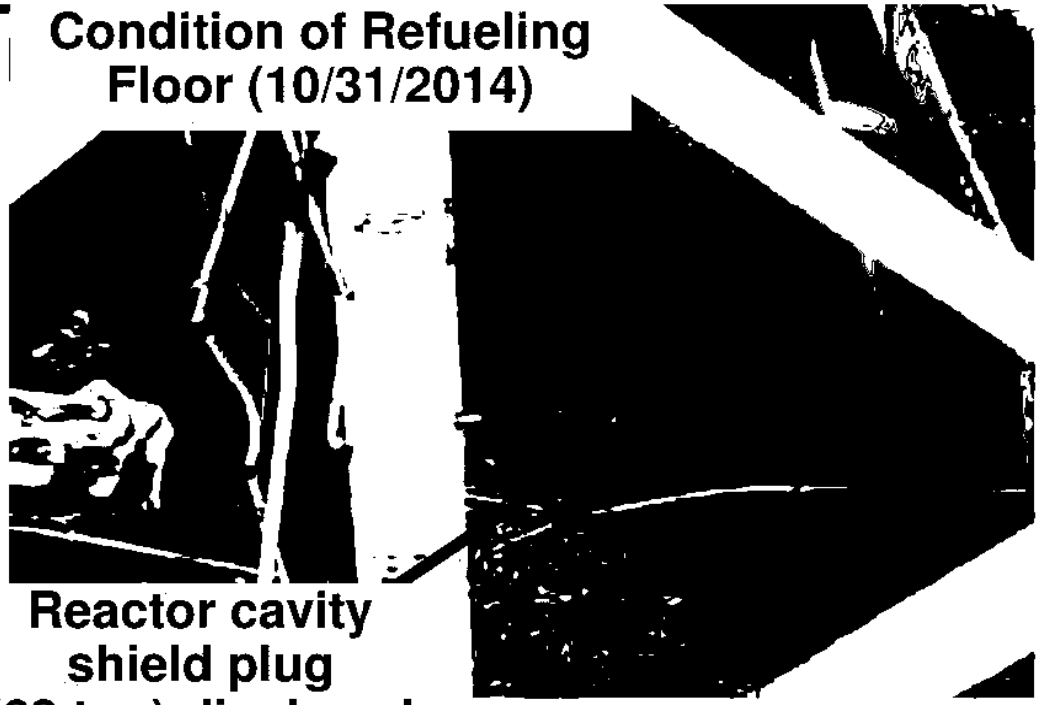
- Leakage in torus room detected by remote-operated boat and robot
- Attempt to detect core debris by muon tomography

Progress Made at 1F Unit 1 (cont'd)

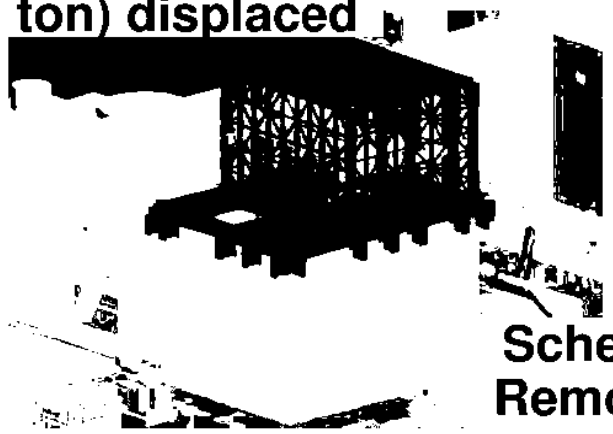
Removal of Roof of Cover (10/31/2014)



Condition of Refueling Floor (10/31/2014)



Reactor cavity shield plug (63 ton) displaced

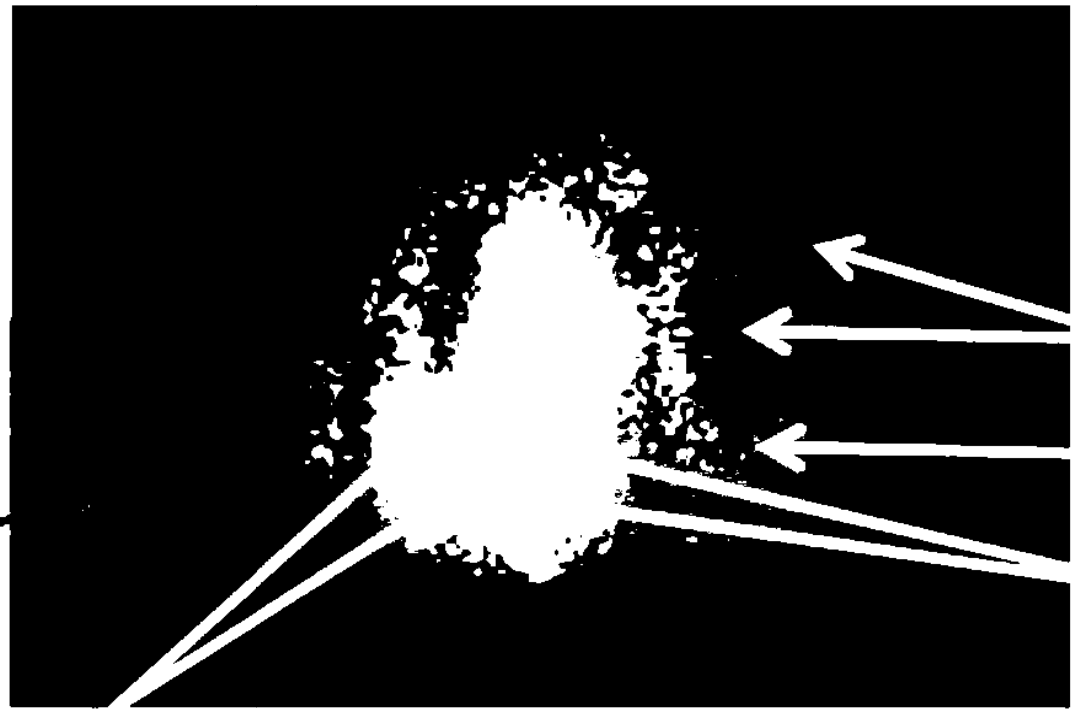


Schematic of Fuel Removal Structure

Reactor building cover to be dismantled in preparation for fuel removal

Progress Made at 1F Unit 1 (cont'd)

Rendering Image



Isolation Condenser

Spent Fuel Pool

Reactor Pressure Vessel and Biological Shield

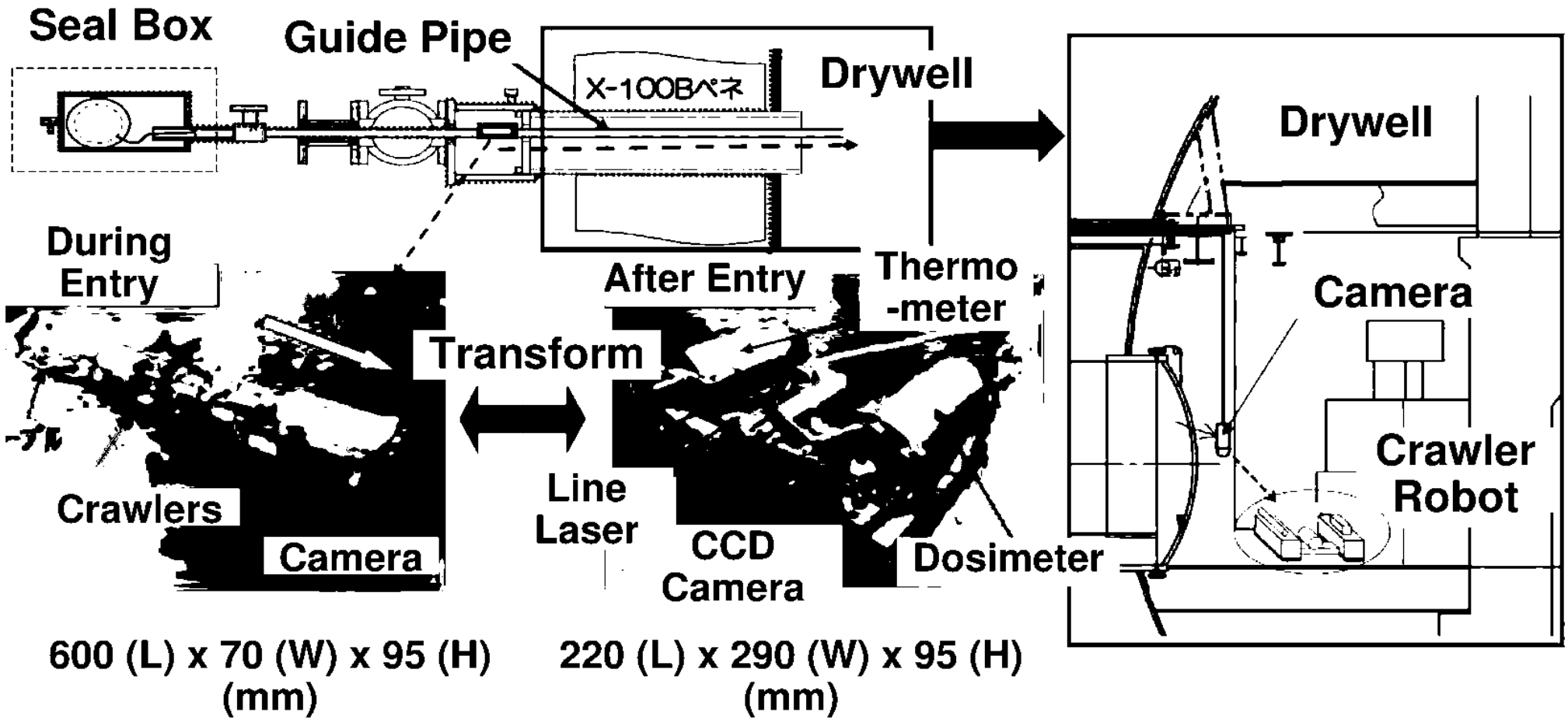
Reactor Building Wall

Containment Vessel

http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150319_01-e.pdf

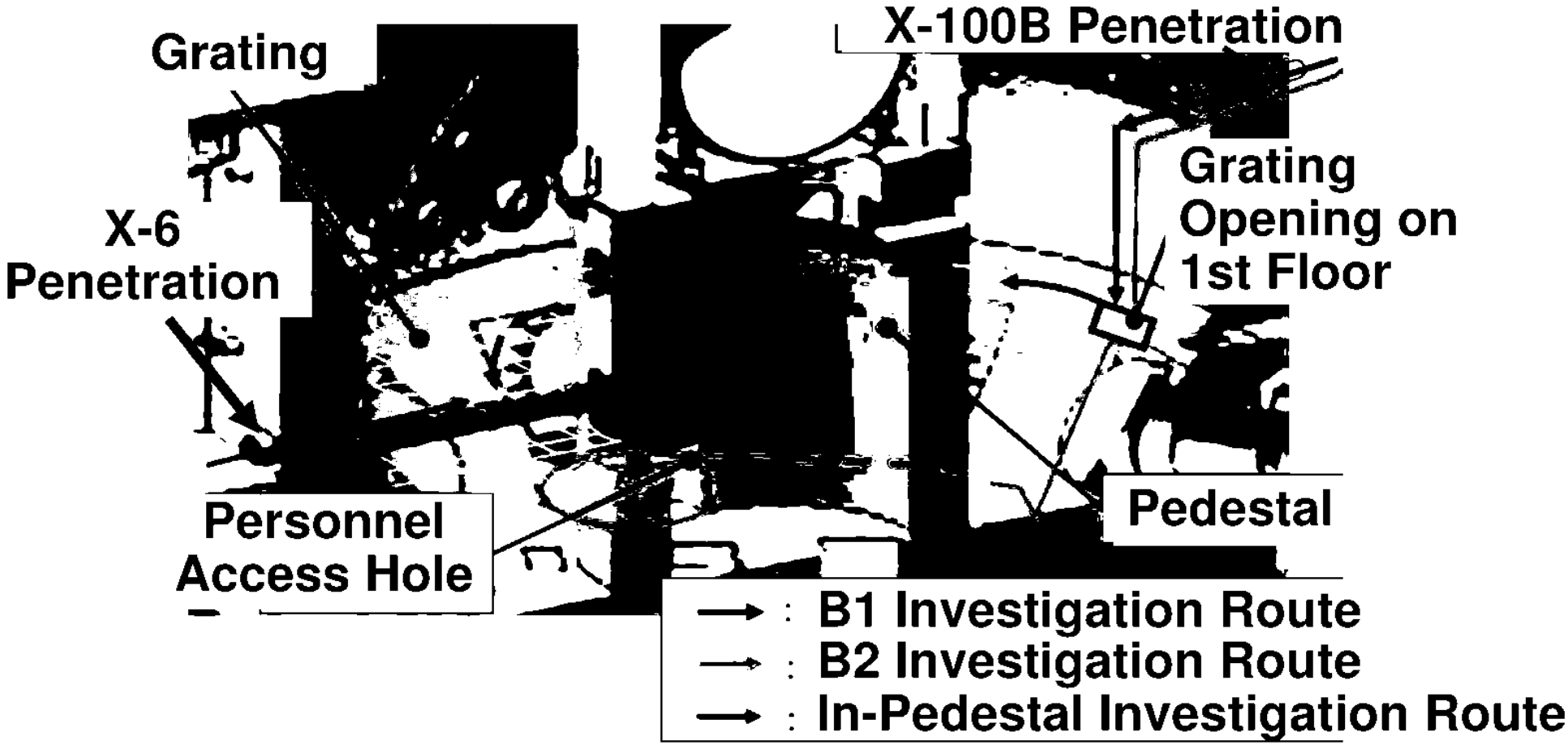
- Preliminary findings from muon tomography (3/19/2015)
- Data collected for 26 days
- No large volume of high-density object (fuel) confirmed in core region

Progress Made at 1F Unit 1 (cont'd)



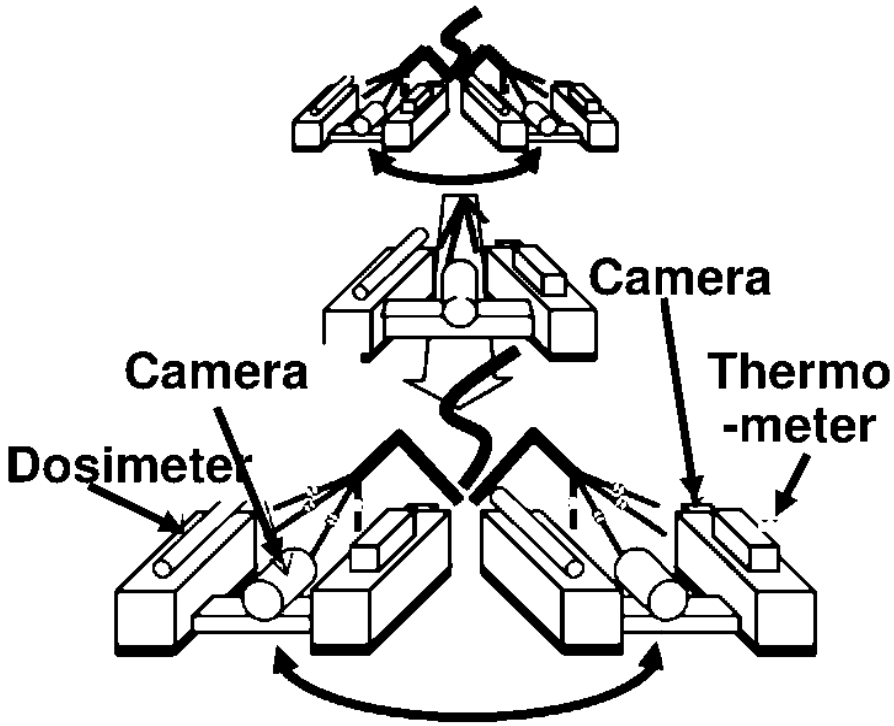
- Crawler robots investigated inside drywell in April 2015
- Robots passed through penetration with inner diameter of 100 mm (4") and transformed in the drywell

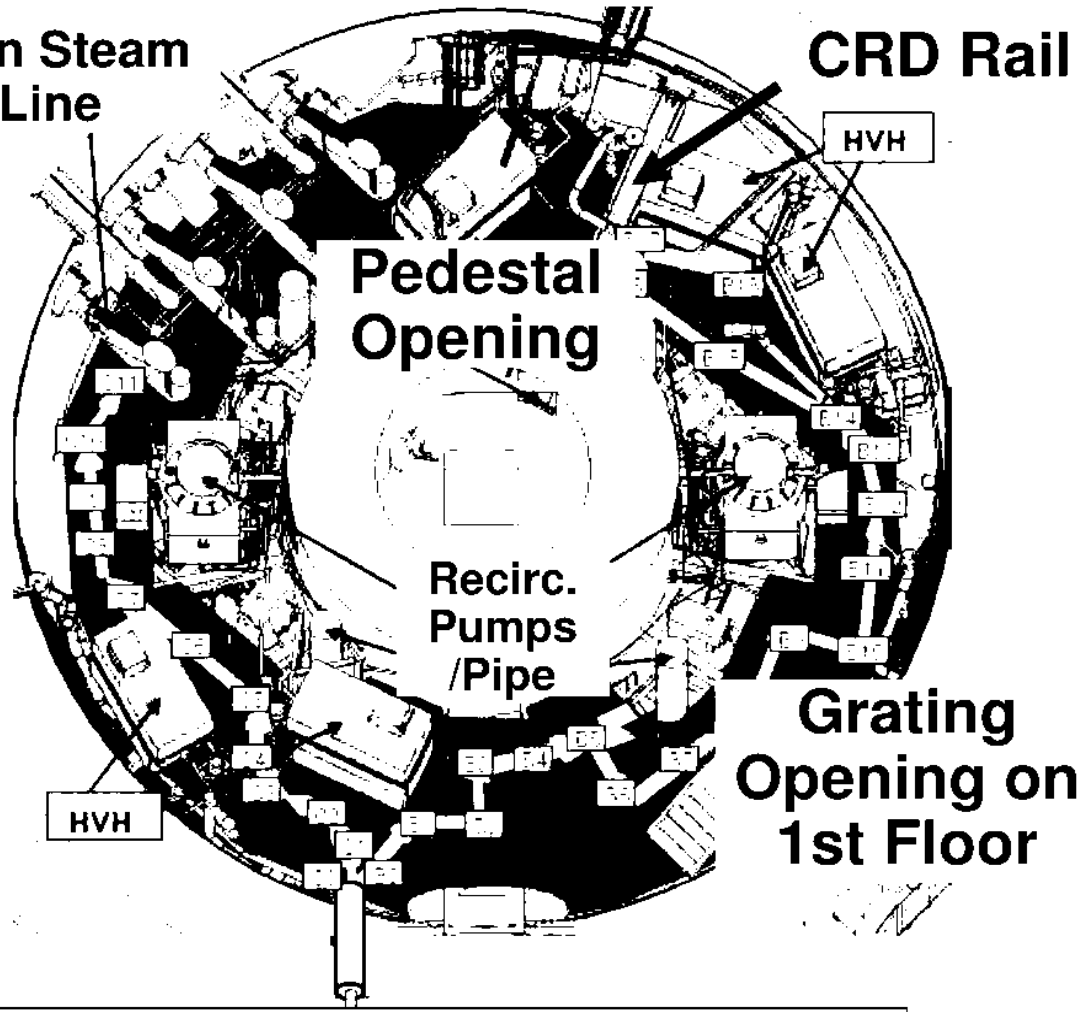
Progress Made at 1F Unit 1 (cont'd)



- **B1 Investigation: above the grating on 1st floor** (April 2015)
- **B2 Investigation: below the grating outside of pedestal** (in early 2016 based on results of B1)
- **In-Pedestal Investigation: in 2016-2017** (based on results of B2)

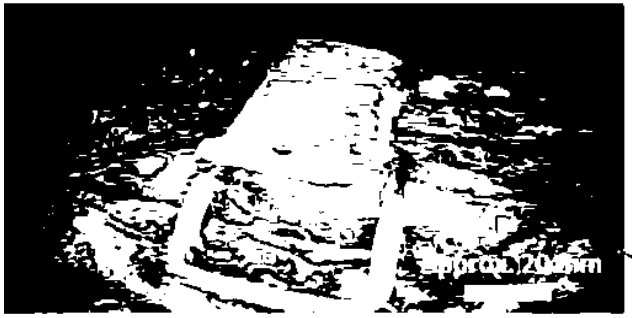
Progress Made at 1F Unit 1 (cont'd)

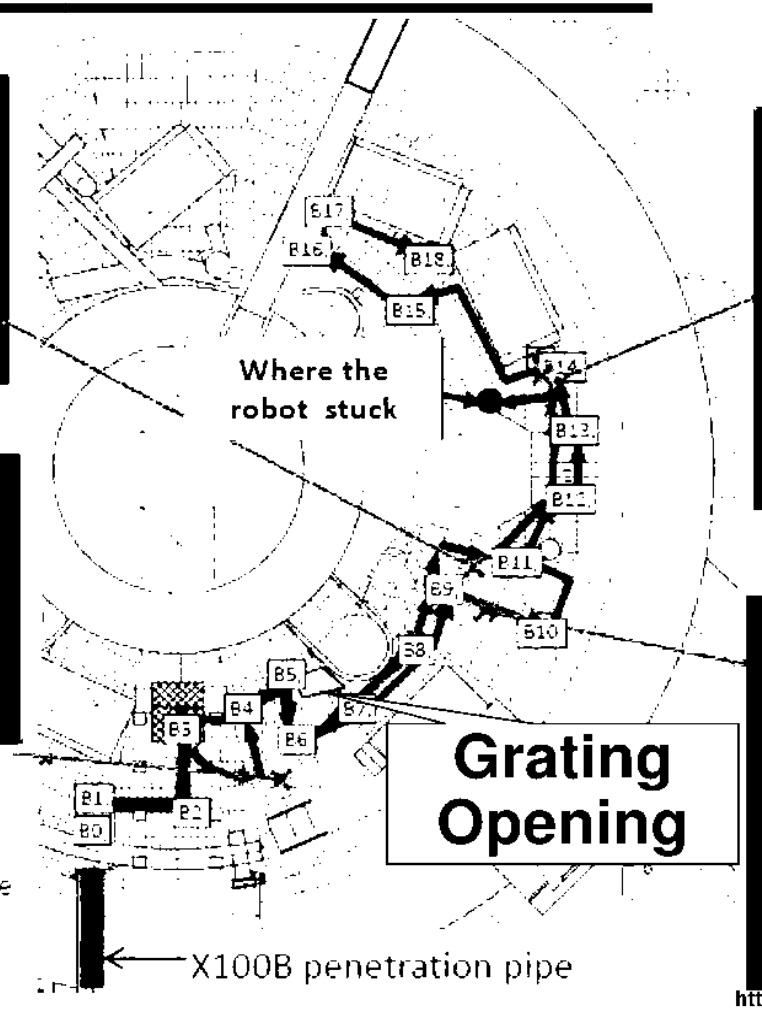




- Crawler robots successfully collected images, temperature, and dose rate data
- 1st robot got stuck and was left in drywell

Progress Made at 1F Unit 1 (cont'd)

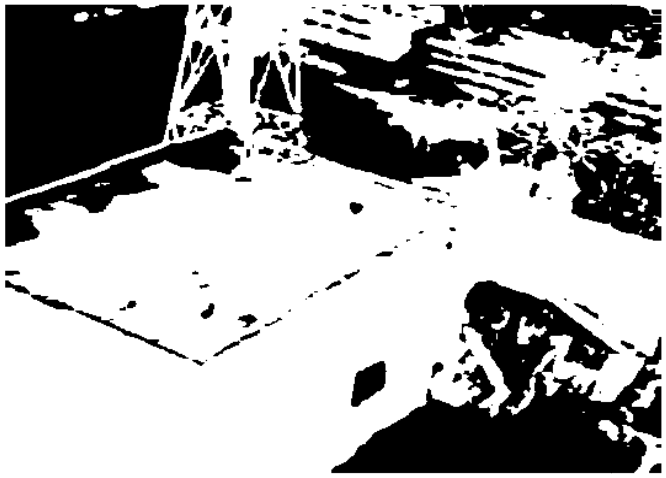




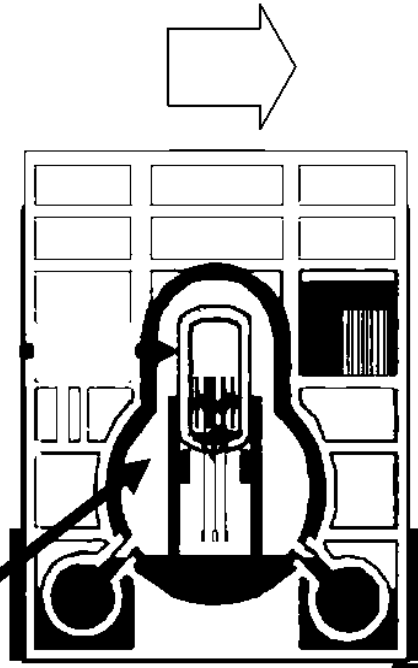
http://photo.tepco.co.jp/en/date/2015/201504-e/150413-01e.html

- Accessibility to pedestal region confirmed
- Foreign objects found on floor
- No significant damage found on structures and equipment
- Max. dose rate ~10 Sv/h (~1,000 rem/h)

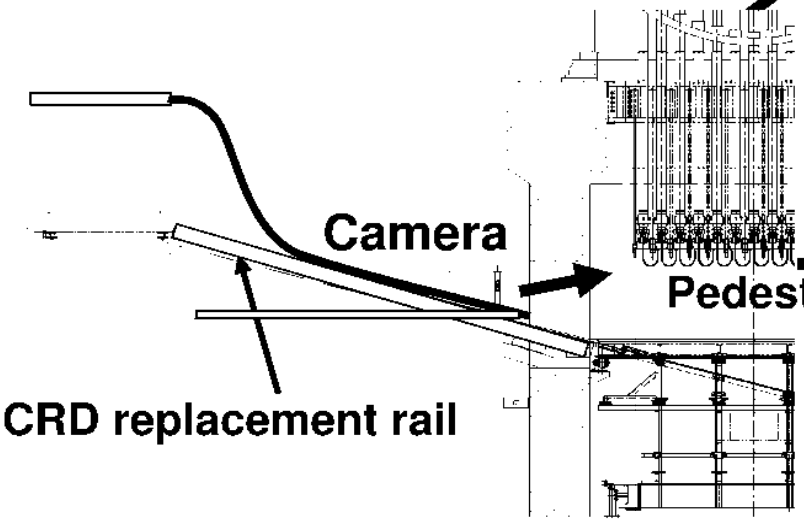
Progress Made at 1F Unit 2

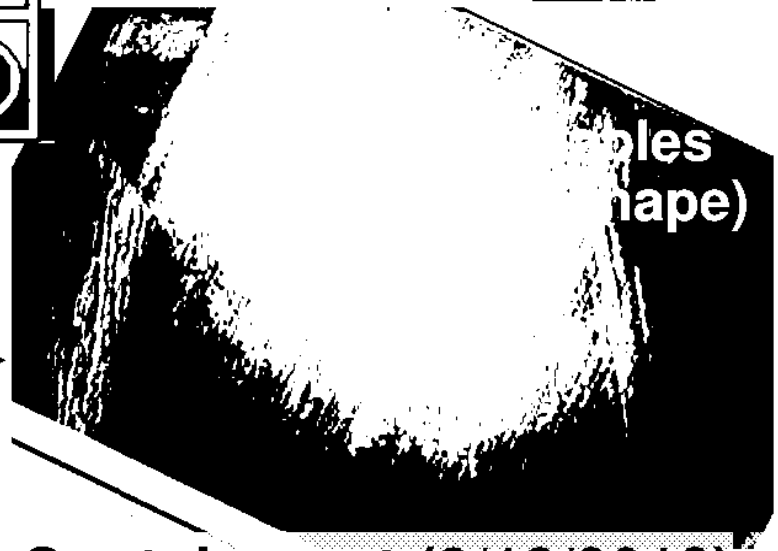


Steam Coming Out From Blow-out Panel (4/10/2011)



Blow-out Panel Closed (3/11/2013)



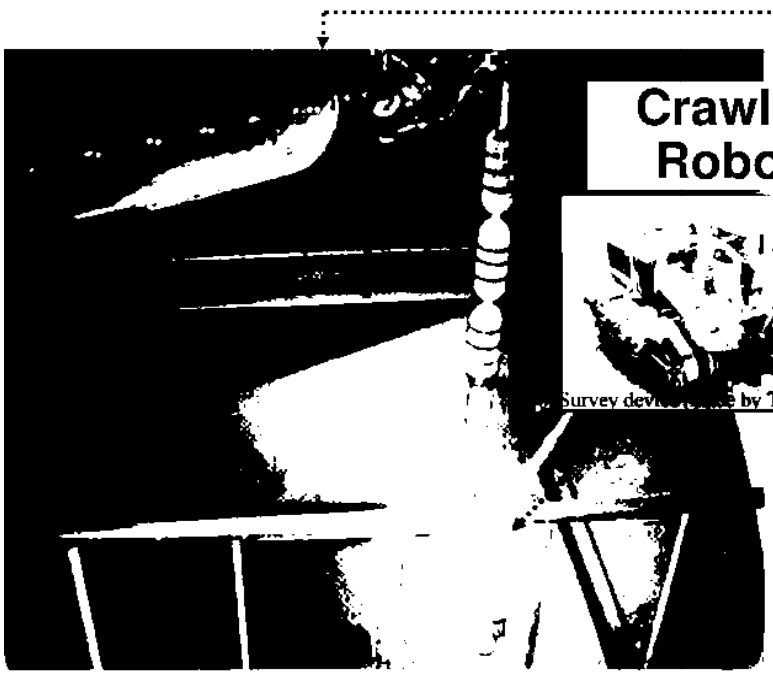


Inside Containment (8/12/2013)

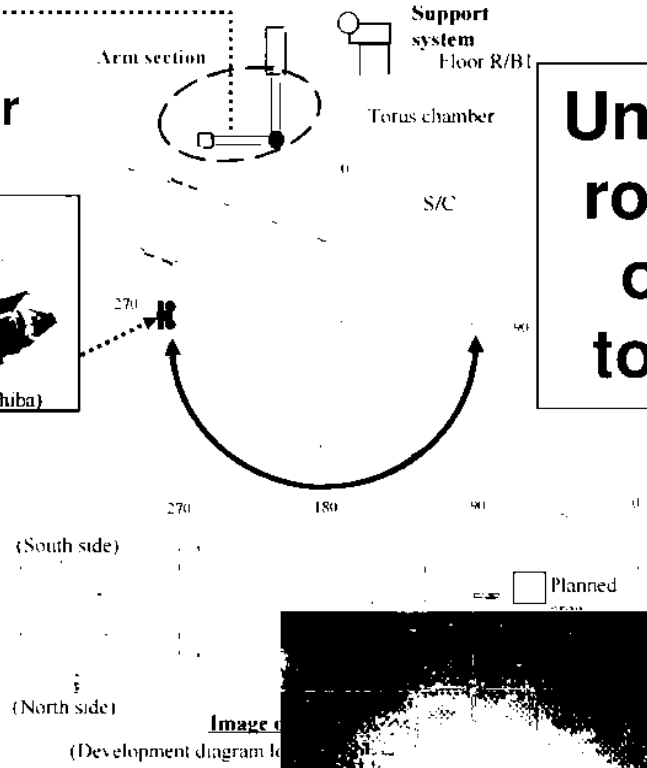
http://photo.tepco.co.jp/en/date/2013/201308-e/130812-02e.html

- Video images obtained inside primary containment
- Attempt to detect core debris by muon tomography

Progress Made at 1F Unit 2 (cont'd)



Survey using actual device at Unit 2
(Lowering the survey device)

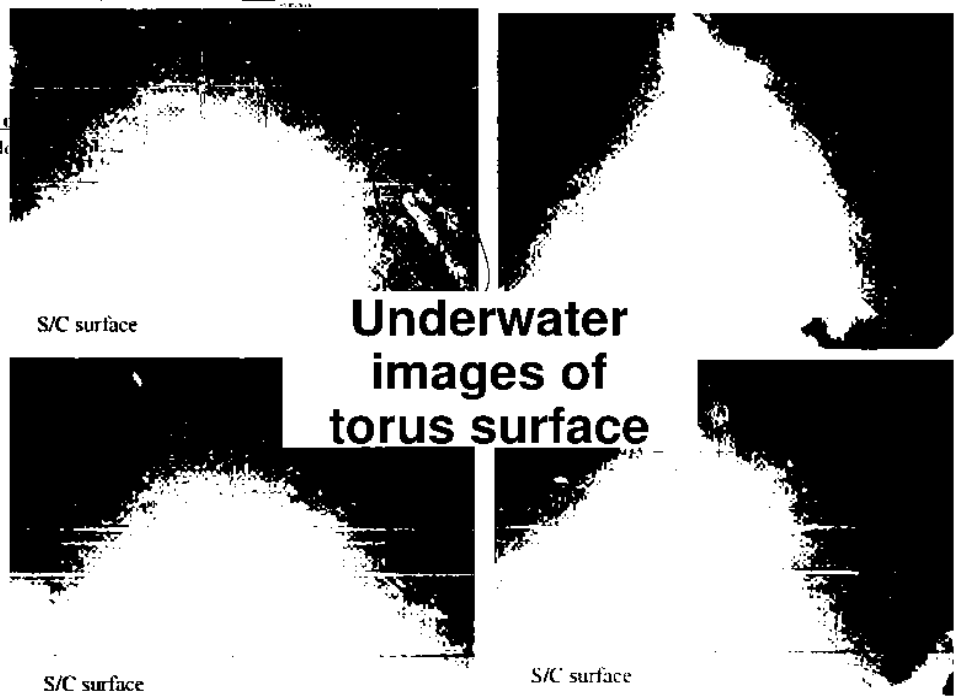


(Development diagram

http://photo.tepco.co.jp/en/date/2014/201409-e/140930_03e.html

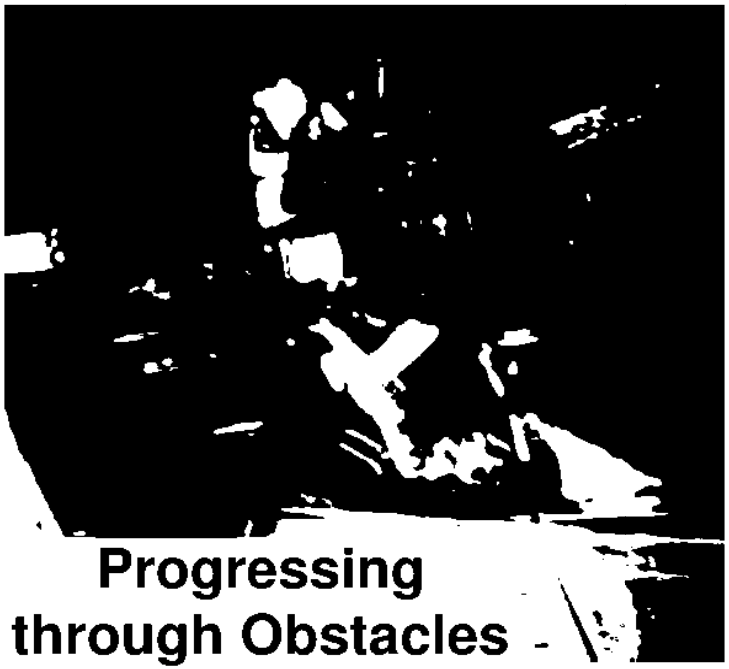
Underwater crawler robot investigated outer surface of torus (Sept. 2014)

- **No large break observed within observed area of torus**
- **Noise in image increased near bottom of torus (may imply high radiation source)**

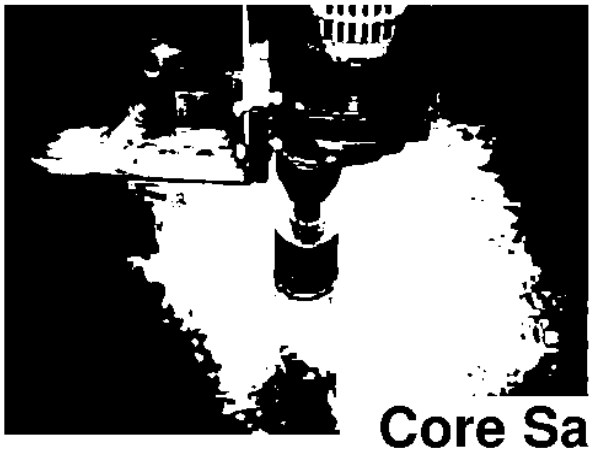


Underwater images of torus surface

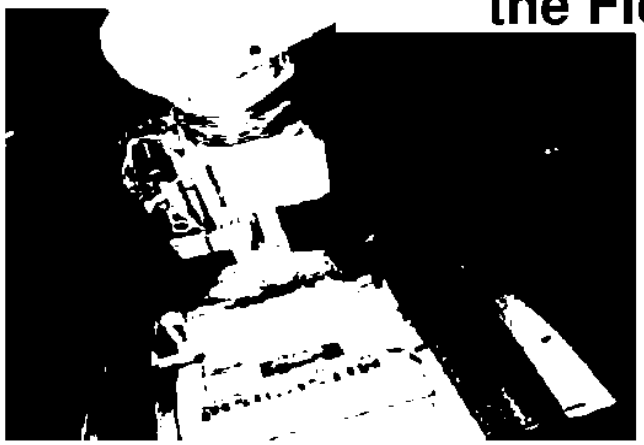
Progress Made at 1F Unit 2 (cont'd)

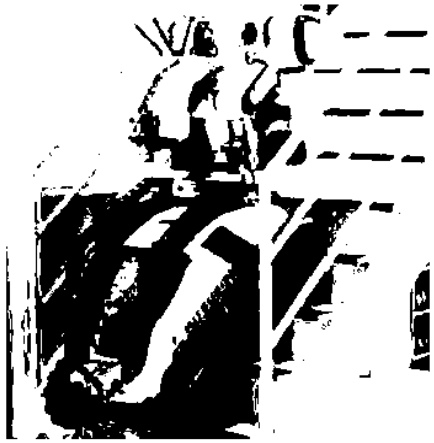


Progressing through Obstacles



Core Sampling of the Floor

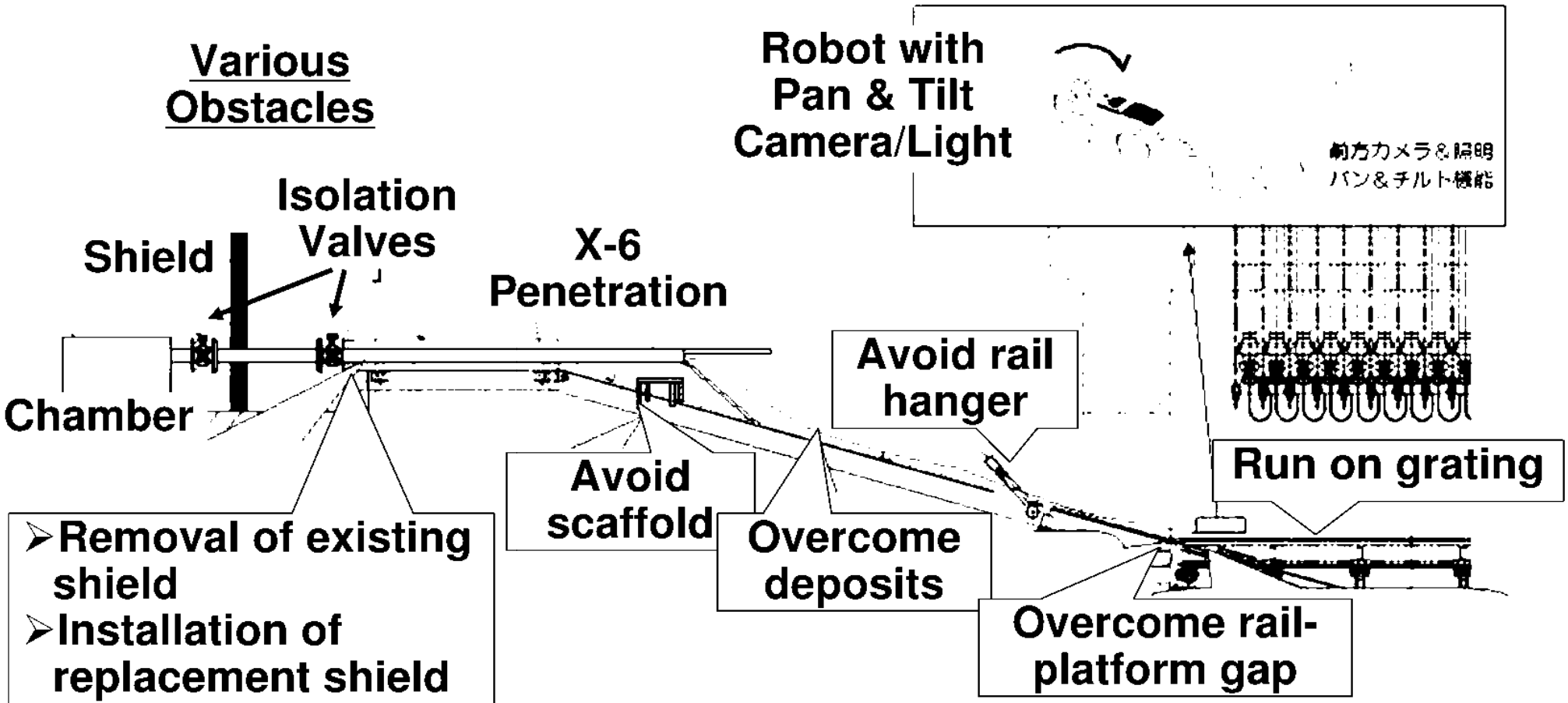




Maneuverability Testing

Robot retrieved concrete samples from refueling floor (March 2014)

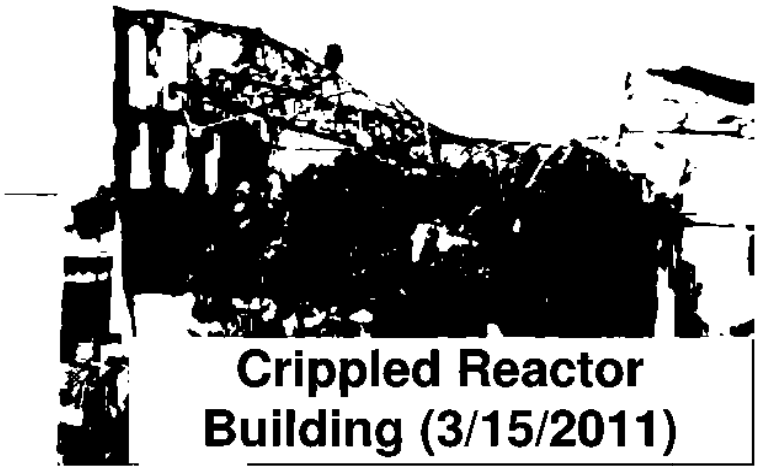
Progress Made at 1F Unit 2 (cont'd)



- Removal of existing shield
- Installation of replacement shield
- Opening hole in penetration hatch
- Removal of material inside of penetration

- Re-attempt to investigate inside pedestal via CRD replacement rail: after summer of 2015
- Various obstacles need to be overcome

Progress Made at 1F Unit 3

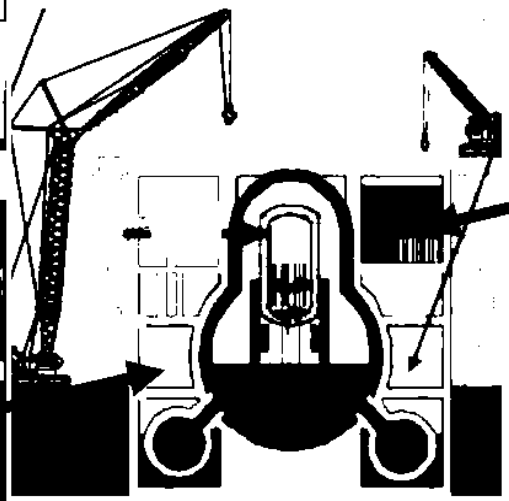


Crippled Reactor Building (3/15/2011)

Large Rubble Removed (10/11/2013)

MSIV Room (5/15/2014)

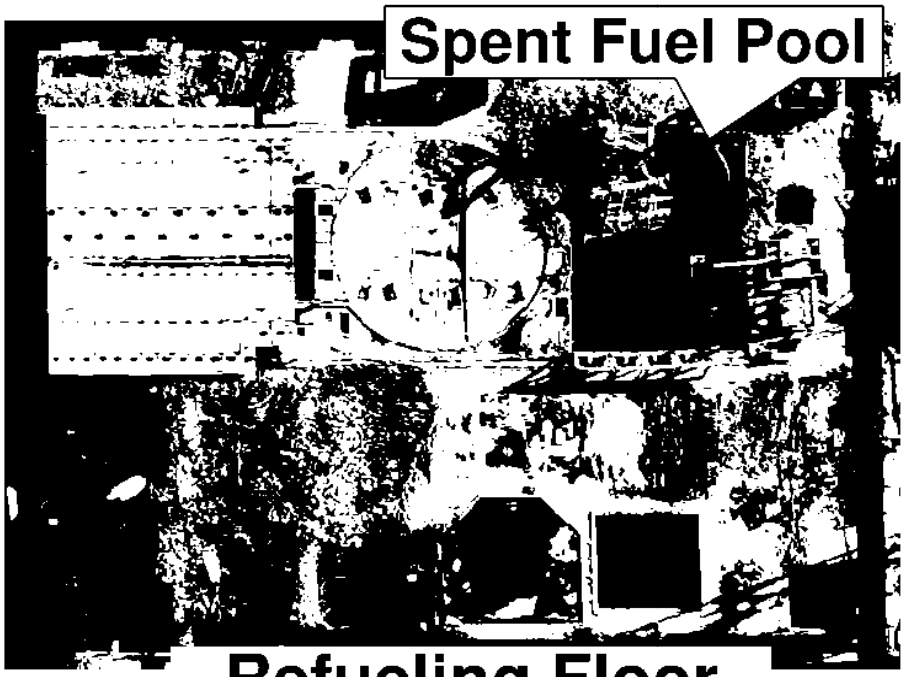
http://photo.tepco.co.jp/en/date/2014/201405-e/140515-01e.html



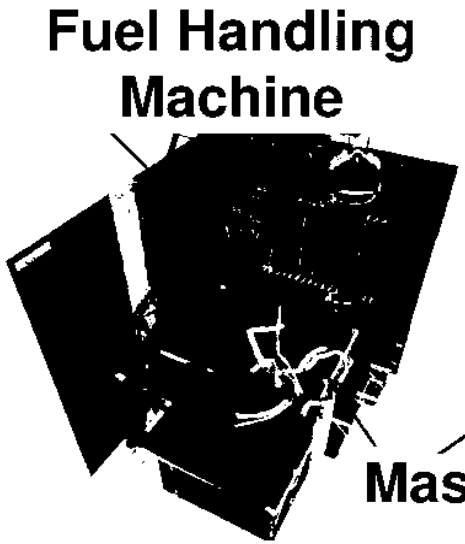
Spent Fuel Pool (Feb. 2013)

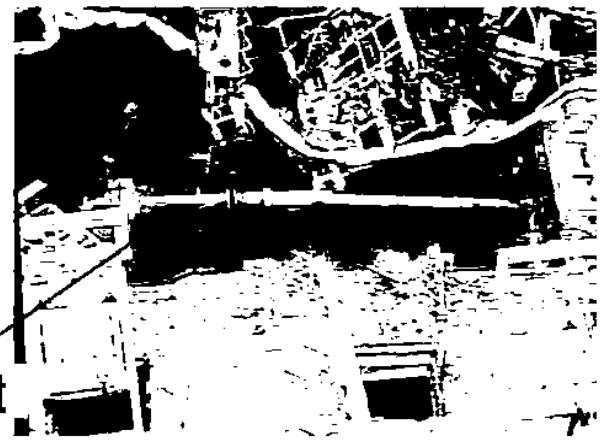
- Robot found leakage location in reactor building
- Removing rubble from SFP in preparation for defueling

Progress Made at 1F Unit 3 (cont'd)



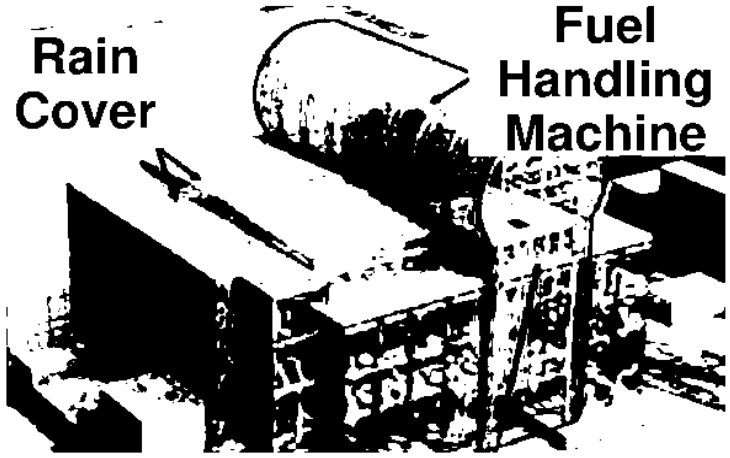
Refueling Floor
(Dec. 2014)





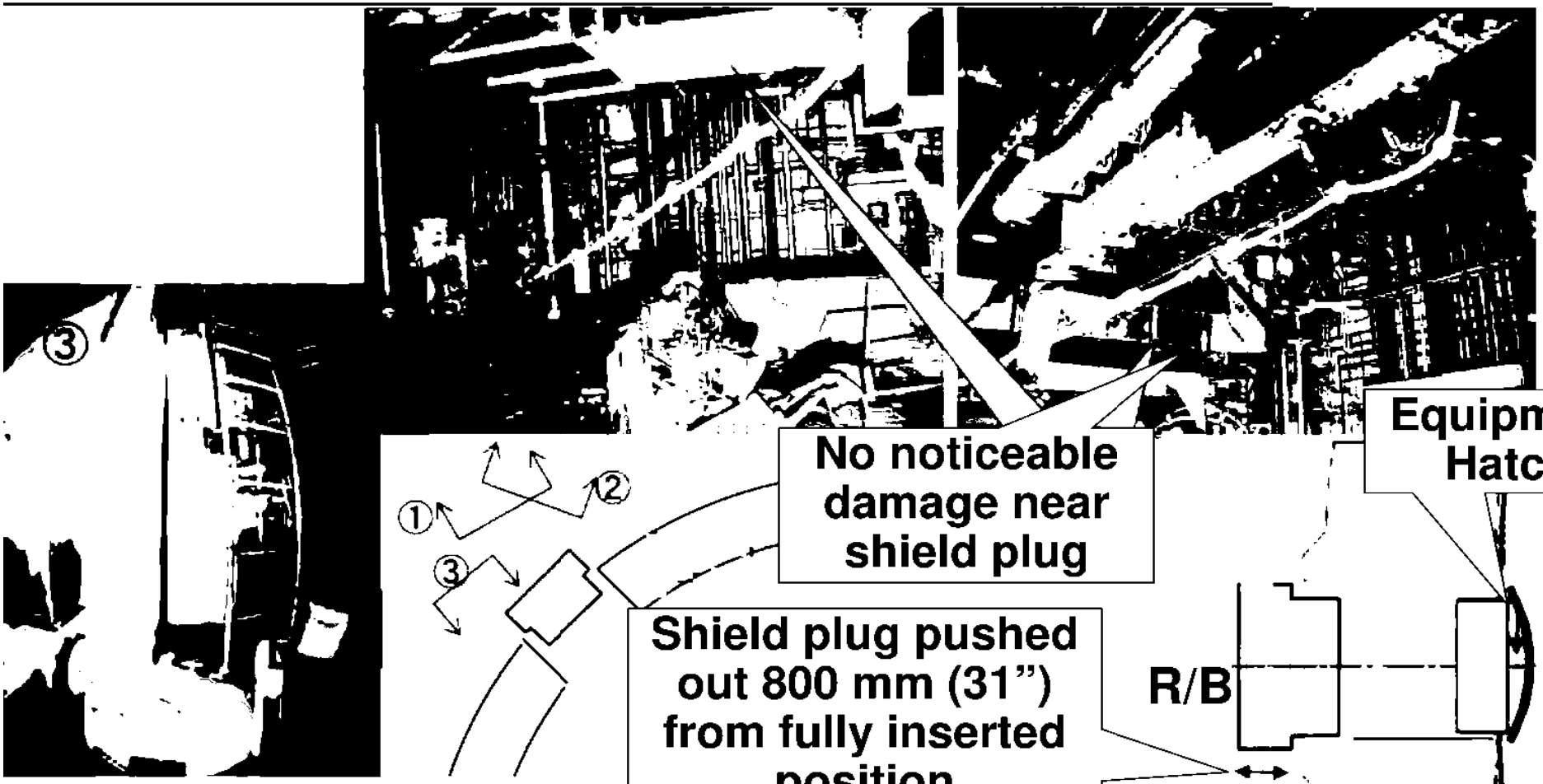
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_10-j.pdf

- Rubble in spent fuel pool being removed by remote operation
- Preparation to construct fuel removal structure



Fuel Removal Structure

Progress Made at 1F Unit 3 (cont'd)

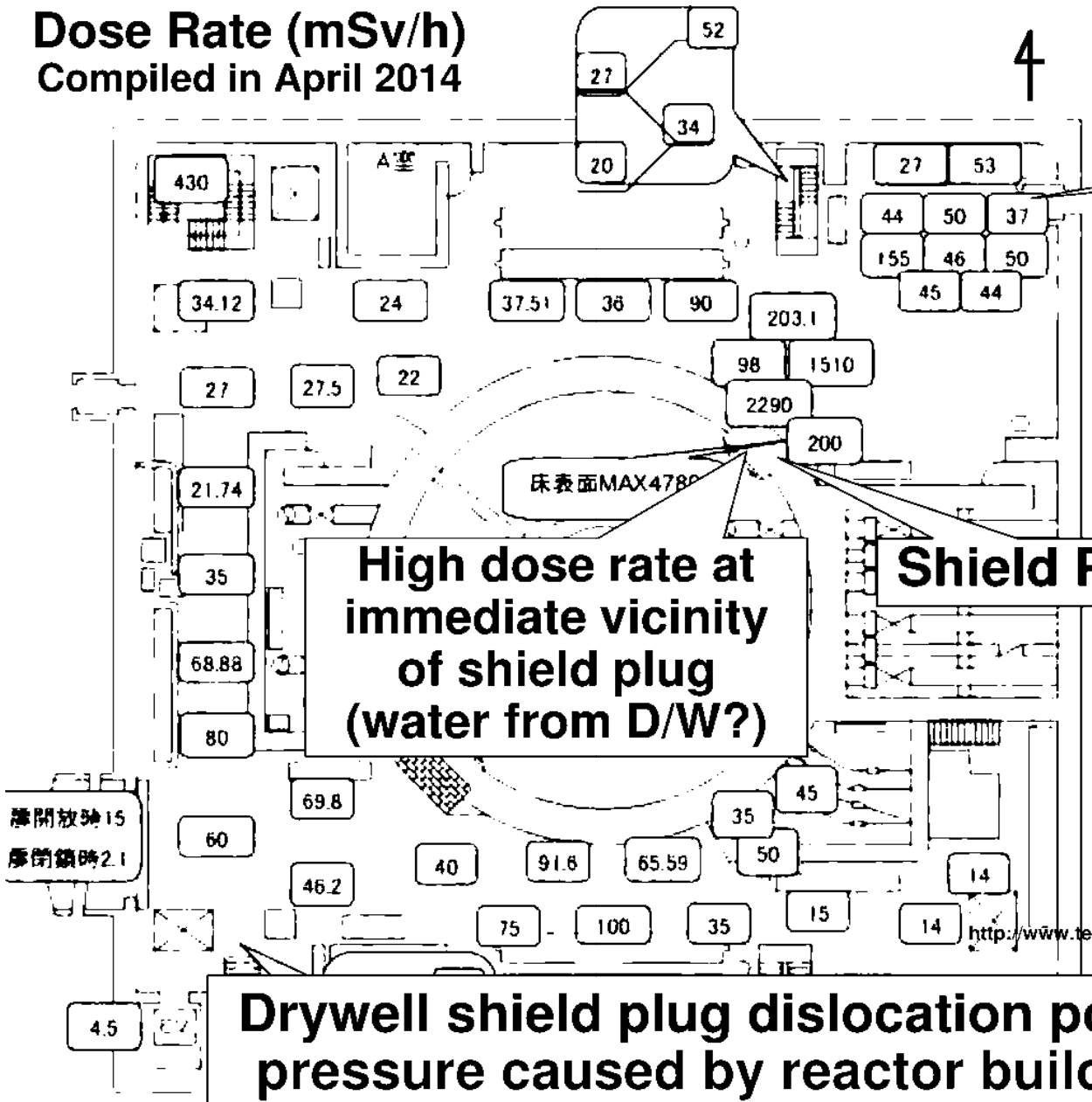


http://www.tepco.jp/nu/fukushima-np/handouts/2015/images/handouts_150330_04-j.pdf

- Drywell shield plug found to be dislocated from original position
- Bore scope investigation hinted water leaking out from drywell into reactor building (April 2012)
- Study conducted to estimate cause of shield plug dislocation (March 2015)

Progress Made at 1F Unit 3 (cont'd)

Dose Rate (mSv/h)
Compiled in April 2014

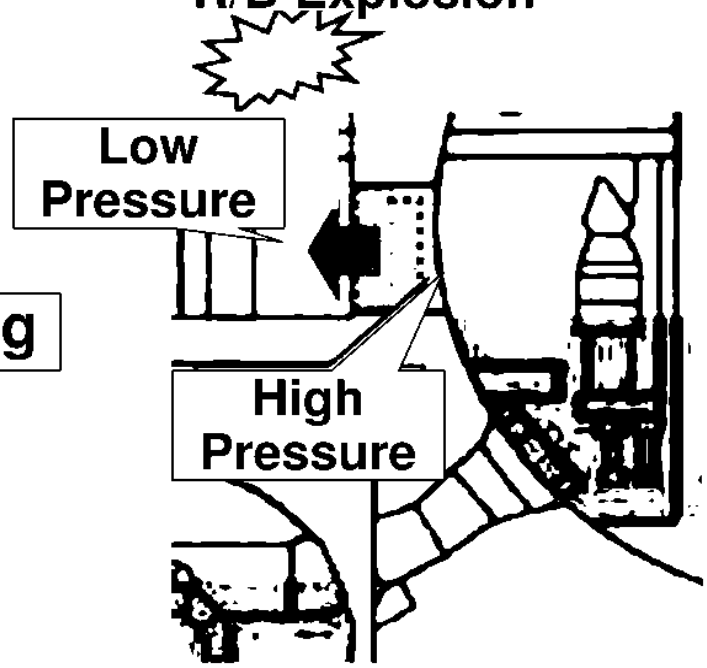


Dose rate at NE corner of R/B similar to other locations

High dose rate at immediate vicinity of shield plug (water from D/W?)

Shield Plug

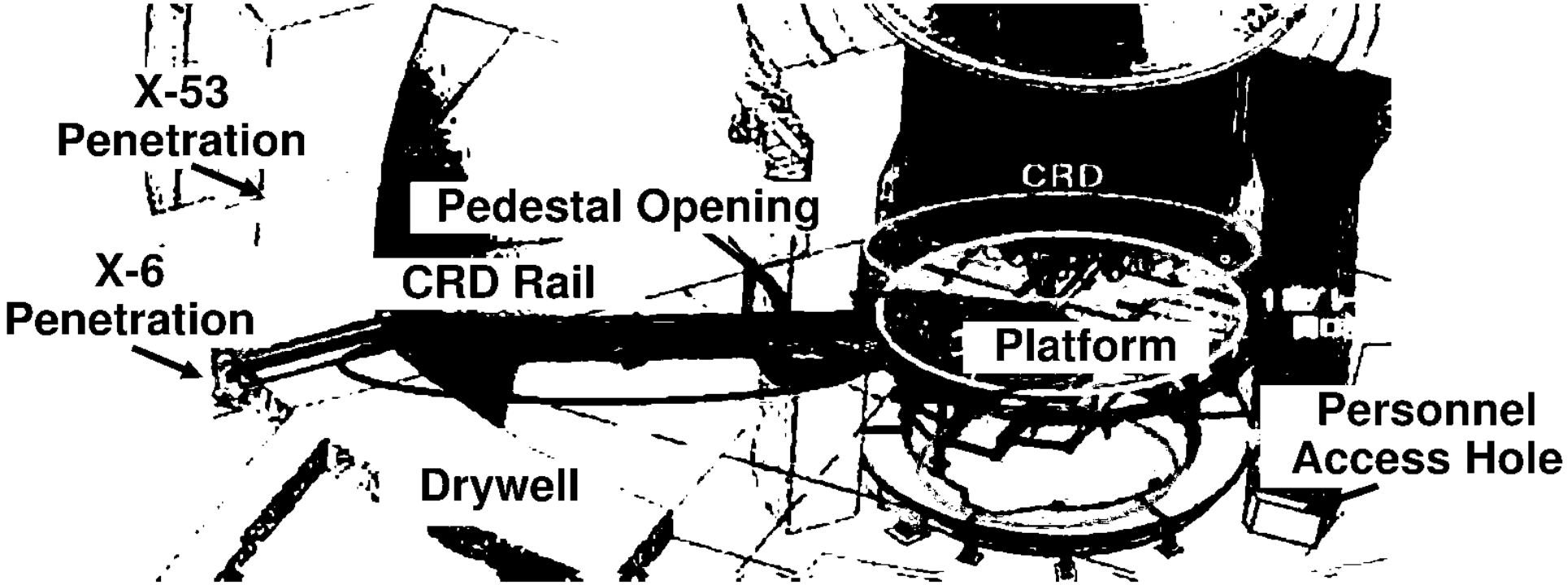
R/B Explosion



http://www.tepco.co.jp/nu/fukushima-np/f1/surveymap/images/f1-sv3-20140327-j.pdf

Drywell shield plug dislocation possibly due to differential pressure caused by reactor building hydrogen explosion (NOT by explosion inside drywell)

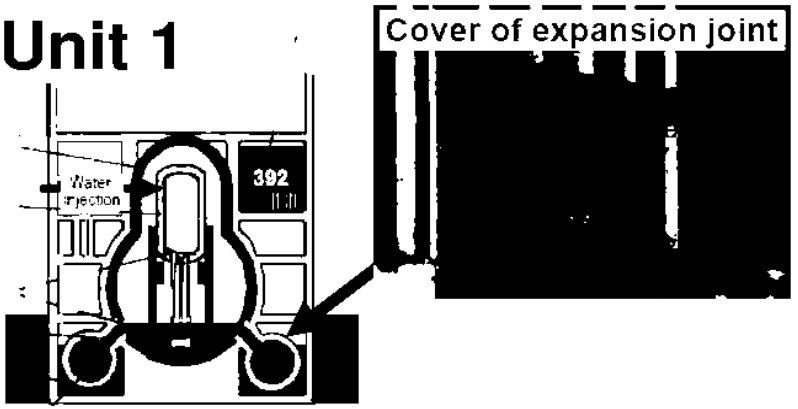
Progress Made at 1F Unit 3 (cont'd)



- Investigation inside drywell under consideration
- X-6 Penetration (to be used in Units 1&2) considered to be submerged
- Use of other penetrations requires further downsizing of robot and underwater maneuver to reach inside pedestal
- Investigation via X-53 Penetration (presumed to be un-submerged): after Sept. 2015

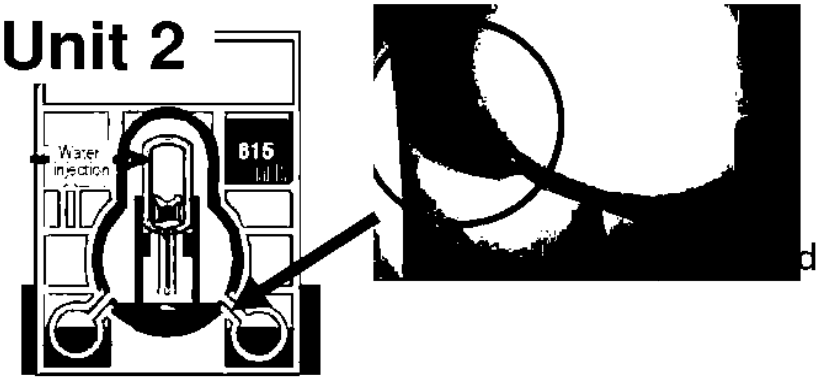
Investigation Insights of 1F Units 1, 2, and 3

Unit 1



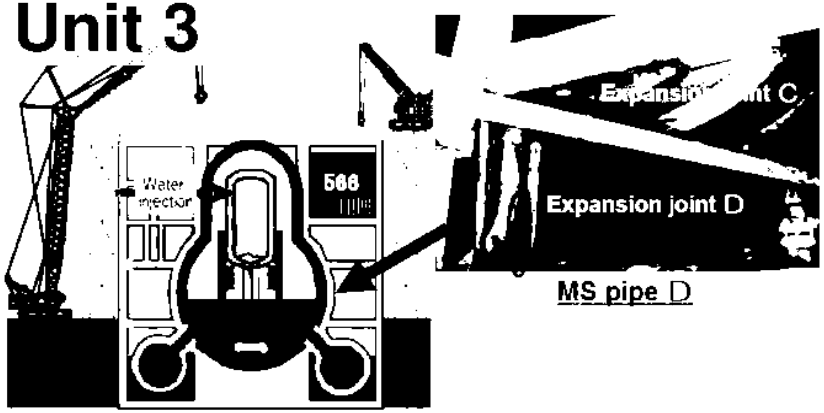
- Two locations of leakage found in torus room
- Indication of leakage in drywell shell

Unit 2



- No leakage confirmed in torus room
- Likely leakage near bottom of suppression chamber

Unit 3



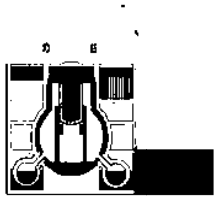
- Leakage from drywell to reactor building found at main steam line penetration
- No indication of leakage from suppression chamber

Progress Made at 1F Unit 4

Pre-work Condition
(9/22/2011)

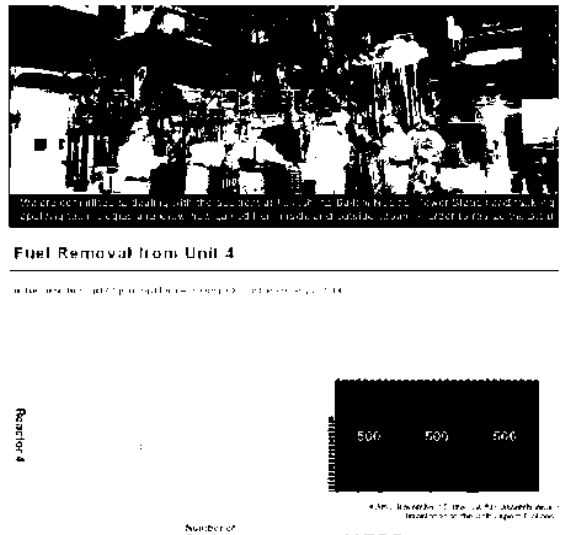
Drywell Head Removal
(8/10/2012)

Defueling Structure
Construction (1/14/2013)



Completion of Defueling
Structure (7/20/2013)

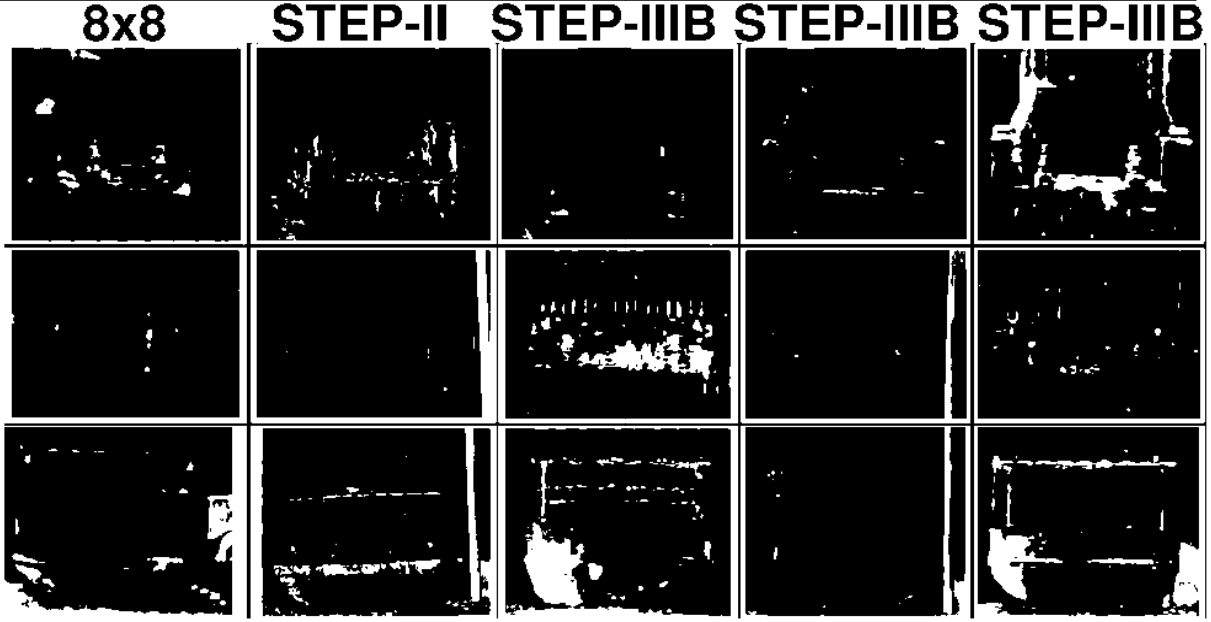
Beginning of Defueling
(11/18/2013)



http://www.tepco.co.jp/en/decommision/index-e.html

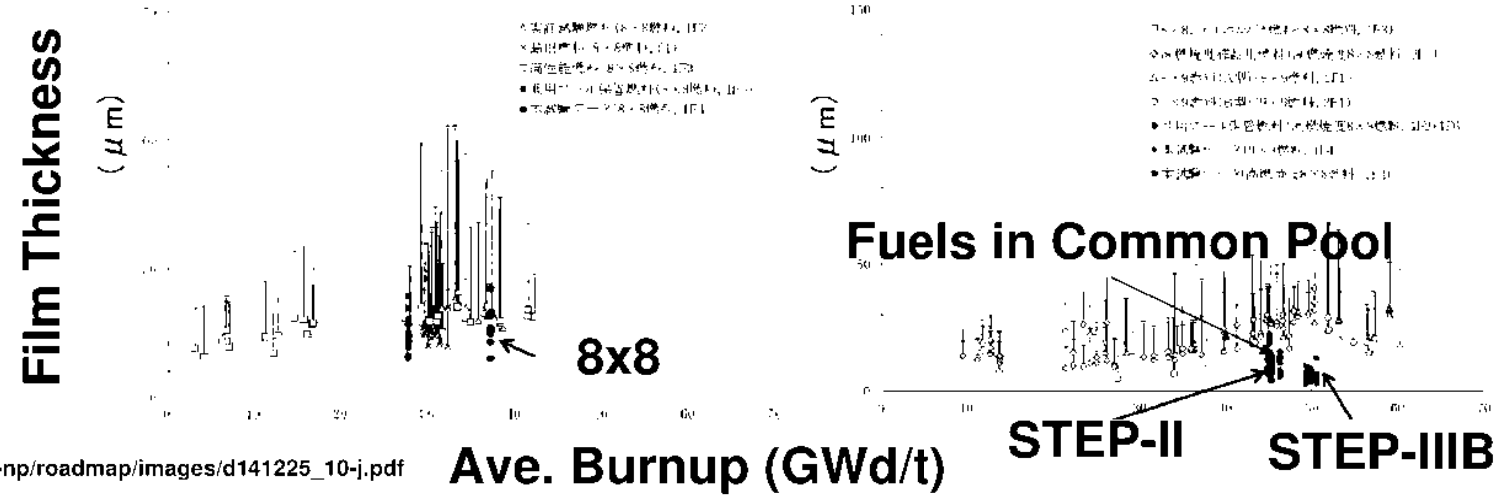
All fuels safely removed from spent fuel pool (12/12/2014)

Progress Made at 1F Unit 4 (cont'd)



Visual Inspection

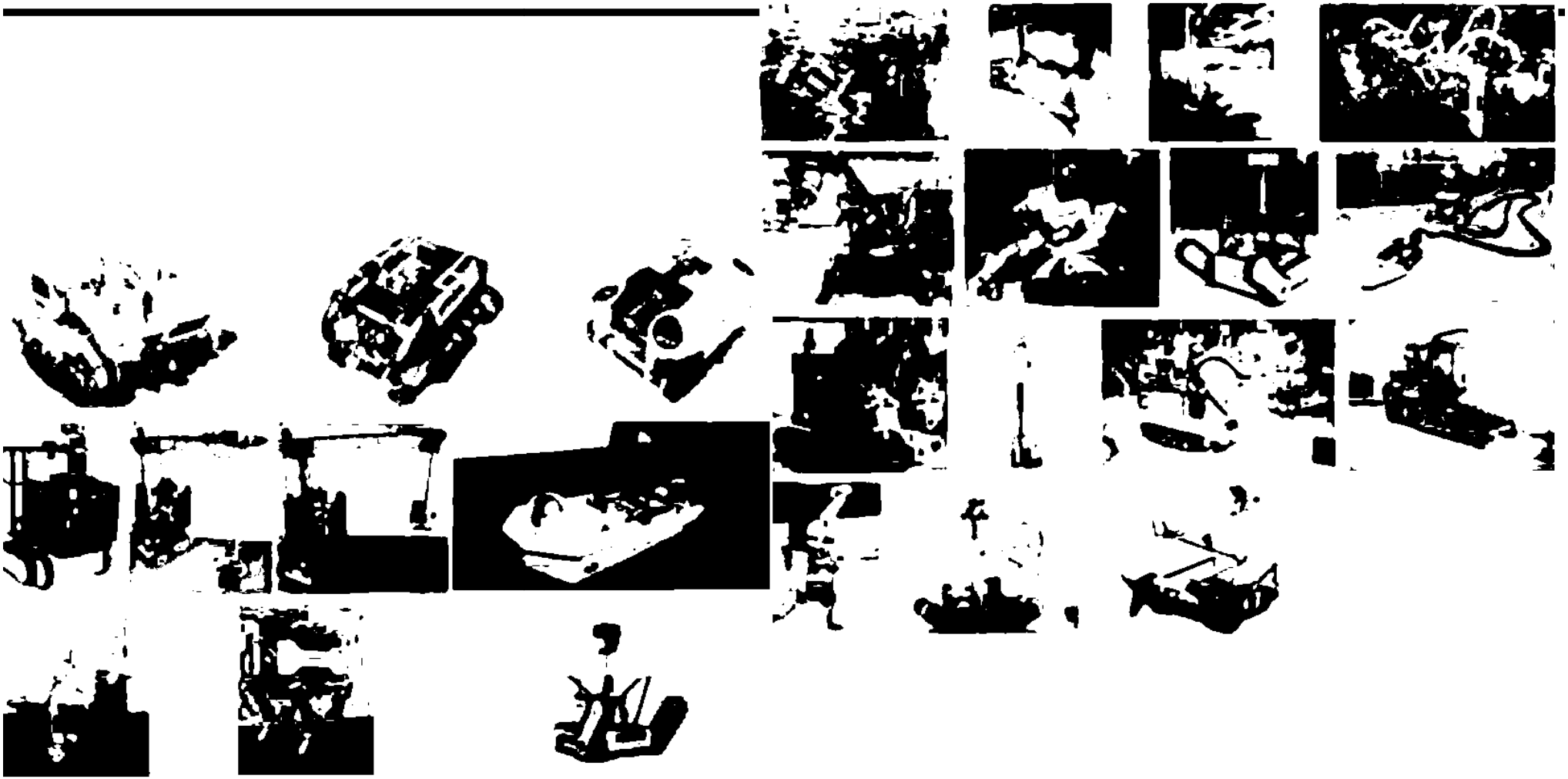
Oxidization Film Thickness Measurement



http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

Inspection of five spent fuels from Unit 4 SFP showed no abnormalities (Nov. 2014)

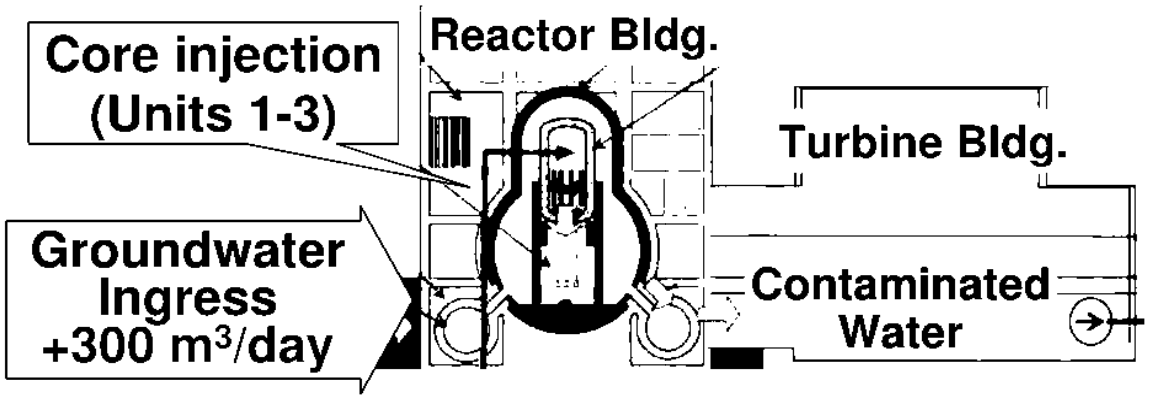
Extensive Use of Robots



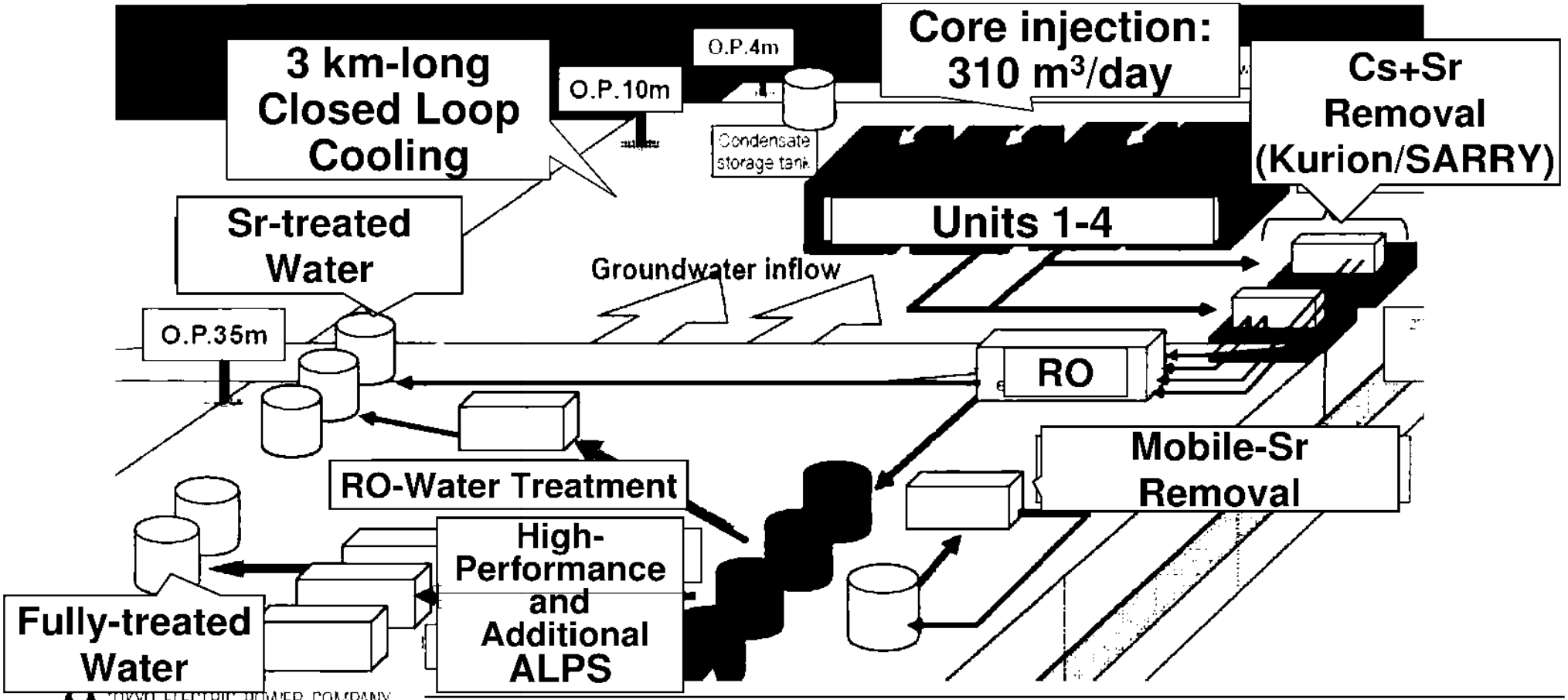
http://photo.tepco.co.jp/en/cat3/04-e.html
http://www.tepco.co.jp/en/decommision/principles/robot/index-e.html
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=raf8si47&catid=61795

Various robots used for investigation, measurement, decontamination, etc. in highly radioactive areas

Core Cooling and Water Treatment Systems



- All reactor cores stably cooled
- Groundwater inflow continues to cause issues



Tackling Water Issues: *"Seven Samurai"*

Mobile Strontium Removal

Operational start date: Oct. 2, 2014
Treatment capacity: 300 m³/ day
Removal capacity: Reduce strontium level at 1/10 down to 1/1000.

Multi-Nuclide Removal (ALPS)

Currently under hot testing.
Treatment capacity: 250 m³/ day X 3 units
Removal capacity: Reduce 62 nuclides below the density limit by the announcement of Reactor Regulation

Improved ALPS

Hot testing start date: Oct.. 9, 2014 (for all units)
Treatment capacity: 250 m³ or more/ day X 3units
Removal capacity: Reduce 62 nuclides below the density limit by the announcement of Reactor Regulation

Cs+Sr Adsorption (KURION)

Filed Implementation plan for approval. (dated Sep 19)
Treatment capacity: 600 m³/ day
Removal capacity: Reduce strontium level at 1/100 down to 1/1000.

Multiple measures for risk reduction

High-Performance ALPS

Hot testing scheduled date: from mid-October
Treatment capacity: 500 m³ or more/ day
Removal capacity: Reduce 62 nuclides below the density limit by the announcement of Reactor Regulation

Cs+Sr Adsorption (SARRY)

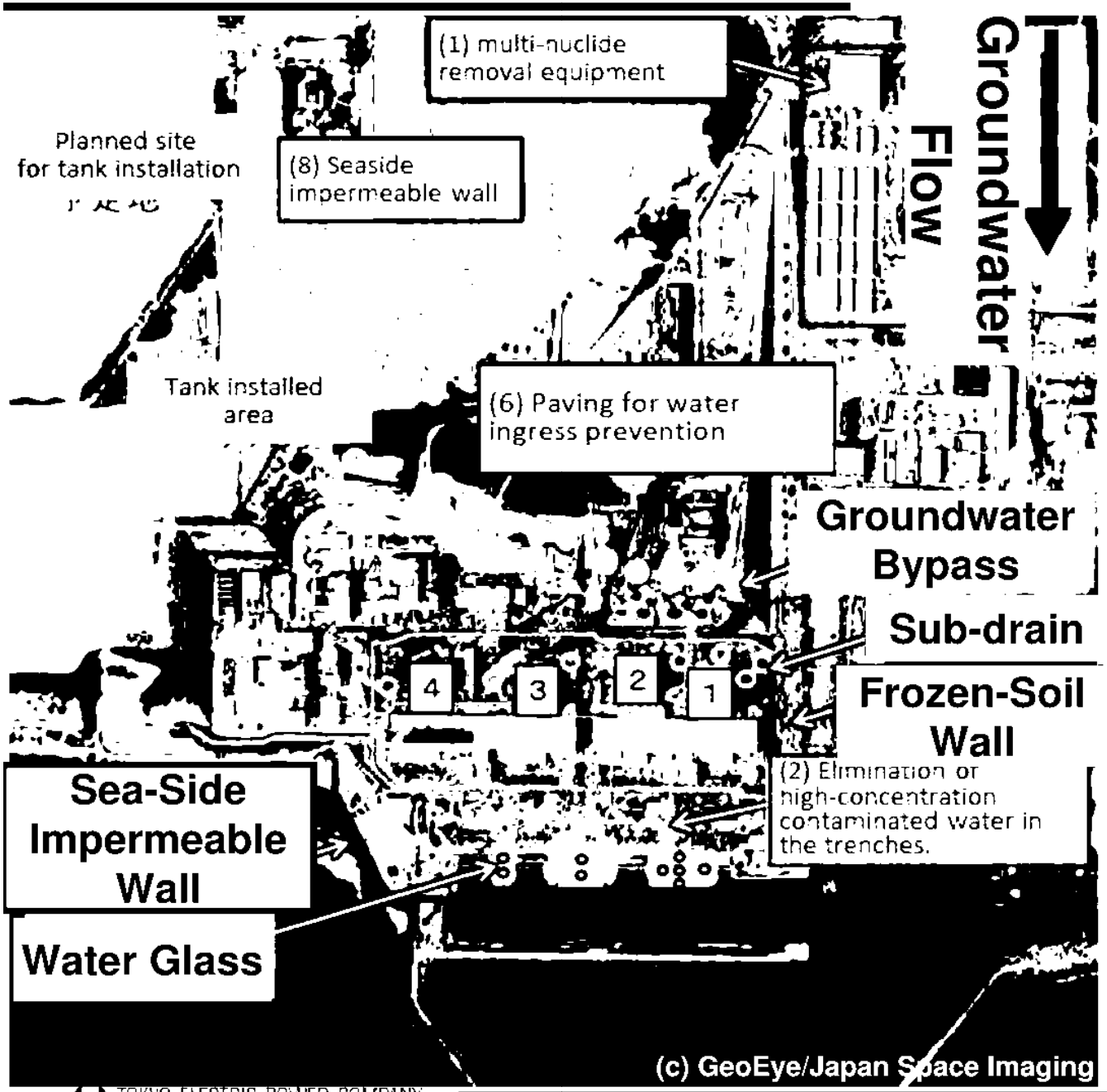
Filed Implementation plan for approval. (dated Jul. 10)
Treatment capacity: 1200 m3/ day
Removal capacity: Reduce strontium level at 1/100 down to 1/1000.

RO Water Treatment (Sr-Removal)

Implementation plan to be filed for approval.
Treatment capacity: 500 to 900 m3/ day
Removal capacity: Reduce strontium level at 1/100 down to 1/1000.

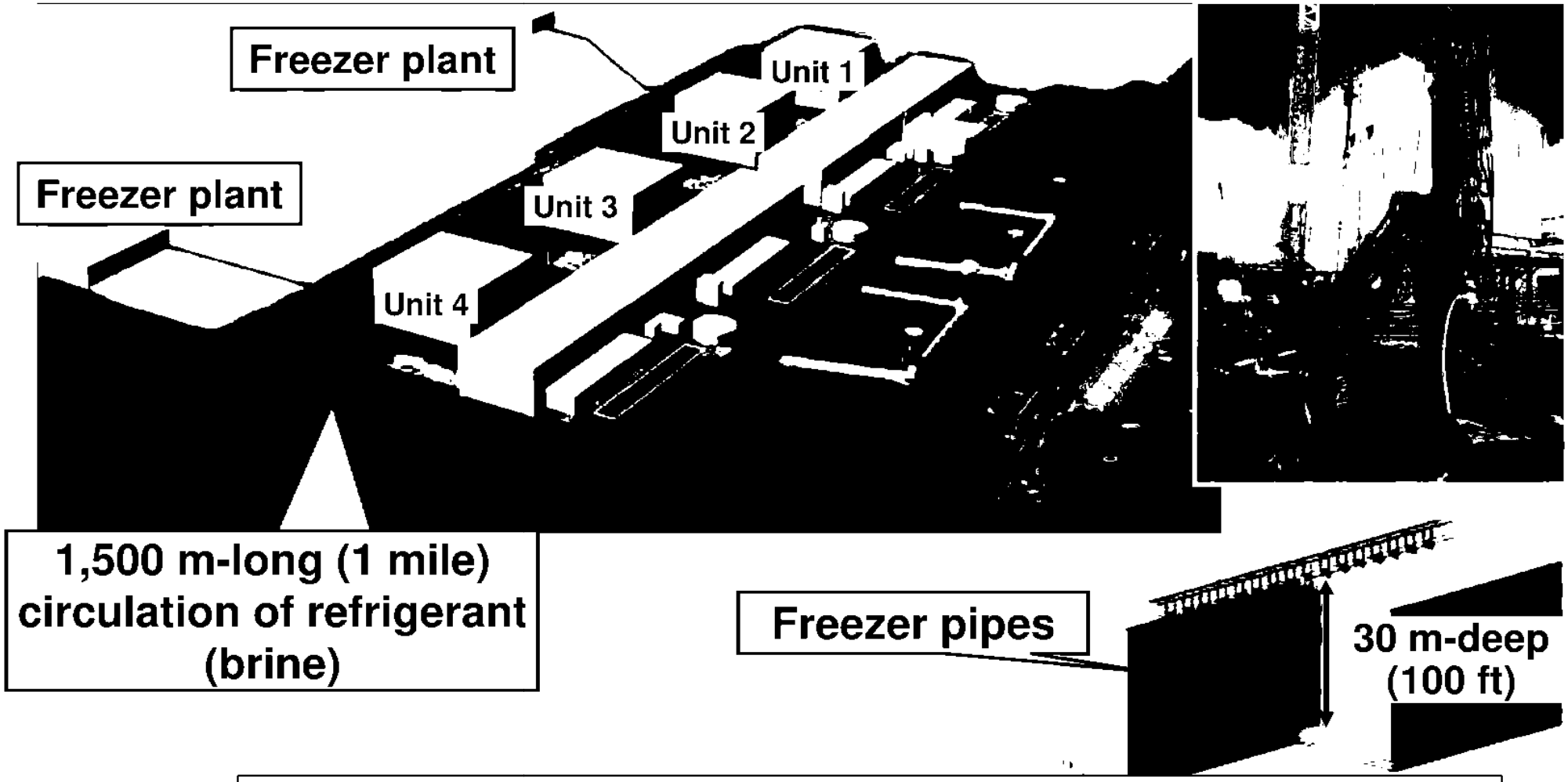
Multiple water treatment facilities employed to reduce risk of contaminated water

Emergency and Fundamental Measures on Water Issues



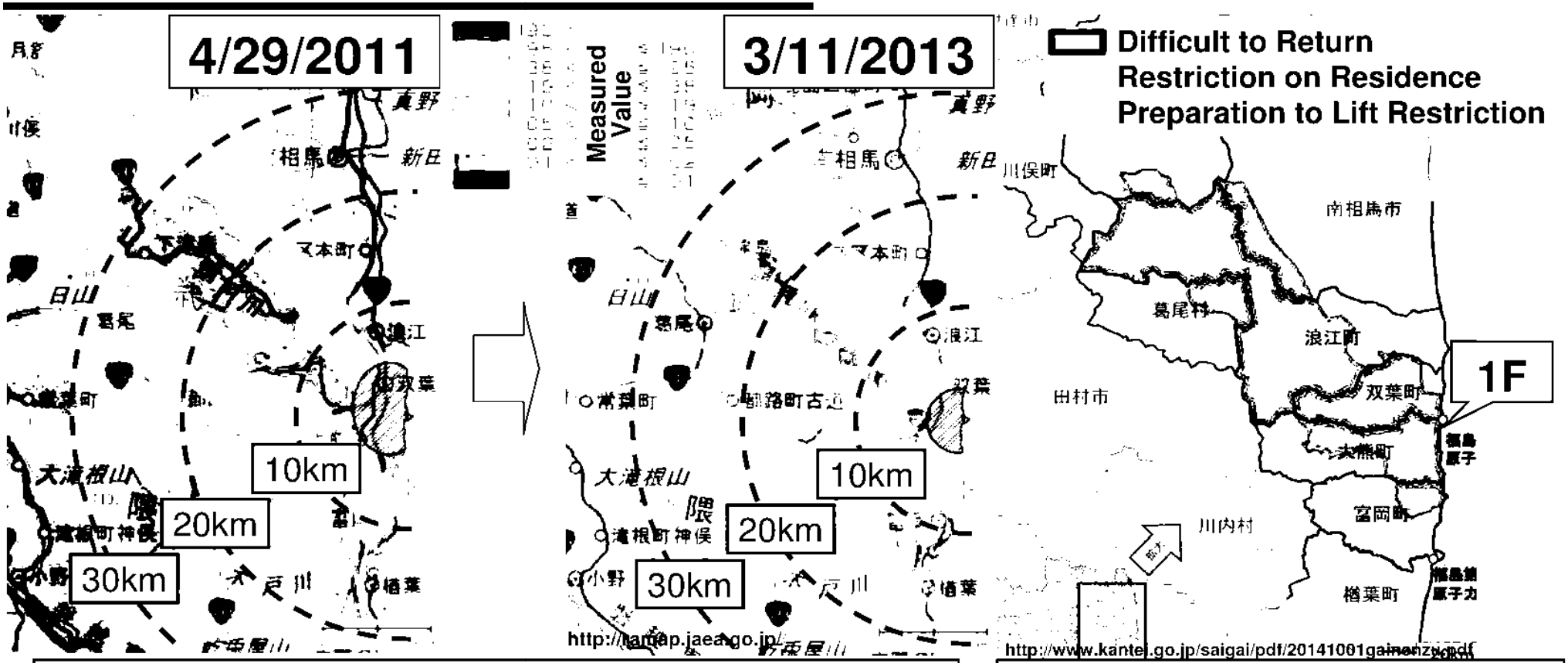
- Prevent groundwater from being contaminated
- Prevent contaminated groundwater from flowing into sea
- Reduce groundwater inflow into buildings

Tackling Water Issues: Frozen-Soil Wall



- Stop groundwater inflow by forming impermeable frozen-soil wall
- Construction work commenced: June 2014
- Test freezing commenced: April 2015

Off-site Radiation Dose and Evacuation Zones



Aerial Radiation Dose Map
(μ Sv/h at 1 m above ground)

Evacuation Zones
(as of 10/1/2014)

- **Off-site dose decreased significantly; evacuation zones gradually relaxed**
- **International consensus on health impact of low-dose radiation critical to relieve anxiety of evacuees**

Decommissioning Roadmap for 1F

Cold Shutdown Condition Achieved (Dec., 2011)

Within 2 years

Within 10 years

30 to 40 years

Phase-1

Begin removal of fuels from spent fuel pools

Unit 4: Nov. 2013

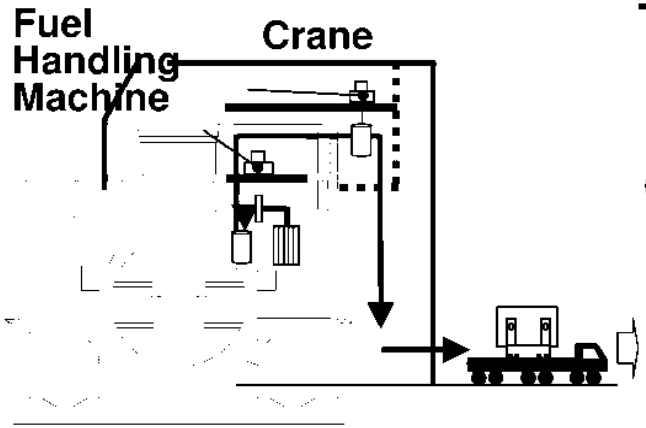
Phase-2

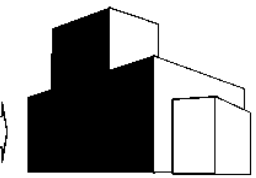
Begin retrieval of fuel debris

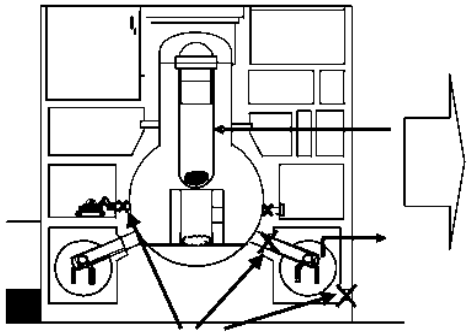
Phase-3

Complete decommissioning

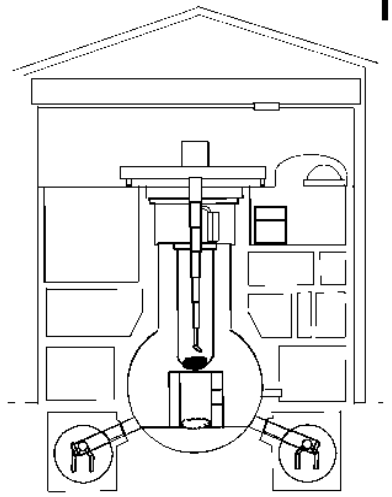
Today







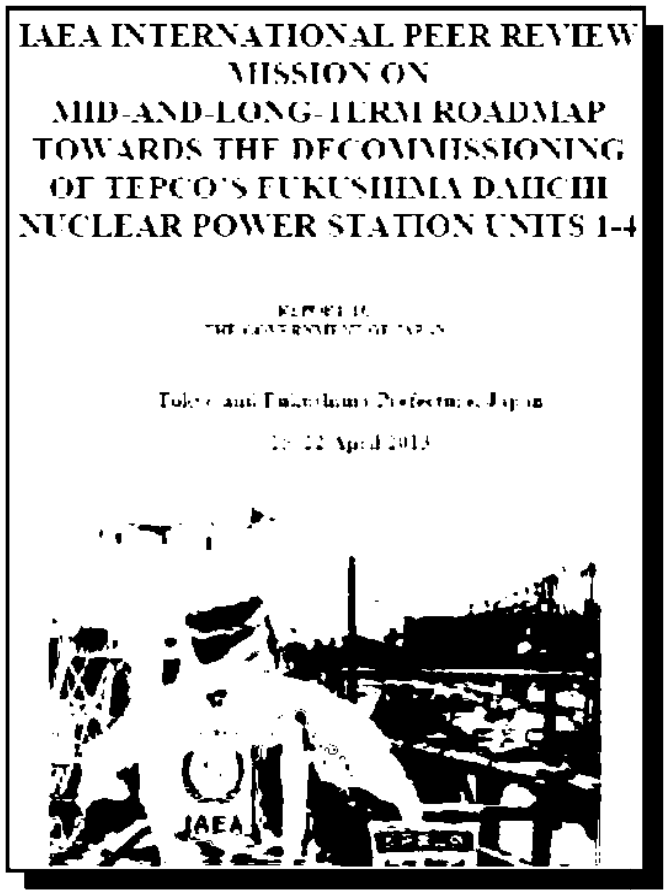
Stop Leakage



Flood PCV and Remove Fuel Debris

Global collaboration vitally important to tackle this unprecedented undertaking

Global Collaboration: IAEA



Unit 4 Fuel Removal (11/27/2013)

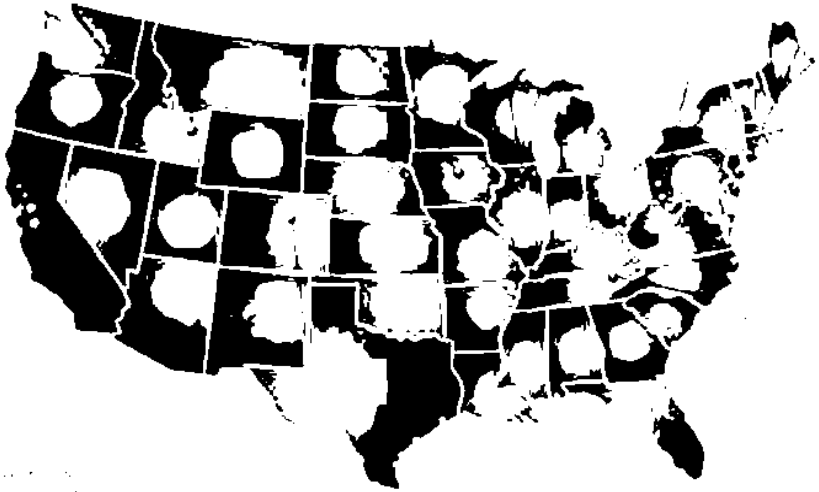
Seismic Isolation Bldg. (2/11/2015)

http://www.meti.go.jp/press/2013/05/20130523001/20130523001-4.pdf
https://www.iaea.org/sites/default/files/missionreport170215.pdf
https://www.iaea.org/newscenter/multimedia/photoessays/iaea-decommissioning-review-mission-fukushima-daiichi-february

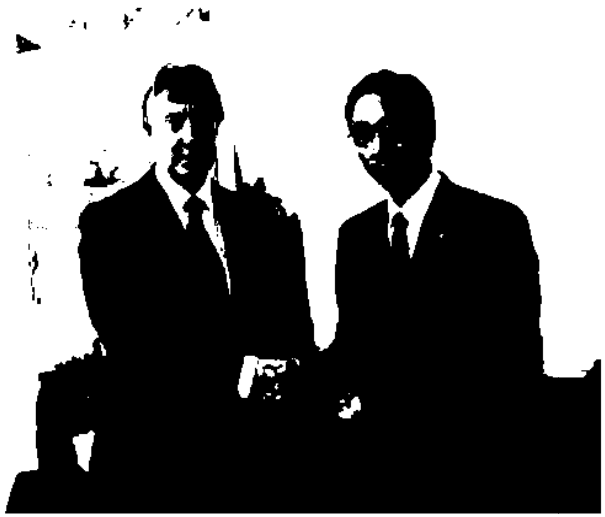
IAEA peer review missions on decommissioning roadmap (April 2013, Nov.-Dec. 2013, Feb. 2015)

Global Collaboration: U.S. and U.K.

TEPCO



ENERGY

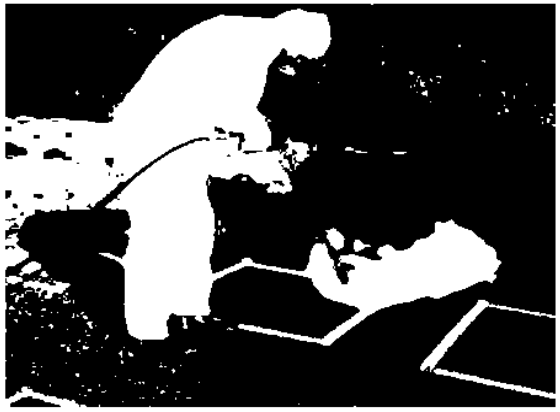


Collaboration with U.S. National Laboratories and U.K. Sellafield Ltd., among many other int'l organizations on various D&D areas

TEPCO's Other Activities

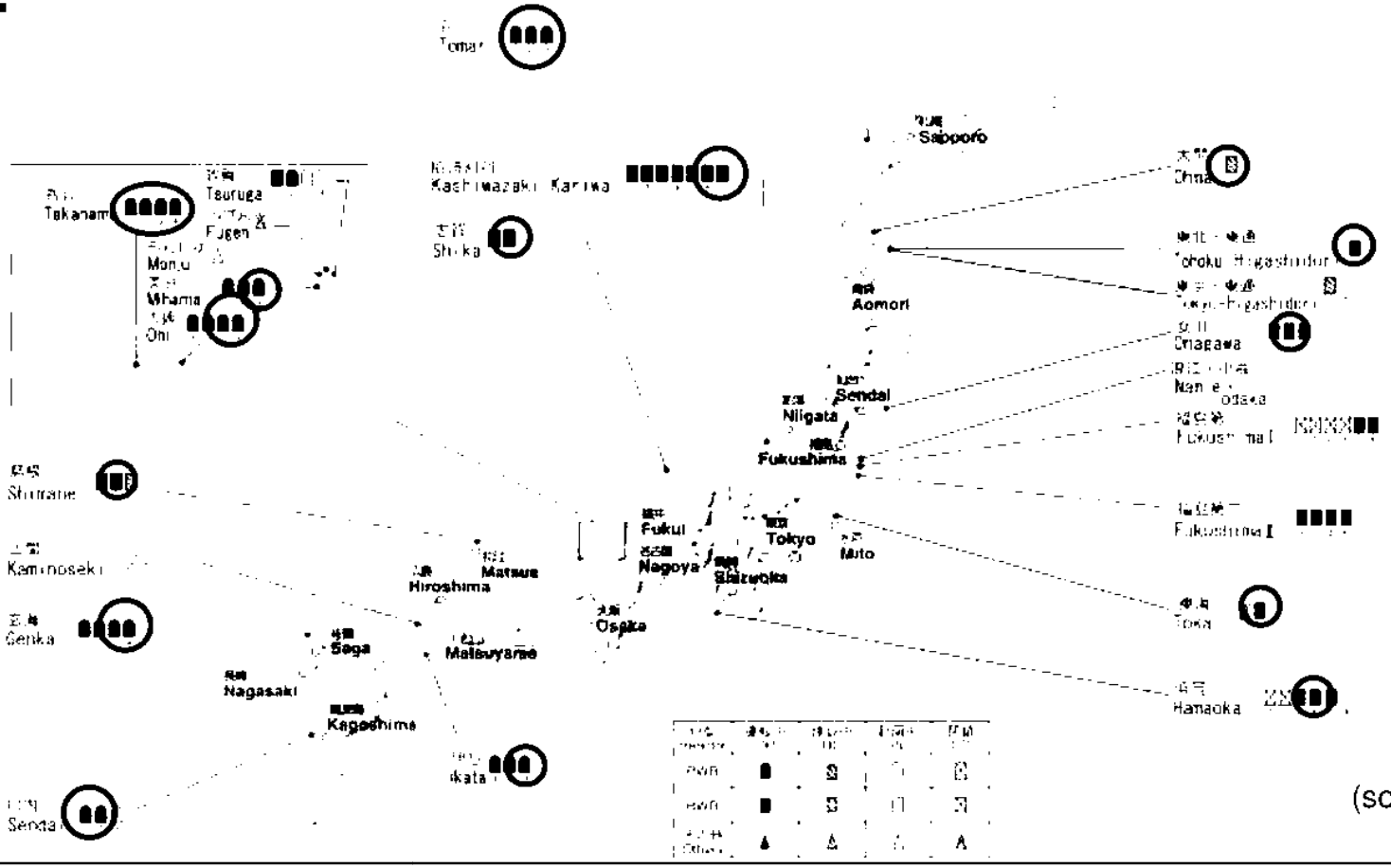
- **Compensation for afflicted people:**
  ¥4.9 trillion (approx. $41 bil.)
  (paid out as of April 2015)

- **Cooperation with gov't in off-site radiation survey, decontamination work, etc.**



- **Assistance in temporary return of evacuees to homes, cleaning homes, etc.**

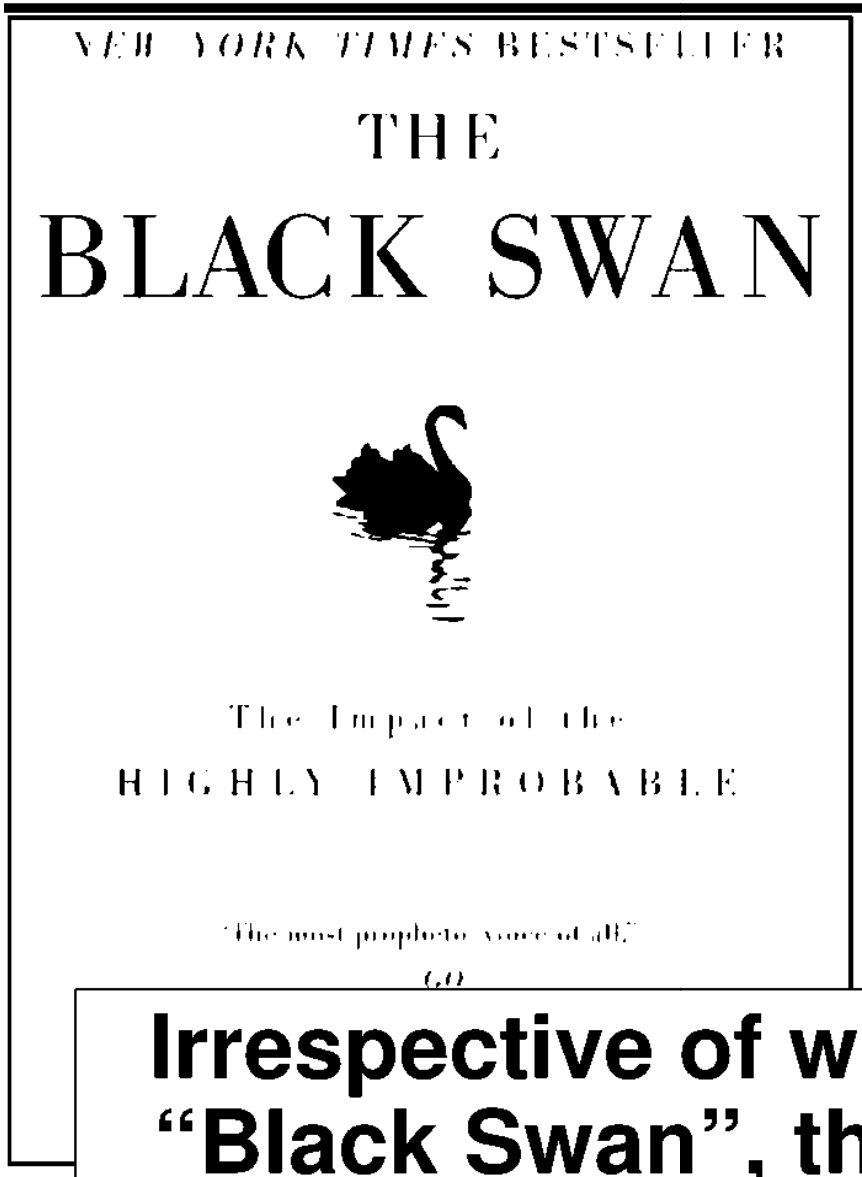
Nuclear Power Operation in Japan



(source) JAIF

- In 2010: Nuclear provided 26% of power (54 reactors)
- As of May 2015:
  - ✓No reactor operating
  - ✓Safety review application for 24 reactors
  - ✓4 reactors (all PWRs) passed safety review
  - ✓5 reactors (2 BWR, 3 PWRs) to be shutdown permanently

Thoughts on Fukushima and *"The Black Swan"*

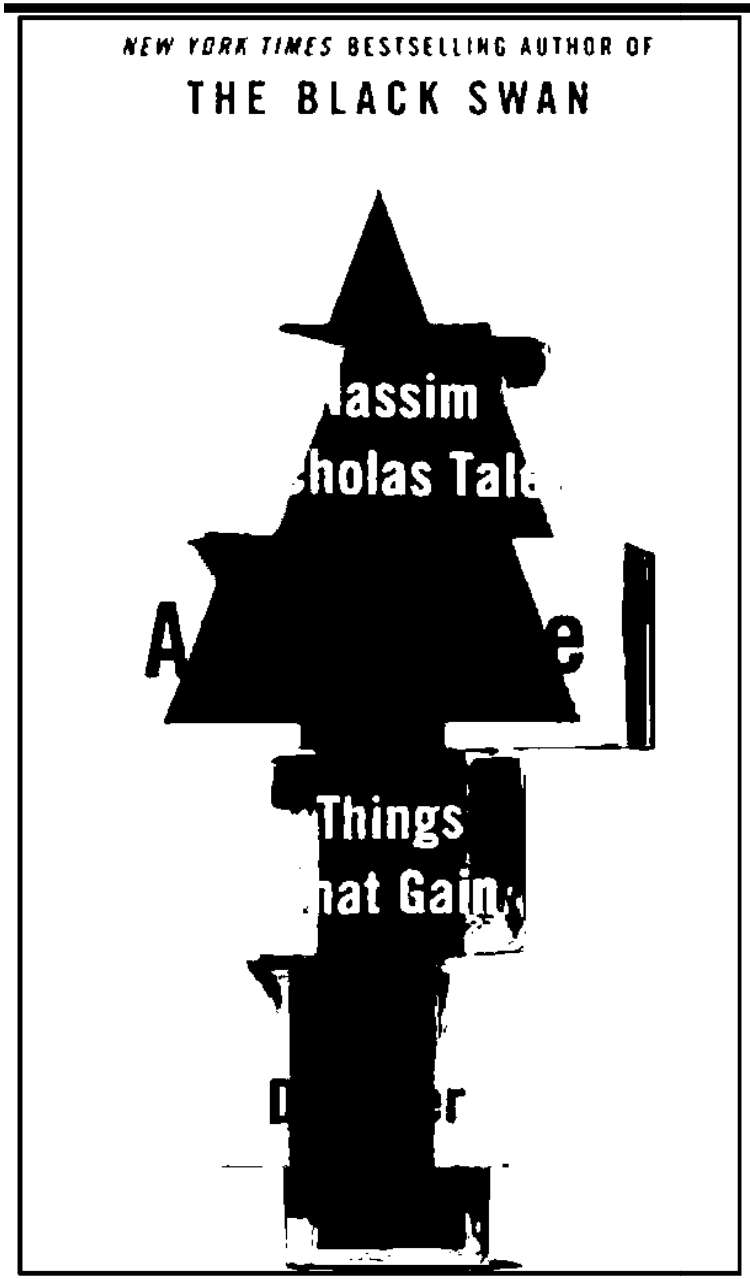


"… Black Swan is an event with the following three attributes… rarity, extreme impact, and retrospective (though not prospective) predictability."

"… two internal mechanisms behind our blindness to Black Swans, the confirmation bias and the narrative fallacy."

Irrespective of whether Fukushima was a "Black Swan", the nuclear industry needs to be prepared for the unexpected

Thoughts on Fukushima and *"Antifragility"*

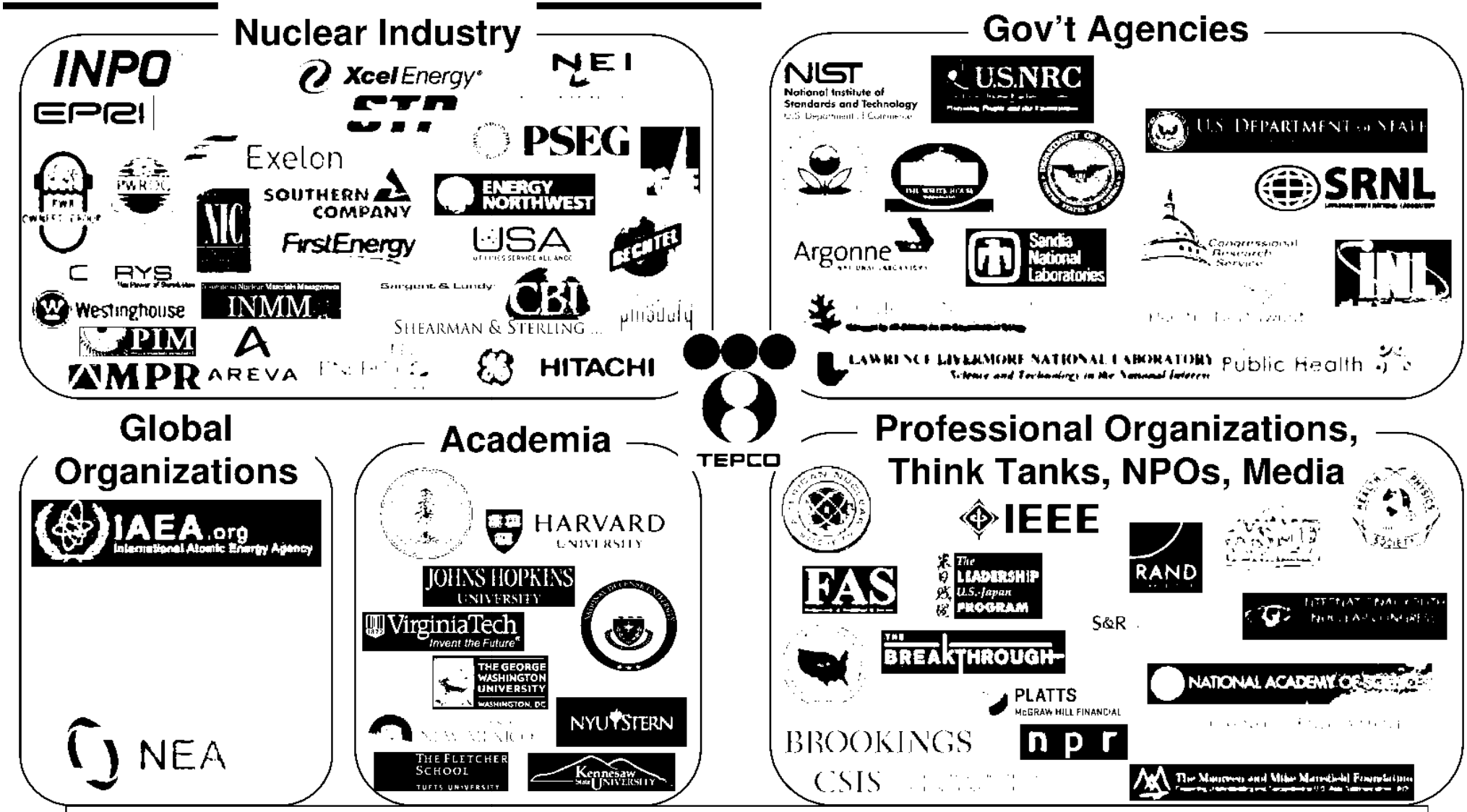


"The answer to the question 'what do you do in a world you don't understand?' is, simply, work on the undesirable states of f(x)."

"Antifragility is beyond resilience or robustness. The resilient resists shocks and stay the same; the antifragile gets better."

Need to strive for "Nuclear Antifragility"

TEPCO's Post-Accident Activities in the U.S.



Committed to sharing lessons learned; making nuclear power plants safer; carrying out decommissioning safely

→ Hosting Weekly Update Teleconferences

References

[Japan]

- **Tokyo Electric Power Company (TEPCO)**
  http://www.tepco.co.jp/en/decommision/index-e.html
  http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html
  https://www.youtube.com/user/OfficialTEPCOen
- **Nuclear Reform Monitoring Committee of TEPCO (NRMC)**
  http://www.nrmc.jp/en/index-e.html
- **Ministry of Economy, Trade and Industry (METI)**
  http://www.meti.go.jp/english/earthquake/
- **Nuclear Regulation Authority (NRA)**
  http://www.nsr.go.jp/english/
- **Japan Atomic Industrial Forum (JAIF)**
  http://www.jaif.or.jp/en/
- **Japan Nuclear Safety Institute (JANSI)**
  http://www.genanshin.jp/english/index.html

[Media]

- **Japan Times "Lives on the Line"**
  http://www.japantimes.co.jp/news/column/lives-on-the-line/

[USA]

- **Institute of Nuclear Power Operations (INPO)**
  http://www.nei.org/corporatesite/media/filefolder/11_005_Special_Report_on_Fukushima_Daiichi_MASTER_11_08_11_1.pdf
  http://www.wano.info/Documents/Lessons%20Learned.pdf
- **Electric Power Research Institute (EPRI)**
  http://www.epri.com/Our-Work/Pages/Nuclear.aspx
- **Nuclear Energy Institute (NEI)**
  http://safetyfirst.nei.org/japan/
- **US Nuclear Regulatory Commission (NRC)**
  http://www.nrc.gov/reactors/operating/ops-experience/japan-dashboard.html
- **National Academy of Science (NAS)—Fukushima Lessons Learned Committee**
  http://www8.nationalacademies.org/cp/projectview.aspx?key=49465

[International]

- **International Atomic Energy Agency (IAEA)**
  http://www.iaea.org/
- **World Association of Nuclear Operators (WANO)**
  http://www.wano.info/
- **United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)**
  http://www.unscear.org/unscear/en/publications/2013_1.html
- **World Health Organization (WHO)**
  http://www.who.int/mediacentre/news/releases/2013/fukushima_report_20130228/en/

From: Orders, William
Sent: 6 Jan 2014 16:21:36 -0500
To: Reckley, William;Norton, Charles
Subject: FW: Follow-up Study on Fukushima Daiichi Accident Unresolved Issues (12/13/2013)

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Monday, January 06, 2014 3:27 PM
To: Orders, William
Subject: Follow-up Study on Fukushima Daiichi Accident Unresolved Issues (12/13/2013)

Bill,

Hope you had a pleasant holiday season.

The English translation of the following report has been posted on TEPCO's website.
"First Progress Report of Follow-up Study on Fukushima Daiichi Accident Unresolved Issues" (12/13/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1233101_5130.html

Please let me know if you have any questions.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Orders, William
To: Tateiwa, Kenji
Sent: Thursday, November 07, 2013 8:44 AM
Subject: Assistance

Kenji-san,

I would certainly appreciate a copy of the report referenced below.

Best Regards
Bill

William T. Orders
Japan Lessons Learned Directorate
Nuclear Regulatory Commission
William.Orders@nrc.gov
301 415 1971 Office

240 888 9826 Cell

TEPCO preparing new report on Fukushima (2013-11-06, NHK)
The head of Tokyo Electric Power Company says the utility is preparing a new report on what caused the crisis at its Fukushima plant. The step is seen as part of the company's efforts to gain understanding for restarting 2 reactors in Niigata Prefecture, central Japan. TEPCO President Naomi Hirose told a Lower House panel on Wednesday that the company plans to shortly release its findings on Fukushima. Hirose said TEPCO has continued to examine the cause of the March 2011 disaster through an expert panel. Members include US and British nuclear power experts. The new report follows one released in June 2012 on the results of the company's own investigations. But the first report left many questions unanswered. Hirose said TEPCO will also present the report to Niigata Prefecture for review. A prefectural technical panel is examining safety features of the Kashiwazaki-Kariwa plant, where the utility hopes to restart 2 reactors. TEPCO apparently decided a further probe into Fukushima was needed to gain the prefecture's approval. Nov. 6, 2013 - Updated 08:02 UTC

From: Skeen, David
Sent: 9 Nov 2012 17:26:12 -0500
To: Foggie, Kirk;Jimenez, Manuel
Cc: Mitchell, Matthew;Reckley, William;Taylor, Robert
Subject: FW: Handoff of NRC's CD at ANS in San Diego

Kirk/Manuel,

See the e-mail string below. I am providing the requested publicly available documents directly to TEPCO (Kenji) in San Diego next week while I'm at the ANS meeting.

Can you be sure that the proper GOJ rep (Bannai? Yamachika?) is aware that we are sharing this info with TEPCO and that they get the same information? We want to ensure our GOJ counterparts are kept informed.

Bill Reckley made a CD for me to give to TEPCO because some of the files are large. I'm sure we can do the same for GOJ, so please contact Bill next week if you need to get a copy of the files.

Let me know if you have any questions or concerns.

Thanks!

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, November 09, 2012 11:32 AM
To: Skeen, David; Klein, Dale
Cc: yamaguchi.hirokazu@tepco.co.jp
Subject: Handoff of NRC's CD at ANS in San Diego

Dave,

Thank you very much for putting together a CD with relevant information to TEPCO.

I will be attending the ANS meeting in San Diego next week as session organizer for "Severe Accident Progression and Scenario Reconstruction."
If you can give the CD to the front desk at Town and Country Hotel, where the meeting will be held, that would be appreciated.
My colleagues from the TEPCO headquarters will be attending the ANS meeting as well and I will make sure to hand the CD to one of them.

Look forward to seeing you in San Diego.

Dale,

Have a nice trip to Korea.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs

Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Klein, Dale
To: 'Skeen, David'
Cc: '[illegible] (tateiwa.kenji@tepco.co.jp)' ; 'Hirokazu Yamaguchi (yamaguchi.hirokazu@tepco.co.jp)'
Sent: Friday, November 09, 2012 10:18 AM
Subject: RE: airplanes

Dave -- Thanks for getting these documents together. Unfortunately, I will not be at the ANS meeting next week. If you can get this information to Kenji Tateiwa, he can get it to the correct people in TEPCO.

Thanks for your help.

Best regards, Dale

From: Skeen, David [mailto:David.Skeen@nrc.gov]
Sent: Friday, November 09, 2012 7:50 AM
To: Klein, Dale
Subject: RE: airplanes

Dr. Klein,

The staff has put together several publicly available documents that might be helpful to TEPCO (see list below). Because some of these files are rather large, even in pdf format, and cannot be sent via e-mail, I asked my folks to prepare a CD that we can share with you or TEPCO. I have the CD with me and can bring it to the ANS meeting next week, if you prefer. Alternatively, we frequently work with a TEPCO point of contact here in DC (Kenji Tateiwa), and we can see that he receives the CD.

I look forward to seeing you next week, and would be happy to discuss further.

Publicly available documents provided on CD –

1. **CNWRA Report: Response of Reinforced Concrete Structures to Aircraft Crash Impact (2011)**

2. **Cover Letter NEI 07-13, "Methodology for Performing Aircraft Impact Assessments for New Plant Designs," (2011)**

3. **NEI 07-13, "Methodology for Performing Aircraft Impact Assessments for New Plant Designs," (2011)**

4. **NRC Reg Guide 1.217, Guidance For The Assessment Of Beyond-Design-Basis Aircraft Impacts (2011)**

5. NRC Final Rule: Consideration of Aircraft Impacts for New Nuclear Power Reactors (2009)

6. DOE Standard: Accident Analysis For Aircraft Crash Into Hazardous Facilities (2006)

7. IAEA Safety Guide: NS-G-1.5, External Events Excluding Earthquakes in the Design of Nuclear Power Plants (2003)

8. EPRI Study: Aircraft Crash Impact Analyses Demonstrate Nuclear Power Plant's Structural Strength (2002)

9. NUREG 1738: Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants (2001)

From: Norton, Charles
Sent: 21 Aug 2013 12:24:15 -0400
To: Skeen, David;Taylor, Robert;Reckley, William;Orders, William;Jimenez, Manuel
Subject: FW: Tank Spill Level 3

Latest from Kenji on Tank Spill

Chuck

From: Tateiwa, Kenji [mailto:tateiwa@wash.tepco.com]
Sent: Wednesday, August 21, 2013 11:03 AM
To: Norton, Charles
Cc: Tateiwa, Kenji
Subject: Re: Tank Spill Level 3

Chuck,

Please see slides below.

Latest info available in English.
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130821_01-e.pdf

Latest info in Japanese.
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130821_12-j.pdf

I will call you sometime later today.

All the best,
Kenji

From: Tateiwa, Kenji [mailto:tateiwa@wash.tepco.com]
Sent: Wednesday, August 21, 2013 9:19 AM
To: Norton, Charles
Cc: tateiwa.kenji@tepco.co.jp
Subject: Re: Tank Spill Level 3

Chuck,

I am in California all this week attending a BWROG meeting.
I will try to find a time to call you and update you on the leakage situation.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----

From: Norton, Charles
To: tateiwa.kenji@tepco.co.jp
Sent: Wednesday, August 21, 2013 9:09 AM
Subject: Tank Spill Level 3

Kenji,

I left you a voice mail this morning. Can you please give me an update to the leaking radioactive water from a tank and the level 3 classification. My management is getting inquiries.

Chuck Norton
NRC JLD
(301) 415 7818

From: Norton, Charles
Sent: 25 Sep 2013 07:54:24 -0400
To: Tateiwa, Kenji (tateiwa@wash.tepco.com)
Cc: Foggie, Kirk;Reckley, William
Subject: Operator Training requirements at Fukushima

Kenji,

In the U. S., initial training and retraining requirements for licensed operators are outlined in 10CFR part 55. Can you provide me (in English if possible) similar Japanese regulatory requirements that were in effect for licensed operators at the time of the accident at Fukushima Daiichi?

Thank you again for helpfulness

Chuck Norton
US NRC/JLD
301 415 7818

From: Reckley, William
Sent: 21 Apr 2015 19:55:57 +0000
To: 'tateiwa.kenji@tepco.co.jp'
Subject: Possible presentation to NRC staff

Kenji,

It was my pleasure to run into you again on April 10th as you were setting up for a presentation to the Advisory Committee on Reactor Safeguards. You mentioned that you are planning to return to Japan later this Spring but that you might be open to providing a presentation to the NRC staff during your remaining time here. We have certainly appreciated and benefited from your other presentations and would very much like to try to arrange a presentation for some newer NRC staff and others that missed your earlier discussions. I can imagine that you are quite busy arranging for the transition and answering other requests but I was wondering if you might have some time in May to visit our offices and give a presentation. If you are able to support, do you have one or more times when this would work best for you? Thank you again for all your previous support, you will certainly be missed.

William D. Reckley
Japan Lessons Learned Project Division
william.reckley@nrc.gov
(301) 415-7490

From: Reckley, William
Sent: 30 Apr 2015 12:42:09 +0000
To: tateiwa.kenji@tepco.co.jp
Cc: Orders, William
Subject: Presentation - May 7, 2015
Attachments: SecureZIP Attachments.zip

Kenji .. I just wanted to check in and make sure that we were still OK for next Thursday, May 7, 2015. We have a room in our training area for 9:00am on that day and are arranging for interested staff to attend. We can meet with you at about 8:30am at the entrance to the One White Flint Building, sign you in through security, and then walk over to the training center, which is our newer Three White Flint Building. Would you plan to drive up (we can secure you a parking space) or take the Metro? In addition, do you plan to use the presentation you previously emailed or do you have a revised presentation? If we can make sure we have the presentation you want to use, we will have it loaded and ready to go that Thursday morning. One last thing, attached is a form that we are required to provide in order for you to give permission for us to record the presentation. You can sign and return or we will have a copy ready next Thursday and can just have you sign it then. Thanks again for agreeing to do this and hopefully things are going well as your make your preparations for your return to Japan.

William D. Reckley
Japan Lessons Learned Project Directorate
william.reckley@nrc.gov
(301) 415-7490

NRC Multimedia Consent Form

Title: Fukushima Nuclear Accident, A TEPCO Nuclear Engineer's Perspective

Contract No.: n/a

Contact Person: William Reckley ; William Orders

Phone Number: 415-7490; 415-1971 Office: NRR/JLD

Presenter: Kenji Tateiwa

Location: PDC

Time: May 7, 2015; 9:00am

Recording: Audio: X Video: X

Duplication: VHS: _____ DVD/CD: X

Broadcast: Training: _____ Webcast: _____

I hereby grant to the NRC the following rights in the interest of furthering the NRC's capture, preservation, and management of critical institutional knowledge I may possess:

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3. The right to combine such recordings of me with other images, recordings, or printed matter in the production of any media, whether audio or visual.
4. The rights to record, reproduce, amplify and simulate my image and all sound effects produced.

I understand and agree that I will not receive specific compensation, now nor in the future, in connection with the NRC's exercise of the rights granted hereunder.

Signature: _____ Date: _____

From: Norton, Charles
Sent: 14 Nov 2013 13:44:36 -0500
To: tateiwa.kenji@tepco.co.jp
Cc: Foggie, Kirk;Jimenez, Manuel;Reckley, William
Subject: Questions
Attachments: New PCV boundary.jpg

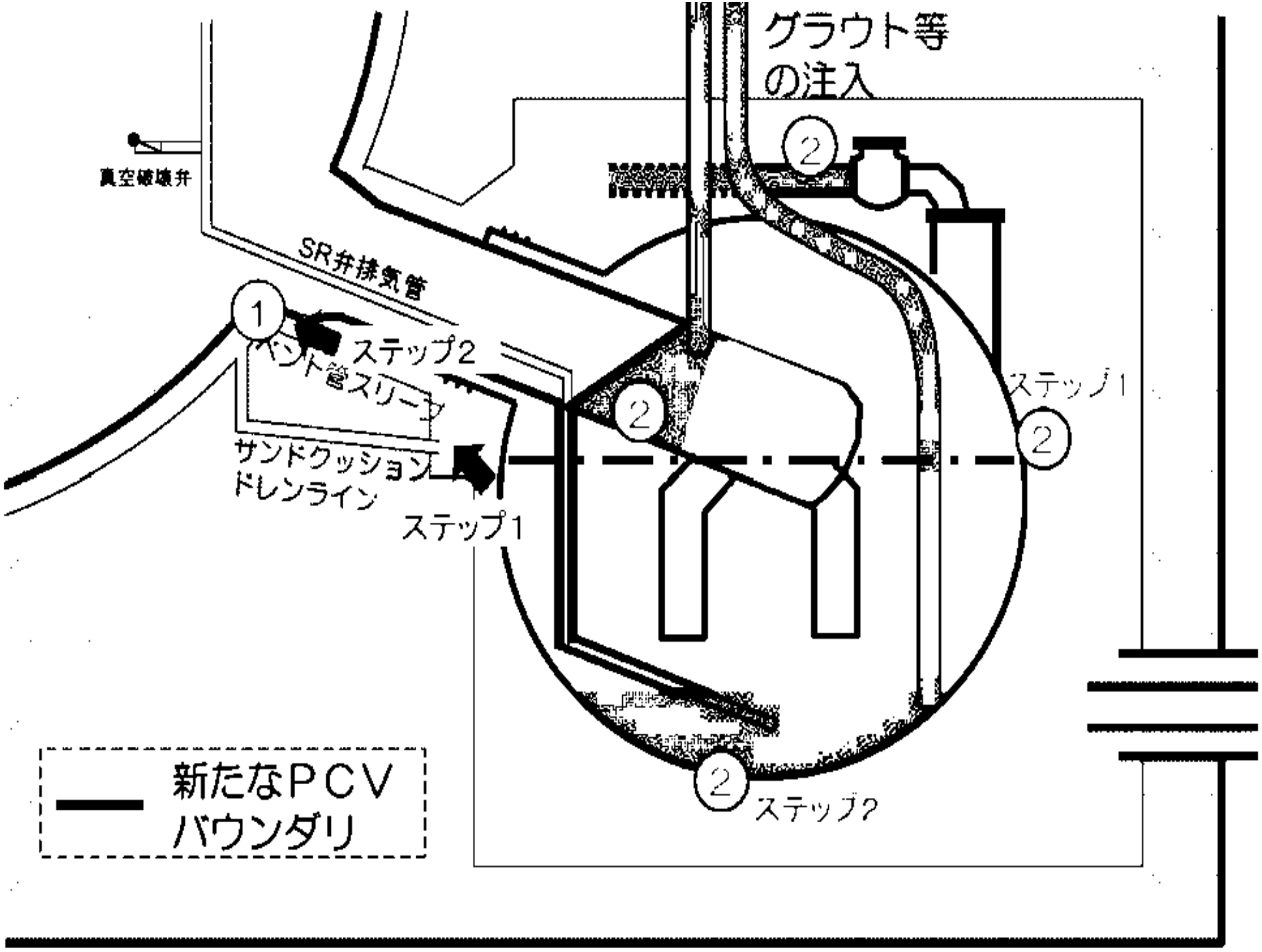
Kenji,

I have to assist a high level briefing on Fukushima next Monday. I have a few questions to help me be better informed.

1. What is the target date for reducing the containment boundary to that shown in red in the attached photo?
2. What is the design air leak rate for the Fukushima Daiichi Units 1, 2, 3 containments?
3. Is the sub drain system in operation at Fukushima Daiichi? Ground water bypass system?
4. During the call today can you briefly go over the ALPS status and provide a target date to start treating the water stored in tanks to remove all isotopes except tritium.
5. Will the fuel transfer casks be wet or dry for transferring the fuel from Unit 4 to the common pool?

Thank you for taking the time to keep me informed. I look forward to the 3PM call today.

All the best,
Chuck Norton
US NRC
301 415 7818


グラウト等
の注入
2
真空破壊弁
SR弁排気管
1
ベント管スリーブ
ステップ2
サンドクッション
ドレンライン
ステップ1
2
ステップ1
2
2
ステップ2
新たなPCV
バウンダリ

From: Tateiwa, Kenji
Sent: 11 Sep 2013 14:35:35 -0400
To: Norton, Charles
Cc: Foggie, Kirk;Fuhrmann, Mark;Reckley, William;Skeen, David
Subject: Re: Breifing NRC officials
Importance: Normal

Chuck,

Please see ALPS presentation.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130829_06-j.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Norton, Charles
Cc: Foggie, Kirk ; Fuhrmann, Mark ; Reckley, William ; Skeen, David
Sent: Wednesday, September 11, 2013 1:56 PM
Subject: Re: Breifing NRC officials

Chuck,

Sorry for the late reply. I had been in a meeting all morning outside and just returned.

Please see below the latest material on water issues.
It is in Japanese so I will call you shortly and go over it.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/1130909_04-j.pdf

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)
----- Original Message -----
From: Norton, Charles
To:tateiwa.kenji@tepco.co.jp
Cc: Skeen, David ; Reckley, William ; Fuhrmann, Mark ; Foggie, Kirk
Sent: Wednesday, September 11, 2013 9:39 AM
Subject: Breifing NRC officials

Kenji,

I need to prepare material for my management to brief Senior NRC officials tomorrow. I will look on the TEPCO web site but I would like to discuss the following with you to ensure my understanding:

- Problems with the ALPS

- Details on the new system to work in parallel with ALPS
- Details on tank construction
- Details on number of leaking tanks
- Contamination of ground water from leaking tanks. What is the extent of water migration? Is the ground water bypass system compromised?
- Status of restarting sub drain system
- Details of the chemical makeup of the water in the tanks

Thank you for all your help,
Chuck Norton
JLD
301 415 7818

From: Norton, Charles
Sent: 17 Aug 2012 15:45:50 -0400
To: Tateiwa, Kenji
Cc: Witt, Kevin;Foggie, Kirk;Mitchell, Matthew;Reckley, William
Subject: RE: Fuel racks [TEPCO Weekly Fukushima Update Call] Fri, Aug. 17 at 3pm EDT

Kenji,
It appears that in units 1-3 have both high and low density fuel racks. In unit 4 only low density racks are used.
Thank you for your quick response to our question.
Chuck Norton

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, August 17, 2012 3:40 PM
To: Norton, Charles
Cc: Witt, Kevin
Subject: Fuel racks [TEPCO Weekly Fukushima Update Call] Fri, Aug. 17 at 3pm EDT

Chuck,
Thank you for joining the update calls and I appreciate the kudos.
Please find below information regarding fuel racks used at Fukushima Daiichi.
[1F-1]
30 racks that hold 20 fuel bundles each; made of aluminum (with no boron)
10 racks that hold 30 fuel bundles each; made of aluminum (with 1.3 weight-% natural boron)
[1F-2]
41 racks that hold 20 fuel bundles each; made of anti-corrosive aluminum (with no boron)
14 racks that hold 30 fuel bundles each; made of aluminum (with 1.3 weight-% natural boron)
[1F-3]
40 racks that hold 20 fuel bundles each; made of anti-corrosive aluminum (with no boron)
14 racks that hold 30 fuel bundles each; made of aluminum (with 1.3 weight-% natural boron)
[1F-4]
53 racks that hold 30 fuel bundles each; made of SUS 304 (stainless steel)
Please let me know if you have further questions.
All the best,
Kenji

----- Original Message -----
From: Norton, Charles
To: Tateiwa, Kenji
Cc: Witt, Kevin
Sent: Friday, August 17, 2012 3:23 PM
Subject: RE: Update [TEPCO Weekly Fukushima Update Call] Fri, Aug. 17 at 3pm EDT

Kenji,
We would like to know if TEPCO used low or high density fuel racks to maintain the Fukushima spent fuel pools sub-critical. Low density racks do not require boron or any poison integrated into the racks to main sub-criticality.
You provide good information and have excellent presentation on your weekly updates We really appreciate you doing this.
Thank you,
Chuck Norton
USNRC JLD

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, August 17, 2012 8:47 AM
To: Tateiwa, Kenji
Subject: Update [TEPCO Weekly Fukushima Update Call] Fri, Aug. 17 at 3pm EDT

Colleagues of nuclear-related U.S. Government agencies and National Laboratories,

Please find below information for today's Weekly Fukushima Update Call.

[Date/time]
Fri, Aug. 17 at 3 pm EDT
(I would like to make Fridays the default day for the call hereafter; apologies for the inconvenience this may cause you.)
[call-in information](Please record your name and company name when joining the call.)
call number: 718-354-1184
passcode: (b)(6)
[Major topics]
1. **Attempt to Investigate Unit 1 Reactor Building Refueling Floor by Balloon Probe (Aug. 8)**
http://www.tepco.co.jp/en/nu/fukushima-np/images/handouts_120808_02-e.pdf

2. Reliability Enhancement of Second Cesium Adsorption Facility (SARRY) (Aug. 9)
http://www.tepco.co.jp/en/nu/fukushima-np/images/handouts_120809_09-e.pdf
3. Unit 4 Primary Containment Vessel Head Lowered to the Ground (Aug. 10)
http://www.tepco.co.jp/en/nu/fukushima-np/images/handouts_120810_01-e.pdf
4. Water Leakage in Unit 4 Turbine Building (Aug. 14)
http://www.tepco.co.jp/en/nu/fukushima-np/images/handouts_120814_02-e.pdf
5. Unit 5 ECCS Suction Strainer to be Inspected (from Aug. 20)
Please let me know if there are any other specific topics that you would like me to cover.

[TEPCO Public Information in English]
Press Releases
http://www.tepco.co.jp/en/press/corp-com/release/index-e.html

Photos and Video Footages
http://photo.tepco.co.jp/en/index-e.html

Press Conference Handouts
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/index-e.html

Rebuttals against Media Misinformation and Rumors
http://www.tepco.co.jp/en/nu/fukushima-np/info/index-e.html
All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

From: Orders, William
Sent: 7 May 2015 18:57:36 -0400
To: 'tateiwa.kenji@tepco.co.jp';Skeen, David;Reckley, William;Norton, Charles;Marksberry, Don
Subject: Re: [Fukushima Presentation at NRC - May 7, 2015] Slides, photo, and thank you

Thank you Kenji, best regards and best wishes for your future.
Bill

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Thursday, May 07, 2015 06:50 PM
To: Skeen, David; Orders, William; Reckley, William; Norton, Charles; Marksberry, Don
Subject: [Fukushima Presentation at NRC - May 7, 2015] Slides, photo, and thank you

Dave, Bill, Don, and Chuck,
It was a great pleasure and honor having the opportunity to talk about a broad scope of topics related to the Fukushima accident with you and your colleagues at the NRC this morning.
It is always invigorating for me to interact with people like you who are motivated to learn from this accident in a serious manner.
Thank you also for the wonderful gifts and a tasty El Salvadoran lunch.
Please find attached the final version of my presentation.
You can find urls to all of the videos that I showed during my talk embedded in the slides.
Feel free to distribute this internally or externally of NRC.
Don,
About making today's video publicly available, it would be no problem without the Q&A session.
If you would like to include the Q&A session, I will probably have to run it through our headquarters.
William,
I am sorry to have missed you today.
Thank you very much for proposing to have me give a presentation at the NRC and making the necessary arrangement.
I look forward to keeping in touch with all of you even after I return to Japan.
All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW, Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)
----- Original Message -----
From: "Tateiwa, Kenji" <tateiwa.kenji@tepco.co.jp>
To: "Orders, William" <William.Orders@nrc.gov>
Cc: "Reckley, William" <William.Reckley@nrc.gov>
Sent: Thursday, May 07, 2015 7:44 AM
Subject: [Fukushima Presentation at NRC - May 7, 2015] Slides and Bio

> Bill,
>

> Please find below my bio and attached a copy of my presentation.
>
> Kenji Tateiwa is Manager of Nuclear Power Programs at TEPCO Washington Office, where he leads collaborative efforts with organizations in the U.S. to enhance the safety of nuclear facilities based on lessons learned from the Fukushima Daiichi nuclear accident and to promote safe decommissioning of the site.
> Kenji received his bachelor's and master's degrees in Nuclear Engineering from Kyoto University in Japan. He began his career at TEPCO in 1996 working at the Fukushima Daini Nuclear Power Station, then at the headquarters in the Nuclear Engineering Department, specializing in severe accident analysis and PRA. After receiving an MBA from the Stanford Graduate School of Business in 2004, Kenji led TEPCO's involvement (as technical advisor and potential equity investor) in the South Texas Project Units 3&4 nuclear new build project in the U.S.
> Kenji has coped with the Fukushima accident from day one, playing a key role as liaison between TEPCO and nuclear experts around the world, especially from the U.S. nuclear industry, who supported TEPCO in the face of the unprecedented disaster. Since his stint in Washington, DC in September 2011, he has shared first-hand account of the Fukushima accident and lessons learned on more than 190 occasions.
>
> See you soon.
>
> All the best,
> Kenji
> ---
> Kenji Tateiwa
> Manager, Nuclear Power Programs
> Tokyo Electric Power Company
> Washington Office
> 2121 K Street, NW Suite 910
> Washington, DC 20037
> tel: +1-202-457-0790 (ext.)116
> mobile: (b)(6)
>
> ----- Original Message -----
> From: Tateiwa, Kenji
> To: Reckley, William
> Cc: Orders, William
> Sent: Monday, May 04, 2015 10:39 AM
> Subject: Re: Presentation - May 7, 2015
>
>
> William,
>
> Yes, I will be at the NRC gate by 8:15 am on Thu, May 7th.
> Thank you for making arrangement for the parking lot.
>
> I will plan for a 90 minute session including Q&A.
> Please find attached a copy of the consent form.
>
> All the best,
> Kenji
> ---
> Kenji Tateiwa
> Manager, Nuclear Power Programs
> Tokyo Electric Power Company
> Washington Office

> 2121 K Street, NW, Suite 910
> Washington, DC 20037
> tel: +1-202-457-0790 (ext.)116
> mobile: (b)(6)
>
> ----- Original Message -----
> From: Reckley, William
> To: 'tateiwa.kenji@tepco.co.jp'
> Cc: Orders, William
> Sent: Monday, May 04, 2015 8:53 AM
> Subject: Re: Presentation - May 7, 2015
>
> Kenji, would it possible for us to meet you at the NRC gate at about 8:15 to give us a little time to make sure everything is set up and working in the room?
>
> Sent from an NRC BlackBerry
> William Reckley
> 202-384-4032
>
>
> From: Reckley, William
> Sent: Friday, May 01, 2015 04:59 PM
> To: Tateiwa, Kenji <tateiwa.kenji@tepco.co.jp>
> Cc: Orders, William
> Subject: RE: Presentation - May 7, 2015
>
> We have arranged a space and someone will meet you at the gate behind our building .. Using your own laptop is fine. If you don't mind, we could plan on the 90 minute version - including questions.
>
> -----Original Message-----
> From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
> Sent: Thursday, April 30, 2015 9:02 AM
> To: Reckley, William
> Cc: Orders, William
> Subject: Re: Presentation - May 7, 2015
>
>
> William,
>
>
> Yes, I am ready for the presentation on Thu, May 7th.
>
> - I will be at the One White Flint Building at 8:30 am.
>
> - If you could arrange for a parking space, that would be much appreciated--I will be driving a grey Toyota Corolla (b)(6)
>
> - I am currently preparing an updated presentation. If possible, I would like to use my own laptop but I will also email the file to you when it is finalized.
>
> - I would like to play a short video clip with audio during me presentation. Could you arrange for a speaker that I can connect my laptop for sound?
>
> - I will sign the consent form and bring it with me on May 7th.
>

> - How much time would you like me to spend for my talk including Q&A--1 hour or 1.5 hours? I am completely flexible.
>
>
> Very much looking forward to talking to you and your colleagues at the NRC.
>
>
> All the best,
> Kenji
> ---
> Kenji Tateiwa
> Manager, Nuclear Power Programs
> Tokyo Electric Power Company
> Washington Office
> 2121 K Street, NW Suite 910
> Washington, DC 20037
> tel: +1-202-457-0790 (ext.)116
> mobile: (b)(6)
>
>
> ----- Original Message -----
> From: Reckley, William
> To: tateiwa.kenji@tepco.co.jp
> Cc: Orders, William
> Sent: Thursday, April 30, 2015 8:42 AM
> Subject: Presentation - May 7, 2015
>
> Kenji .. I just wanted to check in and make sure that we were still OK for next Thursday, May 7, 2015. We have a room in our training area for 9:00am on that day and are arranging for interested staff to attend. We can meet with you at about 8:30am at the entrance to the One White Flint Building, sign you in through security, and then walk over to the training center, which is our newer Three White Flint Building. Would you plan to drive up (we can secure you a parking space) or take the Metro? In addition, do you plan to use the presentation you previously emailed or do you have a revised presentation? If we can make sure we have the presentation you want to use, we will have it loaded and ready to go that Thursday morning. One last thing, attached is a form that we are required to provide in order for you to give permission for us to record the presentation. You can sign and return or we will have a copy ready next Thursday and can just have you sign it then. Thanks
>
> again for agreeing to do this and hopefully things are going well as your make your preparations for your return to Japan.
>
> William D. Reckley
>
> Japan Lessons Learned Project Directorate william.reckley@nrc.gov
>
> (301) 415-7490
>

From: Tateiwa, Kenji
Sent: 27 Nov 2012 08:53:35 -0500
To: Norton, Charles
Cc: Reckley, William;Borchardt, Bill;Skeen, David;Monninger, John
Subject: Re: Fukushima-Daiichi Unit 4 Rx Building
Importance: Normal

Chuck,

Please find below a link to photos showing the condition of Unit 4 reactor building as of Oct. 16th (bottom 2 photos).
http://www.meti.go.jp/earthquake/nuclear/pdf/121022/121022_01w.pdf

As you noted, we have completed removing rubble from the refueling floor of Unit 4.
I will let you know if I find other recent photos.

You can see a live image of Daiichi units from the following link (Unit 4 can be seen in the bottom right; you should be able to get a better view during daytime in Japan):
http://www.tepco.co.jp/en/nu/f1-np/camera/index-e.html

John Monninger will be visiting the Daiichi site on Fri. Nov. 30 and my colleagues should be taking him to the Unit 4 refueling floor.
I will ask my colleagues to send you photos taken there.

Let me know if you have any other questions.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Norton, Charles
To: Reckley, William
Cc: Skeen, David ; Tateiwa, Kenji ; Borchardt, Bill
Sent: Tuesday, November 27, 2012 8:07 AM
Subject: RE: Fukushima-Daiichi Unit 4 Rx Building

Bill

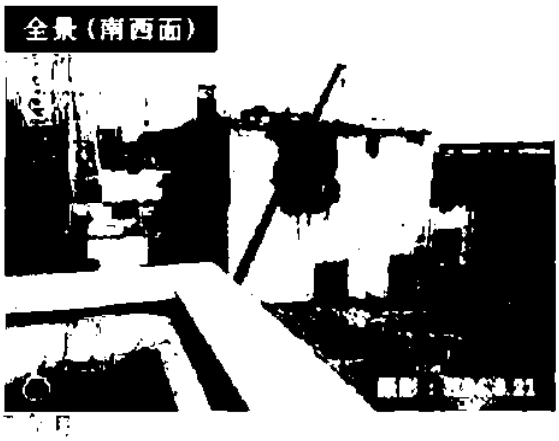
The 5th floor of the reactor building is the refuel floor. On unit 4 TEPCO has removed everything above this level, cleaned up the rubble and is building a structure for removing the fuel from the spent fuel pool.

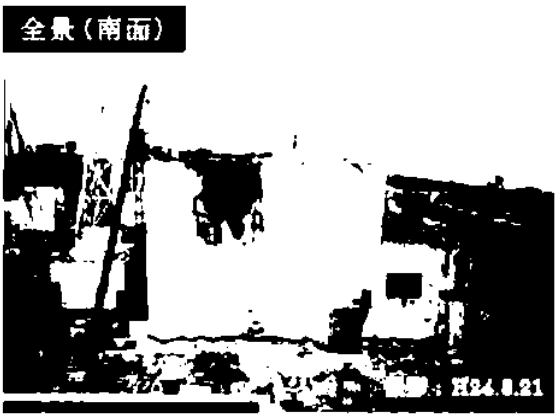
Kenji is having his information conference call this afternoon. I will ask if he can provide more recent photos and other information for Chairman Macfarlane's review prior to her visit.

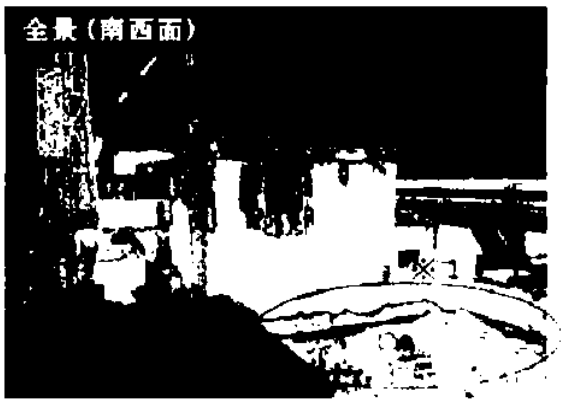
Below are some photos that depict U4 conditions on August 24 of this year compared to September 24. The fifth floor is on top in these photos.

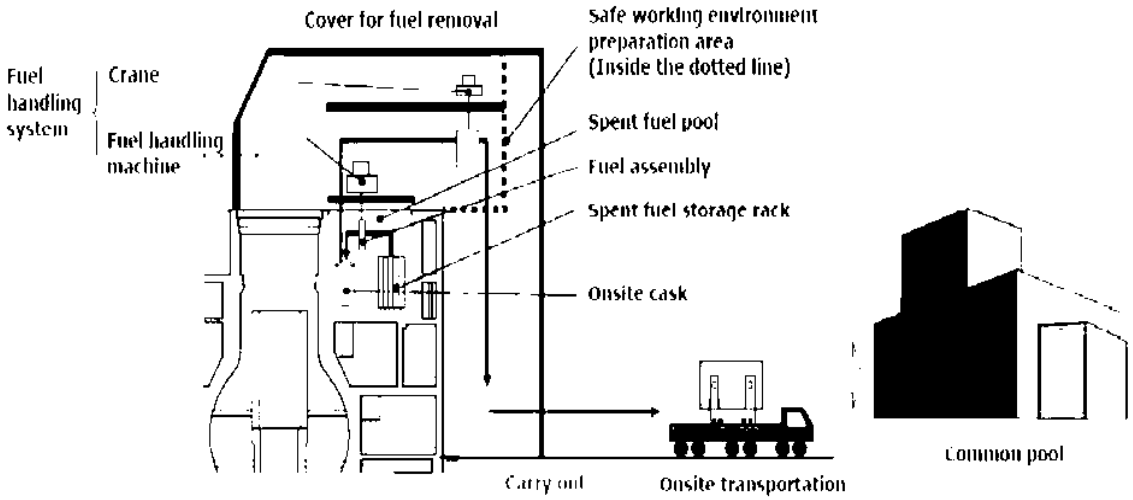
Below the photos is a depiction of the structure and apparatus for removing the fuel from the spent fuel pool.

Chuck Norton
US NRC JLD









From: Reckley, William
Sent: Tuesday, November 27, 2012 7:44 AM
To: Norton, Charles
Subject: FW: Fukushima-Daiichi Unit 4 Rx Building

Can you look to see what info you have, and if necessary what info you might get from Tepco. Thanks

From: Skeen, David
Sent: Tuesday, November 27, 2012 6:46 AM
To: Reckley, William
Cc: Taylor, Robert
Subject: Fukushima-Daiichi Unit 4 Rx Building

Bill,

When I talked with Bill Borchardt yesterday, he showed me a draft itinerary for the Chairman's upcoming tour of the Fukushima site. It indicates that we will get a tour of the 5th floor of the Unit 4 Rx building.

Bill wanted to know if we could get any info on the equipment that would be expected to be on the 5th floor, so that we could explain to the Chairman what she is seeing during the tour.

Does Chuck Norton have any photos of the Unit 4 Rx building, or does he know what is typically found on the 5th floor of a BWR 4? Another thought would be to ask Chuck to pulse Kenji Tatiewa (our friendly TEPCO rep here in town), if Chuck doesn't have much info.

Please see what you can do to get some info by the end of next week.

Thanks!

From: Tateiwa, Kenji
Sent: 28 Sep 2013 12:40:16 -0400
To: Norton, Charles
Cc: Reckley, William;Foggie, Kirk
Subject: Re: Operator Training requirements at Fukushima
Attachments: Operator Training and Procedures_11282012.pdf
Importance: Normal

Chuck,

Sorry for the late reply due to my business trip to Toronto this week.

Please find attached presentation on operator training that TEPCO provided with the National Academy of Science Fukushima Lessons Learned Committee.
(You do not have to worry about the legal disclaimer on the first page. This information has already been made public when we submitted this to the NAS committee.)

Let me know if you have any questions.
I will be traveling on business again from Sept. 29 to Oct 1 but will have email access.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)
----- Original Message -----
From: Norton, Charles
To: Tateiwa, Kenji (tateiwa@wash.tepco.com)
Cc: Foggie, Kirk ; Reckley, William
Sent: Wednesday, September 25, 2013 7:54 AM
Subject: Operator Training requirements at Fukushima

Kenji,

In the U. S., initial training and retraining requirements for licensed operators are outlined in 10CFR part 55. Can you provide me (in English if possible) similar Japanese regulatory requirements that were in effect for licensed operators at the time of the accident at Fukushima Daiichi?

Thank you again for helpfulness

Chuck Norton
US NRC/JLD
301 415 7818

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THE TOKYO ELECTRIC POWER COMPANY, INC.

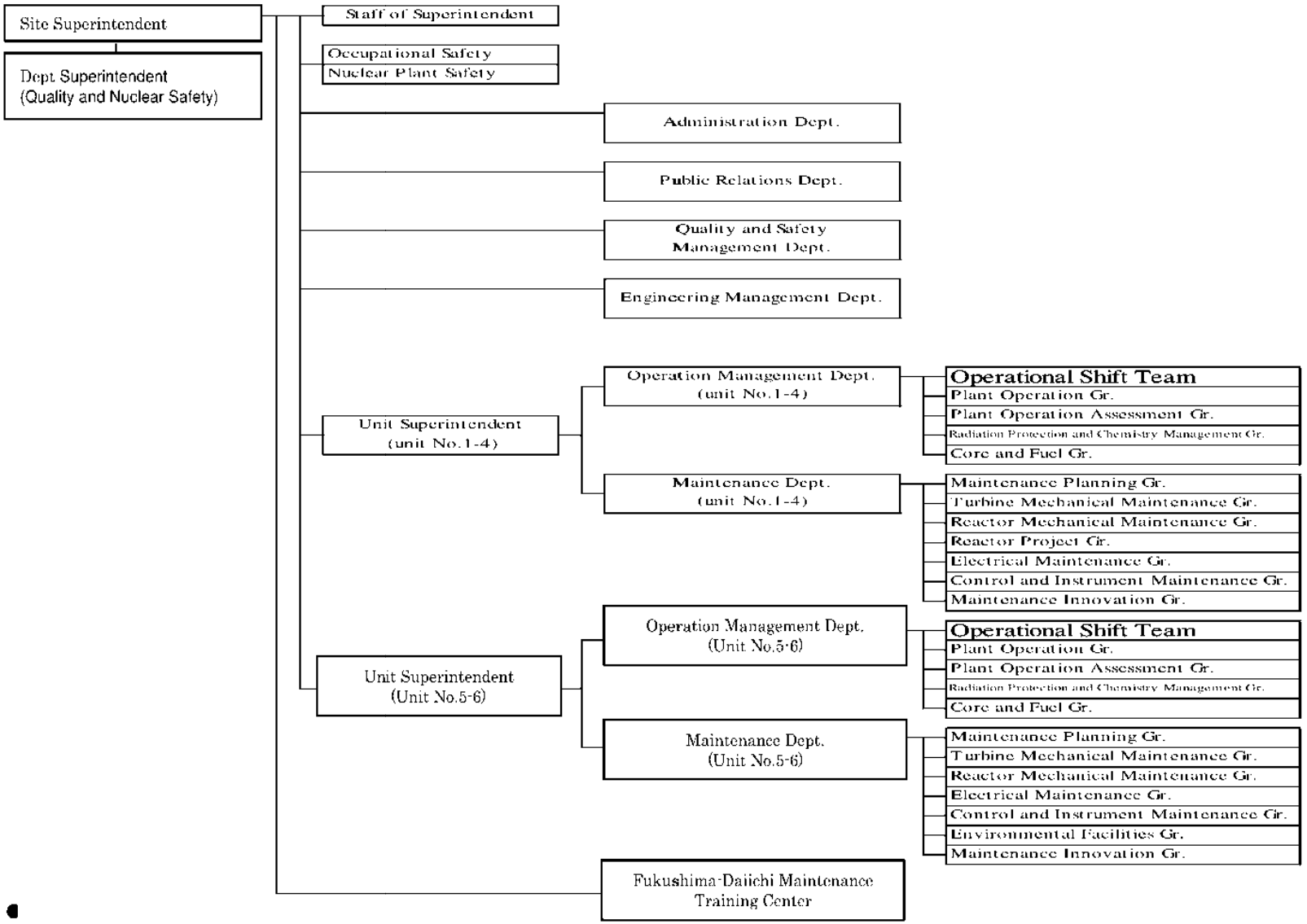
Operator Training and Procedures

NAS Lessons Learned from Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants
Meeting 3 Session 3

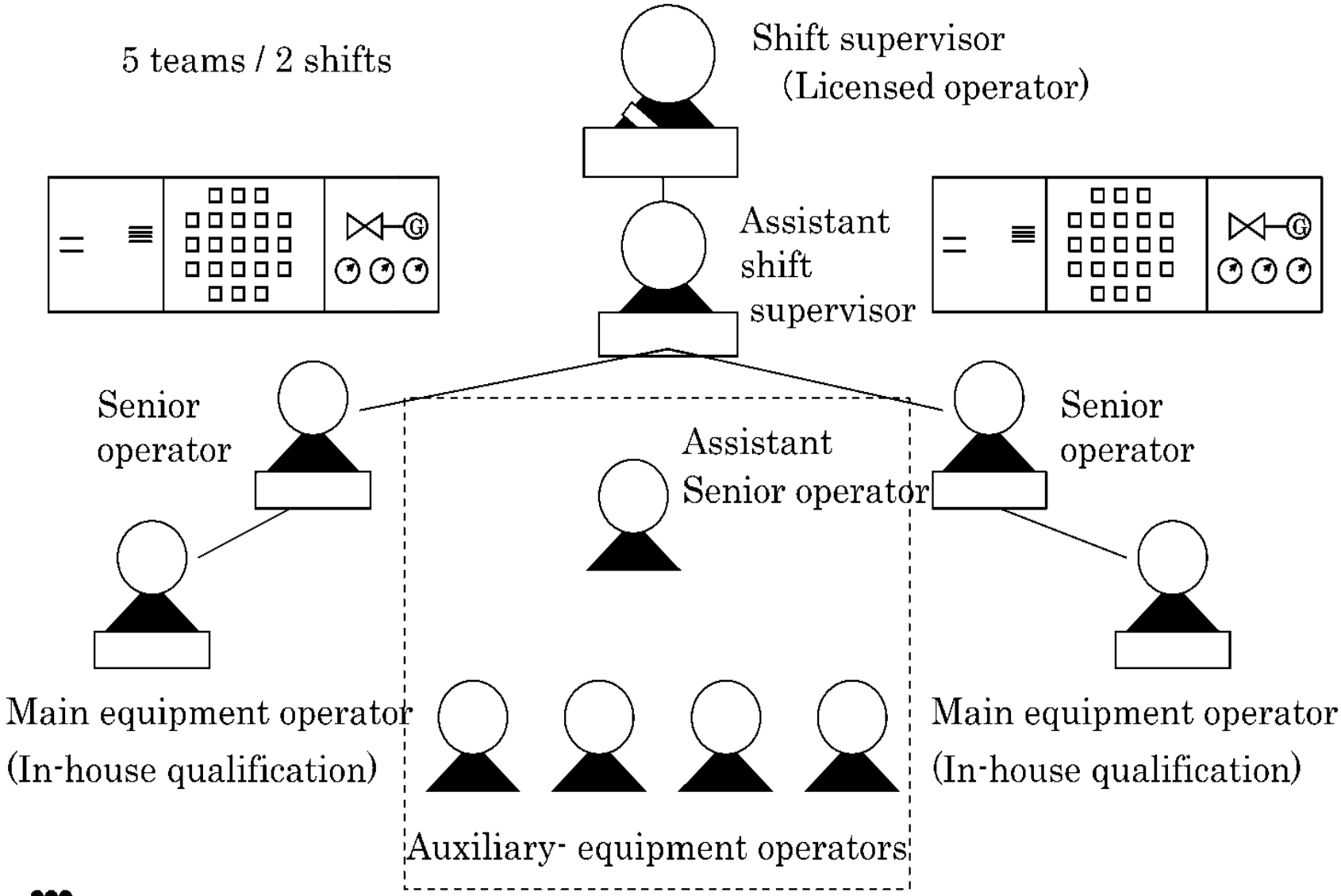
Nov.28th 2012

TEPCO
TOKYO ELECTRIC POWER COMPANY

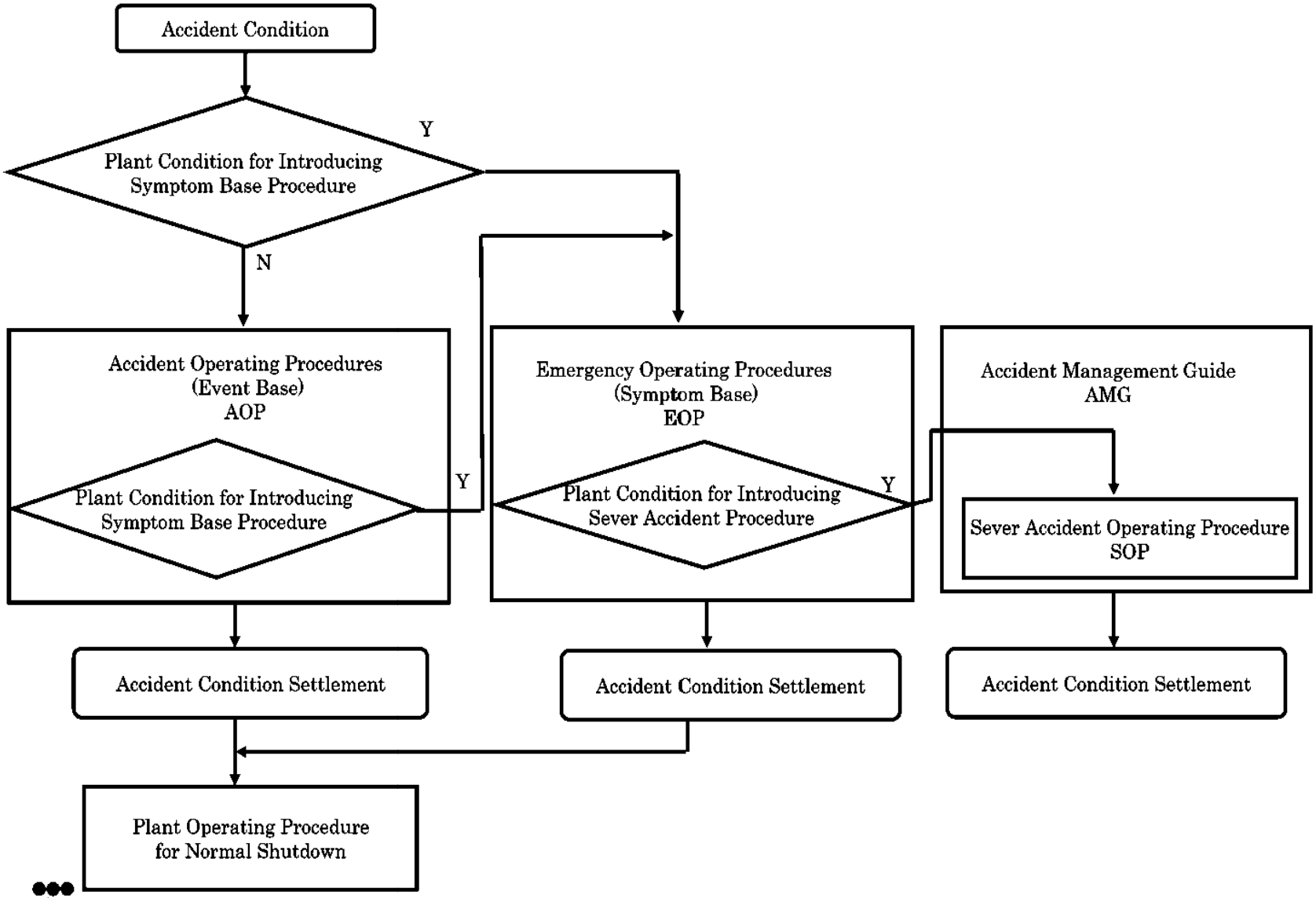
Organization of Fukushima Daiichi Nuclear Power Station (Before Earthquake)



Organization of Operational Shift (Before Earthquake)

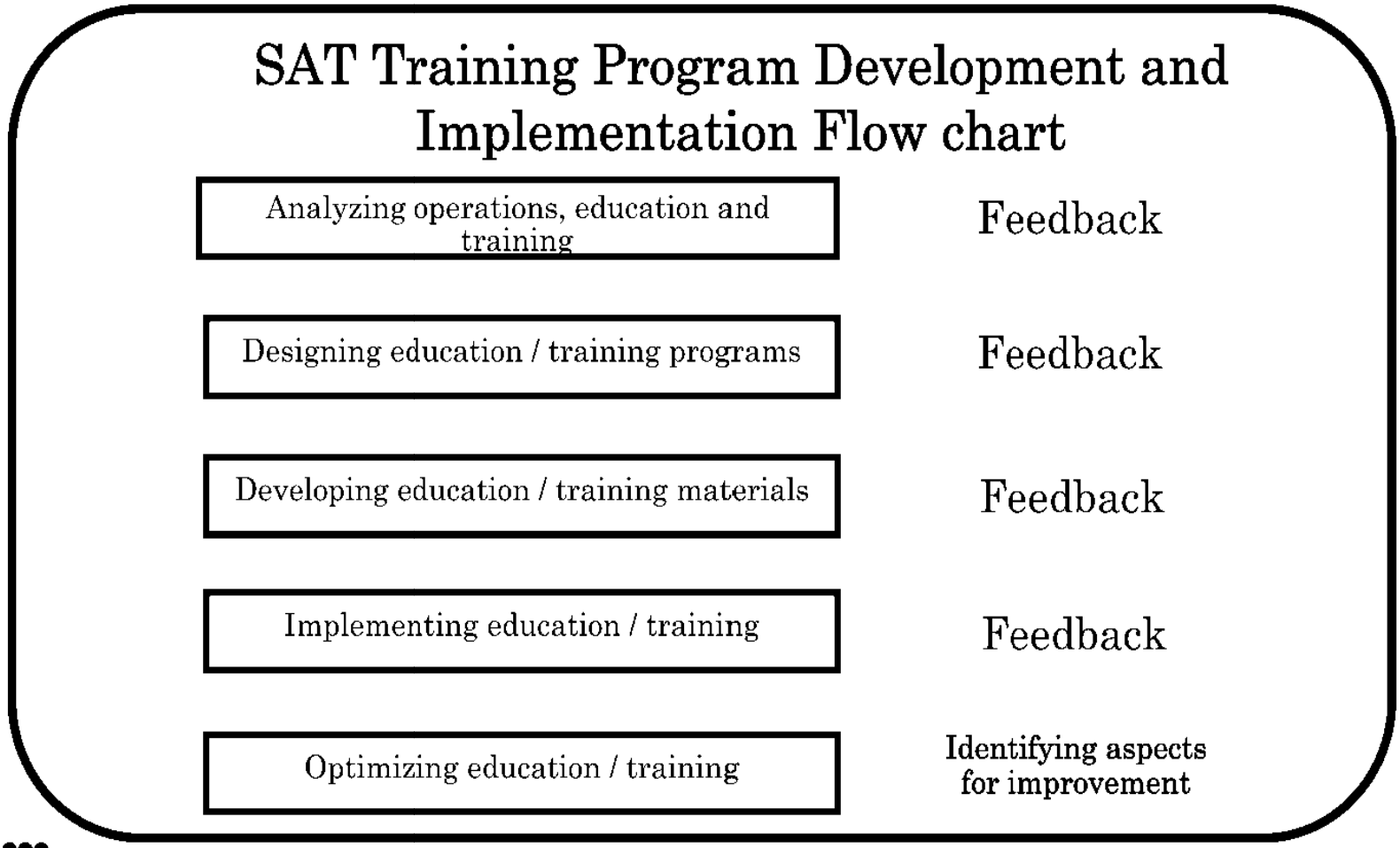


Accident Operating Procedures Overview (Before Earthquake)

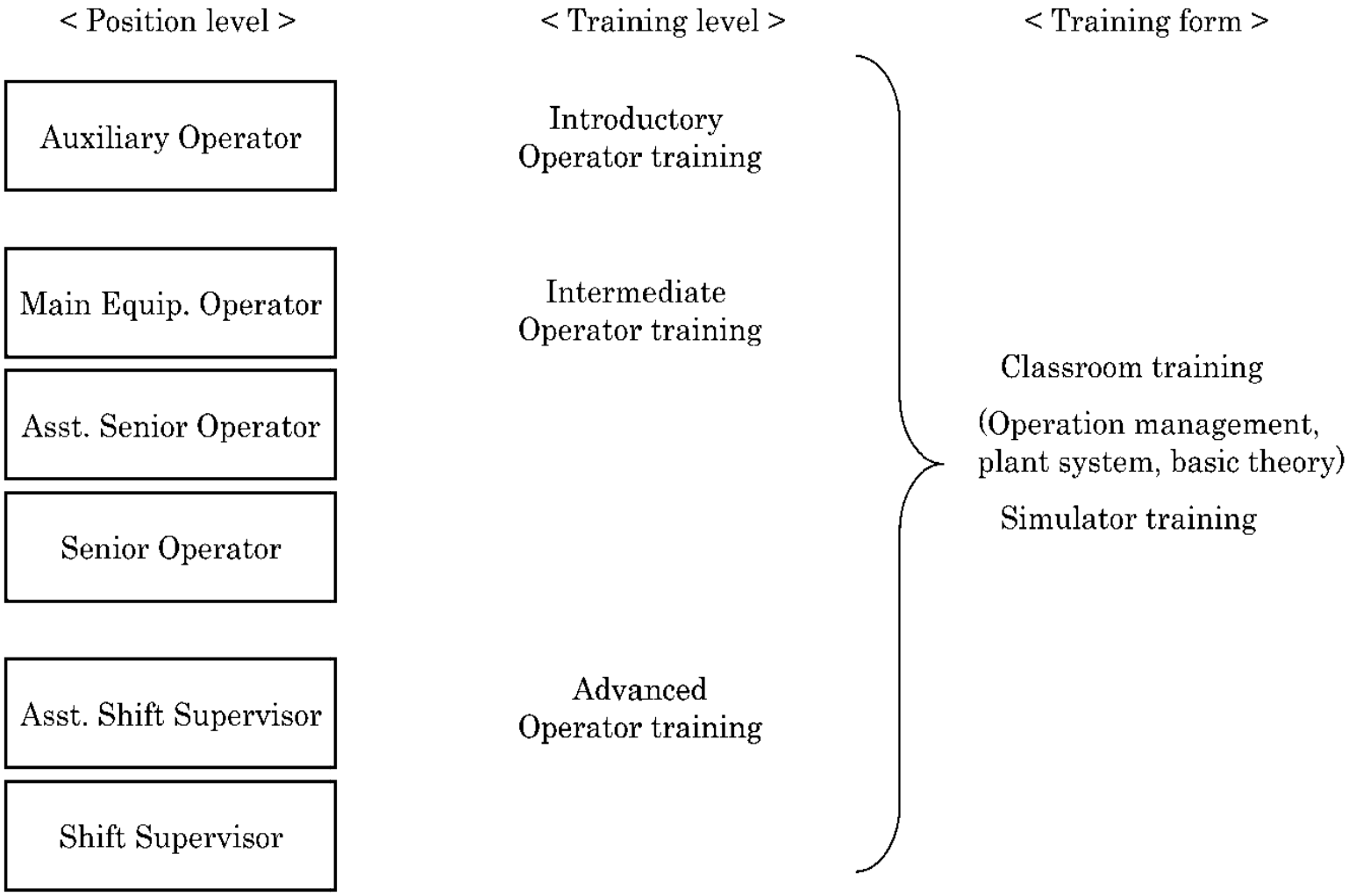


Operator education and training
(1) SAT Approach

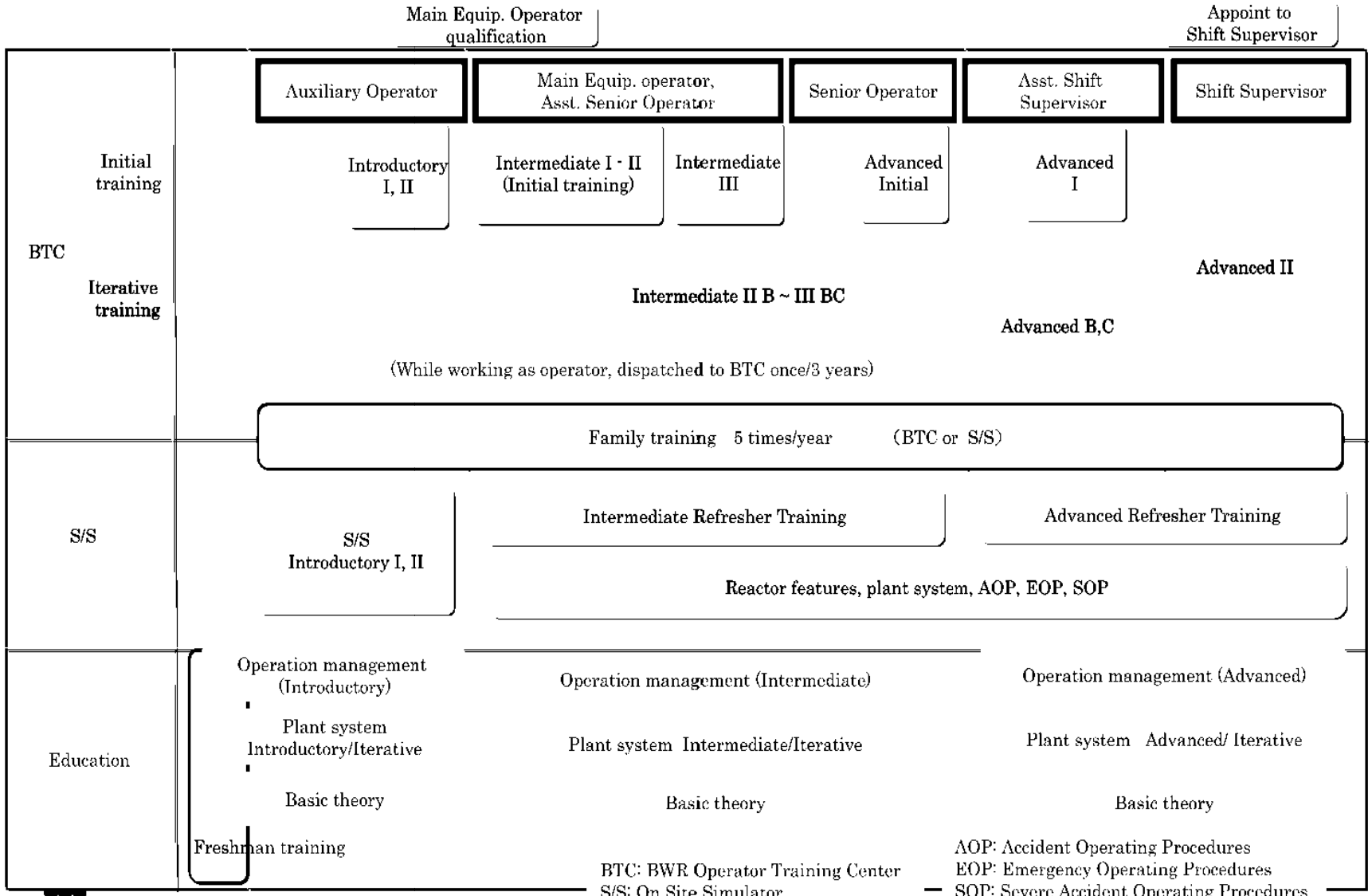
To maintain and enhance safety operator training is developed by SAT ~ Systematic Approach to Training ~ process



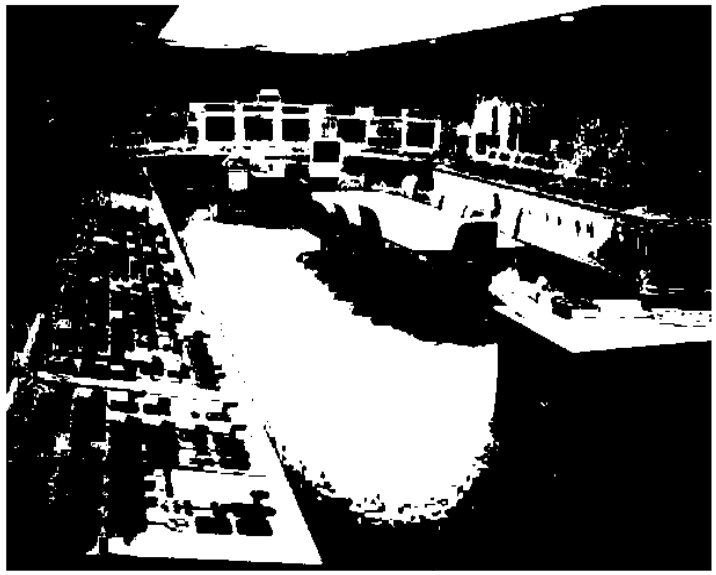
Operator education and training
(2) Operator Training



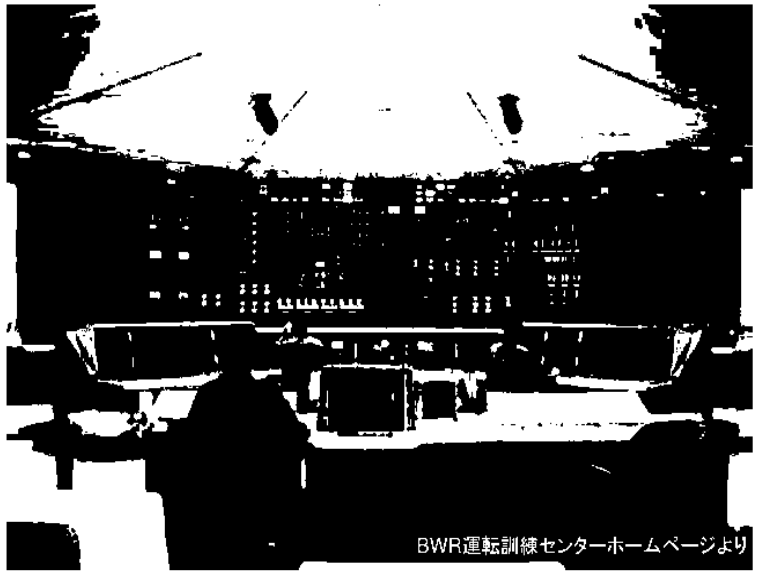
Operator education and training
(3) Operator training program(1/3)



Operator education and training
(3) Operator training program(2/3)

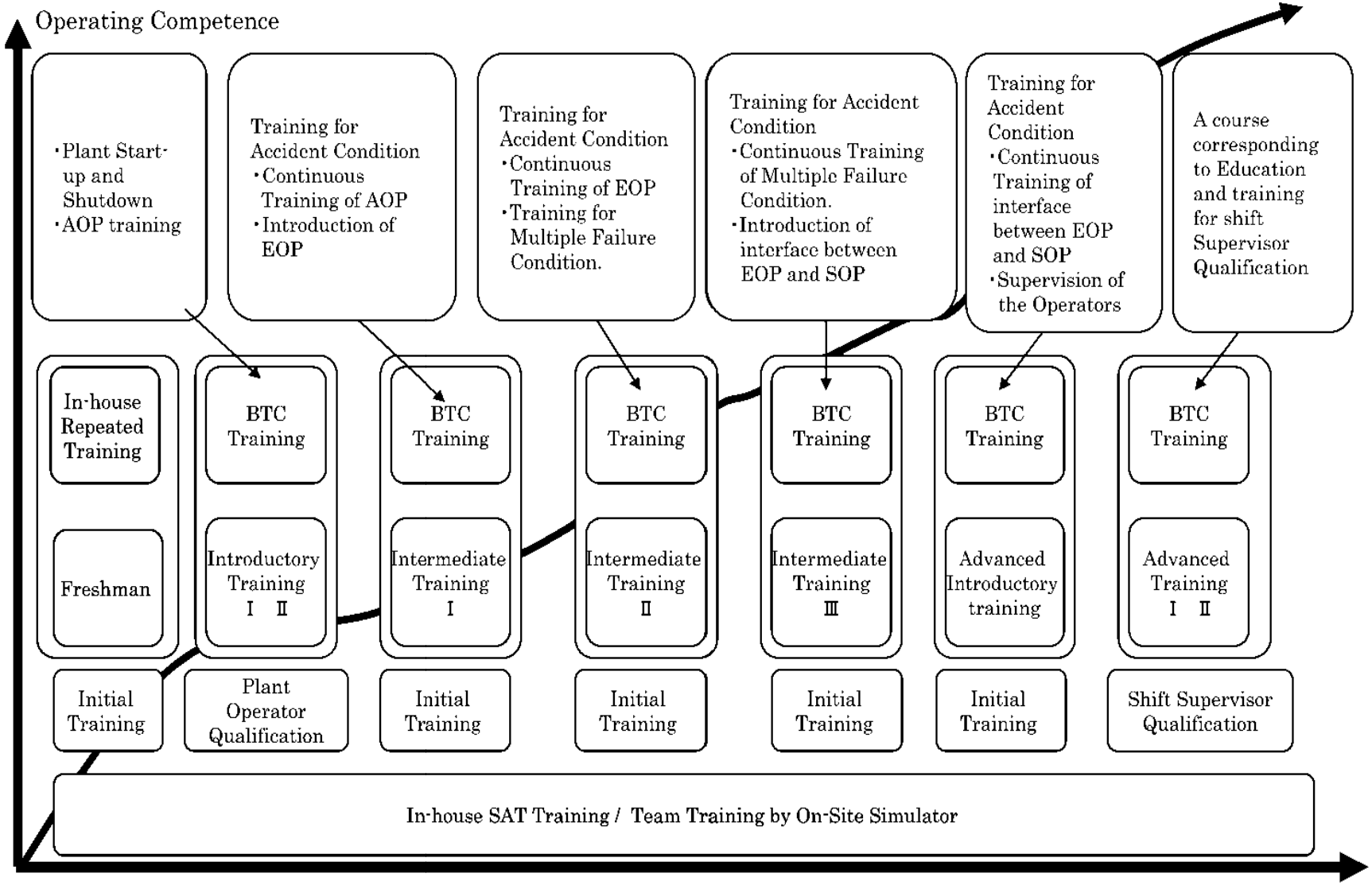


On Site Simulator
(BWR)



BTC
(ABWR)

Operator education and training
(3) Operator training program(3/3)



Operator education and training
(4) Initial Training Details (1/3)

1. BTC Introductory training course (for Main Equipment Operator Qualification)

Course name	Course objectives/outline	Training period
Introductory training course Ⅰ	Master the outline of a BWR plant and basic theories of nuclear engineering, thermal engineering, control engineering and safety engineering. The admission level criterion is mastery of the outline of nuclear plant equipment and operation (Operational experience of about 2 years).	15 days (3 weeks)
Introductory training course Ⅱ	Acquire Comprehensive skills necessary for operating in the central control room. Having acquired knowledge of plant equipment and operational methods, training is conducted in normal operations and actions to be taken in abnormal circumstances. The admission level criteria are completion of the Introductory training course Ⅰ or possession of equivalent knowledge of basic theory, as well as mastery of the outline of plant equipment and operation.	40 days (8 weeks)

Operator education and training
(4) Initial Training Details (2/3)

2. BTC Intermediate training course (for Plant Operator Competence Level Up)

Course name	Course objectives/outline	Training period
Intermediate training course Ⅰ	Be familiarized with accident operating procedures (AOP) and understand EOP entry conditions (RC Scram → Procedure guidelines). The admission level criterion is completion of the Introductory training course Ⅱ or possession of equivalent or higher knowledge and technical skill.	10 days (2 weeks)
Intermediate training course Ⅱ	Improve knowledge and skills relating to emergency operating procedures (EOP) and acquire comprehensive competence in knowledge and technical skill necessary for a central control room operator. The admission level criteria are being a member of the central control room operation staff or involvement in relevant operations, as well as completion of the Intermediate training course Ⅰ or possession of equivalent or higher knowledge and technical skill relating to emergency operating procedures.	10 days (2 weeks)
Intermediate training course Ⅲ	As a superior to central control room operation staff, enhance broad operation management knowledge concerning laws, safety regulations and so forth, and acquire comprehensive abnormal situation handling abilities (AOP,EOP and SOP). The admissions level criteria are possession of sufficient experience as a member of the central control room operation staff, as well as completion of the Intermediate training course Ⅱ or possession of equivalent or higher knowledge and technical skill.	10 days (2 weeks)

Operator education and training
(4) Initial Training Details (3/3)

3. BTC Advanced training course (For Shift Supervisor Qualification)

Course name	Course objectives/outline	Training period
Advanced Introductory training	Master the structure of nuclear facilities including knowledge of nuclear engineering and thermal engineering, and managerial knowledge including nuclear facility capabilities, legislation and safety regulations and case studies, while acquiring the ability to respond (EOP,SOP) to abnormal circumstances as a director. Positioned as a gateway course consistent with JEAG4802 for advanced-level operators. The admission level criteria are planned assignment as an assistant to the person responsible for operation, as well as completion of the Intermediate training course Ⅲ or possession of equivalent or higher knowledge and technical skill.	9 days (2 weeks)
Advanced training course Ⅰ	A course corresponding to Education and training for advanced-level operators as specified in JEAC4804. This course aims at an all-inclusive mastering of the skills necessary to be a person responsible for operation and is targeted at the following persons. 1.Persons who will take an operation skill test as specified in JEAC 4804. 2.Persons who will renew their operator's qualification. 3.Persons who are not qualified operators, but who intended to take the test in the future. ※When someone applies for the test, it will be performed as a qualified-operator practical skills test. If the quota is not reached, the electric company may be asked to bring along operators from the site.	11 days (2 weeks)
Advanced training course Ⅱ	A course corresponding to Education and training for advanced-level operators as specified in JEAC4804. The lectures and operational practical tests are same as in Advanced training course Ⅰ,however, because the period is shorter, training in operational accidents is only provided in representative cases. The following persons are targeted. 1.Persons who will renew their operator's qualification. 2.Persons who are not qualified operators, but who intended to take the test in the future. ※When someone applies for the test, it can be performed as a qualified-operator practical skills test. If the quota is not reached, the electric company may be asked to bring along operators from the site. Excluding one part, Advanced Ⅱ and Advanced A may be administered in parallel.	6days

Operator education and training
(5) Plant Specific Characteristics Consideration in Training

・To master broad and comprehensive skill and knowledge operator training and education is conducted based on long period operator training and education plan.

・Items to be learned as common knowledge and skill.
- －Basic Theory (Nuclear Physics , Thermal hydrodynamics , Electrical Engineering , Reactor Dynamic Characteristics etc.)
- －Operation Management (Basic Fundamentals for Plant Operation , Regulatory Requirement , Technical Specification , Fire Protection , Core and Fuel Management , Radiation Protection , Operating Experiences , Human Factor , Lessons learned from Actual Events etc.)

・Items to be learned as plant specific knowledge and skill
- －Plant system (System Configuration , Inter-lock system)
- －Operation Management (Technical Specification , Safety System Design , Core & Fuel Management)
- －Operating Procedures (Normal Condition Operating Procedures , Event Base & Symptom Base Accident Procedures, Sever Accident Procedures)
- －Simulator training and actual plant operation experiences
- －Simulator training is implemented by using simulator which has the closest design to actual plant

Operator education and training
(6) Operational Shift Rotation

- 5 teams / 2 shifts
- In-house training duty is provided to each team for forty days each year.
- Shift Cycle example

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
A team																												
B team																												
C team																												
D team																												
E team																												

Operation duty Training duty

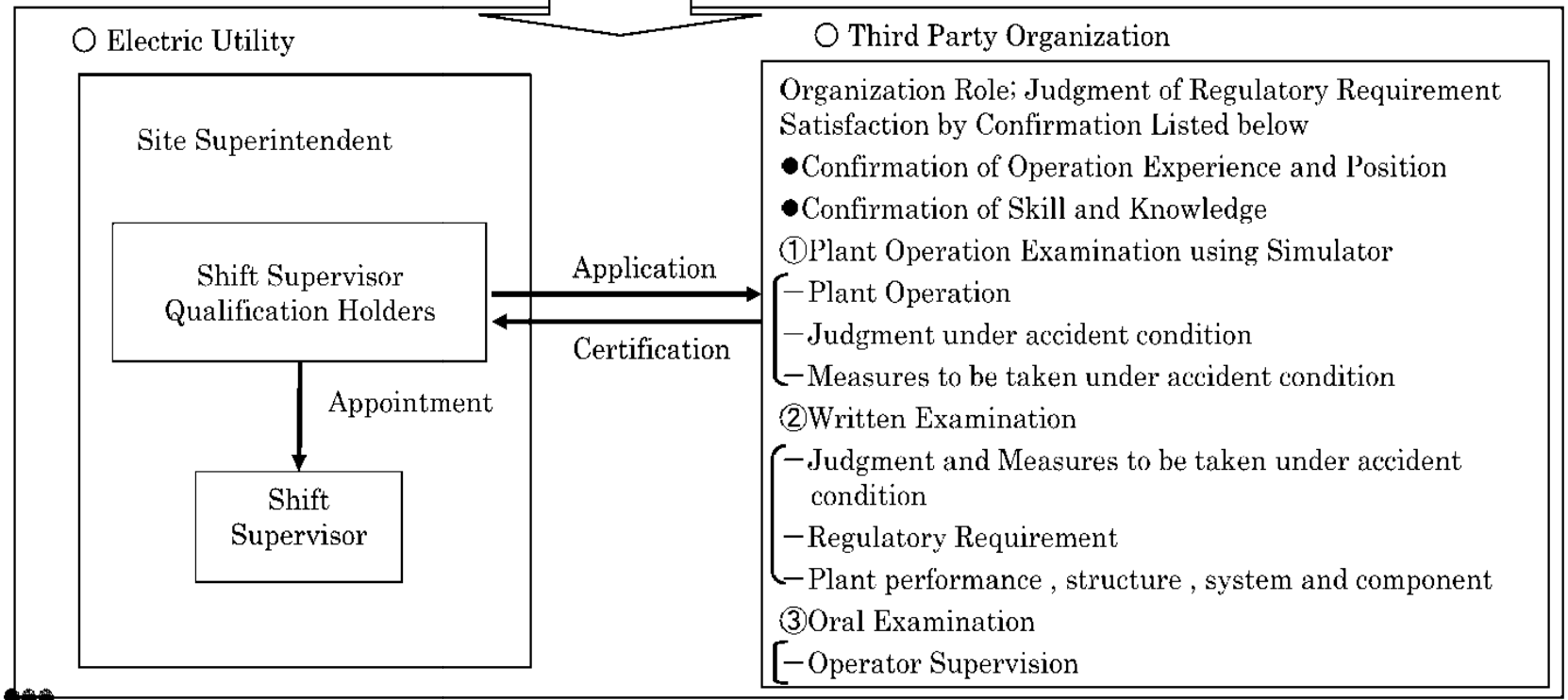
Operator education and training
(7) Qualification of Plant Operators

Shift supervisor	License holder of Shift Supervisor (Regulatory Requirement)	5 years experiences of Assistant shift supervisor
Assistant shift supervisor	Advanced Introductory Course Completion	6 years experiences of Senior operator
Senior operator	Intermediate Training Course Completion	3-4 years experiences of Assistant Senior operator
Assistant Senior operator	Intermediate Training Course Completion	4-5 years experiences of Main equipment Operator
Main equipment Operator	Qualification for Main Equipment Operator	6-7 years experiences of Auxiliary- equipment operators
Auxiliary- equipment operators	Qualification for Auxiliary Equipment Operator	A year experience of Trainee
Trainee	Safety & Regulatory Training	

Operator education and training
(8) Qualification of Shift Supervisor

○ Shift Supervisor Qualification Requirement　(Regulatory Body Bulletin)

a. Nuclear Plant Operation Experiences
b. Supervision Position
c. Skill and Knowledge
  1) Ability to grasp plant condition and to choose correct countermeasures under accident condition
  2) Regulatory Requirement
  3) Plant performance, structure, system and component
  4) Plant Operator Supervision

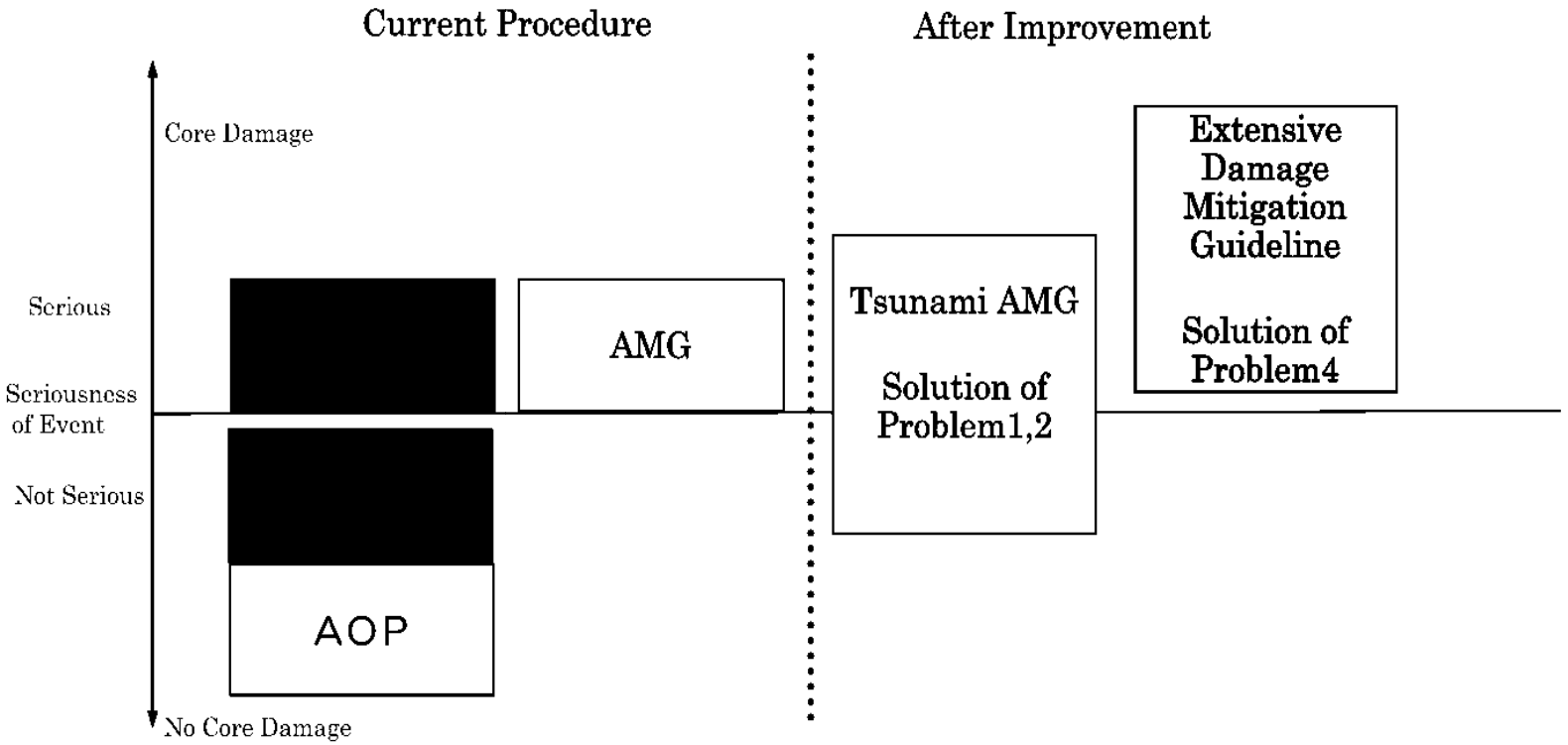


How the Pre-planed Accident Management Worked
(The Tsunami was beyond AM)

Facilities	Outline	Practical use at 1F-1～3	at 2F-1
1. Shutdown	①Recirculation Pump Trip ②Alternative Rod Insertion	－:(CRs are fully inserted)	－
2. Injecting water	①Alternative Injection by MUWC /FP	○:Injected from AM coupler △:Using Fire engine(MUWC & FP are downed as loss of AC power etc.)	○
	②Automatic ADS	×:Manual operated as loss of power	－
3.Containment Cooling	①Alternative Cooling by Drywell Cooler ②Restoration of CCS	×:Inoperable as loss of AC power	○
	③Hardened Vent	△: Manual operated	(prepared line up)
4. Support of Safety Facilities	① Interchangeability of 6.9kV & 480V Power Sources	×: Inoperable as loss of power including the next(1~4) plant (But operable 1F-5,6 BUS tie)	○
	② Restoration Procedure Guidelines (RHR & D/G)	×: Cooling and Electric supply facilities are Inoperable	－

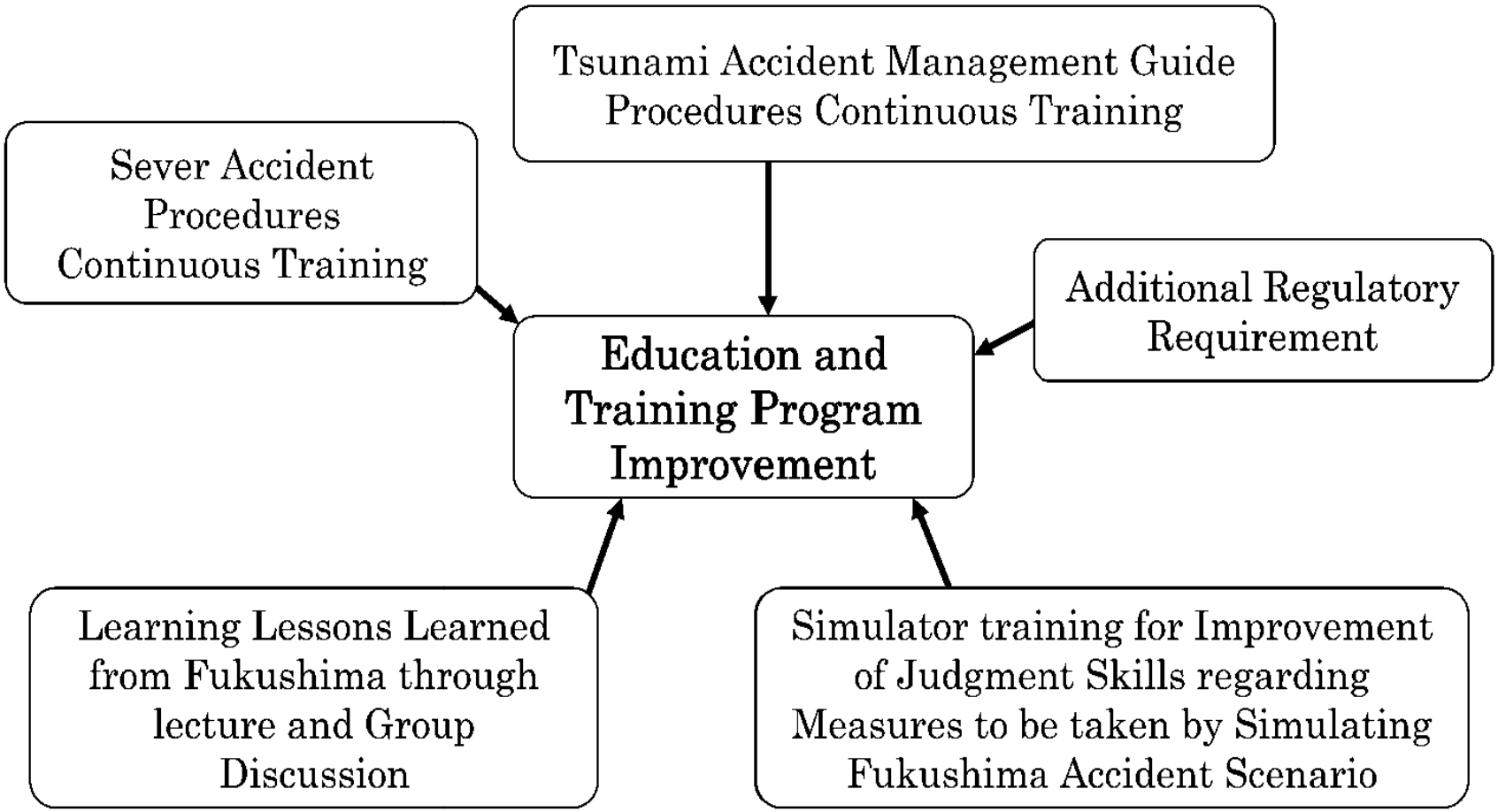
－：no relation　×：couldn't apply　△：partially apply　○：apply

Improvement of Operating Procedures



・Improvement including
  －Additional Regulatory Requirement to cope with Fukushima Accident
  －Requirement and Recommendation from Fukushima Accident Reports of Related Organization
・ Lessons Learned from In-house investigation
・ Lessons Learned from Overseas Experiences to cope with Various Hazard

Improvement of Operator Training
Lessons Learned Feedback to Education and Training Program



Thank you for your attention!

From: Reckley, William
Sent: 23 Apr 2015 20:08:54 +0000
To: 'Tateiwa, Kenji'
Subject: RE: Possible presentation to NRC staff

Thank you so much .. we will begin making the arrangements for the morning of May 7th .. If anything changes for you, please don't hesitate to just let us know, we are pretty flexible in terms of rescheduling if needed.

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Wednesday, April 22, 2015 8:34 PM
To: Reckley, William
Subject: Re: Possible presentation to NRC staff

William,
I will then pencil in Thu, May 7th in the morning for the presentation.
No problem video-taping the presentation.
(I will make sure that I get a hair cut prior to the event.)
All the best,
Kenji

----- Original Message -----
From: Reckley, William
To: Tateiwa, Kenji
Sent: Wednesday, April 22, 2015 10:38 AM
Subject: RE: Possible presentation to NRC staff

Thank you Kenji .. it looks like the morning of Thursday, May 7th might work for us. Would you mind if we taped the session for those staff that will not be in the office that day ?

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Tuesday, April 21, 2015 5:52 PM
To: Reckley, William
Subject: Re: Possible presentation to NRC staff

William,
It was my pleasure seeing you at the NRC headquarters on April 10 as well.
Thank you very much for your kind words and for your invitation to speak to your colleagues.
I am certainly open to and would be delighted to visiting your offices for another presentation prior to my departure to Japan.
My current availability for the month of May is as follows:
Tue, May 5
Wed, May 6
Thu, May 7
Fri, May 8
Any time of the day would work, but preferably in the morning.
(If the above dates do not work, I will probably be available the first two weeks in June.)
As for content of my presentation, please find attached for your information, slide decks for the one that I recently gave at Peach Bottom on April 13.
Please let me know if this kind of presentation would meet your colleagues' needs or if there are other topics that you would like me to cover.
Typically, I talk for about an hour and do Q&A for 30 minutes, but I can make it shorter or longer depending on your needs and availability of time.
Let me know what works for you and I will prepare accordingly.
All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs

Tokyo Electric Power Company
Washington Office
2121 K Street, NW, Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Reckley, William
To: tateiwa.kenji@tepco.co.jp
Sent: Tuesday, April 21, 2015 3:55 PM
Subject: Possible presentation to NRC staff

Kenji,

It was my pleasure to run into you again on April 10th as you were setting up for a presentation to the Advisory Committee on Reactor Safeguards. You mentioned that you are planning to return to Japan later this Spring but that you might be open to providing a presentation to the NRC staff during your remaining time here. We have certainly appreciated and benefited from your other presentations and would very much like to try to arrange a presentation for some newer NRC staff and others that missed your earlier discussions. I can imagine that you are quite busy arranging for the transition and answering other requests but I was wondering if you might have some time in May to visit our offices and give a presentation. If you are able to support, do you have one or more times when this would work best for you? Thank you again for all your previous support, you will certainly be missed.

William D. Reckley
Japan Lessons Learned Project Division
william.reckley@nrc.gov
(301) 415-7490

From: Reckley, William
Sent: 6 May 2015 12:50:42 +0000
To: 'Tateiwa, Kenji'
Subject: RE: Presentation - May 7, 2015

Thank you .. looking forward to seeing you tomorrow.

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Monday, May 04, 2015 10:39 AM
To: Reckley, William
Cc: Orders, William
Subject: Re: Presentation - May 7, 2015

William,
Yes, I will be at the NRC gate by 8:15 am on Thu, May 7th.
Thank you for making arrangement for the parking lot.
I will plan for a 90 minute session including Q&A.
Please find attached a copy of the consent form.
All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW, Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Reckley, William
To: 'tateiwa.kenji@tepco.co.jp'
Cc: Orders, William
Sent: Monday, May 04, 2015 8:53 AM
Subject: Re: Presentation - May 7, 2015

Kenji, would it possible for us to meet you at the NRC gate at about 8:15 to give us a little time to make sure everything is set up and working in the room?

Sent from an NRC BlackBerry
William Reckley
202-384-4032

From: Reckley, William
Sent: Friday, May 01, 2015 04:59 PM
To: Tateiwa, Kenji <tateiwa.kenji@tepco.co.jp>
Cc: Orders, William
Subject: RE: Presentation - May 7, 2015

We have arranged a space and someone will meet you at the gate behind our building .. Using your own laptop is fine. If you don't mind, we could plan on the 90 minute version - including questions.

-----Original Message-----
From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Thursday, April 30, 2015 9:02 AM
To: Reckley, William

Cc: Orders, William
Subject: Re: Presentation - May 7, 2015
William,
Yes, I am ready for the presentation on Thu, May 7th.
- I will be at the One White Flint Building at 8:30 am.
- If you could arrange for a parking space, that would be much appreciated--I will be driving a grey Toyota Corolla (tag # MD 7BL8085).
- I am currently preparing an updated presentation. If possible, I would like to use my own laptop but I will also email the file to you when it is finalized.
- I would like to play a short video clip with audio during me presentation. Could you arrange for a speaker that I can connect my laptop for sound?
- I will sign the consent form and bring it with me on May 7th.
- How much time would you like me to spend for my talk including Q&A--1 hour or 1.5 hours? I am completely flexible.
Very much looking forward to talking to you and your colleagues at the NRC.
All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
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tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)
----- Original Message -----
From: Reckley, William
To: tateiwa.kenji@tepco.co.jp
Cc: Orders, William
Sent: Thursday, April 30, 2015 8:42 AM
Subject: Presentation - May 7, 2015
Kenji .. I just wanted to check in and make sure that we were still OK for next Thursday, May 7, 2015. We have a room in our training area for 9:00am on that day and are arranging for interested staff to attend. We can meet with you at about 8:30am at the entrance to the One White Flint Building, sign you in through security, and then walk over to the training center, which is our newer Three White Flint Building. Would you plan to drive up (we can secure you a parking space) or take the Metro? In addition, do you plan to use the presentation you previously emailed or do you have a revised presentation? If we can make sure we have the presentation you want to use, we will have it loaded and ready to go that Thursday morning. One last thing, attached is a form that we are required to provide in order for you to give permission for us to record the presentation. You can sign and return or we will have a copy ready next Thursday and can just have you sign it then. Thanks
again for agreeing to do this and hopefully things are going well as your make your preparations for your return to Japan.
William D. Reckley
Japan Lessons Learned Project Directorate william.reckley@nrc.gov
(301) 415-7490

From: Reckley, William
Sent: 6 May 2015 21:40:41 +0000
To: 'Tateiwa, Kenji'
Subject: RE: Request for feedback: Presentation - May 7, 2015

Kenji .. Bill Orders has made copies of the feedback sheet and will provide to the NRC staff attending your presentation. Unfortunately, I have a meeting away from our headquarters buildings tomorrow morning and so will not be able to attend. Bill Orders, David Skeen, Chuck Norton and some other familiar staff will be there. I would like to again thank you for doing this and wish you well in your future activities. I believe you will likely cross paths with us again, and I look forward to that occasion. Thank you.

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Wednesday, May 06, 2015 1:40 PM
To: Reckley, William
Cc: Orders, William
Subject: Request for feedback: Presentation - May 7, 2015

William,
Would it be possible to have the attached feedback sheet printed and handed out to participants prior to my talk tomorrow?
I would very much like to hear your colleagues' candid comments so that I can improve my effectiveness in communicating about this important topic.
Thank you very much in advance.
All the best,
Kenji
p.s.
I am still working on the slides and will send it to you when it is fixed.
I will be bringing my laptop too.

----- Original Message -----
From: Tateiwa, Kenji
To: Reckley, William
Cc: Orders, William
Sent: Monday, May 04, 2015 10:39 AM
Subject: Re: Presentation - May 7, 2015

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Kenji

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Tokyo Electric Power Company
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Subject: Presentation - May 7, 2015
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again for agreeing to do this and hopefully things are going well as your make your preparations for your return to Japan.

William D. Reckley
Japan Lessons Learned Project Directorate william.reckley@nrc.gov
(301) 415-7490

From: Norton, Charles
Sent: 20 Aug 2012 12:17:44 -0400
To: Tateiwa, Kenji
Cc: Yamaguchi, Akinori;Takizawa, Shin;Shinoda, Kazuyuki;Nakagawa, Yasushi;Kawano, Akira;Marksberry, Don;Lee, Richard;Helton, Donald;Mitchell, Matthew;Reckley, William;Foggie, Kirk;Jimenez, Manuel
Subject: RE: SFP questions

Kenji,

Thank you for your quick response.

Chuck Norton
NRC JLD

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Monday, August 20, 2012 11:41 AM
To: Norton, Charles
Cc: Yamaguchi, Akinori; Takizawa, Shin; Shinoda, Kazuyuki; Nakagawa, Yasushi; Kawano, Akira; Marksberry, Don; Lee, Richard; Helton, Donald; Mitchell, Matthew; Reckley, William; Foggie, Kirk; Jimenez, Manuel
Subject: Re: SFP questions

Chuck,

Thank you for your inquiry.
Please find below answers.

Question 1. a.

Page 14 of the presentation says the following:
(top left photo) 1. upper part of inside SFP--rubbles
(top right photo) 2. inside SFP: top arrow indicates upper part of fuel; bottom arrow indicates fuel rack
(bottom left photo) 3. inside SFP (photo taken from inside the cask pit): arrow indicates fuel handling machine
(bottom right photo) 4. inside SFP: arrow indicates fuel handling machine

Question 1. b.

Page 16 of the presentation says the following (call-outs in the bottom left photo):
(top center call-out) rebars
(top right call-out) deck plates
(center left call-out) roof truss
(bottom right call-out) SFP

Question 2.

I am not aware of any reports that specifically focused on hydrogen burn surveys.

However, in our Final Internal Investigation Committee Report (only the summary has been translated into English), there is a section in pages 261-266 of the main body that describes studies conducted to estimate the cause of Unit 4 reactor building explosion.

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Photos in pages 265 and 266 show visual inspection results inside the Unit 4 reactor building (on 5th, 4th and 3rd floors.)
The study focused on direction of pressure waves and not necessarily burn.

Please let me know if you have further questions.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Norton, Charles
To: Tateiwa, Kenji
Cc: Marksberry, Don ; Lee, Richard ; Helton, Donald ; Mitchell, Matthew ; Reckley, William ; Foggie, Kirk ; Jimenez, Manuel
Sent: Monday, August 20, 2012 10:31 AM
Subject: SFP questions

Kenji,

NRC Research has questions related to spent fuel pools. These questions come from the update you provided on July 23, 2012.

(We understand that TEPCO has yet to conduct visual investigations and surveys of the damage to Unit 1 due to debris covering the refueling deck. So our request for the information focuses on Units 3 and 4.)

1. On page 14 of the slide presentation "Status of preparation to remove fuels from Units 1-4 spent fuel pools, " July 23, 2012 (http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120723_07-j.pdf)

    a. Were parts of the fuel transfer bridge/platform found in the Unit 3 spent fuel pool?
    b. What other debris can be seen in the Unit 3 spent fuel pool?

2. Are there any reports on the visual effects of hydrogen-burn damage on parts of building structures (and pieces) in Units 3 and 4?

(Note: We are looking for information similar to hydrogen burn surveys that were conducted inside TMI-2 reactor containment building. Examples of visual observation are included in GEND-INF-023-VOL-1, INVESTIGATION OF HYDROGEN-BURN DAMAGE IN THE TMI-2 REACTOR BUILDING, http://kerepos.inl.gov/TMI/GEND-INF-023-VOL-1.pdf#search=GEND-INF-023).

Once again thank you for providing information. We at US NRC appreciate your openness.

Chuck Norton

JLD/PSB
301 415 7818

From: Norton, Charles
Sent: 1 Nov 2013 06:51:37 -0400
To: 'Tateiwa, Kenji'
Cc: Jimenez, Manuel;Foggie, Kirk;Reckley, William
Subject: RE: [TEPCO Weekly Fukushima Update Call] Fri, Nov. 1 at 3pm EDT

Kenji,

I like that your email now includes page numbers and topics for the presentation pages to be discussed. Your weekly updates are a valuable source of information and continuously improve.

I have a some questions regarding Unit 4 at Fukushima. Does the reconstructed fuel floor function as a secondary containment? Will the area be kept at negative pressure during fuel moves? Is there a stand by gas treatment system? Are area radiation monitors functional?

Once again thank you for your openness in providing this service.

All the best,
Chuck Norton
US NRC
JLD/PSB
301 415 7818

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Thursday, October 31, 2013 5:03 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Nov. 1 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Nov. 1, 2013 at 3 pm Eastern Time
(Next call will be on **Fri, Nov. 8** at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Eighth NRA Working Group Meeting on Contaminated Water Issues (10/15/2013)
(only in Japanese)
1-1. Investigation Status on Groundwater Contamination Near Bank Protection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0008_01.pdf
(page 4/78) Contamination map (max. observed)
(page 17/78) Cs-134, 137, gross-beta, tritium concentration in sea water
(page 32/78) Detailed monitoring of groundwater
(page 37/78) Highly-contaminated water removal from Units 2/3 seawater piping trenches utilizing ice barrier

1-2. Investigation Status on Leakage from Partially-treated Water Tank
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0008_02.pdf
(page 12/135) Leakage located by vacuum inspection
(page 15/135) Close-up photo of leak path
(page 65/135) Gross-beta not detected and no increase in tritium from groundwater bypass wells

1-3. Tentative Dischargeable Contamination Level
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0008_05.pdf

2. Eighth Gov't-TEPCO Meeting on Contaminated Water Issues (10/25/2013)
(only in Japanese)
2-1. Overview of Contaminated Water-Related Risks and Actions to be Summarized by Year-end
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c131025_03-j.pdf

2-2. Seven Hundred Seventy Nine Responses to Request for Information on Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c131025_04-j.pdf

2-3. On-site Efforts
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l131009_05-j.pdf
(page 5/94) Tank leakage monitoring
(page 20/94) Rainwater control at tank farms
(page 29/94) Tank replacement plan
(page 50/94) Preventive measures for leak-out of contaminated water due to tsunami
(page 83/94) Restoration of sub-drain system
(page 90/94) Status of sea-side impermeable wall construction

3. Ninth Working-level Meeting of Gov't-TEPCO-Industry Council on Promotion of 1F Decommissioning (10/31/2013)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d131031_04-j.pdf
(page 9/40) Core and containment cooling status
(page 19/40) Follow-up investigation on steam observed from Unit 3 reactor building refueling floor

3-2. Summary Status of Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d131031_05-j.pdf

3-3. Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d131031_06-j.pdf
(page 3/232) Nitrogen injection into Unit 2 containment for hydrogen purge
(page 17/232) Hot testing of ALPS
(page 50/232) Managing rainwater in weir of tank farms
(page 61/232) Ice wall plan
(page 129/232) Unit 4 fuel removal safety analysis
(page 129/232) Unit 3 refueling floor large debris removal completed
(page 179/232) Suppression chamber water level measurement robot demonstration test
(page 187/232) Underwater robot development

4. Licensing Document Amendment in Relation to Fuel Removal Facility for Units 1-4 Approved by NRA (10/30/2013)
(only in Japanese)
http://www.tepco.co.jp/cc/press/2013/1231805_5117.html

** If you cannot display Japanese characters, please install the following font packs:*

http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, October 09, 2013 10:31 PM
Subject: [TEPCO Weekly Fukushima Update Call] Thu, Oct. 10 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Thu, **Oct. 10**, 2013 at 3 pm Eastern Time
(No calls for the next 2 weeks due to business trip to Tokyo. Next call will be on **Fri, Nov. 1** at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Estimation of Tsunami Arrival Time at 1F Reconfirms Conclusion that On-site Power was Lost Due to Tsunami, Not Earthquake (10/7/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_131007_03-j.pdf

2. Seismic Analysis Shows Units 1&2 Main Exhaust Stack with Broken Beams will Remain Intact with Design-basis Earthquake (10/7/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_131007_06-j.pdf

3. Inadvertent Temporary Shutdown of Power Supply to Unit 1 Core Injection Pump and Immediate Recovery (10/7/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_131007_08-j.pdf

4. Leak Paths Identified at Bottom of H4 Area Tank #5 (10/8/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_131008_03-j.pdf

5. Water Leak Halted After Pipe Mistakenly Taken Off at Desalination System; Minor Contamination of Workers (10/9/2013)

(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_131009_04-j.pdf

6. Second On-Site Coordination Meeting on Contaminated Water Issues (10/9/2013)
(only in Japanese)
6-1. Current Status Regarding H4 Area Tank Leakage Detection, Seawater/Groundwater Contamination, Emergency Measures, ALPS, Subdrain System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l131009_03-j.pdf

6-2. Revamping Contaminated Water Management
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l131009_04-j.pdf

6-3. Contaminated Water Issues, Countermeasures and Progress
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l131009_05-j.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 03, 2013 10:49 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 4 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Oct. 4, 2013 at 3 pm Eastern Time
(Next call will be on **Thu, Oct. 10** at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Niigata Prefectural Governor's Approval to Apply for Regulatory Standard Compliance Review of Kashiwazaki-Kariwa Units 6 and 7 (9/26/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230926_5130.html

2. Application for Regulatory Standard Compliance Review of KK Units 6 and 7 (9/27/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230976_5130.html
Attachment (only in Japanese)
http://www.tepco.co.jp/cc/press/betu13_j/images/130927j0101.pdf

3. Eighth Working-level Meeting of Gov't-TEPCO-Industry Council on Promotion of 1F Decommissioning (9/26/2013)
(only in Japanese)

3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130926_04-j.pdf

3-2. Summary Status of Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130926_05-j.pdf

3-3. Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130926_07-j.pdf

4. Seventh Gov't-TEPCO Meeting on Contaminated Water Issues (9/27/2013)
4-1. Identification of Risks Related to Contaminated Water and Examination of Countermeasures
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20130927_001a.pdf

4-2. On-site Progress Related to Contaminated Water Issues
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130927_05-j.pdf

5. Seventh NRA Working Group Meeting on Contaminated Water Issues (9/30/2013)
(only in Japanese)
5-1. Investigation Status on Leakage from Partially-treated Water Tank
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0007_01.pdf

5-2. Investigation Status on Groundwater Contamination Near Bank Protection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0007_02.pdf

5-3 Glitch Found in Train C of ALPS
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0007_03.pdf

6. Current Status and Countermeasures Against Contaminated Water Issues (9/30/2013)
6-1. Summary
http://www.tepco.co.jp/en/nu/fukushima-np/water/images/130930_01.pdf

6-2. Fundamental Measures
http://www.tepco.co.jp/en/nu/fukushima-np/water/images/130930_02.pdf

6-3. Emergency Measures
http://www.tepco.co.jp/en/nu/fukushima-np/water/images/130930_03.pdf

6-4. Current Status of H4 Area Tank #5 Leakage
http://www.tepco.co.jp/en/nu/fukushima-np/water/images/130930_04.pdf

6-5. Risk Reduction Measures
http://www.tepco.co.jp/en/nu/fukushima-np/water/images/130930_05.pdf

7. Desalinated Water Leakage from B-Area South Tank (10/3/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_131003_01-e.pdf

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http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,

Kenji
----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 19, 2013 11:18 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 20 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 20, 2013 at 3 pm Eastern Time
(No call next week. Next call will be on **Fri, Oct. 4th** at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Video Tour of Fukushima Daiichi NPS (9/17/2013)
http://photo.tepco.co.jp/en/date/2013/201309-e/130917-03e.html

2. Broken Beam found in Units 1&2 Main Exhaust Stack (9/18/2013)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130918_13-j.pdf

3. Sixth NRA Working Group Meeting on Contaminated Water Issues (9/12/2013)
(only in Japanese)
3-1. Investigation Status on Leakage from Partially-treated Water Tank
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0006_05r.pdf

3-2. Investigation Status on Groundwater Contamination Near Bank Protection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0006_06.pdf

4. Sixth Gov't-TEPCO Meeting on Contaminated Water Issues (9/13/2013)
(only in Japanese)
4-1. Framework for Worldwide Technology Solicitation Through IRID
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_04-j.pdf

4-2. Examples of Technologies Subject to Solicitation Through IRID
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_05-j.pdf

(Website of International Research Institute for Nuclear Decommissioning)
http://www.irid.or.jp/en/index.html

4-3. Fundamental Countermeasures for Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_07-j.pdf

4-4. Investigation Status on Leakage from Partially-treated Water Tank
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_08-j.pdf

4-5. Investigation Status on Groundwater Contamination Near Bank Protection
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_09-j.pdf

4-6. METI Minister Motegi's Presentation on Basic Policy for Decommissioning and Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_13-j.pdf

5. History of Studies Related to Implementation of Underground Barrier (9/13/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130913_06-j.pdf

6. Overview of Contaminated Water Issues and Countermeasures (9/13/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130913_01-e.pdf

7. Accumulated Rainwater Discharged from Dam Surrounding Partially-treated Contaminated Water Tanks (9/17/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/water/13091701-e.html

8. Radioactivity in Water Samples from Various Locations of Water Treatment System (9/18/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/water_130918-e.pdf

9. H4 Area Tank #5 being Dismantled (9/19/21013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130919_04-j.pdf

10. Prime Minister Abe Visits Fukushima Daiichi (9/19/2013)
(only in Japanese)
http://photo.tepco.co.jp/date/2013/201309-j/130719-02j.html

11. Response to Prime Minister's Requests Regarding Actions Related to Contaminated Water Issues (9/19/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230730_5130.html

12. No Abnormality Found at Fukushima Daiichi Due to M 5.8 Earthquake (9/20/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230749_5130.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Friday, September 13, 2013 9:35 PM
Subject: Follow-up [TEPCO Weekly Fukushima Update Call] Fri, Sept. 13 at 3pm EDT

Nuclear Sector Colleagues,

Please find below major points that we discussed today during the call (for those material available only in Japanese):

1. Development and Demonstration of Suppression Chamber Water Level Measurement Robot (9/12/2013)
- The robots utilize ultrasonic probe to measure the water level of the suppression chamber from outside the torus shell.
- Demonstration at Unit 5 is ongoing followed by demonstration at Unit 2 next week.

2. Preparation to Dismantle Unit 1 Reactor Building Cover (9/12/2013)
- The cover will have to dismantle to remove rubble from the refueling floor.
- Exhaust system of the Unit 1 reactor building cover will be stopped on Sept. 17th in preparation of dismantling the cover from around March 2014.
- Conservative estimate of incremental dose rate due to removal of the cover is only 5E-5 micro-Sievert per hour at a location 5 km away from Unit 1.

8. Current Status on Contaminated Water Issues (9/9/2013)
(page 11/45) Partially-treated contaminated water that leaked from H 4 Area Tank #5 may have flowed through the above ground draining trench to the sea; however, only minimal amount of Cs-137 was detected from the seawater near the discharge of the trench and gross-beta was below detectable level.
(pages 22/45 to 25/45) Results of sea water contamination survey conducted by NRA showed minimal to no Cs-134/137, tritium and gross-beta at locations within 20-km radius of 1F.

9. Investigation of Partially-Treated Contaminated Water Leakage from H4 Area Tank (9/12/2013)
(pages 3 to 38) Inspection of H 4 Area Tank #5 and integrity assessment of steel tanks.
(page 53) Samples taken from groundwater observation holes E-1 and E-2 showed high concentration of tritium and gross-beta. Tritium concentration in E-1 is rapidly increasing.
(pages 61-64) Samples taken from groundwater of the Bypass System showed no gross-beta and there has been no significant increase in tritium concentration.

10. Status of Groundwater Contamination Near Bank Protection and Countermeasures (9/12/2013)
(page 4) Maximum concentration of tritium and gross-beta from various sampling points.
(page 13) No gross-beta has been detected from seawater inside the port of 1F other than in the immediate vicinity of Units1-4 intake structures.
(page 24-27) Highly contaminated water accumulated in Unit 2 branching trench has been transferred and the trench was filled with concrete and mortar. However, water seems to have backflowed from the turbine building into the trench.

On topic 5, there was a question on what kind of level gauge will be use to monitor the water level of flange-type tanks.
We will be installing a level gauge on top of the tank and fix it with a flange bolt; the gauge will emit radar towards the water surface and measure the level based on the speed of the wave and time of reflection.

Have a great weekend.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 12, 2013 9:04 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 13 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 13, 2013 at 3 pm Eastern Time
(Next call will be on **Fri, Sept. 20** at 3 pm)

[Major topics]
1. Development and Demonstration of Suppression Chamber Water Level Measurement Robot (9/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130912_11-j.pdf

2. Preparation to Dismantle Unit 1 Reactor Building Cover (9/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130912_08-j.pdf

3. English Website on Contaminated Water Issues and Countermeasures
http://www.tepco.co.jp/en/nu/fukushima-np/water/index-e.html

4. TEPCO President Mr. Hirose's Video Message on Contaminated Water Issues (9/5/2013)
http://tepco.webcdn.stream.ne.jp/www11/tepco/download/130905_01e.wmv

5. Installation of Water Level Monitoring System in Tank Farms (9/6/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130906_09-e.pdf

6. Gross-beta and Tritium Detected from Groundwater Near Leakage from H4 Area Tank (9/11/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/south_discharge_130911-3-e.pdf

7. Radioactivity in H4 Area #5 Tank (9/12/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/south_discharge_130912-2-e.pdf

8. Current Status on Contaminated Water Issues (9/9/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l130909_04-j.pdf

9. Investigation of Partially-Treated Contaminated Water Leakage from H4 Area Tank (9/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130912_05-j.pdf

10. Status of Groundwater Contamination Near Bank Protection and Countermeasures (9/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130912_06-j.pdf

11. Mr. Lake Barrett to Advise TEPCO on Contaminated Water Issues (9/10/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230443_5130.html

** If you cannot display Japanese characters, please install the following font packs:*

http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,
Kenji
----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Saturday, September 07, 2013 1:27 PM
Subject: Follow-up [TEPCO Weekly Fukushima Update Call] Fri, Sept. 6 at 3pm EDT

Nuclear Sector Colleagues,

Pleaese find below answers to questions that I received related to the call on Sept. 6th.

(Q-1) What are the composition of contaminated water in the underground trenches near the port?
(A-1) Sampling results as of 7/31/2013 were as follows:

Unit 2 seawater piping trench vertical shaft C (depth 1m)
Cs-134: 1.1E+8 Bq/liter
Cs-137: 2.3E+8 Bq/liter
Gross beta: 3.3E+8 Bq/liter
Tritium: 2.4E+6 Bq/liter

Unit 3 seawater piping trench vertical shaft B (depth 1m)
Cs-134: 1.3E+7 Bq/liter
Cs-137: 2.6E+7 Bq/liter
Gross beta: 3.2E+7 Bq/liter
Tritium: 3.6E+5 Bq/liter

(reference: trench water analysis results (Japanese))
http://www.tepco.co.jp/nu/fukushima-np/f1/smp/2013/images/trench0203_130802-j.pdf

(Q-2) How is the number of thermometers in the primary containment regulated?
(A-2) In page 758/3230 of the "Implementation Plan for Specific Reactor Facility", which is a Tech. Spec.-equivalent licensing document for Fukushima Daiichi NPS, it is stipulated as follows:

"Multiple thermometers shall be installed in the RPV and PCV in the circumferential direction and vertical direction."
"Thermometers deemed disfunctional shall be excluded."
"Installation of new thermometers shall be planned and implemented in anticipation of thermometers becoming disfunctional."

(reference: Implementation Plan for Specific Reactor Facility (Japanese))
http://www.tepco.co.jp/cc/press/betu13_j/images/130812j0201.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 05, 2013 11:54 PM

Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 6 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 6, 2013 at 3 pm Eastern Time
(Next call will be on **Fri, Sept. 13** at 3 pm)

[Major topics]
1. Monthly Reliability Report on Thermometers Installed in Units 1-3 PCV (9/2/2013)
(attachment is only in Japanese)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230239_5130.html

2. Jib Mast of a Large Crane Used at Unit 3 Bent (9/5/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130905_06-j.pdf

3. Groundwater Inflow Location Identified at Unit 1 Turbine Building and HTI Building (9/4/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130904_07-e.pdf

Video Clip (Turbine Building)
http://www.tepco.co.jp/en/news/library/movie-01e.html?bcpid=59368209002&bclid=347242463002&bctid=590448354002

Video Clip (HTI Building)
http://www.tepco.co.jp/en/news/library/movie-01e.html?bcpid=59368209002&bclid=347242463002&bctid=590448355002

4. Highly Contaminated Water Storage and Treatment Status (9/4/2013)
http://www.tepco.co.jp/en/press/corp-com/release/betu13_e/images/130904e0301.pdf

5. Contaminated Groundwater Issues Near the Port
5-1. Status on Contaminated Groundwater Issues and Estimate of Sr/Cs Leakage into Sea (8/30/2013)
(only in Japanese)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0005_01.pdf

5-2. Latest and Highest Results of Groundwater Contamination Near the Port (9/4/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/2tb-east_13090403-e.pdf

6. Partially-Treated Contaminated Water Leakage from Tanks
6-1. Status on Partially-Treated Contaminated Water Leakage from H4 Area Tank (8/30/2013)
(only in Japanese)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0005_02.pdf

6-2. The 1,800 mSv/h Dose Rate Observed Near Tank was Mostly Beta-Radiation (9/1/2013)
http://www.tepco.co.jp/en/announcements/2013/1230191_5502.html

6-3. H3, 4, 5 Area Tank Patrol Results (9/2/2013)

http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130902_04-e.pdf

6-4. H3 Area Tank Patrol Results (9/2/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130902_05-e.pdf

6-5. Video Clip of Tank Patrol (9/4/2013)
http://photo.tepco.co.jp/en/date/2013/201309-e/130904-01e.html

6-6. Contamination Survey Results Related to H4 Area Tank Leakage (9/5/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/south_discharge_130905-1-e.pdf

6-7. Possible Groundwater Contamination Due to H4 Area Tank Leakage (9/5/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230333_5130.html

6-8. Effective Shielding of Beta-Radiation at H3 Area Tank (9/5/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130905_01-j.pdf

7. Presentations on Contaminated Water Issues to the Local Fisheries Association (9/3/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130903_04-j.pdf
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130903_03-j.pdf
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130903_01-j.pdf
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130903_02-j.pdf

8. Government Announces "Basic Policy on Contaminated Water Issues" (9/3/2013)
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20130904_01a.pdf

All the best,
Kenji

From: Norton, Charles
Sent: 1 Nov 2013 07:38:36 -0400
To: 'Tateiwa, Kenji'
Cc: Reckley, William;Foggie, Kirk;Jimenez, Manuel
Subject: RE: Unit 4 fuel removal facility [TEPCO Weekly Fukushima Update Call] Fri, Nov. 1 at 3pm EDT

Thank you Kenji for your prompt reply.

Removing the fuel from unit 4 is a major milestone. It will be a big boost for TEPCO and Japan if this activity is completed safely and without incident.

Chuck Norton

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Friday, November 01, 2013 7:29 AM
To: Norton, Charles
Cc: Reckley, William; Foggie, Kirk; Jimenez, Manuel
Subject: Unit 4 fuel removal facility [TEPCO Weekly Fukushima Update Call] Fri, Nov. 1 at 3pm EDT

Chuck,

Thank you for your kind feedback.
I will do my best to be as effective as possible in sharing information.

Please find below answers to your questions regarding fuel removal facility for Unit 4:

Q-1. Does the reconstructed fuel floor function as a secondary containment? Will the area be kept at negative pressure during fuel moves? Is there a stand by gas treatment system?

A-1. No. However, the facility is built to minimize leak potential as much as possible and has the following ventilation system.
Blowers (inflow): 25,000 cubic meters/hour/unit; 3 units
Pre-filters: 25,000 cubic meters/hour; 3 units
HEPA filters: 97% efficiency; 25,000 cubic meters/hour; 3 units

Blowers (outflow): 25,000 cubic meters/hour/unit; 3 units
Pre-filters: 25,000 cubic meters/hour; 3 units
HEPA filters: 97% efficiency; 25,000 cubic meters/hour; 3 units

Q-2. Are area radiation monitors functional?
A-2. Yes. It has scintillation monitors at the inlet and outlet of the outflow blower filtration units.
An alarm will sound in case abnormal condition is detected.

Let me know if you have any other questions.

All the best,
Kenji

----- Original Message -----
From: Norton, Charles
To: 'Tateiwa, Kenji'

Cc: Jimenez, Manuel ; Foggie, Kirk ; Reckley, William
Sent: Friday, November 01, 2013 6:51 AM
Subject: RE: [TEPCO Weekly Fukushima Update Call] Fri, Nov. 1 at 3pm EDT

Kenji,

I like that your email now includes page numbers and topics for the presentation pages to be discussed. Your weekly updates are a valuable source of information and continuously improve.

I have a some questions regarding Unit 4 at Fukushima. Does the reconstructed fuel floor function as a secondary containment? Will the area be kept at negative pressure during fuel moves? Is there a stand by gas treatment system? Are area radiation monitors functional?

Once again thank you for your openness in providing this service.

All the best,
Chuck Norton
US NRC
JLD/PSB
301 415 7818

From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Thursday, October 31, 2013 5:03 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Nov. 1 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Nov. 1, 2013 at 3 pm Eastern Time
(Next call will be on **Fri, Nov. 8** at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Eighth NRA Working Group Meeting on Contaminated Water Issues (10/15/2013)
(only in Japanese)
1-1. Investigation Status on Groundwater Contamination Near Bank Protection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0008_01.pdf
(page 4/78) Contamination map (max. observed)
(page 17/78) Cs-134, 137, gross-beta, tritium concentration in sea water
(page 32/78) Detailed monitoring of groundwater
(page 37/78) Highly-contaminated water removal from Units 2/3 seawater piping trenches utilizing ice barrier

1-2. Investigation Status on Leakage from Partially-treated Water Tank
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0008_02.pdf
(page 12/135) Leakage located by vacuum inspection
(page 15/135) Close-up photo of leak path
(page 65/135) Gross-beta not detected and no increase in tritium from groundwater bypass wells

1-3. Tentative Dischargeable Contamination Level
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0008_05.pdf

2. Eighth Gov't-TEPCO Meeting on Contaminated Water Issues (10/25/2013)
(only in Japanese)
2-1. Overview of Contaminated Water-Related Risks and Actions to be Summarized by Year-end
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c131025_03-j.pdf

2-2. Seven Hundred Seventy Nine Responses to Request for Information on Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c131025_04-j.pdf

2-3. On-site Efforts
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l131009_05-j.pdf
(page 5/94) Tank leakage monitoring
(page 20/94) Rainwater control at tank farms
(page 29/94) Tank replacement plan
(page 50/94) Preventive measures for leak-out of contaminated water due to tsunami
(page 83/94) Restoration of sub-drain system
(page 90/94) Status of sea-side impermeable wall construction

3. Ninth Working-level Meeting of Gov't-TEPCO-Industry Council on Promotion of 1F Decommissioning (10/31/2013)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d131031_04-j.pdf
(page 9/40) Core and containment cooling status
(page 19/40) Follow-up investigation on steam observed from Unit 3 reactor building refueling floor

3-2. Summary Status of Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d131031_05-j.pdf

3-3. Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d131031_06-j.pdf
(page 3/232) Nitrogen injection into Unit 2 containment for hydrogen purge
(page 17/232) Hot testing of ALPS
(page 50/232) Managing rainwater in weir of tank farms
(page 61/232) Ice wall plan
(page 129/232) Unit 4 fuel removal safety analysis
(page 129/232) Unit 3 refueling floor large debris removal completed
(page 179/232) Suppression chamber water level measurement robot demonstration test
(page 187/232) Underwater robot development

4. Licensing Document Amendment in Relation to Fuel Removal Facility for Units 1-4 Approved by NRA (10/30/2013)
(only in Japanese)
http://www.tepco.co.jp/cc/press/2013/1231805_5117.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,
Kenji

Kenji Tateiwa

Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, October 09, 2013 10:31 PM
Subject: [TEPCO Weekly Fukushima Update Call] Thu, Oct. 10 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Thu, **Oct. 10**, 2013 at 3 pm Eastern Time
(No calls for the next 2 weeks due to business trip to Tokyo. Next call will be on **Fri, Nov. 1** at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Estimation of Tsunami Arrival Time at 1F Reconfirms Conclusion that On-site Power was Lost Due to Tsunami, Not Earthquake (10/7/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_131007_03-j.pdf

2. Seismic Analysis Shows Units 1&2 Main Exhaust Stack with Broken Beams will Remain Intact with Design-basis Earthquake (10/7/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_131007_06-j.pdf

3. Inadvertent Temporary Shutdown of Power Supply to Unit 1 Core Injection Pump and Immediate Recovery (10/7/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_131007_08-j.pdf

4. Leak Paths Identified at Bottom of H4 Area Tank #5 (10/8/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_131008_03-j.pdf

5. Water Leak Halted After Pipe Mistakenly Taken Off at Desalination System; Minor Contamination of Workers (10/9/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_131009_04-j.pdf

6. Second On-Site Coordination Meeting on Contaminated Water Issues (10/9/2013)
(only in Japanese)
6-1. Current Status Regarding H4 Area Tank Leakage Detection, Seawater/Groundwater Contamination, Emergency Measures, ALPS, Subdrain System

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l131009_03-j.pdf

6-2. Revamping Contaminated Water Management
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l131009_04-j.pdf

6-3. Contaminated Water Issues, Countermeasures and Progress
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l131009_05-j.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, October 03, 2013 10:49 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Oct. 4 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Oct. 4, 2013 at 3 pm Eastern Time
(Next call will be on **Thu, Oct. 10** at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Niigata Prefectural Governor's Approval to Apply for Regulatory Standard Compliance Review of Kashiwazaki-Kariwa Units 6 and 7 (9/26/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230926_5130.html

2. Application for Regulatory Standard Compliance Review of KK Units 6 and 7 (9/27/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230976_5130.html
Attachment (only in Japanese)
http://www.tepco.co.jp/cc/press/betu13_j/images/130927j0101.pdf

3. Eighth Working-level Meeting of Gov't-TEPCO-Industry Council on Promotion of 1F Decommissioning (9/26/2013)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130926_04-j.pdf

3-2. Summary Status of Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130926_05-j.pdf

3-3. Status of Individual Projects
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d130926_07-j.pdf

4. Seventh Gov't-TEPCO Meeting on Contaminated Water Issues (9/27/2013)

4-1. Identification of Risks Related to Contaminated Water and Examination of Countermeasures
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20130927_001a.pdf

4-2. On-site Progress Related to Contaminated Water Issues
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130927_05-j.pdf

5. Seventh NRA Working Group Meeting on Contaminated Water Issues (9/30/2013)
(only in Japanese)
5-1. Investigation Status on Leakage from Partially-treated Water Tank
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0007_01.pdf

5-2. Investigation Status on Groundwater Contamination Near Bank Protection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0007_02.pdf

5-3 Glitch Found in Train C of ALPS
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0007_03.pdf

6. Current Status and Countermeasures Against Contaminated Water Issues (9/30/2013)
6-1. Summary
http://www.tepco.co.jp/en/nu/fukushima-np/water/images/130930_01.pdf

6-2. Fundamental Measures
http://www.tepco.co.jp/en/nu/fukushima-np/water/images/130930_02.pdf

6-3. Emergency Measures
http://www.tepco.co.jp/en/nu/fukushima-np/water/images/130930_03.pdf

6-4. Current Status of H4 Area Tank #5 Leakage
http://www.tepco.co.jp/en/nu/fukushima-np/water/images/130930_04.pdf

6-5. Risk Reduction Measures
http://www.tepco.co.jp/en/nu/fukushima-np/water/images/130930_05.pdf

7. Desalinated Water Leakage from B-Area South Tank (10/3/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_131003_01-e.pdf

** If you cannot display Japanese characters, please install the following font packs:*
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All the best,
Kenji
----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 19, 2013 11:18 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 20 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 20, 2013 at 3 pm Eastern Time
(No call next week. Next call will be on **Fri, Oct. 4th** at 3 pm)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Video Tour of Fukushima Daiichi NPS (9/17/2013)
http://photo.tepco.co.jp/en/date/2013/201309-e/130917-03e.html

2. Broken Beam found in Units 1&2 Main Exhaust Stack (9/18/2013)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130918_13-j.pdf

3. Sixth NRA Working Group Meeting on Contaminated Water Issues (9/12/2013)
(only in Japanese)
3-1. Investigation Status on Leakage from Partially-treated Water Tank
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0006_05r.pdf

3-2. Investigation Status on Groundwater Contamination Near Bank Protection
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0006_06.pdf

4. Sixth Gov't-TEPCO Meeting on Contaminated Water Issues (9/13/2013)
(only in Japanese)
4-1. Framework for Worldwide Technology Solicitation Through IRID
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_04-j.pdf

4-2. Examples of Technologies Subject to Solicitation Through IRID
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_05-j.pdf

(Website of International Research Institute for Nuclear Decommissioning)
http://www.irid.or.jp/en/index.html

4-3. Fundamental Countermeasures for Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_07-j.pdf

4-4. Investigation Status on Leakage from Partially-treated Water Tank
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_08-j.pdf

4-5. Investigation Status on Groundwater Contamination Near Bank Protection
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_09-j.pdf

4-6. METI Minister Motegi's Presentation on Basic Policy for Decommissioning and Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c130913_13-j.pdf

5. History of Studies Related to Implementation of Underground Barrier (9/13/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130913_06-j.pdf

6. Overview of Contaminated Water Issues and Countermeasures (9/13/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130913_01-e.pdf

7. Accumulated Rainwater Discharged from Dam Surrounding Partially-treated Contaminated Water Tanks (9/17/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/water/13091701-e.html

8. Radioactivity in Water Samples from Various Locations of Water Treatment System (9/18/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/water_130918-e.pdf

9. H4 Area Tank #5 being Dismantled (9/19/21013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130919_04-j.pdf

10. Prime Minister Abe Visits Fukushima Daiichi (9/19/2013)
(only in Japanese)
http://photo.tepco.co.jp/date/2013/201309-j/130719-02j.html

11. Response to Prime Minister's Requests Regarding Actions Related to Contaminated Water Issues (9/19/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230730_5130.html

12. No Abnormality Found at Fukushima Daiichi Due to M 5.8 Earthquake (9/20/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230749_5130.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Friday, September 13, 2013 9:35 PM
Subject: Follow-up [TEPCO Weekly Fukushima Update Call] Fri, Sept. 13 at 3pm EDT

Nuclear Sector Colleagues,

Please find below major points that we discussed today during the call (for those material available only in Japanese):

1. Development and Demonstration of Suppression Chamber Water Level Measurement Robot (9/12/2013)
- The robots utilize ultrasonic probe to measure the water level of the suppression chamber from outside the torus shell.
- Demonstration at Unit 5 is ongoing followed by demonstration at Unit 2 next week.

2. Preparation to Dismantle Unit 1 Reactor Building Cover (9/12/2013)
- The cover will have to dismantle to remove rubble from the refueling floor.
- Exhaust system of the Unit 1 reactor building cover will be stopped on Sept. 17th in preparation of dismantling the cover from around March 2014.
- Conservative estimate of incremental dose rate due to removal of the cover is only 5E-5 micro-Sievert per hour at a location 5 km away from Unit 1.

8. Current Status on Contaminated Water Issues (9/9/2013)
(page 11/45) Partially-treated contaminated water that leaked from H 4 Area Tank #5 may have flowed through the above ground draining trench to the sea; however, only minimal amount of Cs-137 was detected from the seawater near the discharge of the trench and gross-beta was below detectable level.
(pages 22/45 to 25/45) Results of sea water contamination survey conducted by NRA showed minimal to no Cs-134/137, tritium and gross-beta at locations within 20-km radius of 1F.

9. Investigation of Partially-Treated Contaminated Water Leakage from H4 Area Tank (9/12/2013)
(pages 3 to 38) Inspection of H 4 Area Tank #5 and integrity assessment of steel tanks.
(page 53) Samples taken from groundwater observation holes E-1 and E-2 showed high concentration of tritium and gross-beta. Tritium concentration in E-1 is rapidly increasing.
(pages 61-64) Samples taken from groundwater of the Bypass System showed no gross-beta and there has been no significant increase in tritium concentration.

10. Status of Groundwater Contamination Near Bank Protection and Countermeasures (9/12/2013)
(page 4) Maximum concentration of tritium and gross-beta from various sampling points.
(page 13) No gross-beta has been detected from seawater inside the port of 1F other than in the immediate vicinity of Units1-4 intake structures.
(page 24-27) Highly contaminated water accumulated in Unit 2 branching trench has been transferred and the trench was filled with concrete and mortar. However, water seems to have backflowed from the turbine building into the trench.

On topic 5, there was a question on what kind of level gauge will be use to monitor the water level of flange-type tanks.
We will be installing a level gauge on top of the tank and fix it with a flange bolt; the gauge will emit radar towards the water surface and measure the level based on the speed of the wave and time of reflection.

Have a great weekend.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 12, 2013 9:04 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 13 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 13, 2013 at 3 pm Eastern Time
(Next call will be on **Fri, Sept. 20** at 3 pm)

[Major topics]
1. Development and Demonstration of Suppression Chamber Water Level Measurement Robot (9/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130912_11-j.pdf

2. Preparation to Dismantle Unit 1 Reactor Building Cover (9/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130912_08-j.pdf

3. English Website on Contaminated Water Issues and Countermeasures
http://www.tepco.co.jp/en/nu/fukushima-np/water/index-e.html

4. TEPCO President Mr. Hirose's Video Message on Contaminated Water Issues (9/5/2013)
http://tepco.webcdn.stream.ne.jp/www11/tepco/download/130905_01e.wmv

5. Installation of Water Level Monitoring System in Tank Farms (9/6/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130906_09-e.pdf

6. Gross-beta and Tritium Detected from Groundwater Near Leakage from H4 Area Tank (9/11/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/south_discharge_130911-3-e.pdf

7. Radioactivity in H4 Area #5 Tank (9/12/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/south_discharge_130912-2-e.pdf

8. Current Status on Contaminated Water Issues (9/9/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l130909_04-j.pdf

9. Investigation of Partially-Treated Contaminated Water Leakage from H4 Area Tank (9/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130912_05-j.pdf

10. Status of Groundwater Contamination Near Bank Protection and Countermeasures (9/12/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130912_06-j.pdf

11. Mr. Lake Barrett to Advise TEPCO on Contaminated Water Issues (9/10/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230443_5130.html

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

All the best,
Kenji
----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Saturday, September 07, 2013 1:27 PM
Subject: Follow-up [TEPCO Weekly Fukushima Update Call] Fri, Sept. 6 at 3pm EDT

Nuclear Sector Colleagues,

Pleaese find below answers to questions that I received related to the call on Sept. 6th.

(Q-1) What are the composition of contaminated water in the underground trenches near the port?
(A-1) Sampling results as of 7/31/2013 were as follows:

Unit 2 seawater piping trench vertical shaft C (depth 1m)
Cs-134: 1.1E+8 Bq/liter
Cs-137: 2.3E+8 Bq/liter
Gross beta: 3.3E+8 Bq/liter
Tritium: 2.4E+6 Bq/liter

Unit 3 seawater piping trench vertical shaft B (depth 1m)
Cs-134: 1.3E+7 Bq/liter
Cs-137: 2.6E+7 Bq/liter
Gross beta: 3.2E+7 Bq/liter
Tritium: 3.6E+5 Bq/liter

(reference: trench water analysis results (Japanese))
http://www.tepco.co.jp/nu/fukushima-np/f1/smp/2013/images/trench0203_130802-j.pdf

(Q-2) How is the number of thermometers in the primary containment regulated?
(A-2) In page 758/3230 of the "Implementation Plan for Specific Reactor Facility", which is a Tech. Spec.-equivalent licensing document for Fukushima Daiichi NPS, it is stipulated as follows:

"Multiple thermometers shall be installed in the RPV and PCV in the circumferential direction and vertical direction."
"Thermometers deemed disfunctional shall be excluded."
"Installation of new thermometers shall be planned and implemented in anticipation of thermometers becoming disfunctional."

(reference: Implementation Plan for Specific Reactor Facility (Japanese))
http://www.tepco.co.jp/cc/press/betu13_j/images/130812j0201.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, September 05, 2013 11:54 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Sept. 6 at 3pm EDT

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Sept. 6, 2013 at 3 pm Eastern Time
(Next call will be on **Fri, Sept. 13** at 3 pm)

[Major topics]
1. Monthly Reliability Report on Thermometers Installed in Units 1-3 PCV (9/2/2013)
(attachment is only in Japanese)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230239_5130.html

2. Jib Mast of a Large Crane Used at Unit 3 Bent (9/5/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130905_06-j.pdf

3. Groundwater Inflow Location Identified at Unit 1 Turbine Building and HTI Building (9/4/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130904_07-e.pdf

Video Clip (Turbine Building)
http://www.tepco.co.jp/en/news/library/movie-01e.html?bcpid=59368209002&bclid=347242463002&bctid=590448354002

Video Clip (HTI Building)
http://www.tepco.co.jp/en/news/library/movie-01e.html?bcpid=59368209002&bclid=347242463002&bctid=590448355002

4. Highly Contaminated Water Storage and Treatment Status (9/4/2013)
http://www.tepco.co.jp/en/press/corp-com/release/betu13_e/images/130904e0301.pdf

5. Contaminated Groundwater Issues Near the Port
5-1. Status on Contaminated Groundwater Issues and Estimate of Sr/Cs Leakage into Sea (8/30/2013)
(only in Japanese)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0005_01.pdf

5-2. Latest and Highest Results of Groundwater Contamination Near the Port (9/4/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/2tb-east_13090403-e.pdf

6. Partially-Treated Contaminated Water Leakage from Tanks
6-1. Status on Partially-Treated Contaminated Water Leakage from H4 Area Tank (8/30/2013)
(only in Japanese)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi_wg/data/0005_02.pdf

6-2. The 1,800 mSv/h Dose Rate Observed Near Tank was Mostly Beta-Radiation (9/1/2013)
http://www.tepco.co.jp/en/announcements/2013/1230191_5502.html

6-3. H3, 4, 5 Area Tank Patrol Results (9/2/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130902_04-e.pdf

6-4. H3 Area Tank Patrol Results (9/2/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2013/images/handouts_130902_05-e.pdf

6-5. Video Clip of Tank Patrol (9/4/2013)
http://photo.tepco.co.jp/en/date/2013/201309-e/130904-01e.html

6-6. Contamination Survey Results Related to H4 Area Tank Leakage (9/5/2013)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2013/images/south_discharge_130905-1-e.pdf

6-7. Possible Groundwater Contamination Due to H4 Area Tank Leakage (9/5/2013)
http://www.tepco.co.jp/en/press/corp-com/release/2013/1230333_5130.html

6-8. Effective Shielding of Beta-Radiation at H3 Area Tank (9/5/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130905_01-j.pdf

7. Presentations on Contaminated Water Issues to the Local Fisheries Association (9/3/2013)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130903_04-j.pdf
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130903_03-j.pdf
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130903_01-j.pdf
http://www.tepco.co.jp/nu/fukushima-np/handouts/2013/images/handouts_130903_02-j.pdf

8. Government Announces "Basic Policy on Contaminated Water Issues" (9/3/2013)
http://www.meti.go.jp/english/earthquake/nuclear/decommissioning/pdf/20130904_01a.pdf

All the best,
Kenji

From: Tateiwa, Kenji
Sent: 9 Sep 2013 11:28:22 -0400
To: Norton, Charles
Cc: Jimenez, Manuel;Foggie, Kirk;Reckley, William;Correia, Richard
Subject: Re: Water Issues
Importance: Normal

Chuck,

Page 7 of the following presentation by Savannah River National Laboratory provides an overview of the collaboration with TEPCO together with Pacific Northwest National Laboratory.
http://www.srs.gov/general/outreach/srs-cab/library/meetings/2013/fb/07guevara.pdf

Specific topics of discussion during the Feasibility Study were as follows:
Groundwater; Grouting-related Techniques; Sample Analysis Laboratory; Waste Treatment; Fuel Debris; Water Treatment; Community Revitalization

We are close to executing the next phase contract with SRNL/PNNL.

Let me know if you have further questions.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)
----- Original Message -----
From: Norton, Charles
To:tateiwa.kenji@tepco.co.jp
Cc: Correia, Richard ; Reckley, William ; Foggie, Kirk ; Jimenez, Manuel
Sent: Monday, September 09, 2013 11:11 AM
Subject: Water Issues

Kenji,

A while back you told me that PNW labs, Savannah River and EPRI were providing TEPCO help in addressing water management issues. Can you briefly describe what each organization is doing? We do not need a lot of detail.

Thank-you once again for all your help,

Chuck Norton
US NRC
JLD PSB

From: Tateiwa, Kenji
Sent: 14 Dec 2012 06:25:52 -0500
To: Norton, Charles;Reckley, William
Cc: tateiwa.kenji@tepco.co.jp
Subject: RE: were fukushima containments inerted ?
Importance: Normal

Chuck,

You are correct on all units.

In fact, as for Unit 5, our workers entered into the D/W on March 14, 2011 to restore the SRV function that had been made temporarily inoperable due to RPV leak test that was ongoing when the earthquake hit the plant.

Feel free to call me or shoot me an email should you have any questions.

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Norton, Charles
To: Reckley, William ; 'tateiwa.kenji@tepco.co.jp'
Sent: Friday, December 14, 2012 5:37 AM
Subject: RE: were fukushima containments inerted ?

Bill-My recollection is that the unit one through unit 3 containments were inerted with nitrogen prior to the accident on March 11, 2011. Unit 4 obviously was not. I know 5 and 6 were ready to restart but they were shut down and not in a condition where inerting was required.

Kenji-Can you confirm this?

Kenji-I have a conflict with today's information call. I will review the links and get in touch with you if I have questions.

Thank you.
Chuck Norton

From: Reckley, William
Sent: Thursday, December 13, 2012 12:14 PM
To: Norton, Charles
Subject: were fukushima containments inerted ?

William D. Reckley
Japan Lessons Learned Project Directorate
william.reckley@nrc.gov
(301) 415-7490

From: Tateiwa, Kenji
Sent: 6 May 2015 13:39:42 -0400
To: Reckley, William
Cc: Orders, William
Subject: Request for feedback: Presentation - May 7, 2015
Importance: Normal

William,
Would it be possible to have the attached feedback sheet printed and handed out to participants prior to my talk tomorrow?
I would very much like to hear your colleagues' candid comments so that I can improve my effectiveness in communicating about this important topic.
Thank you very much in advance.
All the best,
Kenji
p.s.
I am still working on the slides and will send it to you when it is fixed.
I will be bringing my laptop too.

----- Original Message -----
From: Tateiwa, Kenji
To: Reckley, William
Cc: Orders, William
Sent: Monday, May 04, 2015 10:39 AM
Subject: Re: Presentation - May 7, 2015

William,
Yes, I will be at the NRC gate by 8:15 am on Thu, May 7th.
Thank you for making arrangement for the parking lot.
I will plan for a 90 minute session including Q&A.
Please find attached a copy of the consent form.
All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW, Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Reckley, William
To:'tateiwa.kenji@tepco.co.jp'
Cc: Orders, William
Sent: Monday, May 04, 2015 8:53 AM
Subject: Re: Presentation - May 7, 2015

Kenji, would it possible for us to meet you at the NRC gate at about 8:15 to give us a little time to make sure everything is set up and working in the room?

Sent from an NRC BlackBerry
William Reckley
(b)(6) [redacted]

From: Reckley, William
Sent: Friday, May 01, 2015 04:59 PM
To: Tateiwa, Kenji <tateiwa.kenji@tepco.co.jp>
Cc: Orders, William
Subject: RE: Presentation - May 7, 2015

We have arranged a space and someone will meet you at the gate behind our building .. Using your own laptop is fine. If you don't mind, we could plan on the 90 minute version - including questions.
-----Original Message-----
From: Tateiwa, Kenji [mailto:tateiwa.kenji@tepco.co.jp]
Sent: Thursday, April 30, 2015 9:02 AM
To: Reckley, William
Cc: Orders, William
Subject: Re: Presentation - May 7, 2015
William,
Yes, I am ready for the presentation on Thu, May 7th.
- I will be at the One White Flint Building at 8:30 am.
- If you could arrange for a parking space, that would be much appreciated--I will be driving a grey Toyota Corolla [redacted]
(b)(6)
- I am currently preparing an updated presentation. If possible, I would like to use my own laptop but I will also email the file to you when it is finalized.
- I would like to play a short video clip with audio during me presentation. Could you arrange for a speaker that I can connect my laptop for sound?
- I will sign the consent form and bring it with me on May 7th.
- How much time would you like me to spend for my talk including Q&A--1 hour or 1.5 hours? I am completely flexible.
Very much looking forward to talking to you and your colleagues at the NRC.
All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6) [redacted]
----- Original Message -----
From: Reckley, William
To: tateiwa.kenji@tepco.co.jp
Cc: Orders, William
Sent: Thursday, April 30, 2015 8:42 AM
Subject: Presentation - May 7, 2015
Kenji .. I just wanted to check in and make sure that we were still OK for next Thursday, May 7, 2015. We have a room in our training area for 9:00am on that day and are arranging for interested staff to attend. We can meet with you at about 8:30am at the entrance to the One White Flint Building, sign you in through security, and then walk over to the training center, which is our newer Three White Flint Building. Would you plan to drive up (we can secure you a parking space) or take the Metro? In addition, do you plan to use the presentation you previously emailed or do you have a revised

presentation? If we can make sure we have the presentation you want to use, we will have it loaded and ready to go that Thursday morning. One last thing, attached is a form that we are required to provide in order for you to give permission for us to record the presentation. You can sign and return or we will have a copy ready next Thursday and can just have you sign it then. Thanks again for agreeing to do this and hopefully things are going well as your make your preparations for your return to Japan.

William D. Reckley
Japan Lessons Learned Project Directorate william.reckley@nrc.gov
(301) 415-7490

From: Norton, Charles
Sent: 25 Oct 2013 07:08:27 -0400
To: tateiwa.kenji@tepco.co.jp
Cc: Taylor, Robert;Gibson, Lauren;Burnell, Scott;Skeen, David;Reckley, William;Mitchell, Matthew;Foggie, Kirk
Subject: seismic questions

Kenji,

I apologize for the last email. I unintentionally hit the send button.

Are you able to provide answers to the following seismic questions concerning Fukushima Daiichi? Keep in mind the NRC will make public the answers publically available.

1. What was the Safe Shutdown Earthquake ground motion (SSE) used as the seismic design bases for the Fukushima nuclear power plant? An answer in terms of 'g' would be most useful.
2. Did the ground motion experienced at Fukushima exceed its SSE?

Thank you for your help,

Chuck Norton
US NRC / JLD
301 415 7818

From: Tateiwa, Kenji
Sent: 24 Jul 2012 16:26:01 -0400
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Please respond if interested
Importance: Normal

Dear Colleagues of nuclear-related U.S. Government agencies and National Laboratories,

Thank you for your continued support to TEPCO in various aspects of Fukushima accident response and restoration.

I would like to invite you to join a weekly conference call where I will provide you with an update of the current situation at Fukushima.
My plan is to walk you through latest and important press releases from TEPCO and answer any questions that you may have to the best of my knowledge.

The call will be on every Thursdays from 3 pm eastern time, with an expected duration of about 30 minutes.
There may be times that I will have to ask for changes in schedule due to business trips, etc. and the duration can vary depending on how things unfold at Fukushima during the previous week.

Please reply to this email if you (or your colleagues) would like to be included in a distribution list for future notifications of this call.
(No need to commit to participate in every call; please join the call whenever you have the time and interest in the topic.)

See below for details for this week's call.

[Date/time]
Thu, July 26 at 3 pm EDT

[call-in information]
call number: 718-354-1184
passcode: (b)(6)
(The automated system will speak Japanese from time to time but don't worry; it is just saying "*a new participant has joined.*")

[Major topics]
1. Implementation Plan on Reliability Improvement Measures at Fukushima Daiichi (July 24)
(only in Japanese; 300 pages)
http://www.tepco.co.jp/en/press/corp-com/release/2012/1206826_1870.html

2. TEPCO presentations at a METI-hosted Technical Workshop on Fukushima accident
a. Overall status of Fukushima Daiichi (July 23)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120723_04-j.pdf

b. R&D plan towards decommissioning of Units 1-4 (July 23)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120723_05-j.pdf

c. Status of preparation to remove fuels from Units 1-4 spent fuel pools (July 23)
(only in Japanese)

http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120723_07-j.pdf

d. Accident progression analysis of Units 1-3 using MAAP code (July 23)
(partially in English)
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120723_02-j.pdf

e. Estimation of radioactivity released from Fukushima Daiichi (July 23)
(English)
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120723_03-j.pdf

f. Hydrogen, Xenon, Krypton sampling trend from containment vessel (July 23)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120723_06-j.pdf

g. Seismic ground motion observed and simulated (July 24)
(English)
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120724_02-j.pdf

h. Tsunami survey results and reproduction analysis (July 24)
(English)
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120724_03-j.pdf

i. Earthquake-induced damage (lack of) to Units 1-3 (July 24)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120724_04-j.pdf

j. Inner-containment investigation and identification of its leak path (July 24)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120724_05-j.pdf

k. Various approaches to grasp plant status (July 24)
(only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120724_06-j.pdf

l. Cause of Unit 4 reactor building explosion (July 24)
(English)
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120724_07-j.pdf

m. Unit 4 spent fuel pool integrity (July 24)
(English)
http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120724_08-j.pdf

(Agenda for Technical Workshop on July 23) Only in Japanese
http://www.nisa.meti.go.jp/shingikai/700/14/240723/240723.html

(Agenda for Technical Workshop on July 24) Only in Japanese
http://www.nisa.meti.go.jp/shingikai/700/14/240724/240724.html

Please let me know if there are any other specific topics that you would like me to cover.

[TEPCO Public Information in English]
Press Releases
http://www.tepco.co.jp/en/press/corp-com/release/index-e.html

Photos and Video Footages
http://photo.tepco.co.jp/en/index-e.html

Press Conference Handouts
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/index-e.html

Rebuttals against Media Misinformation and Rumors
http://www.tepco.co.jp/en/nu/fukushima-np/info/index-e.html

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
1901 L Street, NW Suite 720
Washington, DC 20036
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

From: Norton, Charles
Sent: 26 Jul 2012 07:37:53 -0400
To: tateiwa.kenji@tepco.co.jp
Cc: Foggie, Kirk
Subject: Thursday information calls

Sir,

My name is Chuck Norton. I am a Project Manager in the Project support branch of the US NRC Japan Lessons-Learned Project Directorate. I will be calling in for the Thursday informational calls. Please include me on the handout distribution for future calls.

Also please include the Kirk Foggie of the US NRC Office of International Programs, copied on this email, for future handout distribution.

I think this a great tool for keeping the US NRC informed.

Thank you,
Chuck Norton
US NRC JLD

From: Norton, Charles
Sent: 9 Sep 2013 11:11:41 -0400
To: tateiwa.kenji@tepco.co.jp
Cc: Correia, Richard;Reckley, William;Foggie, Kirk;Jimenez, Manuel
Subject: Water Issues

Kenji,

A while back you told me that PNW labs, Savannah River and EPRI were providing TEPCO help in addressing water management issues. Can you briefly describe what each organization is doing? We do not need a lot of detail.

Thank-you once again for all your help,

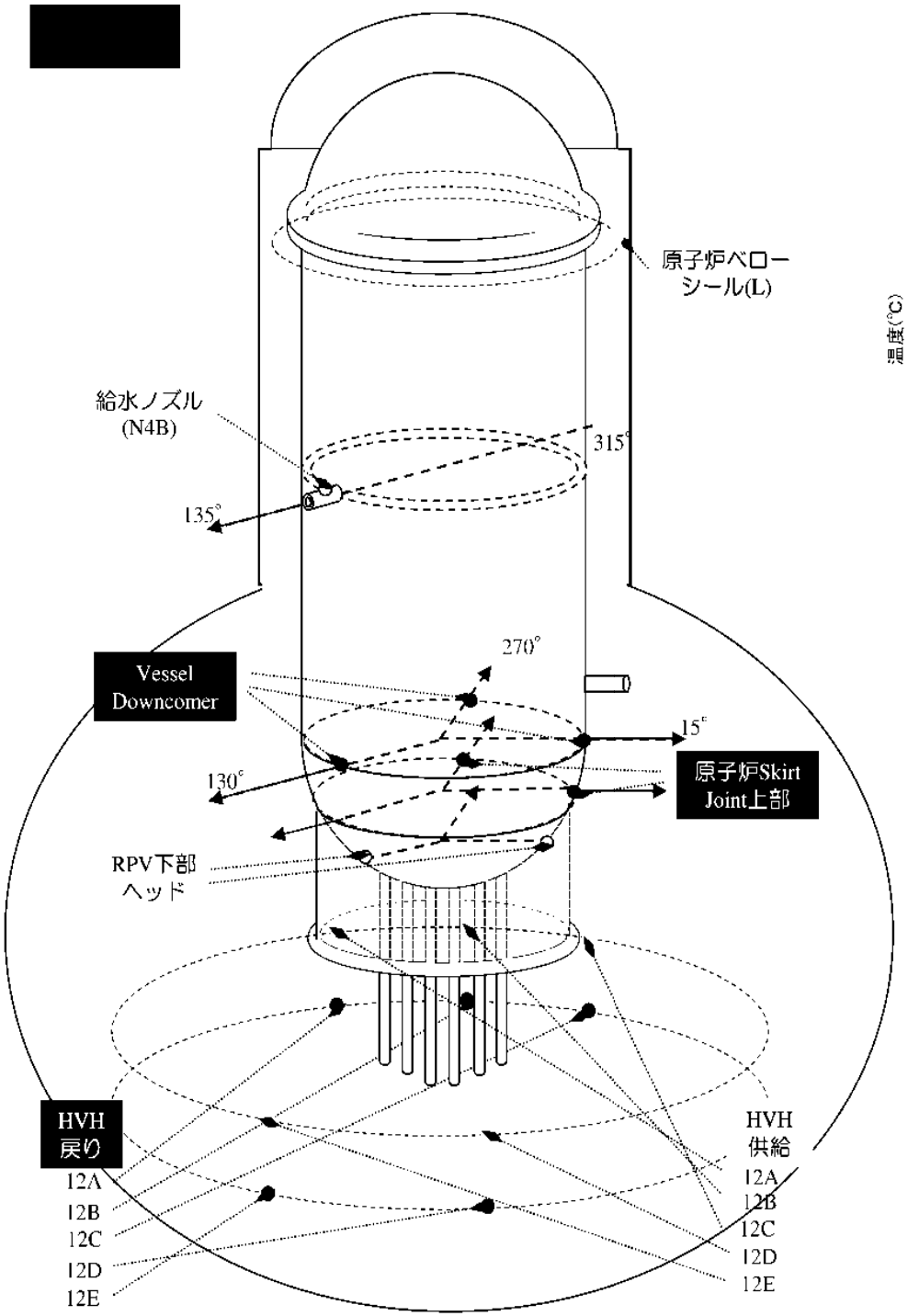
Chuck Norton
US NRC
JLD PSB

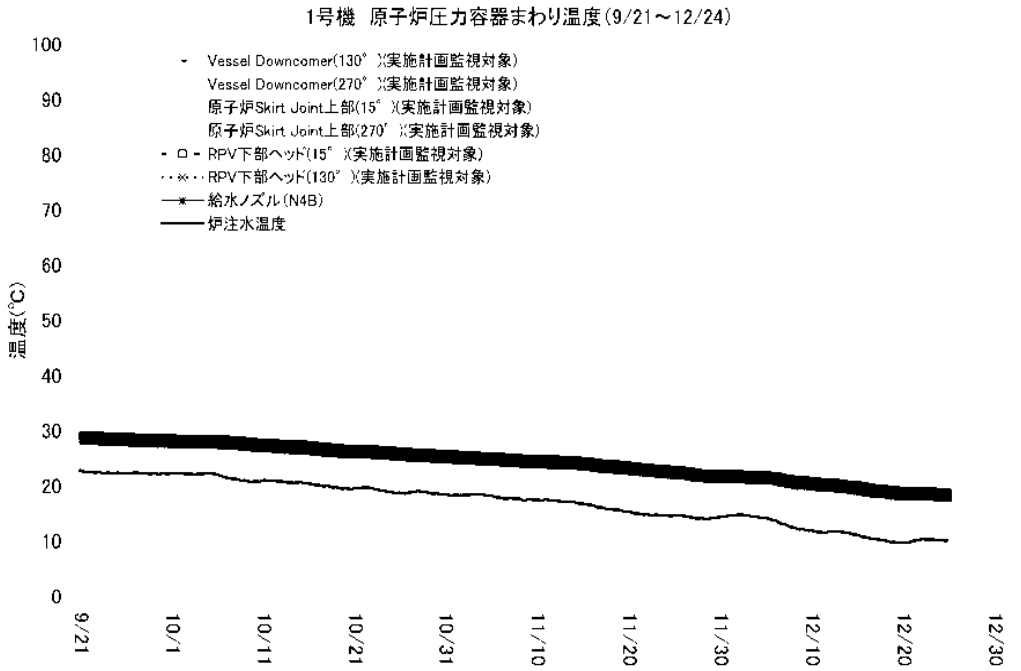
福島第一原子力発電所　プラント関連パラメータ

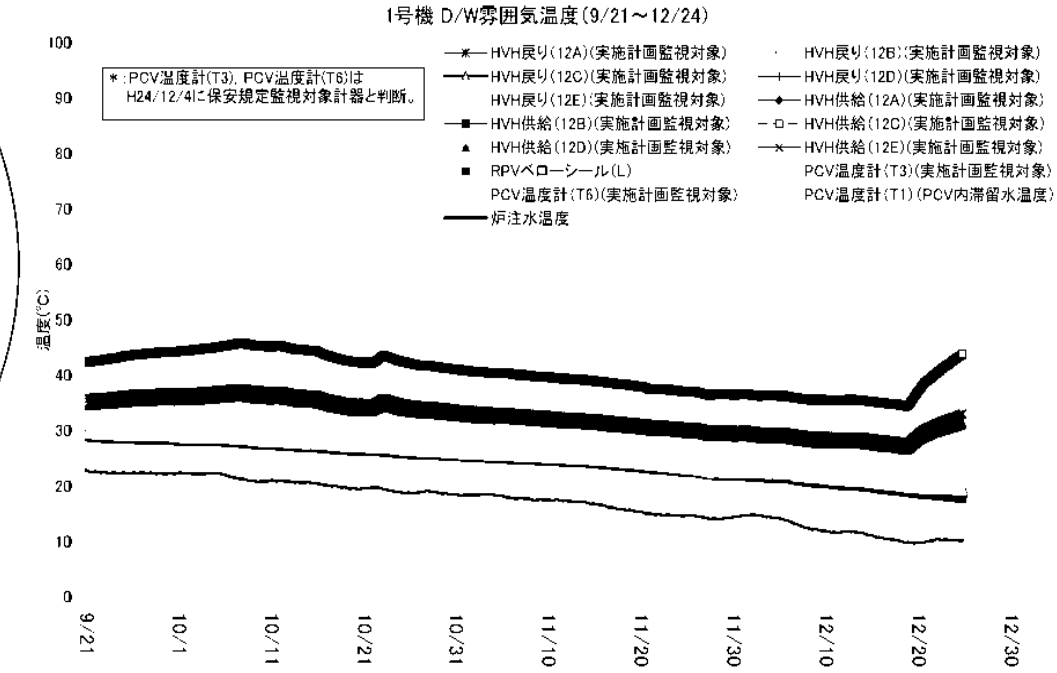
号機	1号機		2号機		3号機		4号機	
	11月26日	12月24日	11月26日	12月24日	11月26日	12月24日	11月26日	12月24日
原子炉注水状況	給水系：2.5m³/h CS系：2.0m³/h （11/26 11:00 現在）	給水系：2.6m³/h CS系：2.0m³/h （12/24 11:00 現在）	給水系：2.0m³/h CS系：2.4m³/h （11/26 11:00 現在）	給水系：2.0m³/h CS系：2.3m³/h （12/24 11:00 現在）	給水系：1.9m³/h CS系：2.5m³/h （11/26 11:00 現在）	給水系：2.0m³/h CS系：2.4m³/h （12/24 11:00 現在）	－	－
原子炉圧力容器底部温度	VESSEL BOTTOM HEAD （TE 263-69L1）：22.5℃ 原子炉 SKIRT JOINT 上部 （TE-263-69H1）：22.4℃ VESSEL DOWNCOMMER （TE 263-69G2）：22.4℃ （11/26 11:00 現在）	VESSEL BOTTOM HEAD （TE 263-69L1）：18.7℃ 原子炉 SKIRT JOINT 上部 （TE-263-69H1）：18.6℃ VESSEL DOWNCOMMER （TE 263-69G2）：18.6℃ （12/24 11:00 現在）	VESSEL WALL ABOVE BOTTOM HEAD （TE-2-3-69H3）：29.0℃ （11/26 11:00 現在）	VESSEL WALL ABOVE BOTTOM HEAD （TE-2-3-69H3）：24.5℃ （12/24 11:00 現在）	RPV下部ヘッド温度 （TE 2-3-69L1）：27.5℃ スカートジャンクション上部温度 （TE-2-3-69H1）：27.6℃ RPV底部ヘッド上部温度 （TE 2-3-69H1）：25.5℃ （11/26 11:00 現在）	RPV下部ヘッド温度 （TE 2-3-69L1）：22.6℃ スカートジャンクション上部温度 （TE-2-3-69H1）：22.7℃ RPV底部ヘッド上部温度 （TE 2-3-69H1）：20.6℃ （12/24 11:00 現在）		
原子炉格納容器内温度	HVH-12A RETURN AIR （TE-1625A）：22.8℃ HVH-12A SUPPLY AIR （TE-1625F）：22.4℃ （11/26 11:00 現在）	HVH-12A RETURN AIR （TE-1625A）：19.0℃ HVH-12A SUPPLY AIR （TE-1625F）：18.4℃ （12/24 11:00 現在）	RETURN AIR DRYWELL COOLER （TE-16-114B）：30.7℃ SUPPLY AIR D/W COOLER HVH2-16B （TE-16-114G#1）：29.0℃ （11/26 11:00 現在）	RETURN AIR DRYWELL COOLER （TE-16-114B）：26.9℃ SUPPLY AIR D/W COOLER HVH2-16B （TE-16-114G#1）：24.3℃ （12/24 11:00 現在）	格納容器空調機戻り空気温度 （TE-16-114A）：27.4℃ 格納容器空調機供給空気温度 （TE-16-114F#1）：25.2℃ （11/26 11:00 現在）	格納容器空調機戻り空気温度 （TE-16-114A）：22.1℃ 格納容器空調機供給空気温度 （TE-16-114F#1）：20.1℃ （12/24 11:00 現在）		
原子炉格納容器圧力	3.6kPa g （11/26 11:00 現在）	4.3kPa g （12/24 11:00 現在）	4.92kPa g （11/26 11:00 現在）	6.28kPa g （12/24 11:00 現在）	0.22kPa g （11/26 11:00 現在）	0.21kPa g （12/24 11:00 現在）		
窒素封入流量 ※1	RPV：28.19Nm³/h PCV：-Nm³/h ※2 （11/26 11:00 現在）	RPV：28.96Nm³/h PCV：-Nm³/h ※2 （12/24 11:00 現在）	RPV：15.46Nm³/h PCV：-Nm³/h ※2 （11/26 11:00 現在）	RPV：15.92Nm³/h PCV：-Nm³/h ※2 （12/24 11:00 現在）	RPV：16.45Nm³/h PCV：-Nm³/h ※2 （11/26 11:00 現在）	RPV：16.97Nm³/h PCV：-Nm³/h ※2 （12/24 11:00 現在）		
原子炉格納容器水素濃度 ※3	A系：0.04vol% B系：0.02vol% （11/26 11:00 現在）	A系：0.05vol% B系：0.06vol% （12/24 11:00 現在）	A系：0.07vol% B系：0.06vol% （11/26 11:00 現在）	A系：0.09vol% B系：0.07vol% （12/24 11:00 現在）	A系：0.08vol% B系：0.06vol% （11/26 11:00 現在）	A系：0.09vol% B系：0.08vol% （12/24 11:00 現在）		
原子炉格納容器放射能濃度（Xe135）	A系：6.77E-04Bq/cm³ B系：1.05E-03Bq/cm³ （11/26 11:00 現在）	A系：9.02E-04Bq/cm³ B系：1.14E-03Bq/cm³ （12/24 11:00 現在）	A系：ND（2.1E-01Bq/cm³以下） B系：ND（2.0E-01Bq/cm³以下） （11/26 11:00 現在）	A系：ND（2.1E-01Bq/cm³以下） B系：ND（2.0E-01Bq/cm³以下） （12/24 11:00 現在）	A系：ND（3.0E-01Bq/cm³以下） B系：ND（3.0E-01Bq/cm³以下） （11/26 11:00 現在）	A系：ND（3.0E-01Bq/cm³以下） B系：ND（3.0E-01Bq/cm³以下） （12/24 11:00 現在）		
使用済燃料プール水温度	17.0℃ ※4 （11/26 5:00 現在）	12.0℃ （12/24 11:00 現在）	16.7℃ （11/26 11:00 現在）	26.2℃ （12/24 11:00 現在）	14.4℃ （11/26 11:00 現在）	20.5℃ （12/24 11:00 現在）	12.8℃ （11/26 11:00 現在）	8.6℃ （12/24 11:00 現在）
FPC スキマージタンク水位	3.67m ※4 （11/26 5:00 現在）	3.12m （12/24 11:00 現在）	4.09m （11/26 11:00 現在）	3.26m （12/24 11:00 現在）	4.64m （11/26 11:00 現在）	4.28m （12/24 11:00 現在）	21.49×10³mm （11/26 11:00 現在）	36.08×10³mm （12/24 11:00 現在）

※1：使用状態の温度・圧力で流量補正した値を記載する。
※2：窒素封入停止中
※3：指示値がマイナスの場合は0.00vol%と記載する。（水素濃度が極めて低い場合は、計器精度によりマイナス表示される場合があるため）
※4：1号機使用済燃料プール代替冷却システム停止中の為、1号機使用済燃料プール水温度とFPCスキマージタンク水位に関しては至近のデータを記載。なお、使用済燃料プールの温度上昇率は0.06℃/h程度と評価。

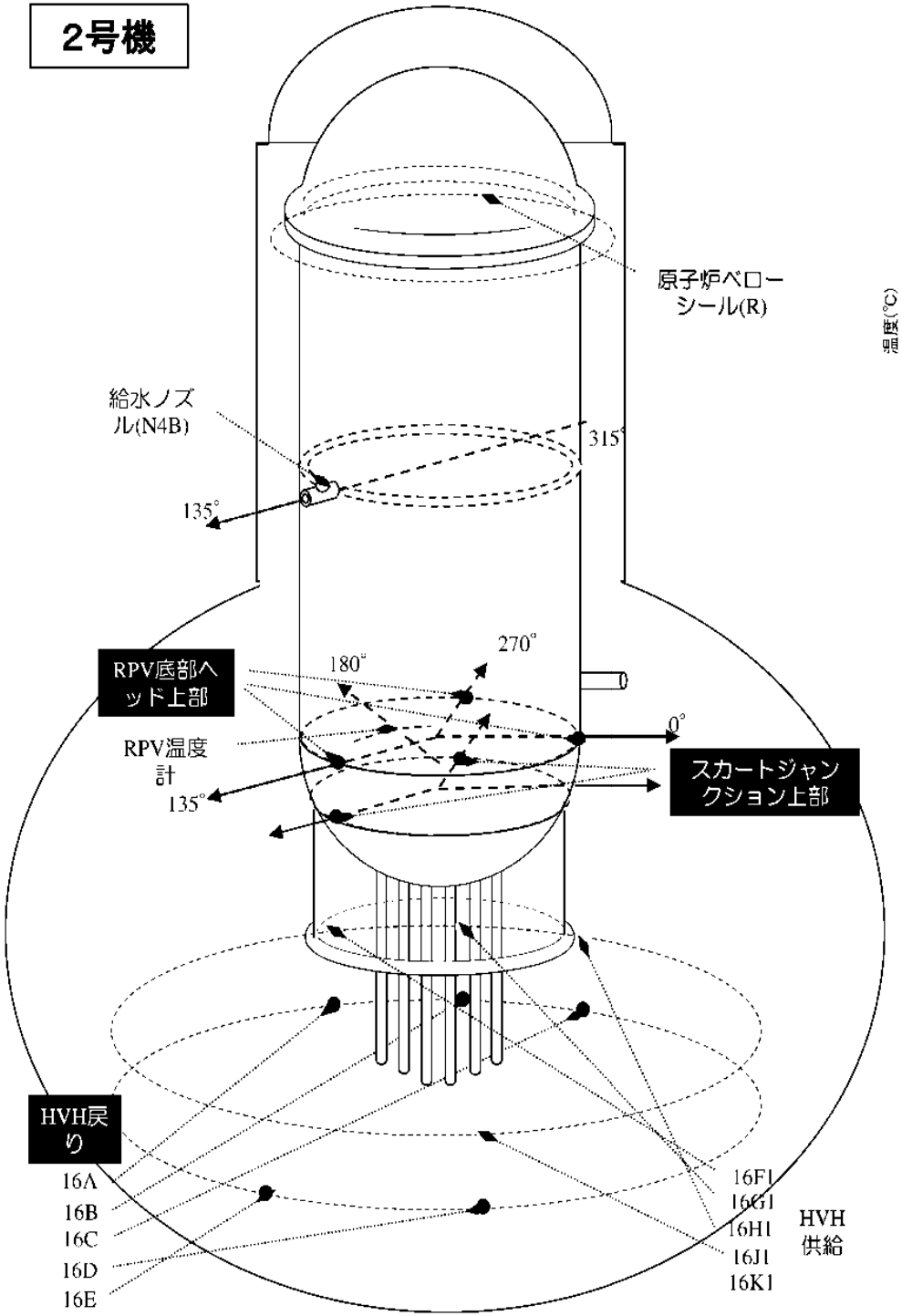
※注水冷却を継続することにより、1～3号機の原子炉圧力容器底部温度、格納容器気相部温度は、号機や温度計の位置によって異なるものの、至近1ヶ月において、約15℃～約45℃で推移。
格納容器内圧力や格納容器からの放射性物質の放出量等のパラメータについては有意な変動はなく、冷却状態の異常や臨界等の兆候は確認されていない。
以上より、総合的に冷温停止状態を維持しており、原子炉が安定状態にあることを確認。

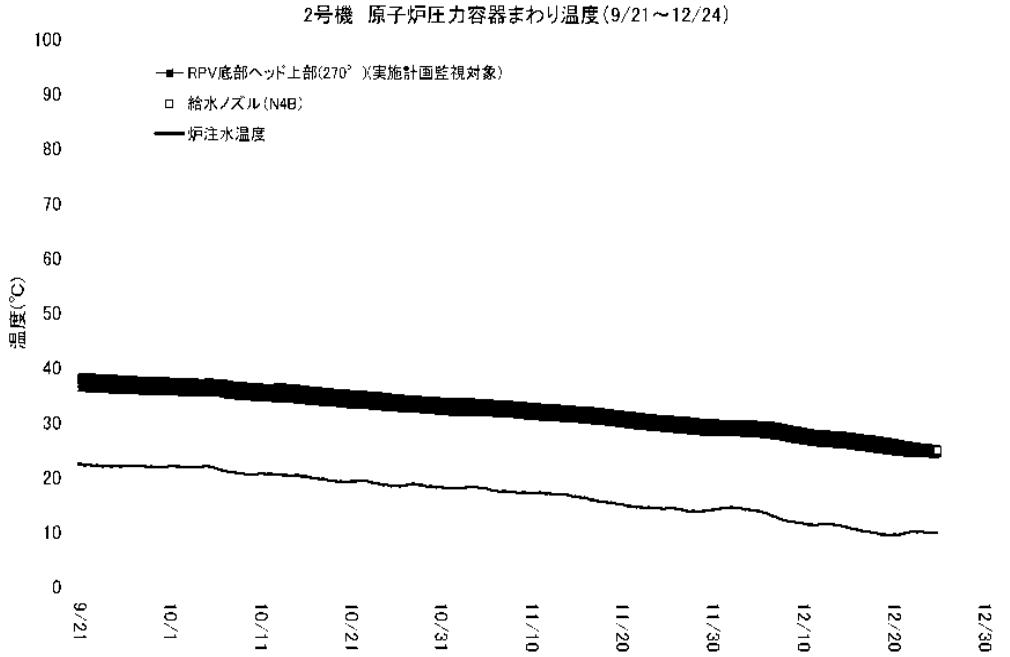

原子炉ベロー
シール(L)
給水ノズル
(N4B)
315°
135°
270°
Vessel
Downcomer
15°
130°
原子炉Skirt
Joint上部
RPV下部
ヘッド
HVH
戻り
12A
12B
12C
12D
12E
HVH
供給
12A
12B
12C
12D
12E

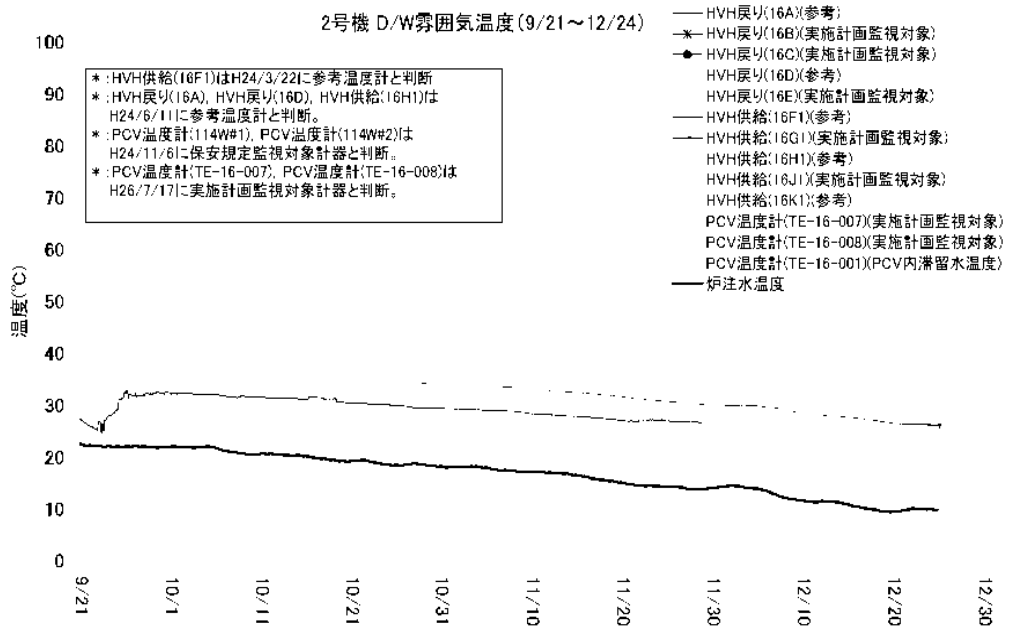

1号機 原子炉圧力容器まわり温度(9/21～12/24)
Vessel Downcomer(130°)(実施計画監視対象)
Vessel Downcomer(270°)(実施計画監視対象)
原子炉Skirt Joint上部(15°)(実施計画監視対象)
原子炉Skirt Joint上部(270°)(実施計画監視対象)
RPV下部ヘッド(15°)(実施計画監視対象)
RPV下部ヘッド(130°)(実施計画監視対象)
給水ノズル(N4B)
炉注水温度
温度(℃)
100
90
80
70
60
50
40
30
20
10
0
9/21
10/1
10/11
10/21
10/31
11/10
11/20
11/30
12/10
12/20
12/30

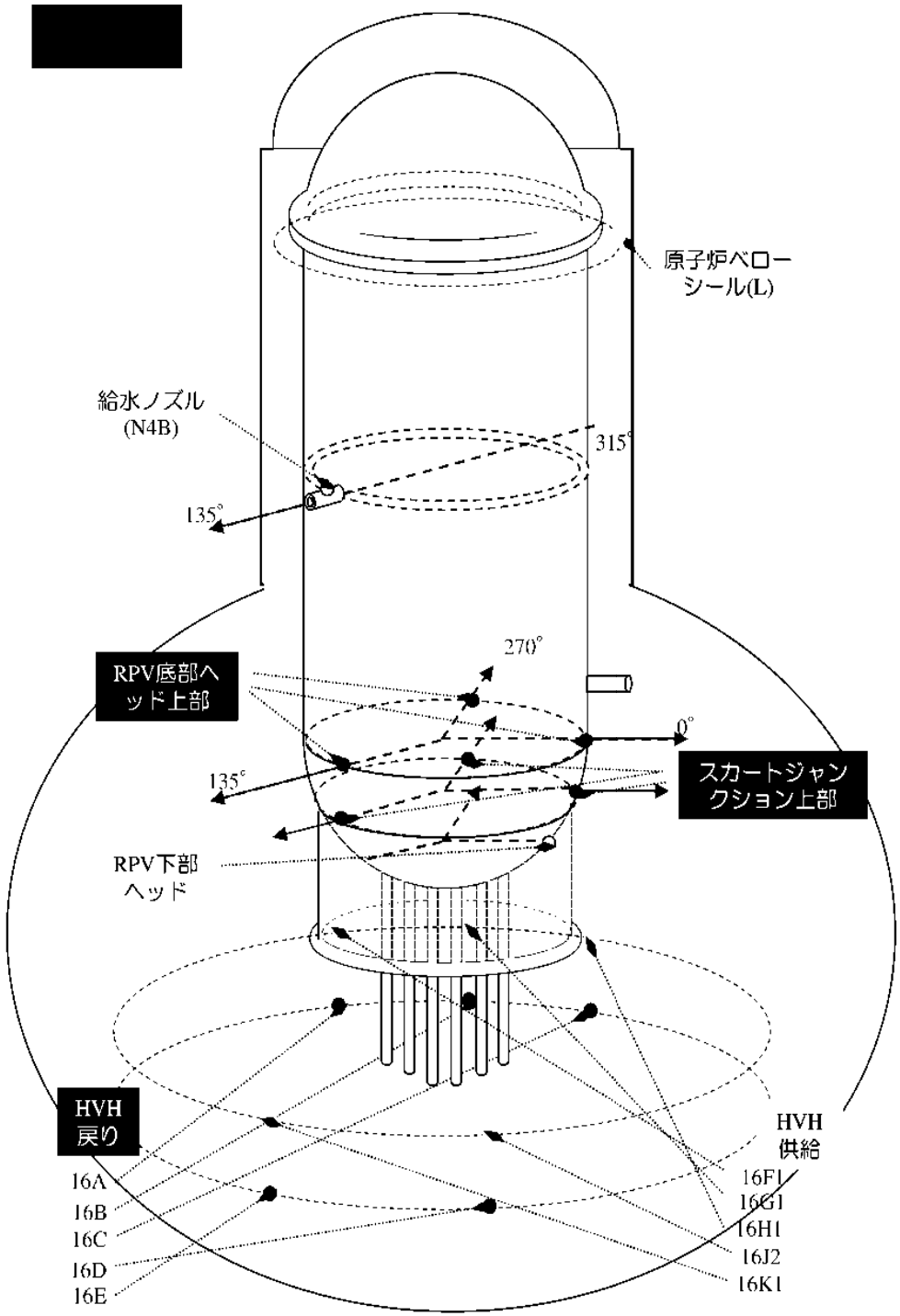

1号機 D/W雰囲気温度(9/21～12/24)
＊:PCV温度計(T3), PCV温度計(T6)は
H24/12/4に保安規定監視対象計器と判断。
HVH戻り(12A)(実施計画監視対象)
HVH戻り(12B)(実施計画監視対象)
HVH戻り(12C)(実施計画監視対象)
HVH戻り(12D)(実施計画監視対象)
HVH戻り(12E)(実施計画監視対象)
HVH供給(12A)(実施計画監視対象)
HVH供給(12B)(実施計画監視対象)
HVH供給(12C)(実施計画監視対象)
HVH供給(12D)(実施計画監視対象)
HVH供給(12E)(実施計画監視対象)
RPVベローシール(L)
PCV温度計(T3)(実施計画監視対象)
PCV温度計(T6)(実施計画監視対象)
PCV温度計(T1)(PCV内滞留水温度)
炉注水温度
温度(℃)
100
90
80
70
60
50
40
30
20
10
0
9/21
10/1
10/11
10/21
10/31
11/10
11/20
11/30
12/10
12/20
12/30

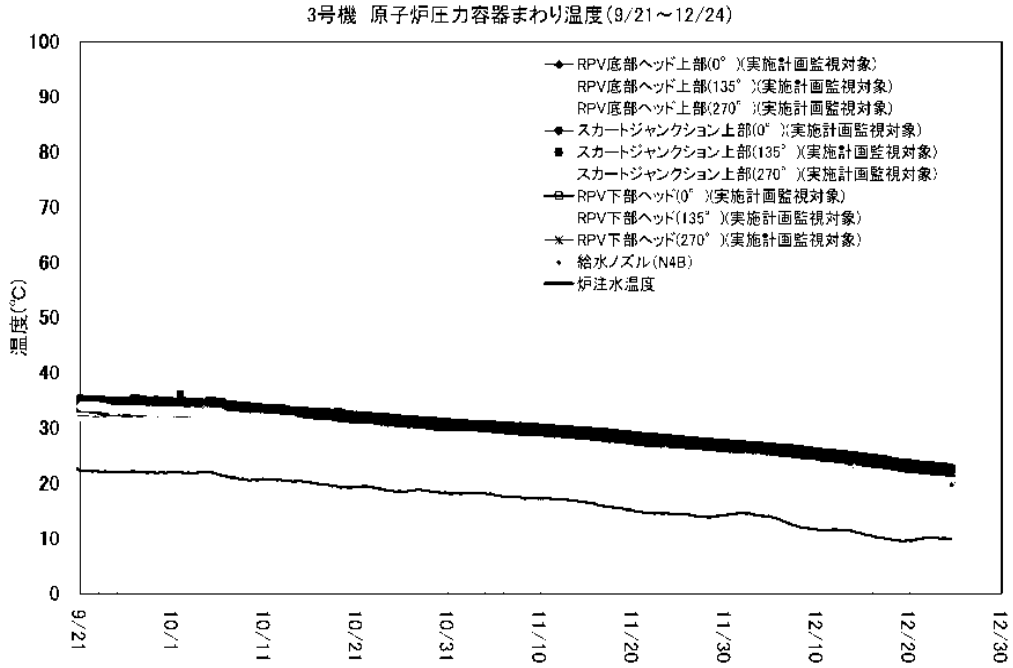
2号機

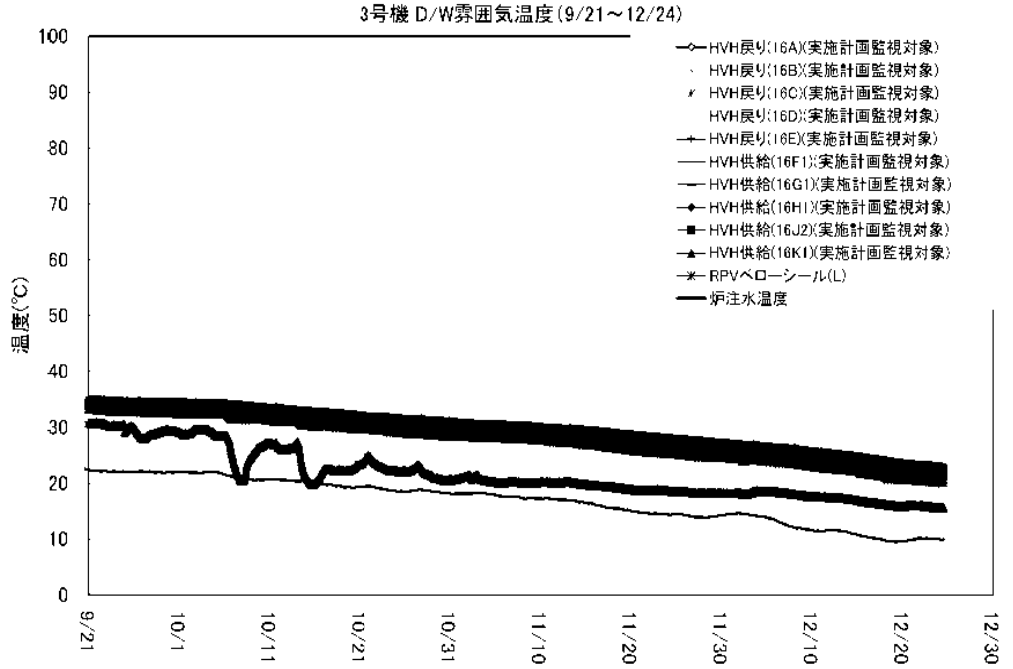

原子炉ベローシール(R)
給水ノズル(N4B)
315°
135°
RPV底部ヘッド上部
180°
270°
0°
RPV温度計
135°
スカートジャンクション上部
HVH戻り
16A
16B
16C
16D
16E
16F1
16G1
16H1
16J1
16K1
HVH供給


2号機 原子炉圧力容器まわり温度(9/21～12/24)
RPV底部ヘッド上部(270°)(実施計画監視対象)
給水ノズル(N4B)
炉注水温度
温度(℃)
100
90
80
70
60
50
40
30
20
10
0
9/21
10/1
10/11
10/21
10/31
11/10
11/20
11/30
12/10
12/20
12/30


2号機 D/W雰囲気温度(9/21～12/24)
＊:HVH供給(16F1)はH24/3/22に参考温度計と判断
＊:HVH戻り(16A), HVH戻り(16D), HVH供給(16H1)は H24/6/11に参考温度計と判断。
＊:PCV温度計(114W#1), PCV温度計(114W#2)は H24/11/6に保安規定監視対象計器と判断。
＊:PCV温度計(TE-16-007), PCV温度計(TE-16-008)は H26/7/17に実施計画監視対象計器と判断。
HVH戻り(16A)(参考)
HVH戻り(16B)(実施計画監視対象)
HVH戻り(16C)(実施計画監視対象)
HVH戻り(16D)(参考)
HVH戻り(16E)(実施計画監視対象)
HVH供給(16F1)(参考)
HVH供給(16G1)(実施計画監視対象)
HVH供給(16H1)(参考)
HVH供給(16J1)(実施計画監視対象)
HVH供給(16K1)(参考)
PCV温度計(TE-16-007)(実施計画監視対象)
PCV温度計(TE-16-008)(実施計画監視対象)
PCV温度計(TE-16-001)(PCV内滞留水温度)
炉注水温度
温度(℃)
100
90
80
70
60
50
40
30
20
10
0
9/21
10/1
10/11
10/21
10/31
11/10
11/20
11/30
12/10
12/20
12/30


原子炉ベロー
シール(L)
給水ノズル
(N4B)
315°
135°
270°
0°
135°
RPV底部ヘ
ッド上部
スカートジャン
クション上部
RPV下部
ヘッド
HVH
戻り
16A
16B
16C
16D
16E
HVH
供給
16F1
16G1
16H1
16J2
16K1


3号機 原子炉圧力容器まわり温度(9/21～12/24)
温度(℃)
RPV底部ヘッド上部(0°)(実施計画監視対象)
RPV底部ヘッド上部(135°)(実施計画監視対象)
RPV底部ヘッド上部(270°)(実施計画監視対象)
スカートジャンクション上部(0°)(実施計画監視対象)
スカートジャンクション上部(135°)(実施計画監視対象)
スカートジャンクション上部(270°)(実施計画監視対象)
RPV下部ヘッド(0°)(実施計画監視対象)
RPV下部ヘッド(135°)(実施計画監視対象)
RPV下部ヘッド(270°)(実施計画監視対象)
給水ノズル(N4B)
炉注水温度
9/21
10/1
10/11
10/21
10/31
11/10
11/20
11/30
12/10
12/20
12/30


3号機 D/W雰囲気温度(9/21～12/24)
温度(℃)
HVH戻り(16A)(実施計画監視対象)
HVH戻り(16B)(実施計画監視対象)
HVH戻り(16C)(実施計画監視対象)
HVH戻り(16D)(実施計画監視対象)
HVH戻り(16E)(実施計画監視対象)
HVH供給(16F1)(実施計画監視対象)
HVH供給(16G1)(実施計画監視対象)
HVH供給(16H1)(実施計画監視対象)
HVH供給(16J2)(実施計画監視対象)
HVH供給(16K1)(実施計画監視対象)
RPVベローシール(L)
炉注水温度
9/21
10/1
10/11
10/21
10/31
11/10
11/20
11/30
12/10
12/20
12/30

滞留水の貯蔵及び処理の状況概略

①建屋内滞留水水位及び貯蔵量
・建屋内滞留水水位は運転上の制限を満足
・処理装置（セシウム吸着装置）は運転中
③廃棄物発生量
・除染装置停止中のため，廃スラッジ貯蔵量は変動なし
④処理水タンク貯蔵量
・淡水化装置による処理により，淡水受タンク及び濃縮塩水タンク貯蔵量は変動あり
・蒸発濃縮装置は全台停止中
⑤5，6号機滞留水貯蔵量

滞留水の貯蔵状況（12月23日時点）

①建屋内滞留水水位及び貯蔵量

号機	貯蔵量	T.P.※建屋内水位
1号機	約13,500m³	OP.2,493
2号機	約15,500m³	OP.2,549
3号機	約10,300m³	OP.2,498
4号機	約14,600m³	OP.2,507
合　計	約62,900m³	

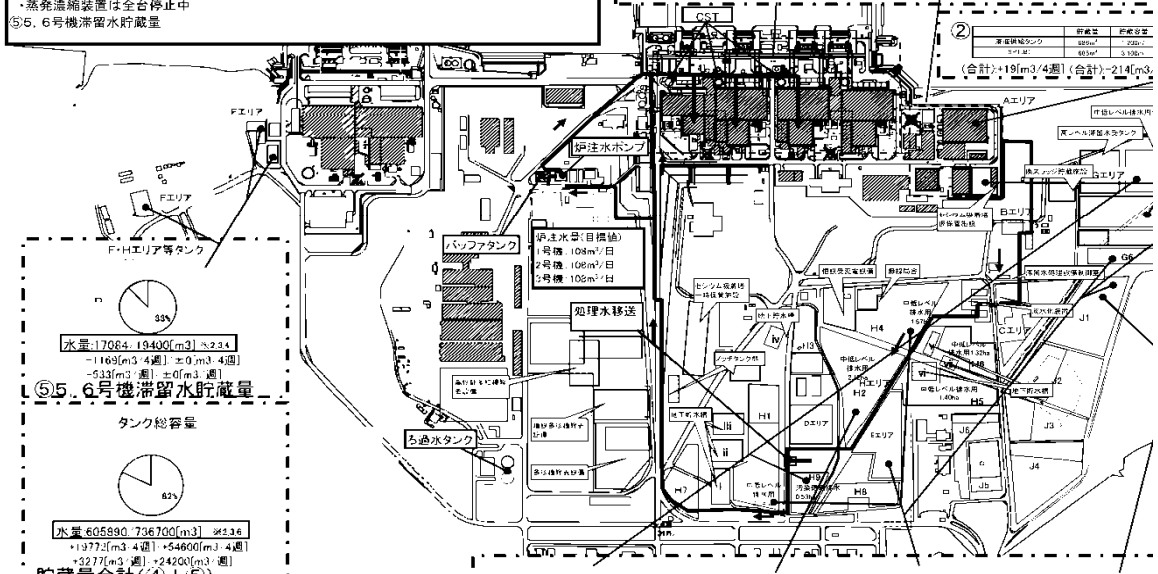
（合計）-7300[m3/4週]（合計）+200[m3/週]

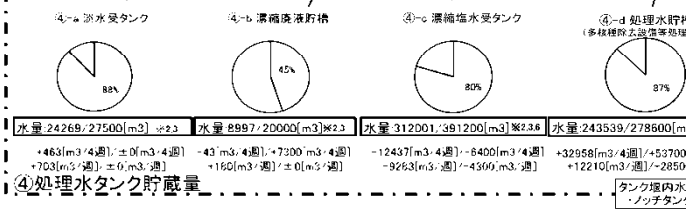
貯蔵施設	貯蔵量	水位
プロセス主建屋	約13,620m³	OP.3,660
高温焼却炉建屋	約3,080m³	OP.1,748
合　計	約16,700m³	

（合計）-560[m3/4週]（合計）-280[m3/週]

②

（合計）+19[m3/4週]（合計）-214[m3/

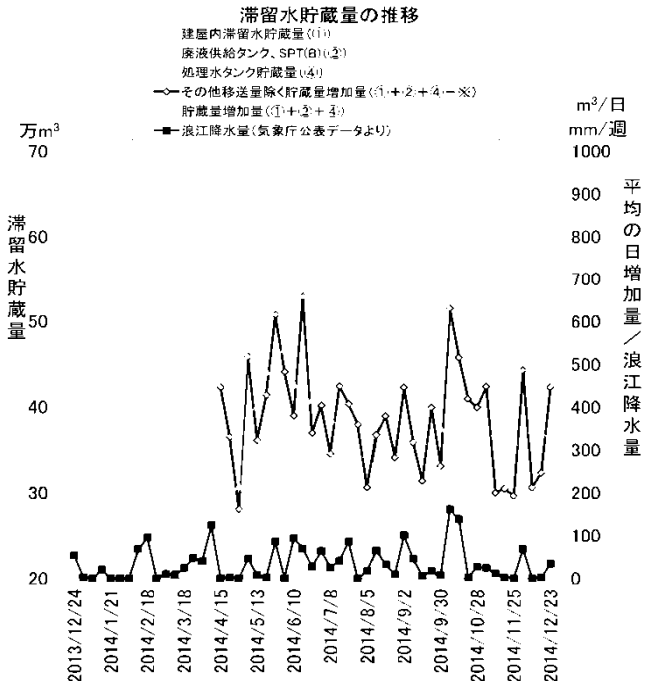


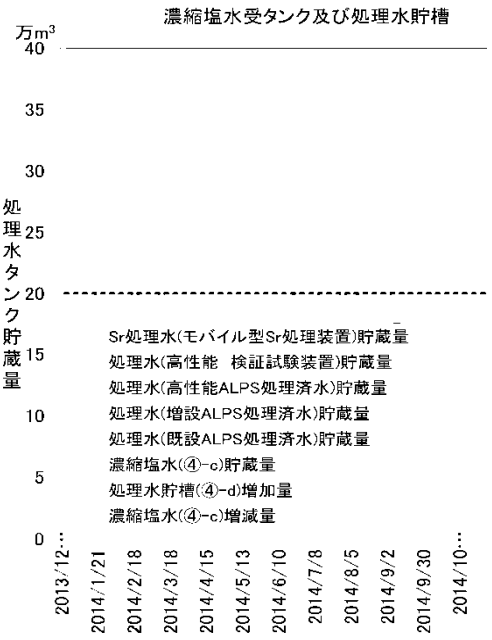


※1 第二セシウム吸着装置使用済ベッセル及び多核種除去設備の保管容器，処理カラム及びモバイル式処理装置使用済ベッセルを含む
※2 装置稼動中につき水位が安定しないため参考扱い
※3 貯蔵容量は運用上の上限を示す．タンクの貯蔵容量は10の位を切り捨てて表記）
※4 H1エリアのタンク（約3,000m³分）を5,6号機滞留水に使用
※5 多核種除去設備（ホット試験中）の処理済水を貯蔵するか，タンクの運用状況に応じて淡水や濃縮塩水を貯蔵
※6 地下貯水槽を含まない．ろ過水タンクの貯蔵容量（4,600m³）を含む
※7 ウェルポイント水（約760m³/週）の移送量を含む
※8 放射性物質濃度が高い多核種除去設備B系出口水を含む

滞留水の貯蔵状況（12月23日時点）

滞留水の貯蔵状況の推移





処理水貯蔵量	累積貯蔵量	期間貯蔵量		定格処理量
	[m3]	[m3/週]	[m3/日]	[m3/日]
既設多核種除去設備	181,481	2,876	411	750以上
増設多核種除去設備	47,447	3,089	441	750以上
高性能多核種除去設備	9,679	1,993	285	500以上
高性能　検証試験装置	680	0	0	50

処理水貯蔵量	Sr処理水	浄化処理中
	[m3]	[m3]
モバイル型Sr除去装置	4252	約4000

①：建屋内滞留水貯蔵量（1～4号機、プロセス主建屋、高温焼却炉建屋）
②：廃液供給タンク、SPT(B)
④：処理水タンク貯蔵量〔(④-a淡水受タンク)＋(④-b濃縮廃液貯槽)＋(④-c濃縮塩水受タンク)＋(④-d処理水貯槽)〕
※：ウェルポイント汲み上げ量、海水配管トレンチへの氷投入量、多核種除去設備薬液注入量の合計

東京電力株式会社
平成26年12月25日

各エリア別タンク一覧

1～4号機用汚染水貯蔵タンク

堰エリア	基数	1基あたり容量（公称）〔m3〕	タンク型	貯蔵水	備　考
B南	5	450	鋼製円筒型タンク（フランジ接合）	淡水	
B北	15	300	鋼製円筒型タンク（フランジ接合）	淡水	
C	26	40	鋼製角型タンク（溶接）	濃縮塩水	
	52	40	鋼製角型タンク（溶接）	淡水	
C東	5	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
C西	8	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
D	31	1000	鋼製円筒型タンク（溶接）	濃縮塩水	
	10	1000	鋼製円筒型タンク（溶接）	濃縮廃液	10基を濃縮廃液用に転用
E	49	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
G1	72	100	鋼製横置きタンク（溶接）※土中埋設	淡水	
G3東	24	1000	鋼製円筒型タンク（溶接）	多核種除去設備 処理済水（既設）	
G3西	40	1000	鋼製円筒型タンク（溶接）	濃縮塩水	
G3北	6	1000	鋼製円筒型タンク（溶接）	濃縮塩水	
G4南	13	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	濃縮塩水用13基の内、2基は使用時期未定
	4	1000	鋼製円筒型タンク（フランジ接合）	Sr処理水	モバイルSr除去装置により浄化完了した4基を「Sr処理水」とした。
G4北	6	1000	鋼製円筒型タンク（フランジ接合）	多核種除去設備 処理済水（既設）	
G5	17	1000	鋼製円筒型タンク（フランジ接合）	多核種除去設備 処理済水（既設）	
G6北	19	500	鋼製円筒型タンク（フランジ接合）	濃縮塩水	漏えいが確認されたため、1基使用停止 20-1=19
G6南	18	500	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
G7	10	700	鋼製円筒型タンク（溶接）	多核種除去設備 処理済水（既設）	
H1東	12	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H2	100	100	鋼製横置きタンク（溶接）	濃縮廃液	
H2北	17	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H2南	11	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H3	9	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	高線量箇所が確認されたため、2基使用停止 11-2=9
H4	20	500	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H4東	12	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H4北	21	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	漏えいが確認されたこと等から、2基撤去済み 23-2=21
H5	31	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H6	24	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H8北	5	1000	鋼製円筒型タンク（溶接）	濃縮塩水	
H8南	11	1000	鋼製円筒型タンク（溶接）	濃縮塩水	
H9	5	1000	鋼製円筒型タンク（フランジ接合）	淡水	
H9西	7	1000	鋼製円筒型タンク（フランジ接合）	淡水	

1～4号機用汚染水貯蔵タンク

堰エリア	基数	1基あたり容量（公称）〔m3〕	タンク型	貯蔵水	備　考
J1	65	1000	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（既設・増設）	
	1	1000	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（高性能検証試験装置）	
	34	1000	鋼製円筒型タンク（溶接）	濃縮塩水	
J2	16	2400	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（既設・増設）	
J3	8	2400	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（既設・増設・高性能）	
J4	12	2900	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（既設・増設・高性能）	
J5	30	1235	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（既設）	
J6	10	1200	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（既設・増設）	
ALPS	4	1000	鋼製円筒型タンク（フランジ接合）	多核種除去設備処理済水（既設）	
高ALPS	2	1000	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（高性能）	
増ALPS	2	1000	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（増設）	
水処理	1	8000	No.1ろ過水タンク	濃縮塩水	側板の一部に変形が認められたため、耐震評価を行いRO濃縮水貯水量を4600m^{3}とした。
合計	900				（平成26年12月23日　現在） ※下線部は前回報告からの変更点

G1	28	100	鋼製横置きタンク（溶接）※土中埋設	高濃度滞留水	非常用の受けタンクであり、現在未使用

H3	9	1000	鋼製円筒型タンク（フランジ接合）	地下水	

5，6号機用汚染水貯蔵タンク

	基数	1基あたり容量（公称）〔m3〕	タンク型	貯蔵水	備　考
F2	6	35	鋼製角型タンク（溶接）	5，6号機滞留水	Aタンク
	6	42	鋼製角型タンク（溶接）	5，6号機滞留水	Aタンク
	4	110	鋼製角型タンク（溶接＋フランジ接合）	5，6号機滞留水	Bタンク
	5	160	鋼製円筒型タンク（フランジ接合）	5，6号機滞留水	Cタンク
	2	200	鋼製円筒型タンク（フランジ接合）	5，6号機滞留水	Cタンク
F1	3	299	鋼製円筒型タンク（フランジ接合）	5，6号機滞留水	hijタンク
	18	508	鋼製円筒型タンク（フランジ接合）	5，6号機滞留水	hijタンク
	5	1100	鋼製円筒型タンク（溶接）	5，6号機滞留水	Kタンク
H4北	3	1100	鋼製円筒型タンク（フランジ接合）	5，6号機滞留水	
合計	52				（平成26年12月23日　現在） ※下線部は前回報告からの変更点

Summary of Decommissioning and Contaminated Water Management

November 27, 2014

Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment

Main works and steps for decommissioning

Fuel removal from Unit 4 SFP is underway. Preparatory works to remove fuel from Unit 1-3 SFP and fuel debris (Note 1) removal are ongoing.

(Note 1) Fuel assemblies melted through in the accident.

Fuel Removal from SFP

Unit 1&2: Rubble removal & dose reduction → Unit 3: Installing FHM* → Unit 4: Fuel removal → Storage and handling

- Unit 1: FY2017 Fuel removal to start (under consideration)
- Unit 2: After FY2017 Fuel removal to start (under consideration)
- Unit 3: FY2015 Fuel removal to start (scheduled)
- Unit 4: 2014 Fuel removal to be completed

FHM*: Fuel-Handling Machine

Fuel Debris (Corium) Removal

Unit 1-3: Dose reduction & Leakage identification → Stop leakage → Fuel debris removal → Storage and handling

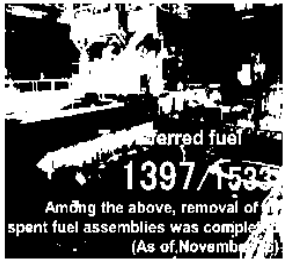
After FY2017 Water stoppage of PCV lower part (under consideration)

Dismantling Facilities

Scenario development & technology consideration → Design & Manufacturing of devices/ equipment → Dismantling

Fuel removal from SFP

Fuel removal from Unit 4 SFP has been underway since November 18, 2013. Removal of spent fuel assemblies was completed on November 5, 2014. Removal of non-irradiated fuel assemblies will be completed in December 2014.



(Fuel-removal operation)

Three principles behind contaminated water countermeasures

Countermeasures for contaminated water (Note 2) are implemented with the following three principles:

(Note 2) The amount is decreasing due to measures such as groundwater bypass and water-stoppage of the buildings.

1. Eliminate contamination sources

① Multi-nuclide removal equipment

② Remove contaminated water in the trench (Note 3)

(Note 3) Underground tunnel containing pipes.

2. Isolate water from contamination

③ Pump up ground water for bypassing

④ Pump up ground water near buildings

⑤ Land-side frozen walls

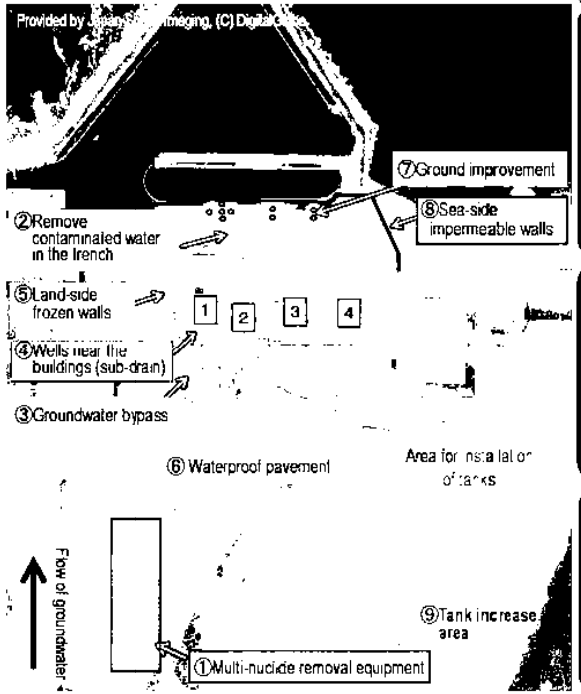
⑥ Waterproof pavement

3. Prevent leakage of contaminated water

⑦ Soil improvement by sodium silicate

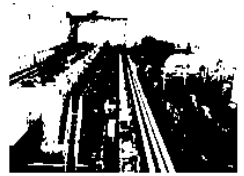
⑧ Sea-side impermeable walls

⑨ Increase tanks (welded-joint tanks)



Multi-nuclide removal equipment (ALPS), etc.

- This equipment removes radionuclides from the contaminated water in tanks, and reduces risks.
- It aims to reduce the levels of 62 nuclides in contaminated water to the legal release limit or lower (tritium cannot be removed).
- Furthermore, contaminated water is treated by installing additional multi-nuclide removal equipment by TEPCO (operation commenced September 2014) and a subsidy project of the Japanese Government (operation commenced October 2014).



(Installation status of high-performance multi-nuclide removal equipment)

Land-side impermeable walls with frozen soil

- The walls surround the buildings with frozen soil and reduce groundwater inflow into the same.
- On-site tests have been conducted since last August. Construction work commenced in June and the freezing operation is scheduled to start within FY2014.

(Length: approx. 1,500m)

Sea-side impermeable walls

- The walls aim to prevent the flow of contaminated groundwater into the sea.
- Installation of steel sheet piles is almost (98%) complete. The closure time is being coordinated.

(Installation status)

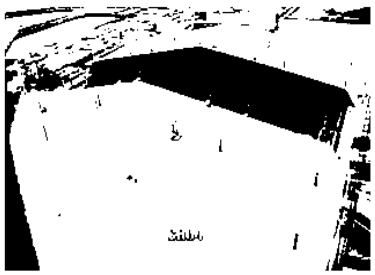
Progress status

◆ The temperatures of the Reactor Pressure Vessel (RPV) and the Primary Containment Vessel (PCV) of Units 1-3 have been maintained within the range of approx. 20-45°C[*1] for the past month. There was no significant change in the density of radioactive materials newly released from Reactor Buildings in the air[*2]. It was evaluated that the comprehensive cold shutdown condition had been maintained.

*1 The values vary somewhat depending on the unit and location of the thermometer
*2 The radiation exposure dose due to the current release of radioactive materials from the Reactor Buildings peaked at 0.03 mSv/year at the site boundaries. This is approx. 1/70 of the annual radiation dose by natural radiation (annual average in Japan: approx. 2.1 mSv/year).

Investigation into the status of rubble and dust on the Unit 1 R/B top floor

Two roof panels of the Unit 1 Reactor Building (R/B) were removed to facilitate investigation of the rubble status and monitoring of the dust concentration trend on the R/B top floor (operating floor).
No significant variation was detected in the indicated values of dust monitors for the radioactive material density and monitoring posts installed at the site boundaries.
The removed roof panels will be temporarily returned to the roof by early December. Subsequently, after completing the "construction of impermeable walls with frozen soil", which is conducted in the same area, dismantling of R/B cover will commence from around March, 2015.


<Status of building cover roof panels>

Rubble removal inside Unit 3 pool resumed

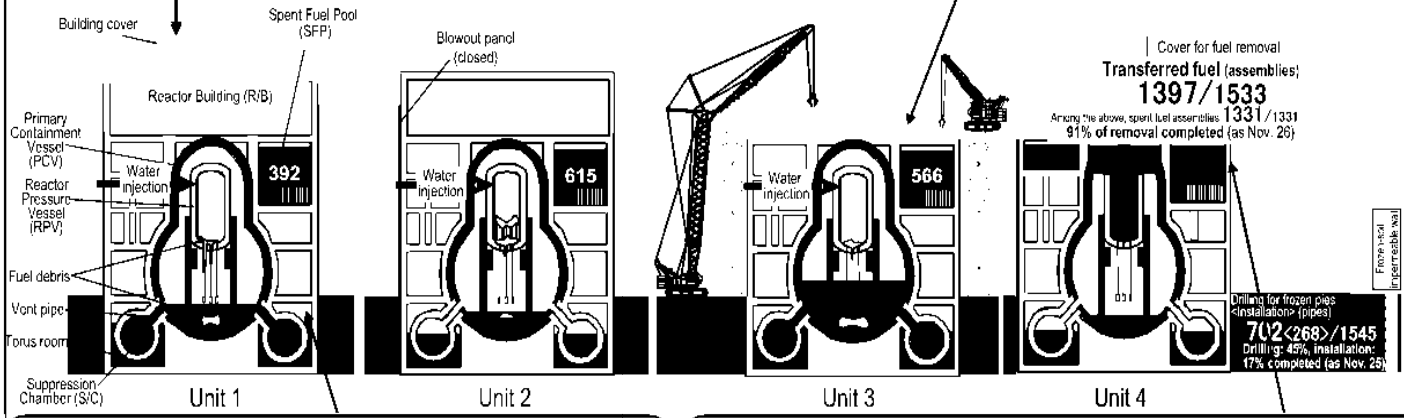
Fuel removal, which was suspended due to the console of the fuel-handling machine falling during work inside the spent fuel pool, will resume from December. As a measure to prevent possible falling, additional cover plates will be installed and large rubble will be removed with dedicated tools.

Questionnaire survey for workers to improve the labor environment

In this survey, approx. 70% of workers (approx. 4,600) answered. The number of "positive" response increased compared with the previous investigation for items such as "transportation to working sites". At the same time, based on requested improvements in the onsite environment and dietary matters, efforts to reform the labor environment will continue.

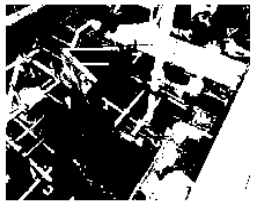
Construction of additional temporary soil cover-type storage commenced

To store waste appropriately, construction of the 3rd temporary soil cover-type storage for rubble commenced on November 10. Reception of rubble will commence in around March 2015.



Removal of contaminated water from seawater pipe trenches and closure commenced

From November 25, contaminated water is being removed from seawater pipe trenches[(note)], which lead from the Turbine Building of Unit 2 on the sea side, and the trenches are being filled with cement-based materials.

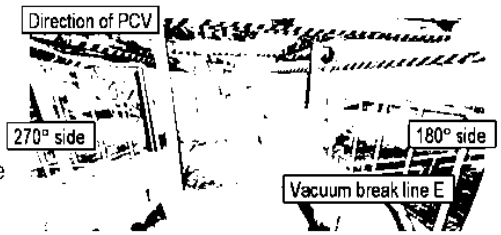

<Near hole for filling>

Note: The term "trench" means an underground tunnel containing pipes

3D laser scan inside Unit 1 R/B underground floor

The upper part of the underground floor (torus room) of Unit 1 R/B was investigated with a laser scan using a remote-controlled robot, and 3D data was collected.

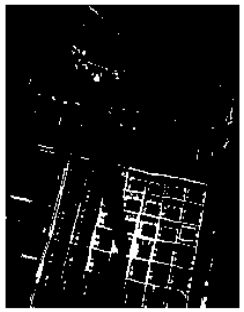
The collected 3D scan data will subsequently be used when considering a plan to repair the PCV in future.



<Image of 3D data>

Fuel removal from the Unit 4 spent fuel pool completed

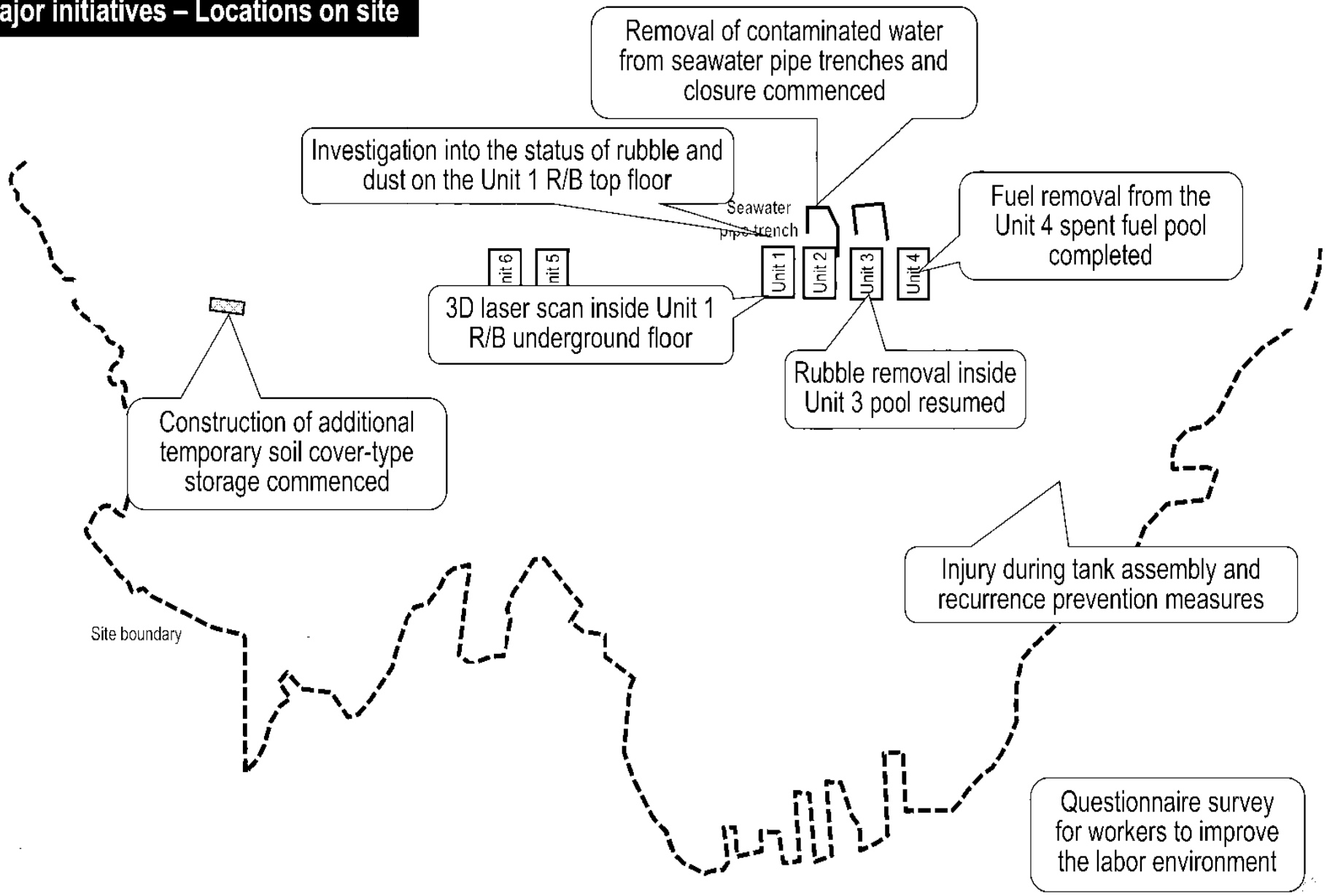
Following the removal of rubble from the top floor of Unit 4 R/B and construction of the cover for fuel removal, the fuel has been transferred from the spent fuel pool (SFP) to the common pool since November 18, 2013. On November 5, within a year of the fuel removal commencing, all 1,331 spent fuel assemblies in the pool had been transferred.
The remaining non-irradiated fuel assemblies to the Unit 6 SFP will be transferred within December. When completed, all fuel assemblies will have been removed from Unit 4. Based on this experience, fuel assemblies will be removed from Unit 1-3 pools.


<Storage of spent fuel in common pool>

Injury during tank assembly and recurrence prevention measures

While assembling the tank, tank parts fell from the upper side and injured three workers who were working on a neighboring tank.
The procedures when handling heavy load will be reviewed, measures to prevent tank parts falling will be implemented, while works around tanks will be appropriately managed to ensure safety.

Major initiatives – Locations on site

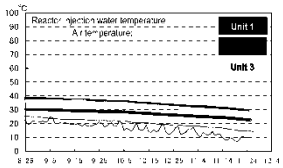


* Data of Monitoring Posts (MP1-MP8.)
Data of Monitoring Posts (MPs) measuring airborne radiation rate around site boundaries show 1.220 - 4.173μSv/h (October 29-November 25, 2014.)
We improved the measurement conditions of monitoring posts 2 to 8 for precise measurement of air dose rate. Construction works such as tree-clearing, surface soil removal, and shield wall setting were implemented from Feb 10 to Apr 18. Therefore monitoring results at these points are lower than elsewhere in the power plant site.
The radiation shielding panel around the monitoring post No. 6, which is one of the instruments used to measure the radiation dose of the power station site boundary, were taken off from July 10 to July 11, since the surrounding radiation dose has largely fallen down due to further cutting down of the forests etc.

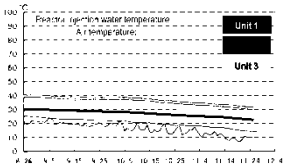
I. Confirmation of the reactor conditions

1. Temperatures inside the reactors

Through continuous reactor cooling by water injection, the temperatures of the Reactor Pressure Vessel (RPV) bottom and the Primary Containment Vessel (PCV) gas phase have been maintained within the range of approx. 20 to 45°C for the past month, though they vary depending on the unit and location of the thermometer.



RPV bottom temperatures (recent quarter)



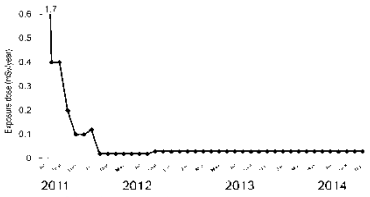
PCV gas phase temperatures (recent quarter)

* The trend graphs show part of the temperature data measured at multiple points.

2. Release of radioactive materials from the Reactor Buildings

The density of radioactive materials newly released from Reactor Building Units 1-4 in the air measured at site boundaries was evaluated at approx. 1.8 x 10^{-9} Bq/cm^3 for both Cs-134 and -137. The radiation exposure dose due to the release of radioactive materials was 0.03 mSv/year (equivalent to approx. 1/70 of the annual radiation dose by natural radiation (annual average in Japan: approx. 2.1 mSv/year)) at the site boundaries.

Annual radiation dose at site boundaries by radioactive materials (cesium) released from Reactor Building Units



(Reference)
- The density limit of radioactive materials in the air outside the surrounding monitoring area
  [Cs-134]: 2 x 10^{-5} Bq/cm^3
  [Cs-137]: 3 x 10^{-5} Bq/cm^3
- Dust density around the site boundaries of Fukushima Daiichi Nuclear Power Station (actual measured values)
  [Cs-134]: ND (Detection limit: approx. 1 x 10^{-9} Bq/cm^3)
  [Cs-137]: ND (Detection limit: approx. 2 x 10^{-9} Bq/cm^3)
- Data of Monitoring Posts (MP1-MP8)
  Data of Monitoring Posts (MPs) measuring airborne radiation rate around site boundaries showed 1,220 - 4,173μSv/h (October 29 – November 25, 2014).
  To measure the variation in the airborne radiation rate at MP2-MP8 more accurately, environmental improvement (tree trimming, removal of surface soil and shielding around the MPs) has been completed

Note: Different formulas and coefficients were used to evaluate the net dose in the face-to-operations plan and monthly report. The evaluation methods were integrated in September 2012. As the fuel removal from the spent fuel pool (SFP) commenced for Unit 4, the radiation exposure dose from Unit 4 was added to the items subject to evaluation since November 2013.

3. Other indices

There was no significant change in indices, including the pressure in the PCV and the PCV radioactivity density (Xe-135) for monitoring criticality, nor was any abnormality of cold shutdown condition or sign of criticality detected. Based on the above, it was confirmed that the comprehensive cold shutdown condition had been maintained and the reactors remained in a stabilized condition.

II. Progress status by each plan

1. Reactor cooling plan

The cold shutdown condition will be maintained by cooling the reactor by water injection and measures to complement status monitoring will continue to be implemented.

➢ Replacement of the thermometer at the bottom of Unit 2 RP

- In April, attempts to remove and replace the thermometer installed at the bottom of the RPV, which had broken in February 2014, failed and the operation was suspended. The estimated cause was fixation or added friction due to rust having formed. To facilitate the task, mock-up test equipment us
- To remove rust, the use of rust-stripping chemicals was examinec verifying the effect of removal to alleviate drawing tension were cor on-site work by installing the mock-up test equipment using full-scal
- After deciding on the method and training the workers involved, January 2015.

2. Accumulated water-treatment plan

To tackle the increase in accumulated water due to groundwater inflow, fundamer Buildings will be implemented, while improving the decontamination capability of contaminated water

➢ Operation of groundwater bypass

- From April 9, the operation of 12 groundwater bypass pumpin groundwater. Release commenced from May 21 in the presence Office for the Decommissioning and Contaminated Water Issue of m^3 of groundwater had been released. The pumped up groundw released after TEPCO and a third-party organization (Japan Chen met operational targets.
- It was confirmed that the groundwater inflow into the buildings evaluation data obtained to date through measures such as the grou Temperature Incinerator Building (HTI) (see Figure 1).
- It was confirmed that the groundwater level at the observation holes to the level before pumping at the groundwater bypass commenced
- Regarding the pumping well No. 11, as the flow rate decreased sin on October 15 and the situation was investigated. Groundwater suspended solids as general bacteria in tunnels. After implementin scheduled to resume in around early December.

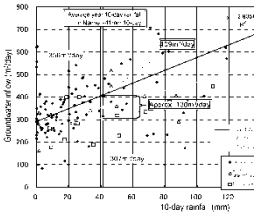


Figure 1: Analytical results of inflow

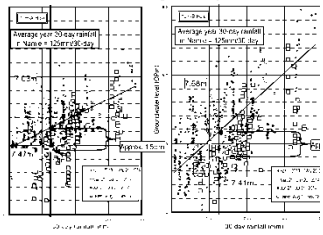


Figure 2: Water levels of groundwater bypass Obse

Construction status of impermeable walls with frozen soil

- To facilitate the installation of frozen-soil impermeable walls surrounding Units 1-4 (a subsidy project of the Ministry of Economy, Trade and Industry), drilling to place frozen pipes commenced (from June 2). As of November 25, drilling at 834 points (for frozen pipes: 702 of 1,545 points, for temperature-measurement pipes: 132 of 317 points) and installation of frozen pipes at 268 of 1,545 points had been completed (see Figure 3).
- Installation of 30 chillers for freezing was completed (from August 26 to November 26).

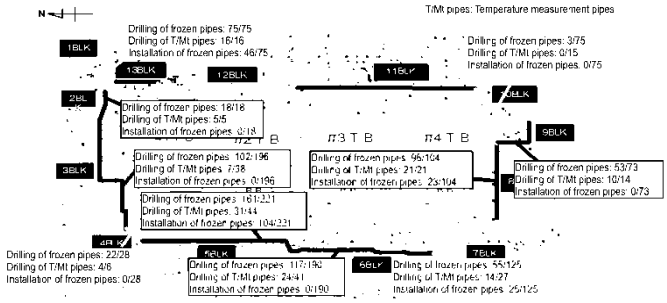


Figure 3: Drilling status for frozen-soil impermeable walls and installation of frozen pipes

Status of the subdrain system

- Regarding the subdrain purification system, groundwater (subdrain water) was pumped up and an amount equivalent to four temporary storage tanks (approximately 4,000m³) was purified by the purification system as a system operation test to confirm stable operation (from September 16 to November 5). Through purification by the system, a decline in the density of radioactive materials to below the operational target and the absence of any other γ nuclide were all confirmed.
- Treated groundwater will be released inside the port after confirming compliance with the above operational target. The release will be contingent on the relevant parties reaching agreement.
- Though an increase in the radioactive material density was detected at pit Nos. 18 and 19 (October 22), the density drastically declined in the water quality measurement two days later. It was estimated that as those pits connect with Nos. 15-17, which could not be recovered due to the high radiation dose, via horizontal pipes, the fallout components were gradually drawn into pit Nos. 18 and 19 by pump operation. From November 14-21, pit No. 17 was blocked with crushed stone and mortar (see Figure 4).

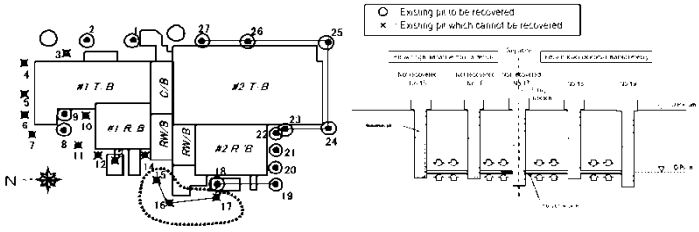


Figure 4: Existing subdrain pits around Units 1 and 2

Operation of multi-nuclide removal equipment

- Regarding multi-nuclide removal equipment (existing, additional and water are underway (for existing equipment, System A: from Ma System C: from September 27, 2013; for additional equipment, S September 27, System C: from October 9, 2014; for high-performan approx. 171,000, 36,000 and 3,000 m³ at the existing, additiona equipment respectively have been treated (as of November 25, i which contained water with a high density of radioactive materials at

Toward risk reduction of the contaminated water stored in t

- To purify RO concentrated salt water stored in tanks, mobile strontiu the G4 south area (from October 2). The number of mobile strontiu concentrated salt water stored in tanks in the H5 north area (sched mobile strontium-removal equipment will also be installed to purify R areas (scheduled to commence in late January).
- In addition to multi-nuclide removal equipment (existing, ad strontium-removal equipment, measures including removal of stront secondary cesium absorption apparatus (SARRY), and RO concent reduce risks of contaminated water via multiple approaches.

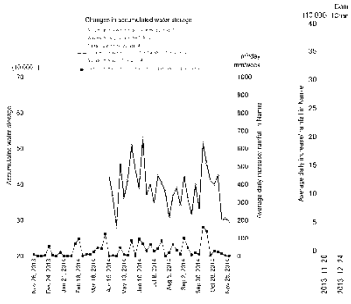


Figure 5: Status of accumulated water s

Measures in Tank Areas

- Rainwater under the temporary release standard having accumulat tank area, was sprinkled on site after removing radioactive mater May 21 (as of November 24, a total of 12,800 m³). On November underground reservoir No. 4 was completed.
- The destination of the C-release channel was also switched from o amount released inside the port was gradually increased. As the re no significant change, the release of the entire amount was confirme

Removal of contaminated water from seawater-pipe trench

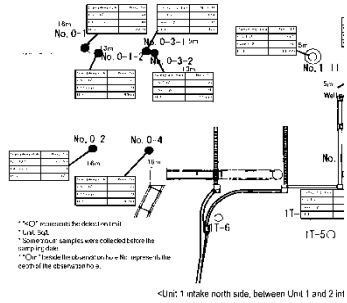
- At the seawater-pipe trench Unit 2 open-cut duct, space filling was (Vertical Shaft A: from October 20 to November 2, open-cut duct: and close the trench has been underway since November 25.
- At the seawater-pipe trench Unit 3 Vertical Shaft A, drilling of holes was completed (September 4). At Vertical Shaft D, drilling of holes is underway. From late December, work will commence to remove w

3. Plan to reduce radiation dose and mitigate contamination

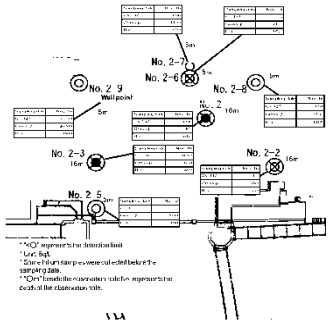
Effective dose-reduction at site boundaries and purification of the port water to mitigate the impact of radiation on the external environment

➢ Status of groundwater and seawater on the east side of Turbine Building Units 1 to 4

- Regarding the radioactive materials in groundwater near the bank on the north side of the Unit 1 intake, the density of tritium has been increasing at groundwater Observation Holes Nos. 0-1-2 and 0-4 since July, currently standing at around 9,000 and 18,000 Bq/L, respectively in these locations. Pumping of 1 m³/day of water from Observation Hole No. 0-3-2 continues.
- Regarding the groundwater near the bank between the Unit 1 and 2 intakes, the density of gross β radioactive materials at groundwater Observation Holes Nos.1-6 increased to 7.8 million Bq/L in October, currently decreasing to the level before the increase (around 1 million Bq/L). The density of tritium at groundwater Observation Hole No. 1-14 decreased to 3,000 Bq/L since October, currently standing at the level before the decrease (around 10,000 Bq/L). Though the density of tritium at groundwater Observation Hole No. 1-17, which had been around 10,000 Bq/L, increased to 160,000 Bq/L since October, it is currently standing at around 100,000 Bq/L. The density of gross β, which has been increasing since March, reached 1.2 million Bq/L by October before decreased to 2,700 Bq/L and is currently standing at around 30,000 Bq/L. Water pumping from the well point (approx. 10 m³/day) and the pumping well No. 1-16 (P) (1m³/day) installed near the Observation Hole No. 1-16 continues.
- Regarding the radioactive materials in groundwater near the bank between the Unit 2 and 3 intakes, the densities of tritium and gross β radioactive materials are high on the north (Unit 2) side up to October. These densities have been decreasing since November, currently standing at around 3,000 and 40,000 Bq/L for tritium and gross β radioactive materials respectively. To increase the height of the ground improvement area with mortar, the volume of water pumped from the well point increased to 50 m³/day (from October 31).
- Regarding the radioactive materials in groundwater near the bank between the Unit 3 and 4 intakes, a low density was maintained at all Observation Holes up to October.
- Regarding the radioactive materials in seawater at the additional sampling point, which was installed outside the sea-side impermeable walls inside the open channels of Units 1-4 after March, a low density equivalent to that at the point to the north of the east breakwater was maintained.
- The density of radioactive materials in seawater within the port has been slowly declining up to October.
- The radioactive material density in seawater at and outside the port entrance has remained within the same range previously recorded.
- To increase the frequency of marine-trend monitoring, a seawater monitor was installed at the port entrance. Failures in terms of facility and measurement were identified in the test operation conducted from September 4. After rectifying the failures, checking the operation conditions and collecting and evaluating measurement data, full-scale operation will commence from February 2015.
- The density of cesium 137, in water accumulated in the vertical shaft on the upstream side of the Unit 1 release channel, increased immediately after Typhoon Nos. 18 and 19 and then declined. There was no significant change in the density of cesium 137 in seawater within and outside the port. Additional investigation around the vertical shaft on the upstream side of the Unit 1 release channel could not identify the contamination source. Investigation and measures regarding inflow into the release channel will continue while preparation for the full-scale purification of accumulated water gets underway.
- Construction to cover the seabed soil within the port is underway to prevent contamination spreading due to stirred-up seabed soil (scheduled for completion at the end of FY2014). After the plant modification associated with the change in covering materials was conducted (from October 10 to November 11), covering over Area (2) commenced on November 17 (see Figure 9). As of November 25, 28% of the construction had been completed. The seabed of the intake open channels had been covered by FY2012.
- Regarding the analysis of strontium, which requires advanced professional skills and considerable time (a minimum of approx. 24 days), "β nuclide analysis equipment (Pico β)" was introduced since September 2013 to reduce the analysis time; targeting improved pre-treatment technology within far less time (a minimum of approx. 2-4 days). To further reduce time, a method to analyze strontium using ICP-MS (a minimum of approx. 30 minutes) was developed by a team including Fukushima University and a demonstration test prior to introduction conducted. The results showed that the method would be applicable for freshwater samples with a detection limit exceeding 1Bq/L. Operation will commence in December 2014



<Unit 1 intake north side, between Unit 1 and 2 int



<Between Unit 2 and 3 intakes, between Unit 3 a

Figure 6: Groundwater density on the Turbine

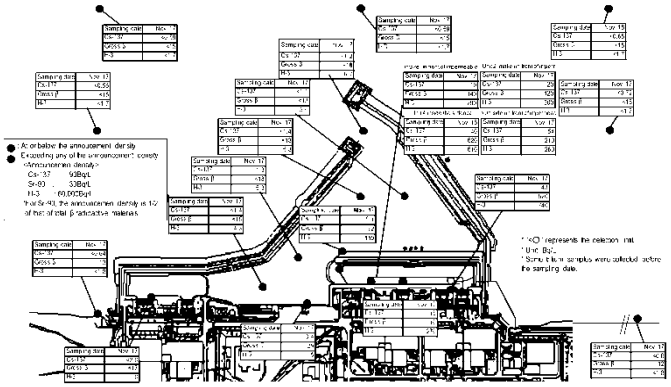


Figure 7 Seawater density around the port

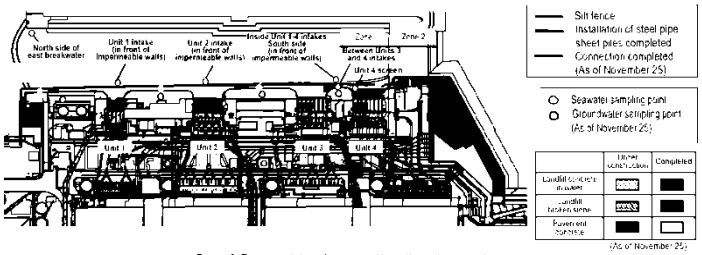


Figure 8 Progress status of impermeable walls on the sea side

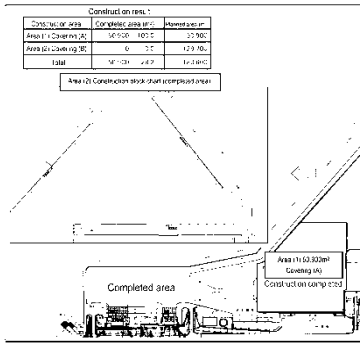


Figure 9: Progress status of the seabed soil cove

4. Plan to remove fuel from the spent fuel pools

Work to help remove spent fuel from the pool is progressing steadily while er spent fuel from the Unit 4 pool commenced on November 18, 2013 and efforts the end of 2014

Fuel removal from the Unit 4 spent fuel pool

- Fuel removal from the spent fuel pool (SFP) commenced on Novem assemblies in the pool had been transferred to the common pool, sic
- As of November 26, 1,331 of 1,331 spent fuel assemblies and 66 transferred to the common pool. Approx. 91% of the fuel remova assemblies, transfer to the Unit 6 spent fuel pool will be completed b
- To evaluate long-term soundness of fuel assemblies removed from assemblies transferred from the Unit 4 spent fuel pool to the commo

Main work to help remove spent fuel at Unit 3

- During rubble removal inside the spent fuel pool, the console and machine, which were scheduled for removal, fell (August 29). The o incident, will resume from December. To prevent possible fall, additic
- Measures to reduce radiation dose (decontamination and shield (operating floor) has been implemented since October 15, 2013. As initial plan have yet to be achieved, installation of additional shields a the collapsed northwest area.

Main work to help remove spent fuel at Unit 1

- To help the work on dismantling the building cover, scheduled t smoothly, anti-scattering agents are to be sprayed and an investigati
- On October 22, spraying of anti-scattering agents began from holes
- Two roof panels were removed (the 1st, on October 31 and the 2nd, rubble on the operating floor and monitoring of the dust concentratic will be temporarily returned to the roof by early December.
- On November 12, oil bleeding was detected with the 750t-crawler c replacing and inspecting pipes with which bleeding was identified, th

5. Fuel debris removal plan

In addition to decontamination and shield installation to improve PCV accessibility, technology was developed and data gathered as required to prepare to remove fuel debris (such as investigating and repairing PCV leak locations)

➢ 3D laser scan inside the Unit 1 torus room

- For use in evaluating obstacles as required for works, including water stoppage at the PCV, inside the Unit 1 Reactor Building torus room, which will be conducted as a future step, 3D data inside the torus room was collected using remote-controlled equipment and with mounted 3D laser-measurement equipment (from October 31 to November 7). The collected 3D scan data will be used in the plan to repair the PCV and vacuum break line.

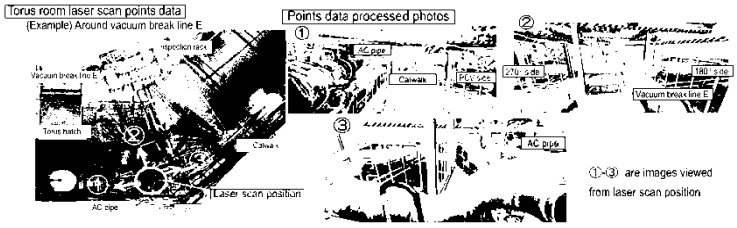


Figure 10: Results of laser scan inside torus room

6. Plan to store, process and dispose of solid waste and decommission reactor facilities

Promoting efforts to reduce and store waste generated appropriately and R&D to facilitate adequate and safe storage, processing and disposal of radioactive waste

➢ Construction of additional temporary soil cover-type storage commenced

- To store waste appropriately, construction of the 3rd temporary soil cover-type storage for rubble commenced on November 10. Reception of rubble will commence in around March 2015.

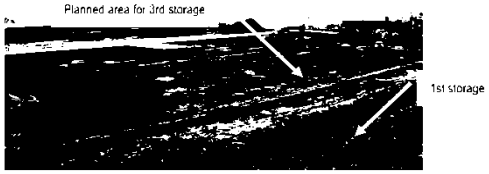


Figure 11: Temporary soil cover-type storage – Drilling status of 3rd installation area

➢ Management status of rubble and trimmed trees

- As of the end of October, the total storage volume of concrete and metal rubble was approx. 123,300 m³ (+8,100 m³ compared to at the end of September, area-occupation rate: 69%). The total storage volume of trimmed trees was approx. 79,600 m³ (-100 m³ compared to at the end of September, area-occupation rate: 58%). The increase in rubble was mainly attributable to the construction to install tanks and impermeable walls with frozen soil. The decrease in trimmed trees was mainly attributable to arranging stored items.

➢ Management status of the secondary waste from water tre

- As of November 25, the total storage volume of waste sludge was number of stored spent vessels and high-integrity containers (HIC) (area-occupation rate: 50%).
- Regarding the storage of cesium absorption vessels (3rd storage) removal equipment, the implementation plan was approved on Nove

7. Plan for staffing and ensuring work safety

Securing appropriate staff long-term while thoroughly implementing work environment and labor conditions continuously based on an understanding of w

➢ Staff management

- The monthly average total of people registered for at least one day from July to September was approx. 13,500 (TEPCO and partner c average number of actual workers (approx. 10,400). Accordingly, su
- It was confirmed with the prime contractors that the estimated n (approx. 6,280 per day: TEPCO and partner company workers) numbers of workers per day for each month of the last fiscal yea 3,000 to 6,400 per month since the last fiscal year (See Figure 12).
  - Some works for which contract procedure
- The number of workers is increasing, both from within and outside rate of workers from outside exceeds that of those from within the and partner company workers) as of October was approx. 45%.

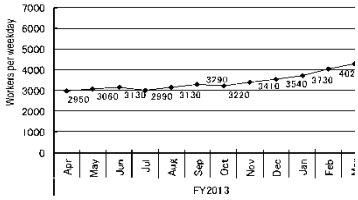


Figure 12: Changes in the average number of workers per weekday for e

- The average exposure dose of workers remained at approx. 1mSv/ annual average exposure dose 20mSv/year ≒ 1.7mSv/month)
- For most workers, the exposure dose was sufficiently within the lim engaging in radiation work.

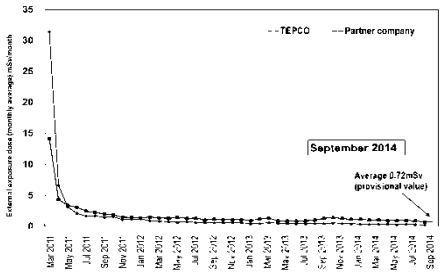


Figure 13: Changes in monthly individual worker exposure dose
(monthly average exposure dose since March 2011)

➢ Initiatives to improve the labor environment

- A questionnaire survey for workers regarding the overall labor environment was conducted (August 2014), to which 4,587 workers responded (collection rate: 69.8%). Regarding the current labor environment, the number of "positive" responses increased for all items compared with the previous investigation. At the same time, regarding the on-site environment and dietary matters, many respondents requested an improvement as in the previous survey. In particular, in response to the requested improvement in the dietary environment, a meal service center will be built in Ohkuma Town and a dining area set up in the large rest house (9 stories above ground with a capacity of approx. 1,200 workers) to supply meals (April 2015).

➢ Preventing infection and expansion of influenza and norovirus

- Since October, measures for influenza and norovirus have been implemented. As part of these efforts, free influenza vaccination (subsidized by TEPCO) is being provided at the new Administration Office Building in the Fukushima Daiichi Nuclear Power Station (from October 29 to December 5) and medical clinics around the site (from November 4 to January 30, 2015) for workers of partner companies. As of November 21, a total of 5,036 workers had been vaccinated. In addition, a comprehensive range of other measures is also being implemented, including daily actions to prevent infection and expansion (measuring body temperature, health check and monitoring infection status) and response after detecting possible infection (control of swift entry/exit and mandatory wearing of masks in working spaces).

B. Others

➢ Incident involving fall of step rails for the turntable ladder in the J2 tank area

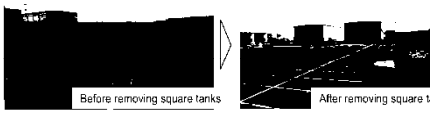
- When moving a rail for the turntable ladder (half-around), which was temporarily fixed to the upper part of the A-4 tank in the J2 area to adjust its position relative to another rail (which had been temporarily welded), the rail for the turntable ladder fell. It then bounced off the ground and touched three workers who were installing temporary connections for the neighboring A-3 tank.
- To prevent recurrence, procedures when lifting heavy loads will be clarified and hard measures, such as installing welded metal materials to prevent rail falls in advance, will be implemented while coordination with work performed by other companies when handling heavy materials shall be managed appropriately

➢ Progress status of the "Emergency Safety Measures for Fukushima Daiichi Nuclear Power Station"

- Regarding the "Emergency Safety Measures for Fukushima Daiichi Nuclear Power Station" formulated in November 2013 to accelerate decommissioning and measures for issues related to contaminated water and tanks and to improve reliability, the following progress has been made (see Figure 14).
  - ✓ Removing damaged vehicles on the east side of the Turbine Building (the last vehicle was removed on September 19)
  - ✓ Constructing a new Administration Office Building (full-scale operation commenced on October 27)
  - ✓ Building a large rest house (construction commenced on January 27, installation of external walls and other related works is underway)

- ✓ Building a meal service center (the groundbreaking ceremc other works are underway)
- ✓ Enhancing the management and framework for safety and qu
- ✓ Measures for rainwater (fence height was increased and rain
- ✓ Water stoppage by caulking at the bottom of flange tanks (co
- ✓ Replacement with welded-joint tanks (completed in D area)

Building a large rest house



Replacement of D area tanks

Figure 14: Progress status of Emergency Safet

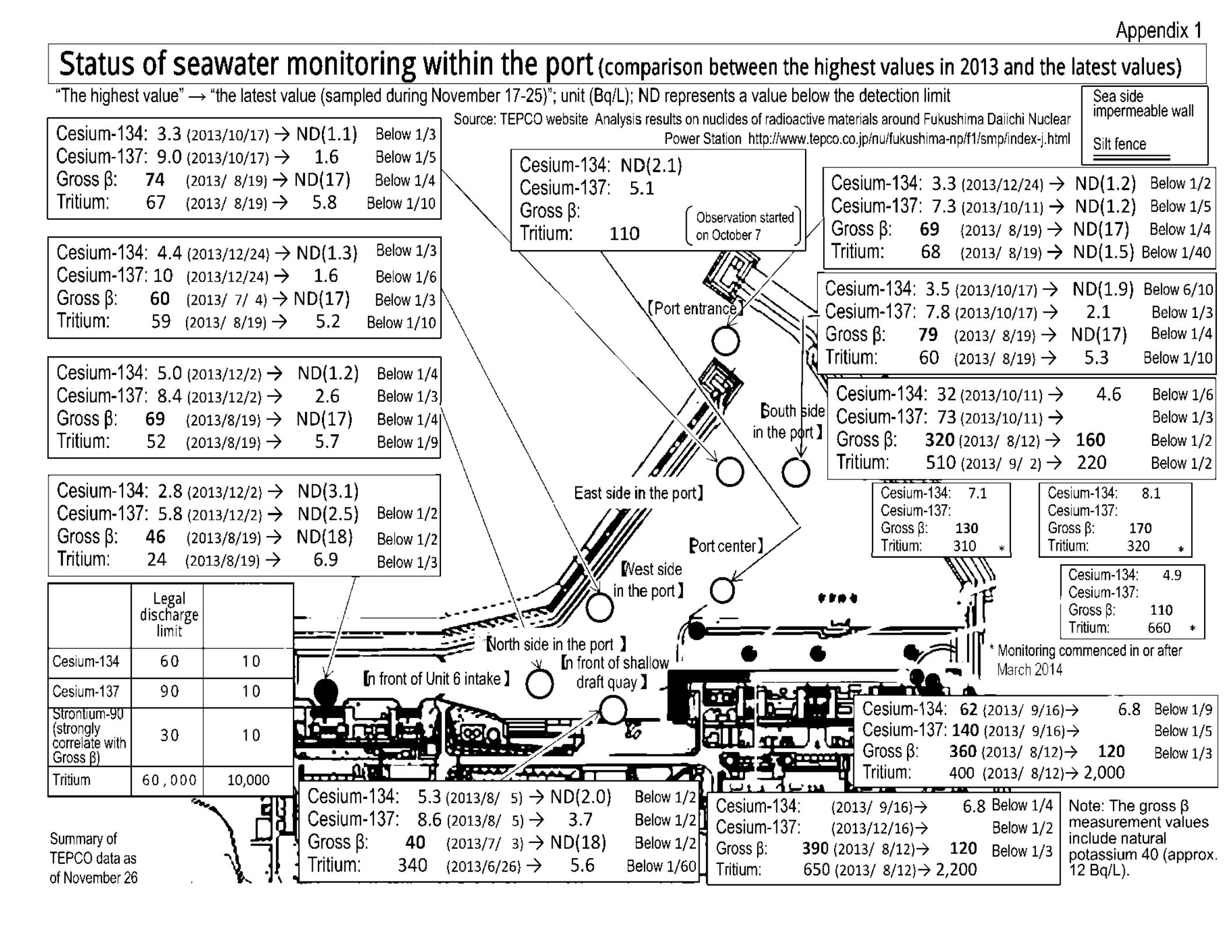
Status of seawater monitoring within the port (comparison between the highest values in 2013 and the latest values)

"The highest value" → "the latest value (sampled during November 17-25)"; unit (Bq/L); ND represents a value below the detection limit

Source: TEPCO website Analysis results on nuclides of radioactive materials around Fukushima Daiichi Nuclear Power Station http://www.tepco.co.jp/nu/fukushima-np/f1/smp/index-j.html

Sea side impermeable wall

Silt fence



Cesium-134: 3.3 (2013/10/17) → ND(1.1) Below 1/3
Cesium-137: 9.0 (2013/10/17) → 1.6 Below 1/5
Gross β: **74** (2013/ 8/19) → ND(17) Below 1/4
Tritium: 67 (2013/ 8/19) → 5.8 Below 1/10

Cesium-134: ND(2.1)
Cesium-137: 5.1
Gross β:
Tritium: 110
(Observation started on October 7)

Cesium-134: 3.3 (2013/12/24) → ND(1.2) Below 1/2
Cesium-137: 7.3 (2013/10/11) → ND(1.2) Below 1/5
Gross β: **69** (2013/ 8/19) → ND(17) Below 1/4
Tritium: 68 (2013/ 8/19) → ND(1.5) Below 1/40

Cesium-134: 4.4 (2013/12/24) → ND(1.3) Below 1/3
Cesium-137: 10 (2013/12/24) → 1.6 Below 1/6
Gross β: **60** (2013/ 7/ 4) → ND(17) Below 1/3
Tritium: 59 (2013/ 8/19) → 5.2 Below 1/10

Cesium-134: 3.5 (2013/10/17) → ND(1.9) Below 6/10
Cesium-137: 7.8 (2013/10/17) → 2.1 Below 1/3
Gross β: **79** (2013/ 8/19) → ND(17) Below 1/4
Tritium: 60 (2013/ 8/19) → 5.3 Below 1/10

Cesium-134: 5.0 (2013/12/2) → ND(1.2) Below 1/4
Cesium-137: 8.4 (2013/12/2) → 2.6 Below 1/3
Gross β: **69** (2013/8/19) → ND(17) Below 1/4
Tritium: 52 (2013/8/19) → 5.7 Below 1/9

Cesium-134: 32 (2013/10/11) → 4.6 Below 1/6
Cesium-137: 73 (2013/10/11) → Below 1/3
Gross β: **320** (2013/ 8/12) → **160** Below 1/2
Tritium: 510 (2013/ 9/ 2) → 220 Below 1/2

Cesium-134: 2.8 (2013/12/2) → ND(3.1)
Cesium-137: 5.8 (2013/12/2) → ND(2.5) Below 1/2
Gross β: **46** (2013/8/19) → ND(18) Below 1/2
Tritium: 24 (2013/8/19) → 6.9 Below 1/3

Cesium-134: 7.1
Cesium-137:
Gross β: **130**
Tritium: 310 *

Cesium-134: 8.1
Cesium-137:
Gross β: **170**
Tritium: 320 *

Cesium-134: 4.9
Cesium-137:
Gross β: **110**
Tritium: 660 *

* Monitoring commenced in or after March 2014

	Legal discharge limit	
Cesium-134	60	10
Cesium-137	90	10
Strontium-90 (strongly correlate with Gross β)	30	10
Tritium	60,000	10,000

Cesium-134: **62** (2013/ 9/16)→ 6.8 Below 1/9
Cesium-137: **140** (2013/ 9/16)→ Below 1/5
Gross β: **360** (2013/ 8/12)→ **120** Below 1/3
Tritium: 400 (2013/ 8/12)→ 2,000

Cesium-134: 5.3 (2013/8/ 5) → ND(2.0) Below 1/2
Cesium-137: 8.6 (2013/8/ 5) → 3.7 Below 1/2
Gross β: **40** (2013/7/ 3) → ND(18) Below 1/2
Tritium: 340 (2013/6/26) → 5.6 Below 1/60

Cesium-134: (2013/ 9/16)→ 6.8 Below 1/4
Cesium-137: (2013/12/16)→ Below 1/2
Gross β: **390** (2013/ 8/12)→ **120** Below 1/3
Tritium: 650 (2013/ 8/12)→ 2,200

Note: The gross β measurement values include natural potassium 40 (approx. 12 Bq/L).

Summary of TEPCO data as of November 26

Status of seawater monitoring around outside of the port
(comparison between the highest values in 2013 and the latest values)

(The latest values sampled during November 17-25)

Unit (Bq/L); ND represents a value below the detection limit; values in ( ) represent the detection limit; ND (2013) represents ND throughout 2013

	Legal discharge limit	
Cesium-134	60	10
Cesium-137	90	10
Strontium-90 (strongly correlate with Gross β)	30	10
Tritium	60,000	10,000

【Northeast side of port entrance(offshore 1km)】

Cesium-134: ND (2013) → ND (0.67)
Cesium-137: ND (2013) → ND (0.59)
Gross β: ND (2013) → ND (15)
Tritium: ND (2013) → ND (1.8)

【East side of port entrance (offshore 1km)】

Cesium-134: ND (2013) → ND (0.47)
Cesium-137: 1.6 (2013/10/18) → ND (0.59) Below 1/2
Gross β: ND (2013) → ND (15)
Tritium: 6.4 (2013/10/18) → ND (1.8) Below 1/5

【Southeast side of port entrance(offshore 1km)】

Cesium-134: ND (2013) → ND (0.74)
Cesium-137: ND (2013) → ND (0.65)
Gross β: ND (2013) → ND (15)
Tritium: ND (2013) → ND (1.8)

Cesium-134: ND (2013) → ND (0.73)
Cesium-137: ND (2013) → ND (0.56)
Gross β: ND (2013) → ND (15)
Tritium: 4.7 (2013/ 8/18) → ND (1.8) Below 1/2

【North side of north breakwater(offshore 0.5km)】

【Port entrance】

【South side of south breakwater(offshore 0.5km)】

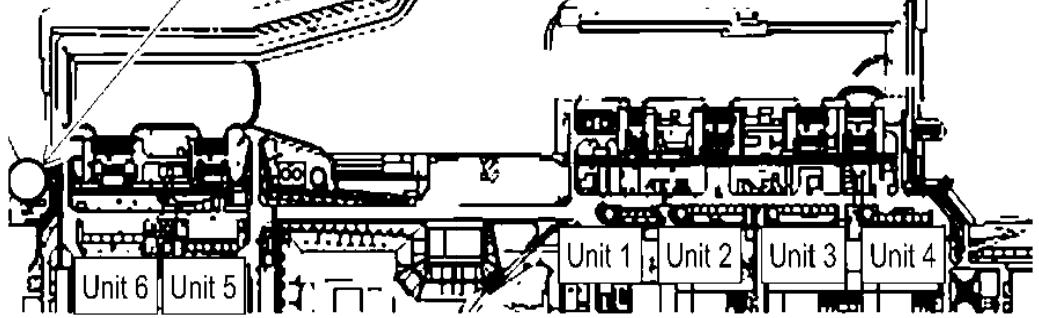
Cesium-134: ND (2013) → ND (0.73)
Cesium-137: ND (2013) → ND (0.72)
Gross β: ND (2013) → ND (15)
Tritium: ND (2013) → ND (1.8)

Cesium-134: 3.3 (2013/12/24) → ND (1.2) Below 1/2
Cesium-137: 7.3 (2013/10/11) → ND (1.2) Below 1/5
Gross β: 69 (2013/ 8/19) → ND (17) Below 1/4
Tritium: 68 (2013/ 8/19) → ND (1.5) Below 1/40

【North side of Units 5 and 6 discharge channel】

Cesium-134: 1.8 (2013/ 6/21) → ND (0.71) Below 1/2
Cesium-137: 4.5 (2013/ 3/17) → ND (0.76) Below 1/5
Gross β: (2013/12/23) →
Tritium: 8.6 (2013/ 6/26) → 3.5 Below 1/2

Cesium-134: ND (2013) → ND (0.85)
Cesium-137: 3.0 (2013/ 7/15) → ND (0.72) Below 1/4
Gross β: (2013/12/23) →
Tritium: 1.9 (2013/11/25) → 4.2



Sea side impermeable wall

Silt fence

【Around south discharge channel】

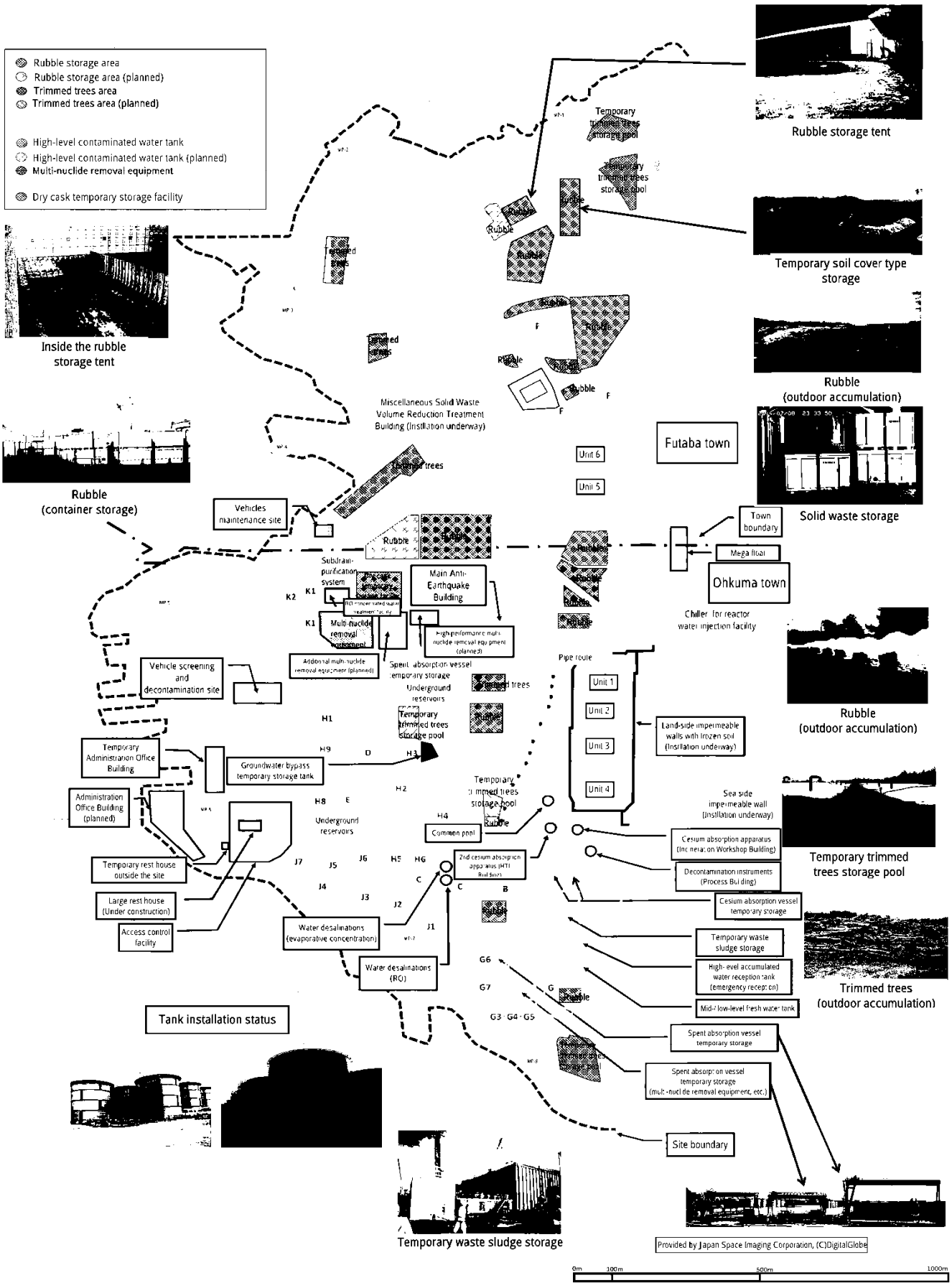
Note: The gross β measurement values include natural potassium 40 (approx. 12 Bq/L).

Summary of TEPCO data as of November 26

Source: TEPCO website, Analysis results on nuclides of radioactive materials around Fukushima Daiichi Nuclear Power Station, http://www.tepco.co.jp/nu/fukushima-np/f1/smp/index-j.html

Appendix 2
November 27, 2014

TEPCO Fukushima Daiichi Nuclear Power Station Site Layout

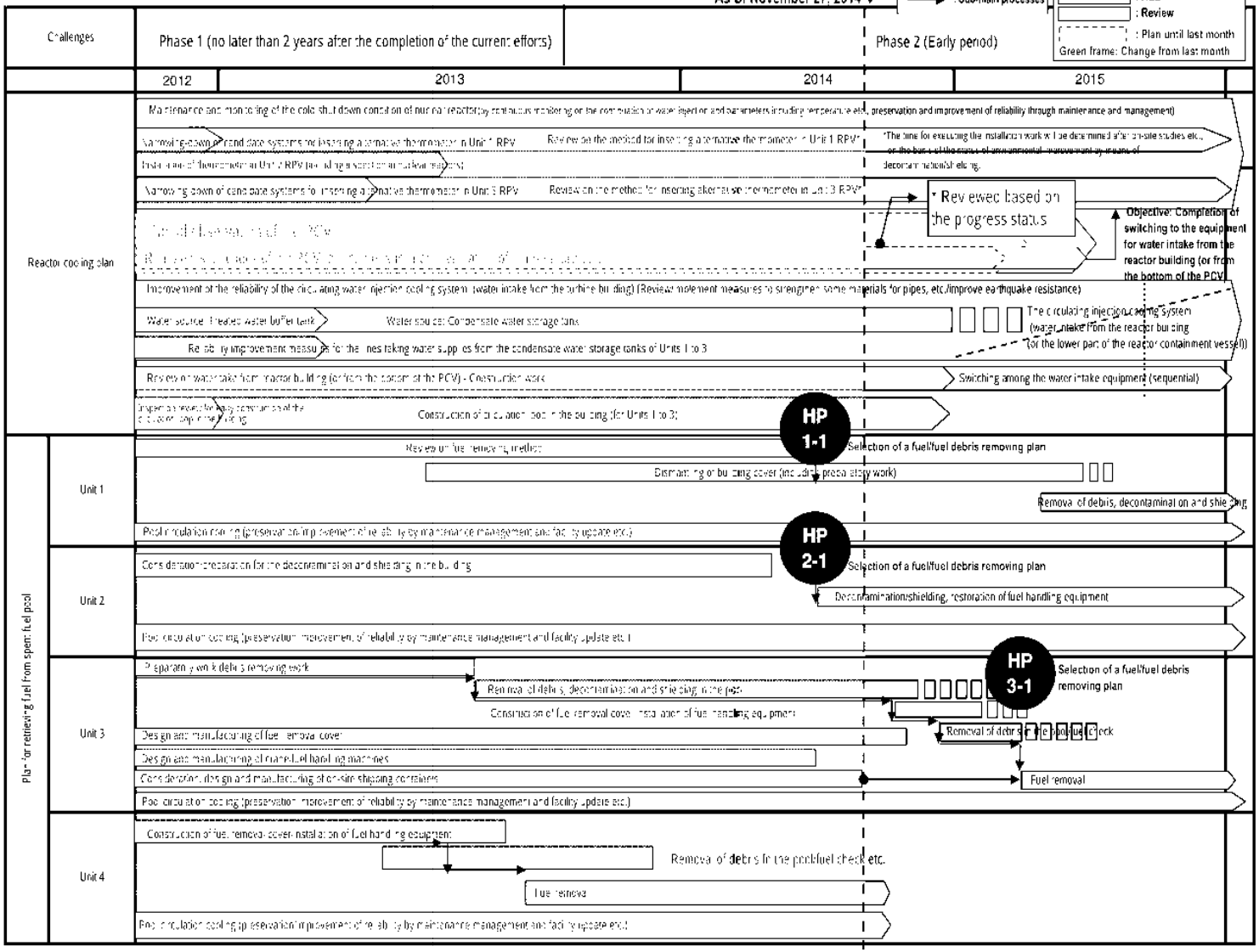


Status of efforts on various plans (Part 1)

Attachment 3

As of November 27, 2014

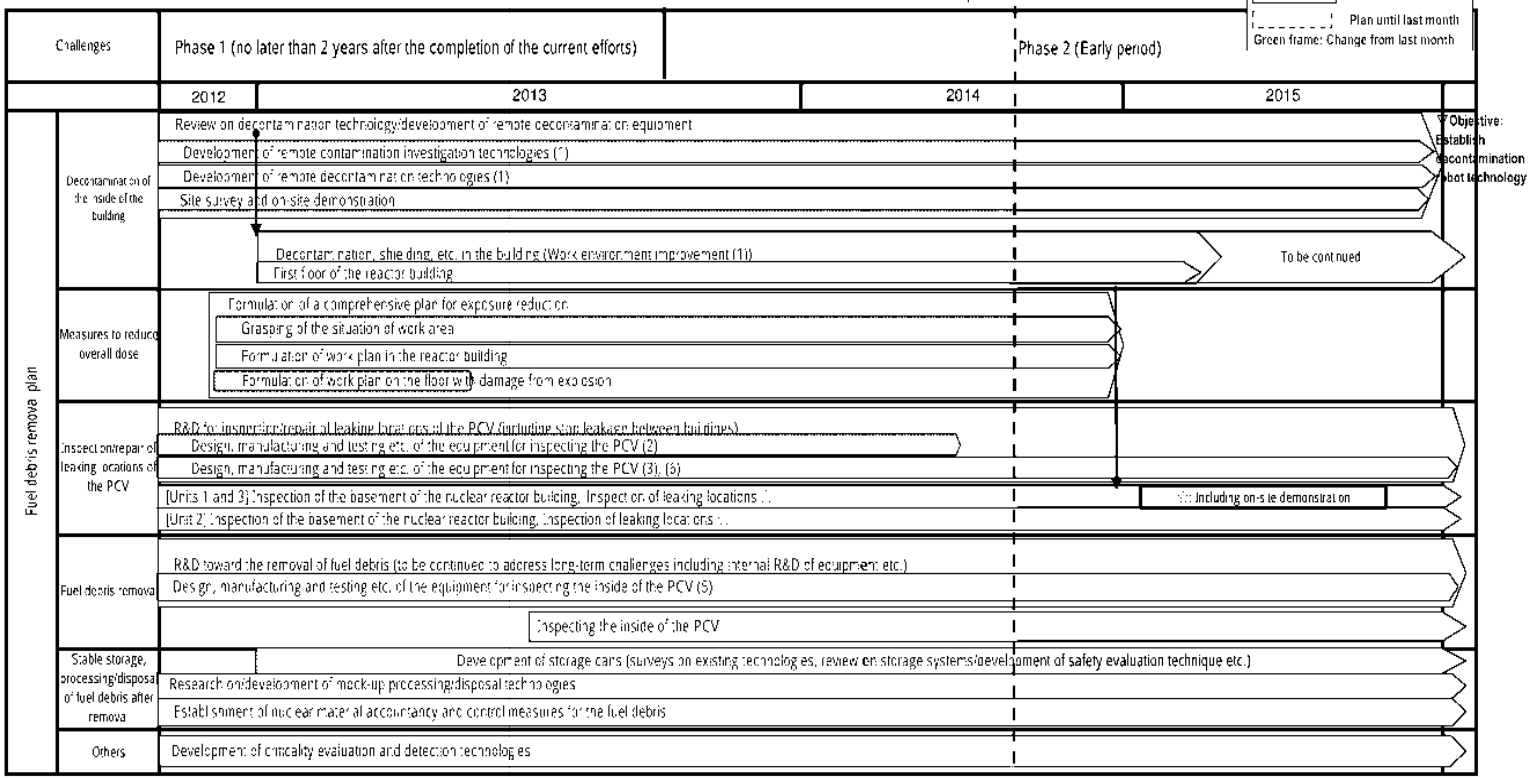
: Main processes
: Sub-main processes
: Field work
: R&D
: Review
: Plan until last month
Green frame: Change from last month



Status of efforts on various plans (Part 2)

As of November 27, 2014

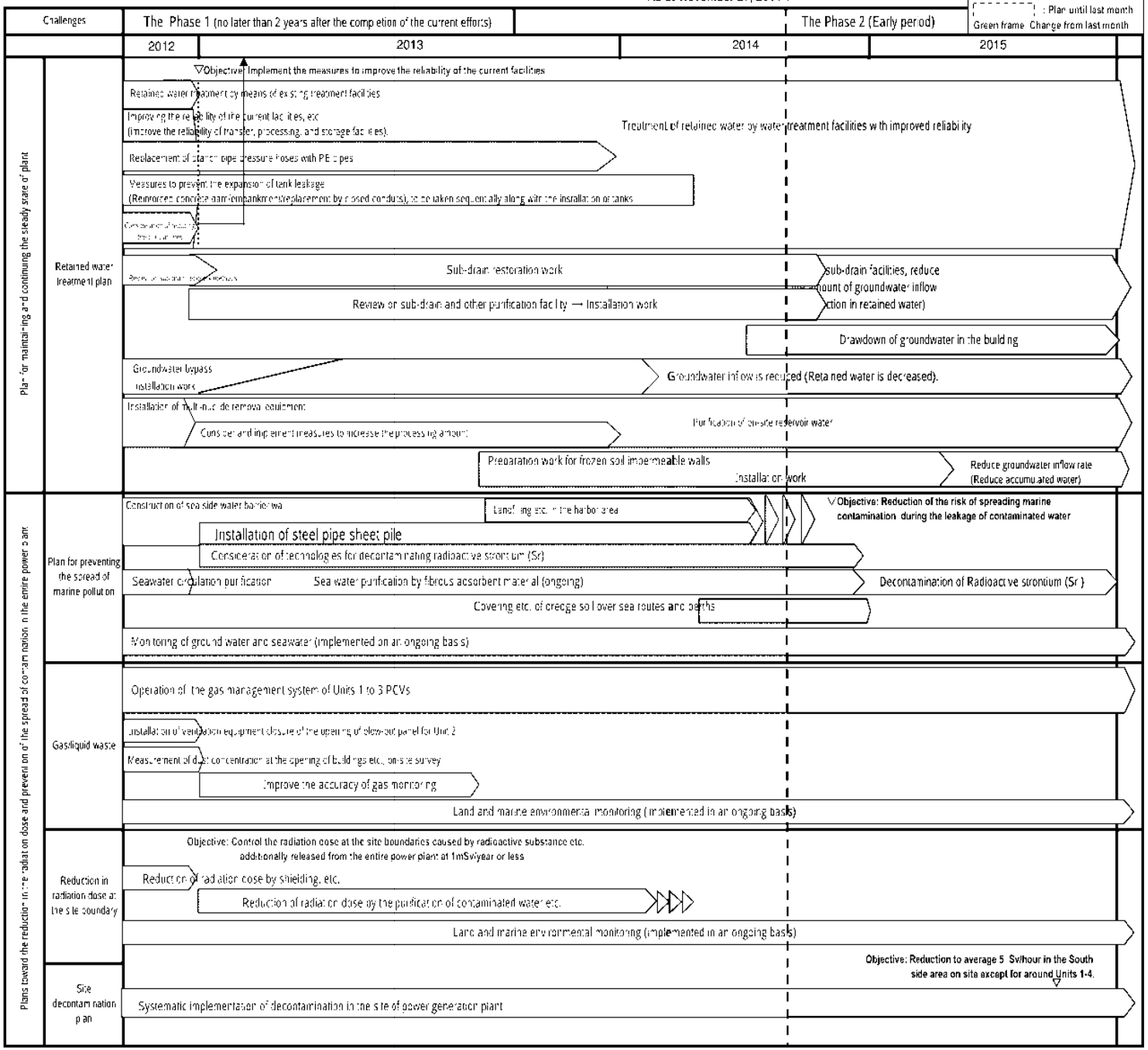
: Main processes
: Sub-main processes
: Field work
: R&D
: Review
Plan until last month
Green frame: Change from last month



Status of efforts on various plans (Part 3)

As of November 27, 2014▼

: Main processes
: Sub-main processes
: Field work
: R&D
: Review
: Plan until last month
Green frame: Change from last month

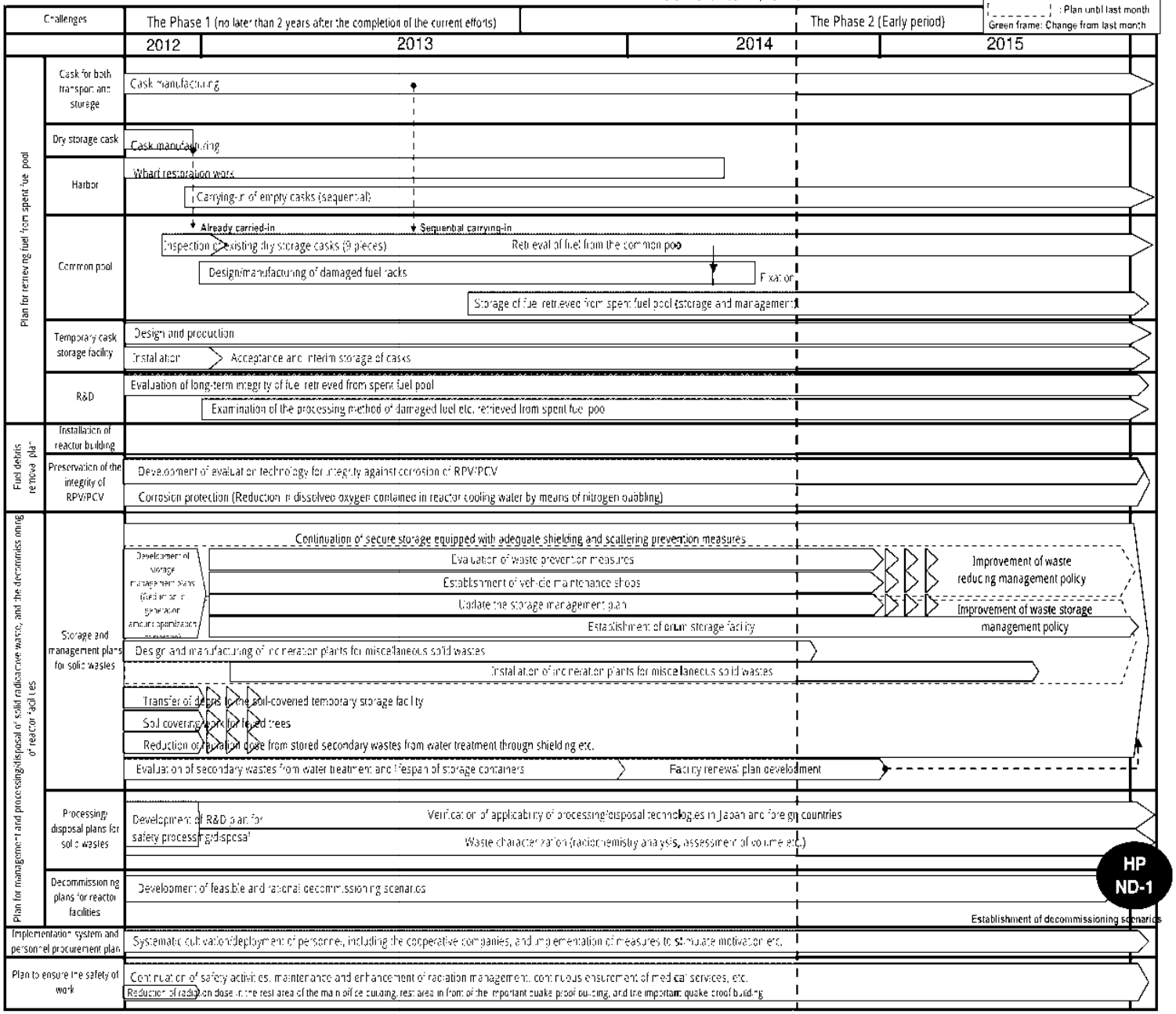


Status of efforts on various plans (Part 4)

As of November 27, 2014▼

: Main processes
: Sub-main processes

: Field work
: R&D
: Review
: Plan until last month
Green frame: Change from last month



Progress toward decommissioning: Fuel removal from the spent fuel pool (SFP)

Immediate target | Commence fuel removal from the Spent Fuel Pool (Unit 4, November 2013)

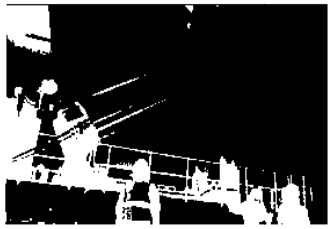
Unit 4

In the Mid- and Long-Term Roadmap, the target of Phase 1 involved commencing fuel removal from inside the spent fuel pool (SFP) of the 1st Unit within two years of completion of Step 2 (by December 2013). On November 18, 2013, fuel removal from Unit 4, or the 1st Unit, commenced and Phase 2 of the roadmap started.

On November 5, 2014, within a year of commencing work to remove the fuel, all 1,331 spent fuel assemblies in the pool had been transferred.

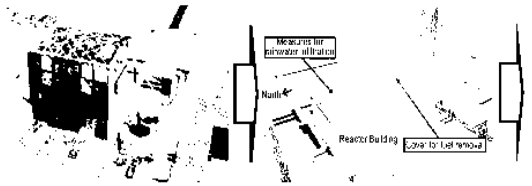
The transfer of spent fuel will be completed in the next transportation and the remaining non-irradiated fuel assemblies will be transferred to Unit 6 SFP within December. When completed, all fuel assemblies will have been removed from Unit 4. Based on this experience, fuel assemblies will be removed from Unit 1-3 pools.

Fuel removal status


Loading the transportation container onto the trailer

Work is proceeding with appropriate risk countermeasures, careful checks and safety first

Steps toward fuel removal



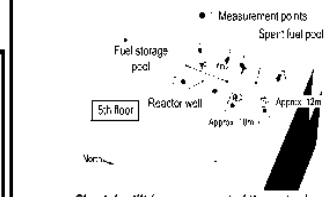
Removal of rubble from the roof of the Reactor Building — Completed in Dec. 2012

Installation of cover for fuel removal — From Apr. 2012, completed in Nov. 2013

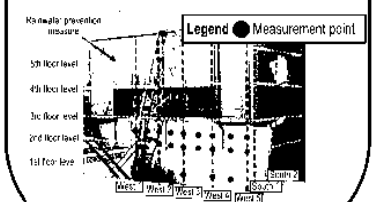
Removal — Commenced in Nov. 2013

Check of the soundness of the Reactor Building

Since May 2012, regular quarterly inspections have been conducted, which have confirmed that the soundness of the Reactor Building has been maintained.



Check for tilt (measurement of the water level)



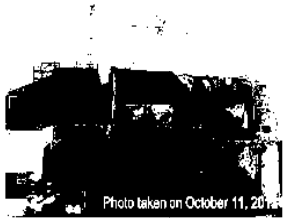
Check for tilt (measurement of the external wall)

* Some portions of these photos, in which classified information related to physical protection is included, were corrected.

Unit 3

To facilitate the installation of a cover for fuel removal, installation of the gantry was completed (March 13, 2013). Removal of rubble from the roof of the Reactor Building was completed (October 11, 2013). Currently, toward the installation of a cover for fuel removal and the fuel-handling machine on the operating floor (*1), measures to reduce the radiation dose (decontamination and shielding) are underway (from October 15, 2013). Removal of large rubble from the SFP is also underway (from December 17, 2013).

Before removal of the large rubble



After removal of the large rubble

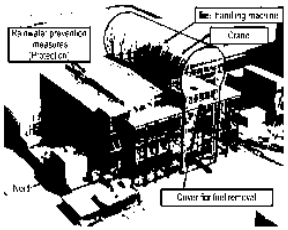


Image of the cover for fuel removal

Units 1 and 2

- Regarding Unit 1, there are plans to dismantle the cover over the Reactor Building to remove rubble from the top of the operating floor.

Two roof panels of the Unit 1 Reactor Building (R/B) were removed to facilitate investigation of the rubble status on the R/B top floor. When the building cover is dismantled and the rubble removed, sufficient measures to prevent scattering of radioactive materials will be taken and monitoring conducted.

- Regarding Unit 2, to prevent risks of reworking due to change in the fuel debris removal plan, the plan continues to be examined within a scope not affecting the scheduled commencement of removal.

Dismantling of the cover over Reactor Building Unit 1

To facilitate the early removal of fuel and fuel debris from the SFP, the cover over the Reactor Building will be dismantled to accelerate the removal of rubble on the operation floor. The radiation dose on the site boundaries will also increase compared to before the dismantling. However, through measures to reduce the release, the estimated impact of the release from Units 1 to 3 on the site boundaries (0.03mSv/year) will be limited.

1 Spraying anti-scattering agents

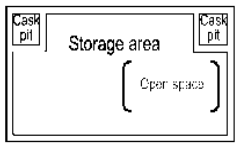
2 Removing dust and dirt by suctioning devices

3 Preventing dust from being stirred up via a windbreak sheet system by

4. Enhancing the dust-monitoring system by installing additional monitors

Measures to reduce release

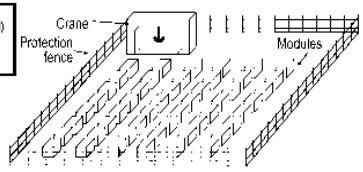
Common pool



An open space will be maintained in the common pool (Transfer to the temporary dry cask storage facility)

Progress to date
- The common pool has been restored to a condition allowing it to re-accommodate fuel to be handled (November 2012)
- Loading of spent fuel stored in the common pool to dry casks commenced (June 2013)
- Fuel removed from the Unit 4 spent fuel pool began to be received (November 2013)

Temporary dry cask (*2) storage facility



Spent fuel is accepted from the common pool

Operation commences on April 12, 2013; from the cask storage building, transfer of 9 existing dry casks completed (May 21, 2013); fuel stored in the common pool sequentially transferred

<Glossary>
(*1) Operating floor: During regular inspection, the roof over the reactor is opened while on the operating floor, fuel inside the core is replaced and the core internals are inspected.
(*2) Cask: Transportation container for samples and equipment including radioactive materials.

Progress toward decommissioning: Works to identify the plant status and toward fuel debris removal

November 27, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment

Immediate target	Identify the plant status and commence R&D and decontamination toward fuel debris removal

3D laser scan inside the Unit 1 R/B underground floor

The upper part of the underground floor (torus room) of Unit 1 R/B was investigated with a laser scan using a remote-controlled robot, and collected 3D data.

3D data, which allows examination based on actual measurements, can be used to examine more detailed accessibility and allocation of equipment.

Combining it with 3D data on the R/B 1st floor allows obstacles on both 1st and underground floors to be checked simultaneously. This allows efficient examination of positions to install repair equipment for PCVs and vacuum break lines.

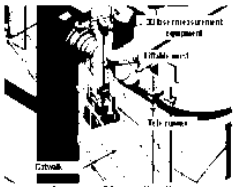
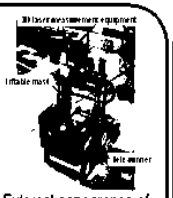


Image of investigation



External appearance of remote-controlled robot

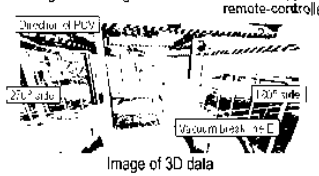


Image of 3D data

Investigation in the leak point detected in the upper part of Unit 1 Suppression Chamber (S/C(*1))

Investigation in the leak point detected in the upper part of Unit 1 S/C from May 27 from one expansion joint cover among the lines installed there. As no leakage was identified from other parts, specific methods will be examined to halt the flow of water and repair the PCV.

Leak point

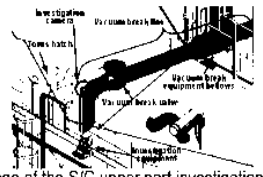
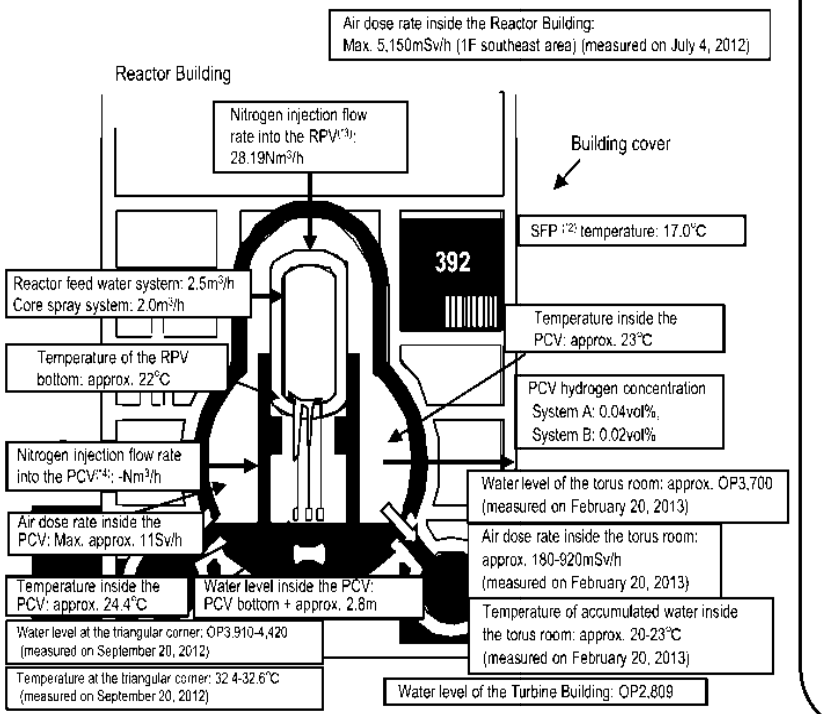


Image of the S/C upper part investigation

Unit 1



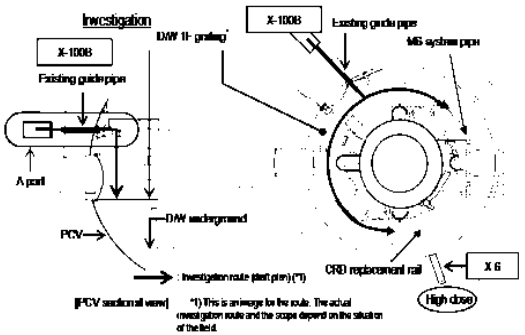
* Indices related to the plant are values as of 11:00, November 26, 2014

Status of equipment development toward investigating inside the PCV

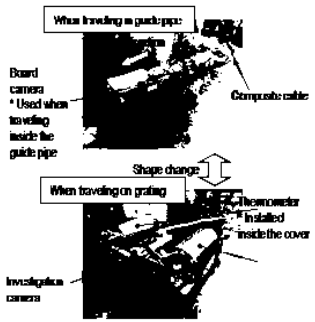
Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigation inside the PCV is scheduled.

[Investigative outline]
- Inserting equipment from Unit 1 X-100B penetration(*5) to investigate in clockwise and counter-clockwise directions.

[Status of investigation equipment development]
- Crawler-type equipment with a shape-changing structure which allows it to enter the PCV from the narrow access entrance (bore: φ100mm) and stably move on the grating is currently uncer development. A field demonstration is scheduled for the 2nd half of FY2014.



Investigative route inside the PCV (draft plan)



<Glossary>
(*1) S/C (Suppression Chamber): Suppression pool, used as the water source for the emergent core cooling system.
(*2) SFP (Spent Fuel Pool):
(*3) RPV (Reactor Pressure Vessel)
(*4) PCV (Primary Containment Vessel)
(*5) Penetration: Through-hole of the PCV

Progress toward decommissioning: Works to identify the plant status and toward fuel debris removal

November 27, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment
3/6

Immediate target	Identify the plant status and commence R&D and decontamination toward fuel debris removal

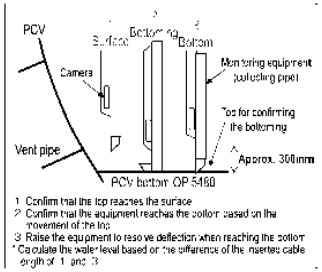
Installation of an RPV thermometer and permanent PCV supervisory instrumentation

(1) Replacement of the RPV thermometer

- As the thermometer installed at the Unit 2 RPV bottom after the earthquake had broken, it was excluded from the monitoring thermometers (February 19).
- On April 17, removal of the broken thermometer failed and was suspended. With the final aim of removing the thermometer, the on-site method is currently being selected through testing. The removal will be impermanent in around January 2015.

(2) Reinstallation of the PCV thermometer and water-level gauge

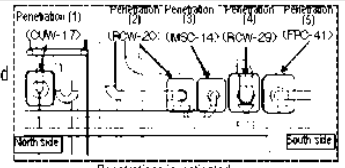
- Some of the permanent supervisory instrumentation for PCV could not be installed in the planned locations due to interference with existing grating (August 13, 2013).
- The instrumentation was removed on May 27, 2014 and new instruments were reinstalled on June 5 and 6. The trend of added instrumentation will be monitored for approx. one month to evaluate its validity.
- The measurement during the installation confirmed that the water level inside the PCV was approx. 300mm from the bottom.



Method to measure water levels when re-installing monitoring instrumentation for Unit 2 PCV

Investigative results on torus room walls

- The torus room walls were investigated (on the north side of the east-side walls) using equipment specially developed for that purpose (a swimming robot and a floor traveling robot).
- At the east-side wall pipe penetrations (five points), "the status" and "existence of flow" were checked.
- A demonstration using the above two types of underwater wall investigative equipment showed how the equipment could check the status of penetration.
- Regarding Penetrations 1 - 5, the results of checking the sprayed tracer (*5) by camera showed no flow around the penetrations. (investigation by the swimming robot)
- Regarding Penetration 3, a sonar check showed no flow around the penetrations. (investigation by the floor traveling robot)



Penetrations investigated

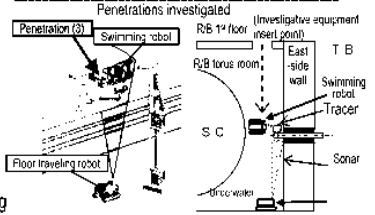
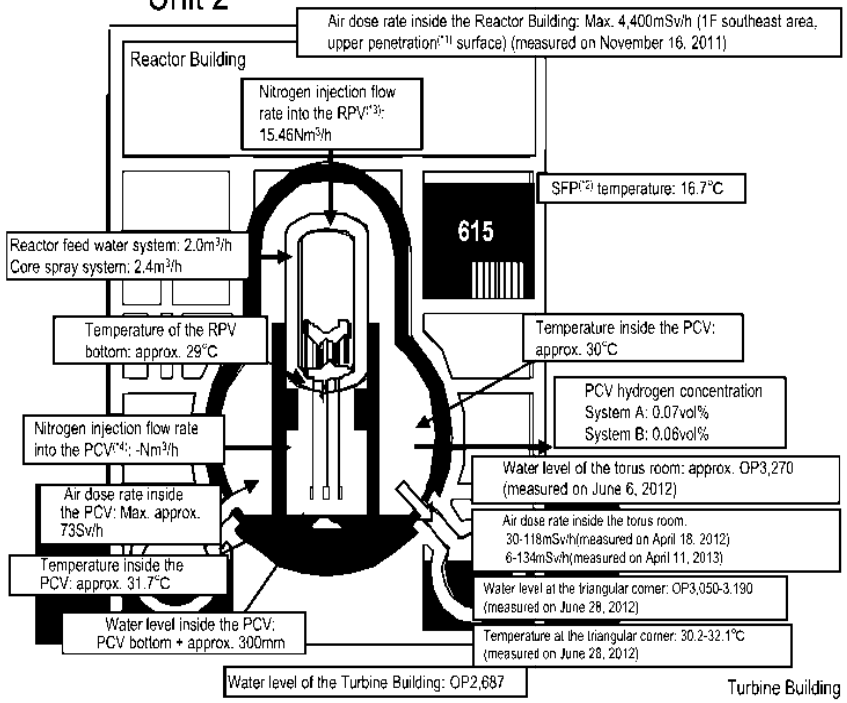


Image of the torus room east-side cross-sectional investigation

Unit 2



* Indices related to plant are values as of 11:00, November 26, 2014

Status of equipment development toward investigating inside the PCV

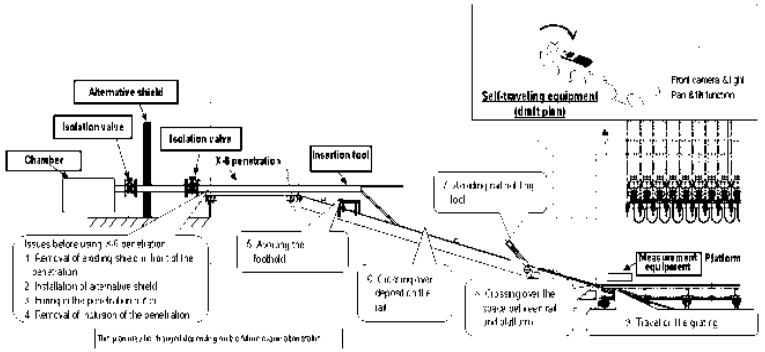
Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigations inside the PCV are scheduled.

[Investigative outline]

- Inserting the equipment from Unit 2 X-6 penetration(*1) and accessing inside the pedestal using the CRD rail to conduct investigation.

[Status of investigative equipment development]

- Based on issues confirmed by the CRD rail status investigation conducted in August 2013, the investigation method and equipment design are currently being examined. A demonstration is scheduled in the field in the 2nd half of FY2014.



Investigative issues inside the PCV and equipment configuration (draft plan)

<Glossary>
(*1) Penetration: Through-hole of the PCV (*2) SFP (Spent Fuel Pool)
(*3) RPV (Reactor Pressure Vessel) (*4) PCV (Primary Containment Vessel)
(*5) Tracer: Material used to trace the fluid flow. Clay particles

Progress toward decommissioning: Works to identify the plant status and toward fuel debris removal

November 27, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment
4/6

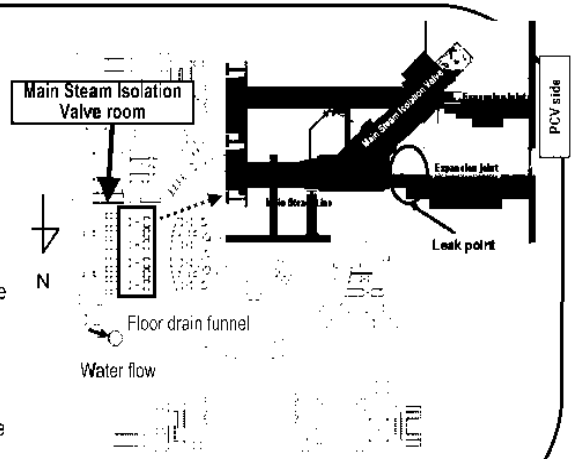
Immediate target	Identify the plant status and commence R&D and decontamination toward fuel debris removal

Water flow was detected from the Main Steam Isolation Valve* room

On January 18, a flow of water from around the door of the Steam Isolation Valve room in the Reactor Building Unit 3 1st floor northeast area to the nearby floor drain funnel (drain outlet) was detected. As the drain outlet connects with the underground part of the Reactor Building, there is no possibility of outflow from the building.

From April 23, image data has been acquired by camera and the radiation dose measured via pipes for measurement instrumentation, which connect the air-conditioning room on the Reactor Building 2nd floor with the Main Steam Isolation Valve Room on the 1st floor. On May 15, water flow from the expansion joint of one Main Steam Line was detected.

This is the first leak from PCV detected in Unit 3. Based on the images collected in this investigation, the leak volume will be estimated and the need for additional investigations will be examined. The investigative results will also be utilized to examine water stoppage and PCV repair methods.



Outline of the water-flow status

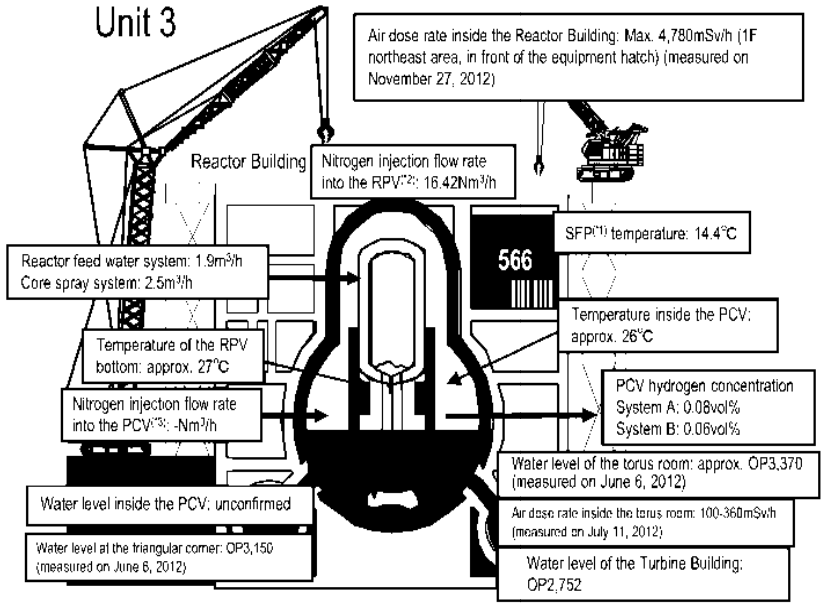
* Main Steam Isolation Valve: A valve to shut off the steam generated from the Reactor in an emergency

Decontamination inside R/B

- The contamination status inside the Reactor Building (R/B) was investigated by a robot (June 11-15, 2012).
- To select an optimal decontamination method, decontamination samples were collected (June 29 to July 3, 2012).
- To facilitate decontamination inside the Reactor Building, removal of obstacles on the 1st floor was conducted (from November 18, 2013 to March 20, 2014).

Robot for investigating the contamination status (gamma camera mounted)

Unit 3



* Indices related to plant are values as of 11:00, November 26, 2014

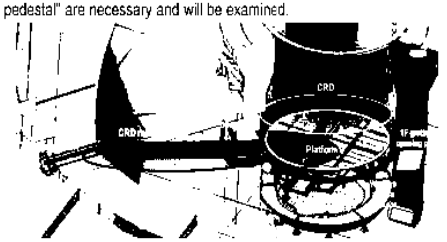
Status of equipment development toward investigating inside the PCV

Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigation inside the PCV is scheduled. As the water level inside the PCV is high and the penetration scheduled for use in Units 1 and 2 may be under the water, another method needs to be examined.

[Steps for investigation and equipment development]

(1) Investigation from X-53 penetration
- From October 22-24, the status of X-53 penetration, which may be under the water and which is scheduled for use to investigate the inside of the PCV, was investigated using remote-controlled ultrasonic test equipment. Results showed that the penetration is not under the water.
- An investigation of the inside of the PCV is scheduled for around the 1st half of FY2015. Given the high radioactivity around X-53 penetration, the introduction of remote-controlled equipment will be examined based on the decontamination status and shielding.

(2) Investigation plan following the investigation of X-53 penetration
- Based on the measurement values of hydraulic head pressure inside the PCV, X-6 penetration may decline. It is estimated that access to X-6 penetration is difficult.
- For access from another penetration, approaches such as "further downsizing the equipment" or "moving in water to access the pedestal" are necessary and will be examined.



<Glossary>
(*1) SFP (Spent Fuel Pool)
(*2) RPV (Reactor Pressure Vessel)
(*3) PCV (Primary Containment Vessel)

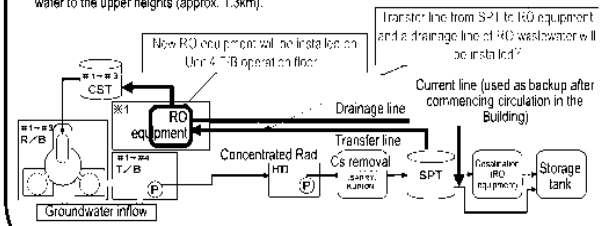
Progress toward decommissioning: Work related to circulation cooling and accumulated water treatment line

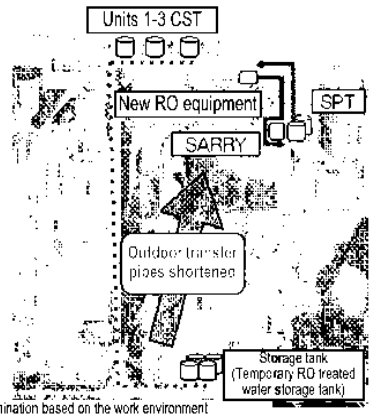
Immediate target | Stably continue reactor cooling and accumulated water treatment, and improve reliability

Work to improve the reliability of the circulation water injection cooling system and pipes to transfer accumulated water.

- Operation of the reactor water injection system using Unit 3 CST as a water source commenced (from July 5, 2013). Compared to the previous systems, in addition to the shortened outdoor line, the reliability of the reactor water injection system was enhanced, e.g. by increasing the amount of water-source storage and enhancing durability.
- By newly installing RO equipment inside the Reactor Building by the end of FY2014, the reactor water injection loop (circulation loop) will be shortened from approx. 3km to approx. 0.8km*.

* The entire length of contaminated water transfer pipes is approx. 2.1km, including the transfer line of surplus water to the upper heights (approx. 1.3km).

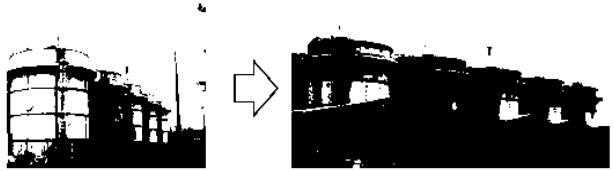




*1 Unit 4 T/B operation floor is one of the installation proposals, which will be determined after further examination based on the work environment
*2 A detailed line configuration will be determined after further examination

Typhoon measures improved for Tank Area

- Enhanced rainwater measures were implemented, including increasing the height of fences to increase the capacity to receive rainwater and installing rain gutters and fence cover to prevent rainwater inflow. Though a total of 300mm of rainfall was recorded by typhoon Nos. 18 and 19, no outflow of contaminated rainwater from inside the fences was detected.

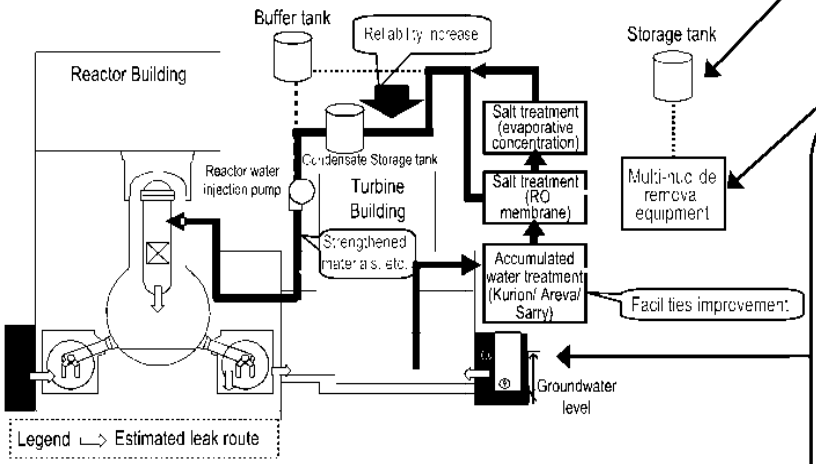


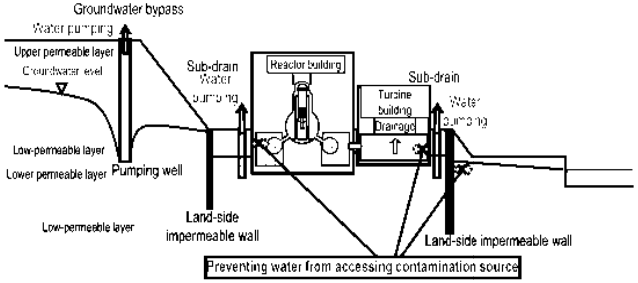
Before installing the fence cover | After installing the fence cover

Risk reduction of contaminated water stored in tanks

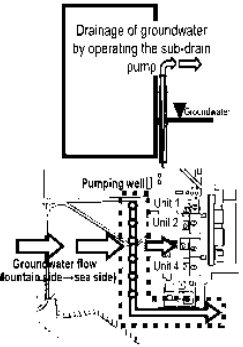
All three multi-nuclide removal equipment (ALPS) systems (existing, additional and high-performance) are operating.

In addition, work to install multiple treatment equipment to reduce strontium density is underway. This equipment is also used to reduce the risks of contaminated water stored in tanks.





Preventing groundwater from flowing into the Reactor Buildings



Aiming to reduce the level of groundwater by pumping subdrain water, tests were conducted to verify the stable operation of water treatment facilities, including subdrain.

The results showed that through purification by the system, the density of radioactive materials declined to below the operational target and no other γ nuclides were detected.

Reducing groundwater inflow by pumping sub-drain water

Measures to pump up groundwater flowing from the mountain side upstream of the Building to reduce the groundwater inflow (groundwater bypass) have been implemented.

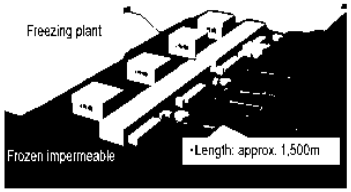
The pumped up groundwater is temporarily stored in tanks and released after TEPCO and a third-party organization have confirmed that its quality meets operational targets.

Through periodical monitoring, pumping of wells and tanks is operated appropriately.

At the observation holes installed at a height equivalent to the buildings, the trend showing a decline in groundwater levels is checked.

The analytical results on groundwater inflow into the buildings based on existing data showed a declining trend.

Via a groundwater bypass, reduce the groundwater level around the Building and groundwater inflow into the Building



To prevent the inflow of groundwater into the Reactor Buildings, installation of impermeable walls surrounding the buildings on the land side is planned.

Targeting efforts to commence freezing at the end of this fiscal year, drilling holes to install frozen pipes commenced from June 2.

<Glossary>
(*1) CST (Condensate Storage Tank)
Tank for temporarily storing water used in the plant.

Installing frozen impermeable walls around Units 1-4 to prevent the inflow of groundwater into R/B

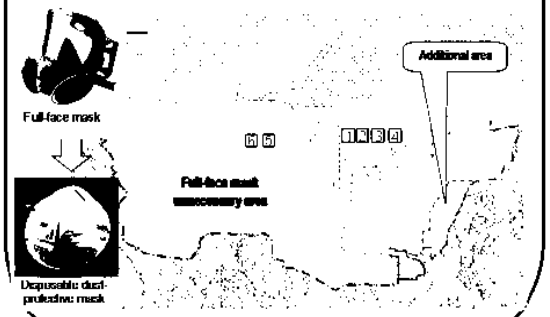
Progress toward decommissioning: Work to improve the environment within the site

Immediate targets	・Reduce the effect of additional release from the entire power station and radiation from radioactive waste (secondary water treatment waste, rubble, etc.) generated after the accident, to limit the effective radiation dose to below 1mSv/year at the site boundaries. ・Prevent contamination expansion in sea, decontamination within the site

Expansion of full-face mask unnecessary area

Operation based on the rules for mask wearing according to radioactive material density in air and decontamination/ ionization rules was defined, and the area is being expanded.

In the J tank installation area on the south side of the site, as decontamination was completed, the area will be set as full-face mask unnecessary area (from May 30), where for works not handling contaminated water, wearing disposable dust-protective masks will be deemed sufficient .

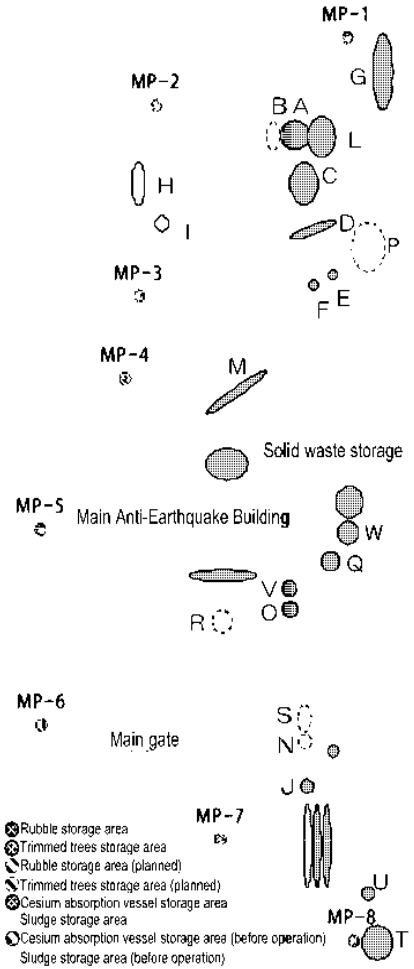


Full-face mask unnecessary area

Expansion of work areas for women

Regarding female workers engaging in radioactivity-related jobs at the Fukushima Daiichi Nuclear Power Station, there has been no onsite work area since the East Japan Great Earthquake due to the increased radioactivity rate. However, improved work environment conditions mean female workers have been allowed to work within limited onsite areas since June 2012.

Based on the improved onsite work environment and the reduced potential for internal exposure, work areas for female workers will be expanded site-wide, excluding specified high-dose works and those for which the radiation dose exceeds 4mSv per exposure (from November 4.)

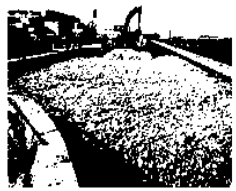


Installation of impermeable walls on the sea side

To prevent contamination expansion into the sea where contaminated water had leaked into groundwater, impermeable walls are being installed (scheduled for completion in September 2014).

Installation of steel pipe sheet piles temporarily completed by December 4, 2013 except for 9 pipes.

The next stage will involve installing steel pipe sheet piles outside the port, landfilling within the port, and installing a pumping facility to close before the construction completion.



Installation status of impermeable walls on the sea side
(Landfill status on the Unit 1 intake side)

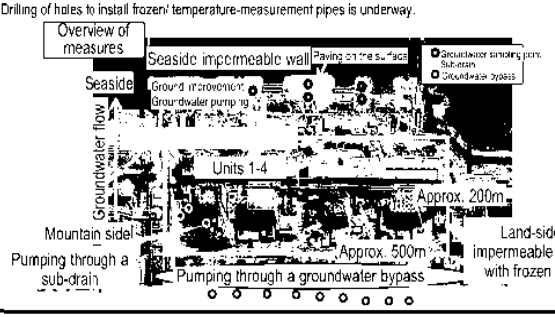
Reducing radioactive materials in seawater within the harbor

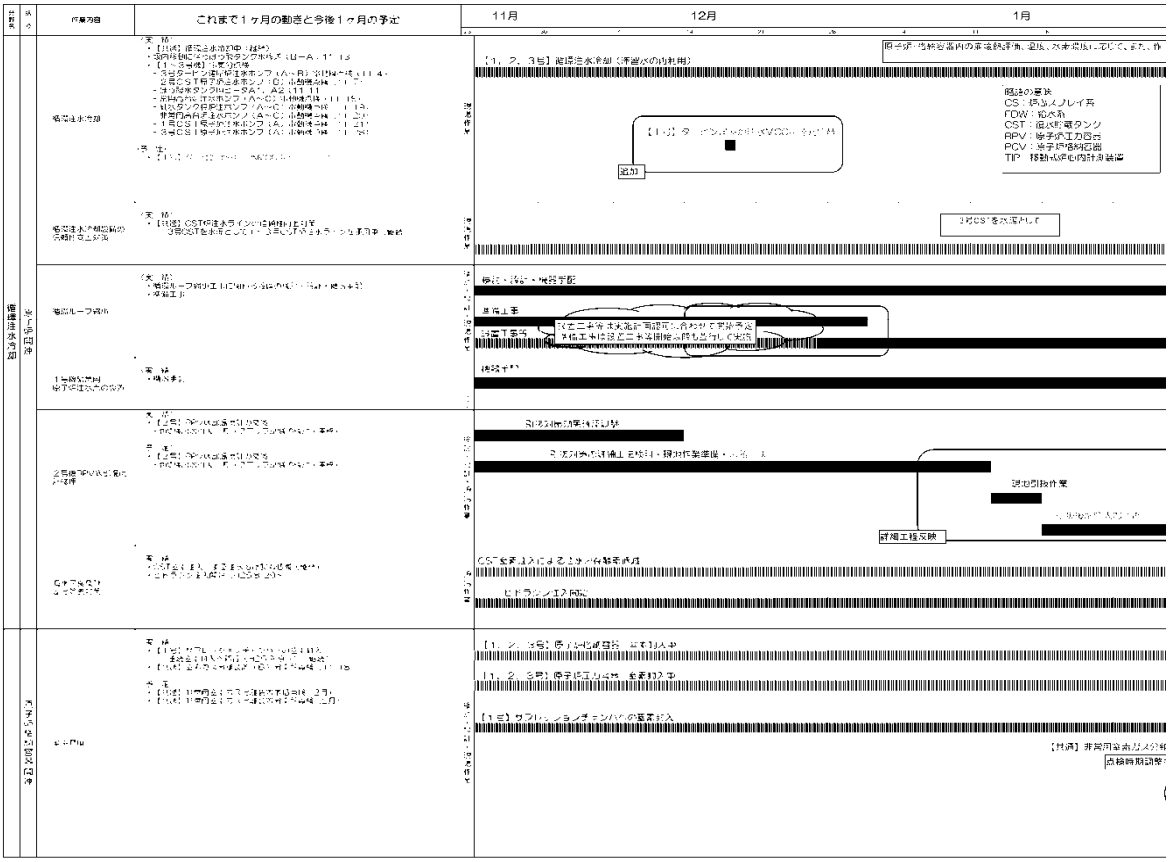
- The analytical result for data such as the density and level of groundwater on the east (sea) side of the Building identified that contaminated groundwater was leaking into seawater.
- No significant change has been detected in seawater within the harbor for the past month, nor was any significant change detected in offshore measurement results as of last month.
- To prevent contamination expansion into the sea, the following measures are being implemented:

(1) Prevent leakage of contaminated water
- Ground improvement behind the bank to prevent the expansion of radioactive materials.
  (Between Units 1 and 2: completed on August 9, 2013;
  between Units 2 and 3: from August 29 and completed on December 12, 2013;
  between Units 3 and 4: from August 23, 2013 and completed on January 23, 2014)
- Pumping groundwater in contaminated areas (from August 9, 2013, scheduled to commence sequentially)

(2) Isolate water from contamination
- Enclosure by ground improvement on the mountain side
  (Between Units 1 and 2: from August 13, 2013 and completed on March 25, 2014;
  between Units 2 and 3: from October 1, 2013 and completed on February 6, 2014;
  between Units 3 and 4: from October 19, 2013 and completed on March 5, 2014)
- To prevent the ingress of rainwater, the ground surface was paved with concrete (commenced on November 25, 2013 and completed on May 2, 2014)

(3) Eliminate contamination sources
- Removing contaminated water in branch trenches and closing them (completed on September 19, 2013)
- Treatment and removal of contaminated water in the seawater pipe trench
  Unit 2: November 14, 2013 – April 25, 2014, treatment of cesium and strontium.
  From November 26, work to remove contaminated water and fill trenches with cement-based materials has got underway.
  Unit 3: November 15, 2013 – July 28, 2014, treatment of cesium.
  Drilling of holes to install frozen/ temperature-measurement pipes is underway.




作業内容
これまで1ヶ月の動きと今後1ヶ月の予定
11月
12月
1月
循環注水冷却
【1，2，3号】循環注水冷却（淡水の再利用）
原子炉・格納容器内の滞留水、追加、水素爆発によってさらに作
【1号】ターピンビルVCS
追加
略語の凡例
CS：循環ノズル
FDW：給水系
CST：復水貯蔵タンク
RPV：原子炉圧力容器
PCV：原子炉格納容器
TIP：移動式炉内計測装置
3号CSTを水源として
循環注水冷却
循環ループ構成
現状の構成・機器配置
追加工事
詳細工事計画
※左記工事着手後計画調整に合わせて実施予定
※循環工事は設定ミス等調整の時も並行して実施
維持管理
1号機原子炉格納容器内の水位
1号機PCV水位計の信頼性向上
詳細工程反映
CST重要上流にあるタンクの解体撤去
ヒドラジン注入開始
【1，2，3号】原子炉圧力容器・窒素封入中
【1号】サプレッションチェンバへの窒素封入
【共通】非常用発電設備
点検時期調整
廃炉作業
循環注水冷却
今日の作業

作業項目
これまで1ヶ月の動きと今後1ヶ月の予定
11月
12月
1月
PCVガス処理
PCVガス処理
【1、2、3号】機械運転中
【3号】PCVガス制御・電源盤据付・配線
準備
本体
【1号】PCVガス制御盤・電源盤据付・配線
【1号】S.F.P.ラック撤去
【1、2、3、4号】建屋壁一部取り壊し
【1、3、4号】コンクリートポンプ車等の搬入搬出
【1、2、3、4号】ヒドラジン導入による除染
【1、2、3、4号】フール設置撤去

循環ループ縮小化工事の対応状況について

東京電力株式会社

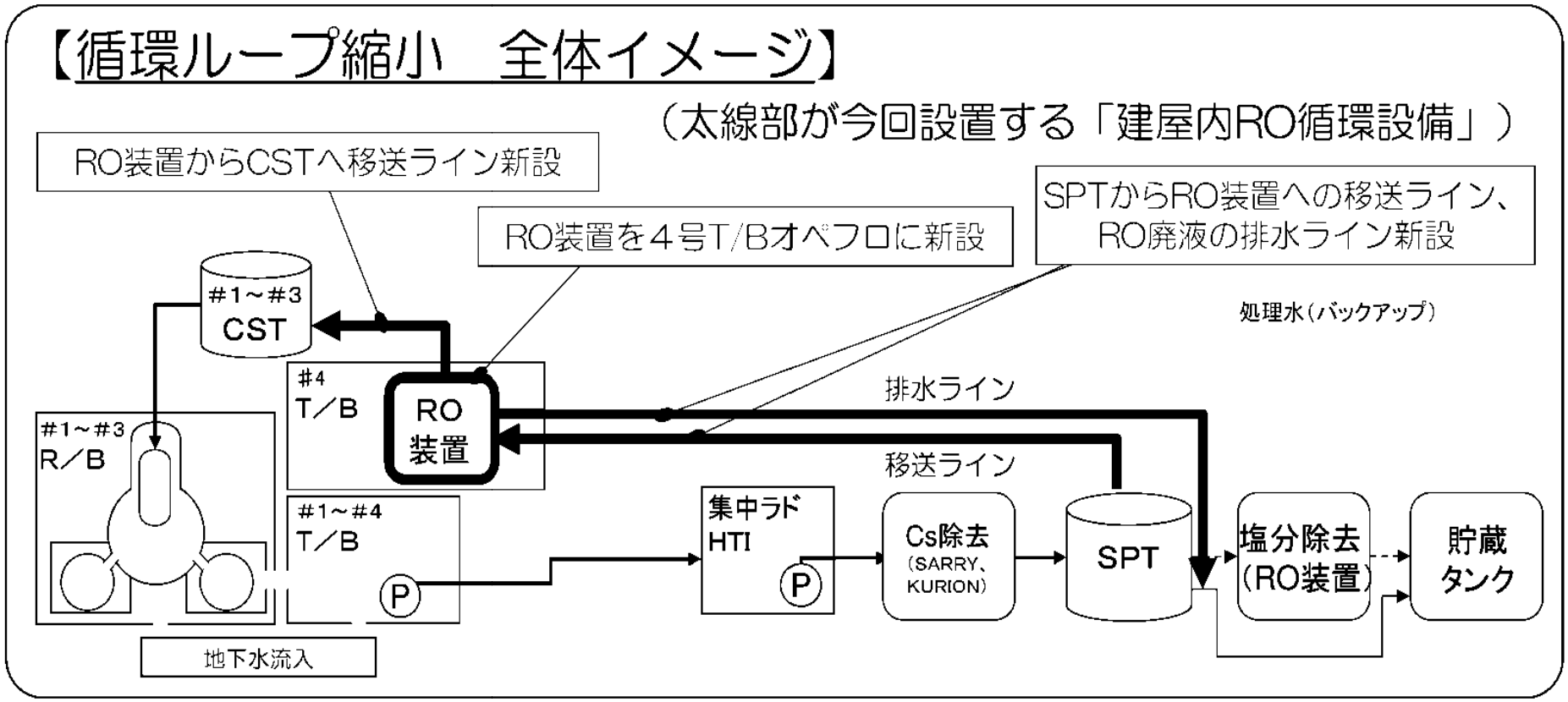
平成26年12月25日

1．循環ループ縮小化工事について

概要

汚染水の移送、水処理、炉注を行う循環ループの内、塩分除去（RO）装置を４号タービン建屋に設置し、循環ループの縮小による屋外移送配管の漏えいリスク低減等を行うもの。（これに伴い設置する設備を「建屋内RO循環設備」と呼ぶ）。

当該取組により、循環ループ（屋外移送配管）は約3kmから約0.8kmに縮小され、高台エリア（35m盤）の経由が不要となる（滞留水移送ラインを含めると約2.1km）。



2．位置付け及び他の取組との関連性について

位置付け

ロードマップ記載の建屋内循環ループの構築に向けた作業と位置付け、2014年度末までの設置、運転開始を目標に取り組むことを公表（2013年11月廃炉推進会議にて説明済）

当該取組が完了するまでは、既設の水処理設備等で運用を継続（他の廃炉作業、汚染水対策等への影響なし）。

他の取組との関連性

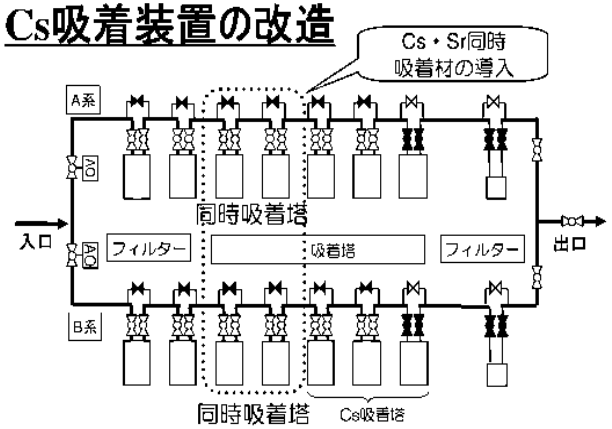
Cs吸着装置の改造により、年内にSr同時吸着塔を導入予定であり、Cs吸着装置以降の放射能インベントリが低減可能となる見込み。

⇨ **循環ループ縮小化の範囲（Cs吸着装置以降）の汚染水漏えいリスクの低減が可能。**

2014年度～2015年度上期での対応を目標とした対応（汚染水処理、凍土遮水壁設置等）が多く、関連工事（高性能多核種除去設備設置工事、建屋内滞留水移送設備設置工事等）と現場作業や設計・製作工程での輻輳が発生。また、作業干渉による作業安全上の問題等も懸念あり。

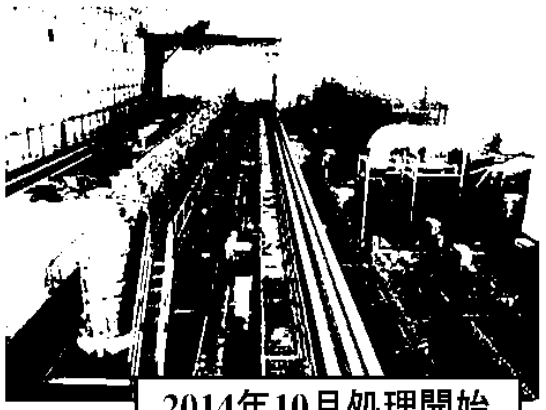
⇨ **廃炉作業全体のバランスを考慮し、各取組を着実に進めることが必要。**

Cs吸着装置の改造



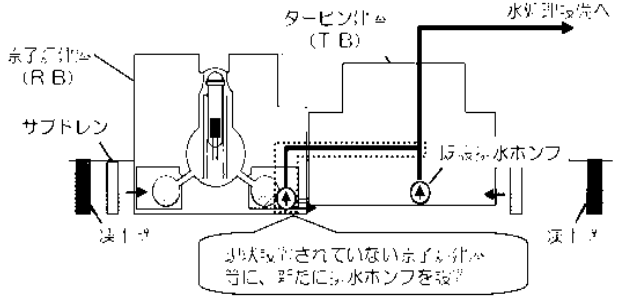
2014年12月下旬より運用開始予定

高性能多核種除去設備



2014年10月処理開始

建屋内滞留水移送設備



2014年度中に設置予定

3．当該取組の対応状況について

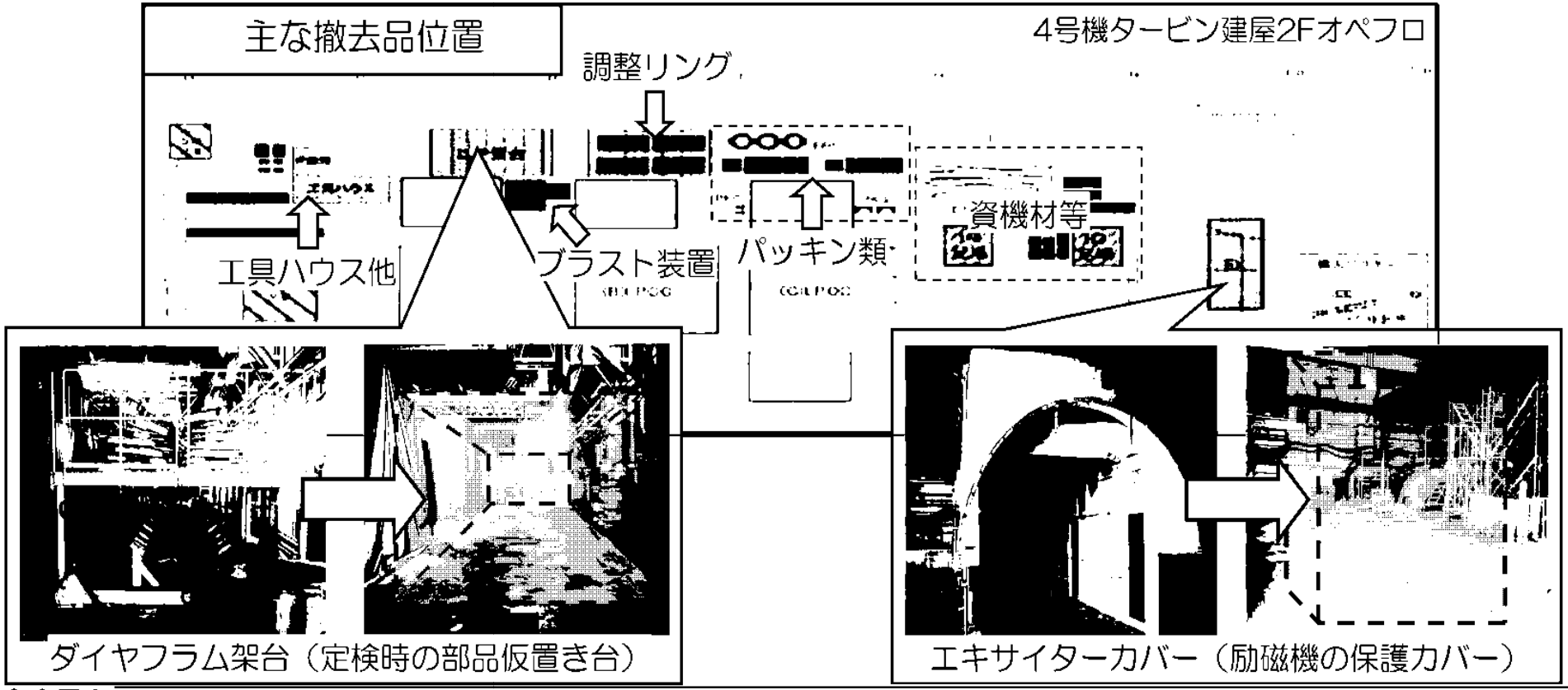
対応状況

2014年7月に実施計画変更申請実施。以降、２回の補正申請を行い、現在審査中。

2014年8月より建屋内RO循環設備を設置する４号タービン建屋オペフロ等の干渉物撤去作業を実施中。

2014年11月より屋外配管ルートの整地作業を実施中。

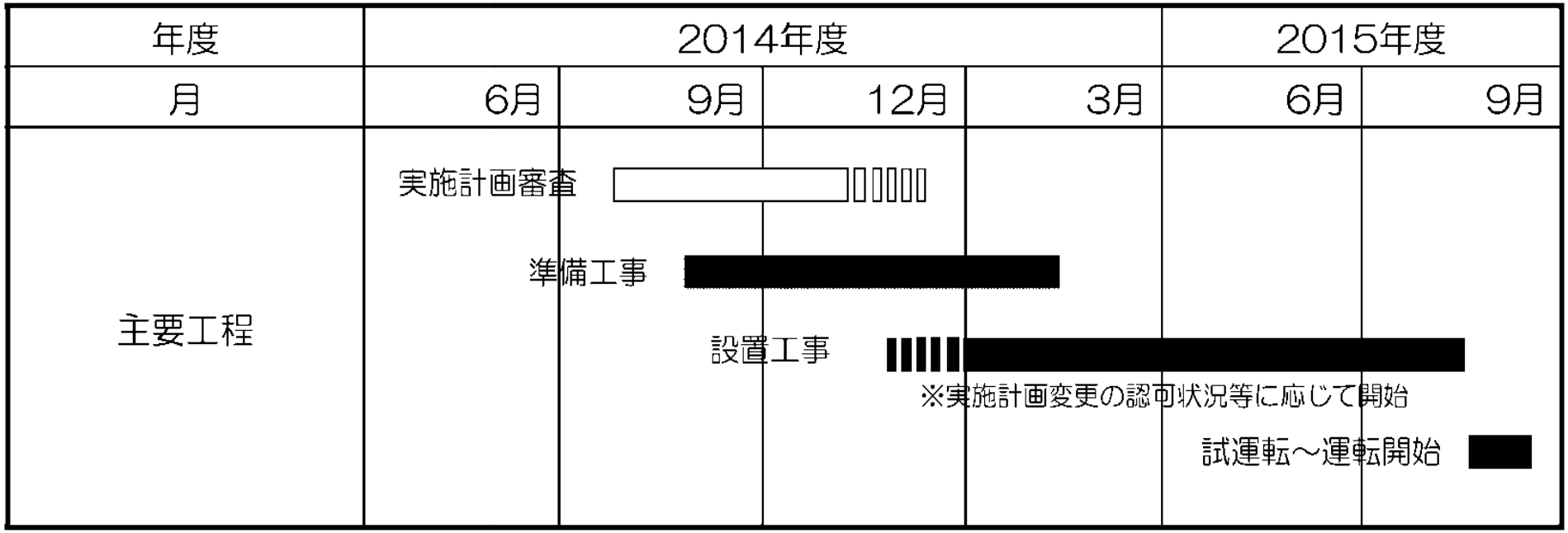
実施計画変更申請の認可状況に応じ、本格的な機器等の設置を実施予定。



4．今後の対応について

Cs吸着装置の改造（Sr同時吸着塔の導入）等により循環ループ縮小範囲の汚染水漏えいリスク（放射能インベントリ）も改善される予定。
一方、当該対応との輻輳が発生する対応（汚染水処理、凍土遮水壁設置等）は、廃炉作業全体でも重要な位置付けにあり、各対応によるプラントへの影響等を確認しながら慎重に進めていく必要あり。また、作業干渉を出来るだけ回避し、作業安全を確保する必要有り。
上記状況を踏まえ、廃炉作業を着実に進めるため、当該対応の工事・運転開始時期を適切な時期とする。

⇨ 運転開始時期（目標）を2015年度上期とする。

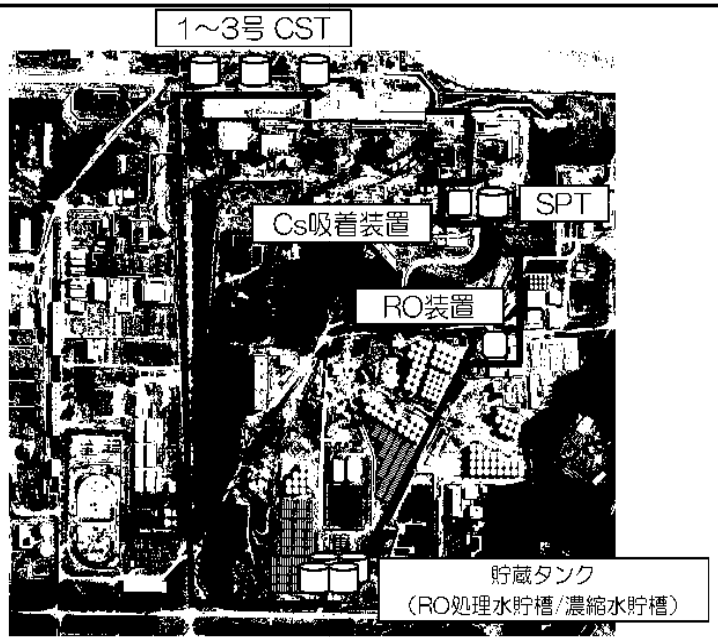


【参考】循環ループ縮小効果（屋外移送配管）について

今回の工事による循環ループ縮小効果（屋外移送配管）は以下の通り。

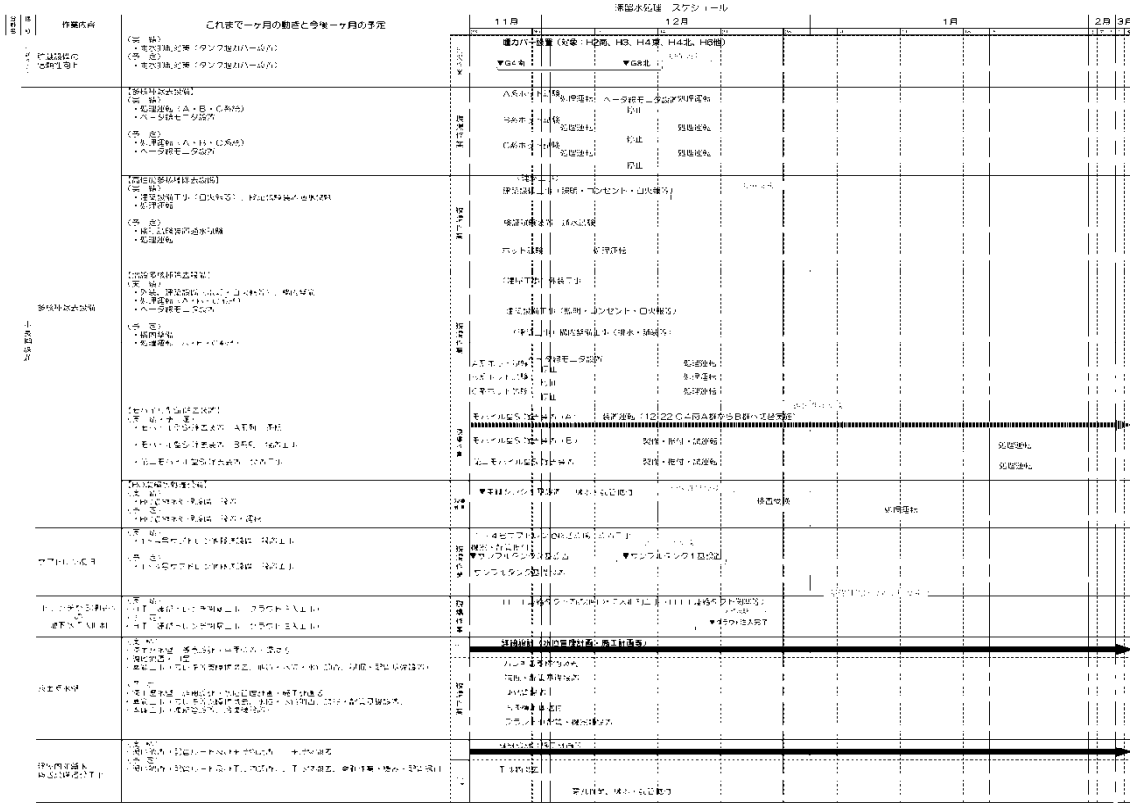
SPTからの戻りラインが必要となるが、貯蔵タンク（RO処理水貯槽）を経由したCSTまでの移送ラインの削減が可能。

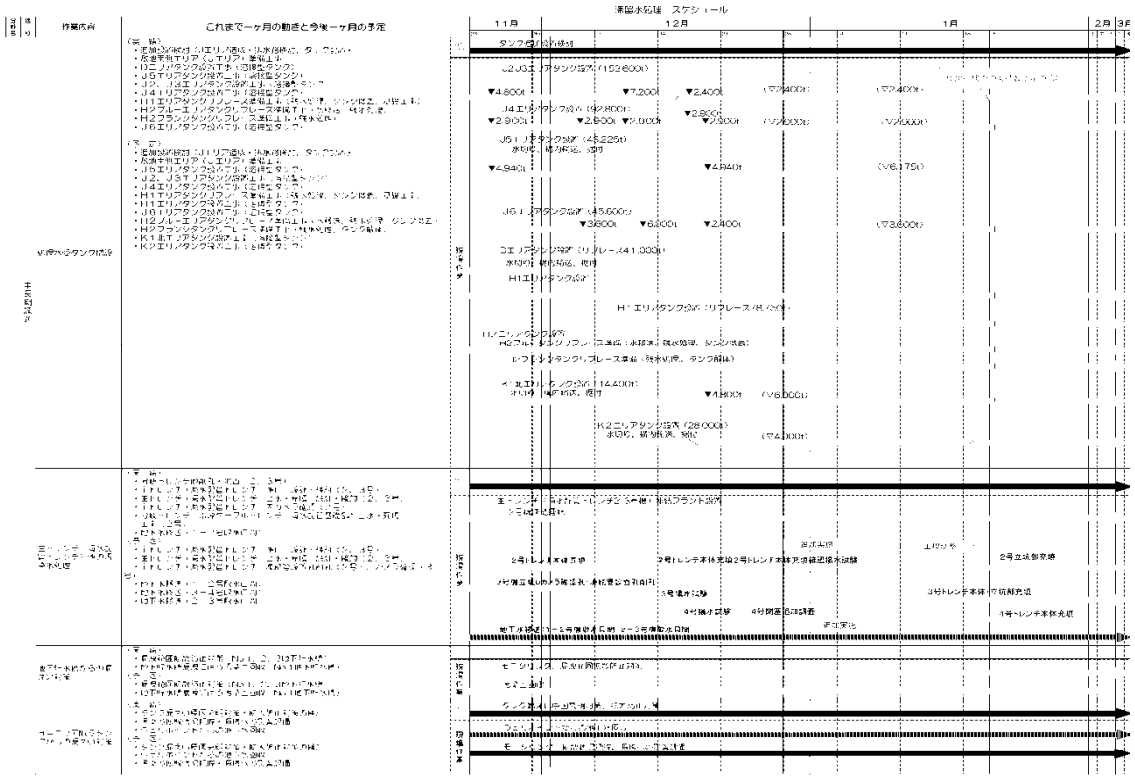
建屋滞留水（地下流入分等）の処理が必要な期間は、当該移送のラインが必要。

	CST循環（現行）	RO装置新設
ループ配置		
ループ長さ	約3km	約0.8km（注）

（注）建屋滞留水移送ラインを含めた屋外移送配管は約2.1km

⇨ 炉注水に関わるループ（循環ループ）は約3kmから約0.8kmに縮小


滞留水処理　スケジュール
11月
12月
1月
2月
作業内容
これまで一ヶ月の動きと今後一ヶ月の予定


滞留水処理　スケジュール
11月
12月
1月
2月
3月
作業内容
これまでの一ヶ月の動きと今後一ヶ月の予定
タンク受け入れ
J2,J3エリアタンク設置（152,800t）
J4エリアタンク設置（92,800t）
J5,J6エリアタンク設置（45,225t）
水処理、循環運転、廃炉
J6-1エリアタンク設置（45,600t）
エリアタンク設置（リプレース41,000t）
水処理、循環運転、廃炉
H1エリアタンク設置
H1エリアタンク設置（リプレース81,000t）
H2エリアタンク設置
H2フランジタンク設置（水抜き：既設処理、タンク撤去）
H2フランジタンク設置（リプレース撤去：既設処理、タンク撤去）
K1エリアタンク設置（14,400t）
水処理、循環運転、廃炉
K2エリアタンク設置（28,000t）
水処理、循環運転、廃炉
2号トレンチ本体充填
2号トレンチ本体充填
2号トレンチ本体充填
3号トレンチ本体充填
4号トレンチ本体充填
地下水バイパス
サブドレン
モニタリング
タンク堰内雨水
ウェルポイント
モニタリング

2-1．タンク工程（新設分）

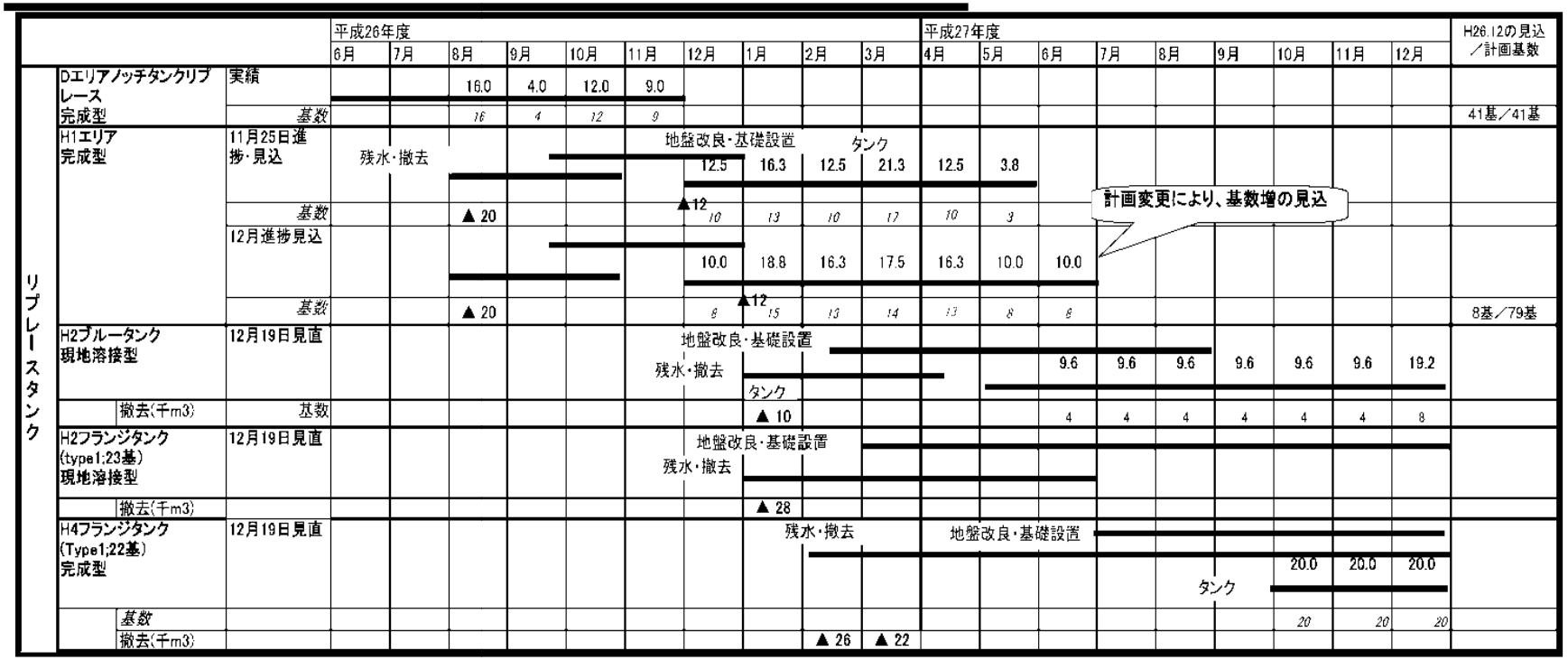
				平成26年度										平成27年度									H26 12の見込／計画基数
				6月	7月	8月	9月	10月	11月	12月	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	
新設タンク	Jエリアタンク建設	J2/3 現地溶接型	11月25日進捗・見込				14.4	24.0	14.4	26.4	26.4	24.0	24.0										
			基数				6	10	6	11	11	10	10										
			12月進捗見込				14.4	24.0	12.0	19.2	26.4	28.8	28.8										
			基数				6	10	5	8	11	12	12										29基／64基
		J5 完成型	11月25日進捗・見込		9.9	3.7	0.0	8.6	9.9	11.1													
			基数		3	3	0	7	8	9													
			12月進捗見込		9.9	3.7	0.0	8.6	9.9	11.1													
			基数		3	3	0	7	8	9													35基／35基
		J4 現地溶接	11月25日進捗・見込					11.6	17.4	17.4	14.5	17.4	14.5										
			基数					4	6	6	5	6	5										
			12月進捗見込					11.6	17.4	17.4	14.5	17.4	14.5										
			基数					4	6	6	5	6	5										16基／30基
	J6エリア 現地溶接型		11月25日進捗・見込						7.2	12.0	14.4	12.0											
			基数						6	10	12	10											
			12月進捗見込							15.6	14.4	8.4	7.2										
			基数							13	12	7	6										13基／38基
	J7 現地溶接型		11月25日進捗・見込				伐採・地盤改良・基礎設置		タンク		9.6	9.6	9.6	9.6									
			基数								8	8	8	8									
			12月19日見直									12.0	14.4	9.6	9.6	4.8							
			基数									10	12	8	8	4							0基／42基
	K1北エリア 現地溶接型		11月25日進捗・見込						7.2	4.8	2.4												
			基数						6	4	2												
			12月進捗見込							12.0		2.4											
			基数							10		2											10基／12基
	K1南エリア 完成型		11月25日進捗・見込							2.4	4.8	4.8											
			基数							2	4	4											
			12月進捗見込							2.5	4.9	4.9											
			基数							2	4	4											2基／10基
	K2エリア 完成型		11月25日進捗・見込			準備工	地盤改良・基礎設置			8.0	8.0	12.0											
			基数							8	8	12											
			12月進捗見込							8.0	8.0	12.0											
			基数							8	8	12											8基／28基

太数字：タンク容量（単位：千m3）

作業スペース、設置方法の観点から検討中

計画確定により、基数増の見込

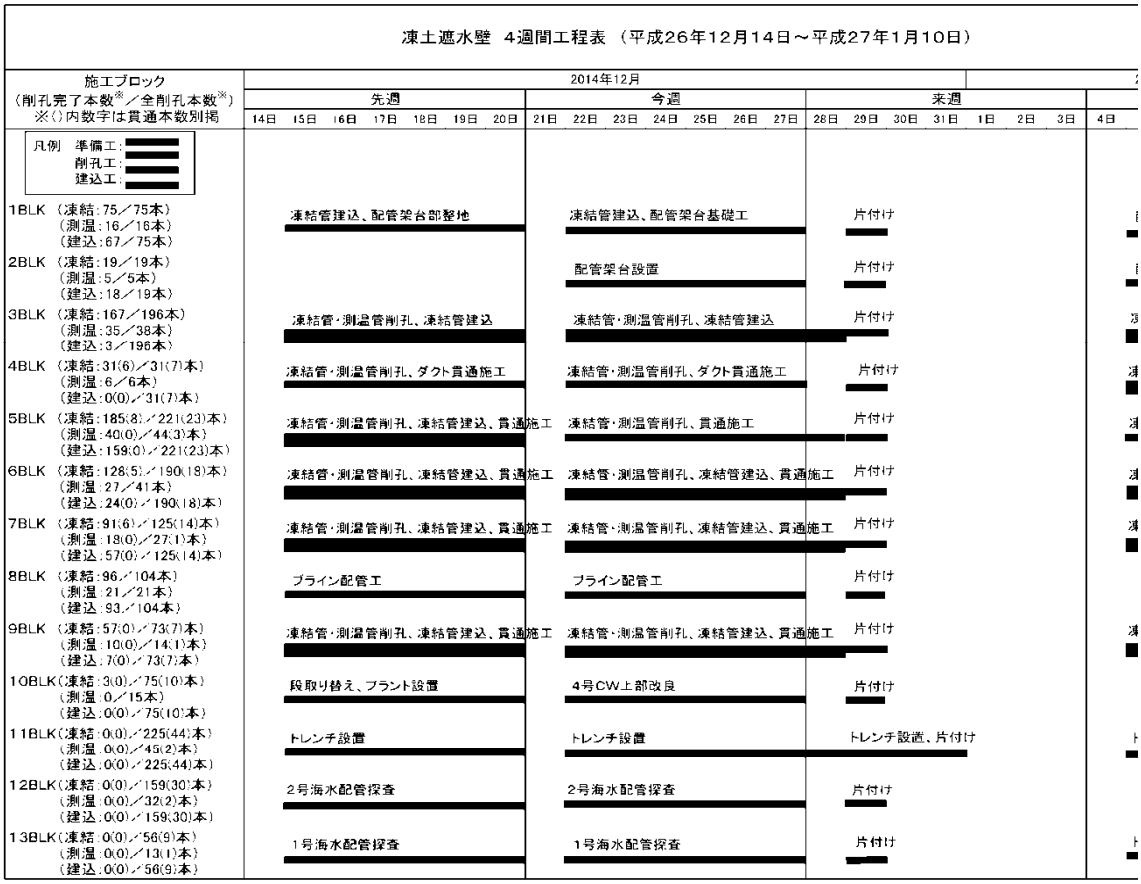
2-2．タンク工程（リプレース分）



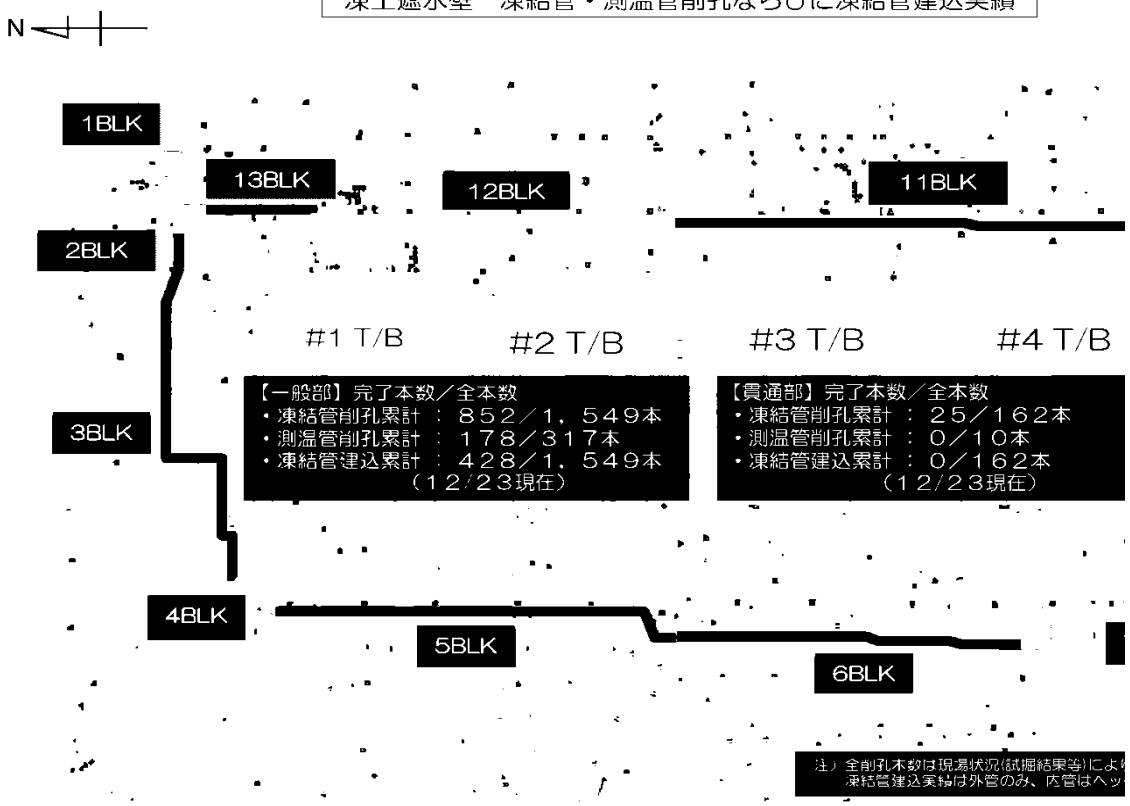
タンク設置に係る現状分析及び対策（12月25日現在）

エリア	現状分析	対策・水平展開
J2/3	・災害防止対策として、同一エリアの同時作業を禁止した。そのため、タンク工事作業時間が当初想定より短縮となっているため、生産減が発生 ・12/25　使用前検査済み（累計25基）（使用承認済み）	→他工事との時間割の見直しを検討
J4	・12/ 25　使用前検査済み（累計12基）（使用承認済み）	
J5	・12/ 25　使用前検査済み（累計30基）（使用承認済み）	
D	・Dエリアタンク設置完了（全４１基）	－
J6	・12/ 25　使用前検査済み（累計10基）（使用承認済み）	－
K1北	・12/ 25　使用前検査済み（累計4基）（使用承認_未）	－
K1南	・工場製作中	－
K2	・工場製作中 ・タンク現地設置中	－
H1	・工場製作中 ・タンク現地設置中	－

凍土遮水壁　4週間工程表 （平成26年12月14日～平成27年1月10日）



凍土遮水壁　凍結管・測温管削孔ならびに凍結管建込実績



増設多核種除去設備
本格運転に向けた対応について

平成26年12月25日

東京電力株式会社

東京電力
TEPCO

1．概要

増設多核種除去設備は，ホット試験開始以降，不具合による停止もなく，安定した処理を継続中

	A系	B系	C系
ホット試験開始日	H26.9.17	H26.9.27	H26.10.7
処理量（m^3） （H26.12.16日時点）	約16,000	約14,500	約14,000

ホット試験において，増設多核種除去設備は，RO濃縮塩水に含まれる62核種の放射能濃度を告示濃度限度未満に除去できる性能を有していることを確認

また，先行運用としていたサンプルタンクの残り１基の設置工事および１号使用前検査※1が，平成26年12月17日に完了

※１：構造強度、漏えいに係る検査

本格運転へ移行する準備が整ったことから，ホット試験結果を踏まえた実施計画の変更認可申請を今後実施

実施計画認可後，３号使用前検査※2を受検し，本格運転へ移行

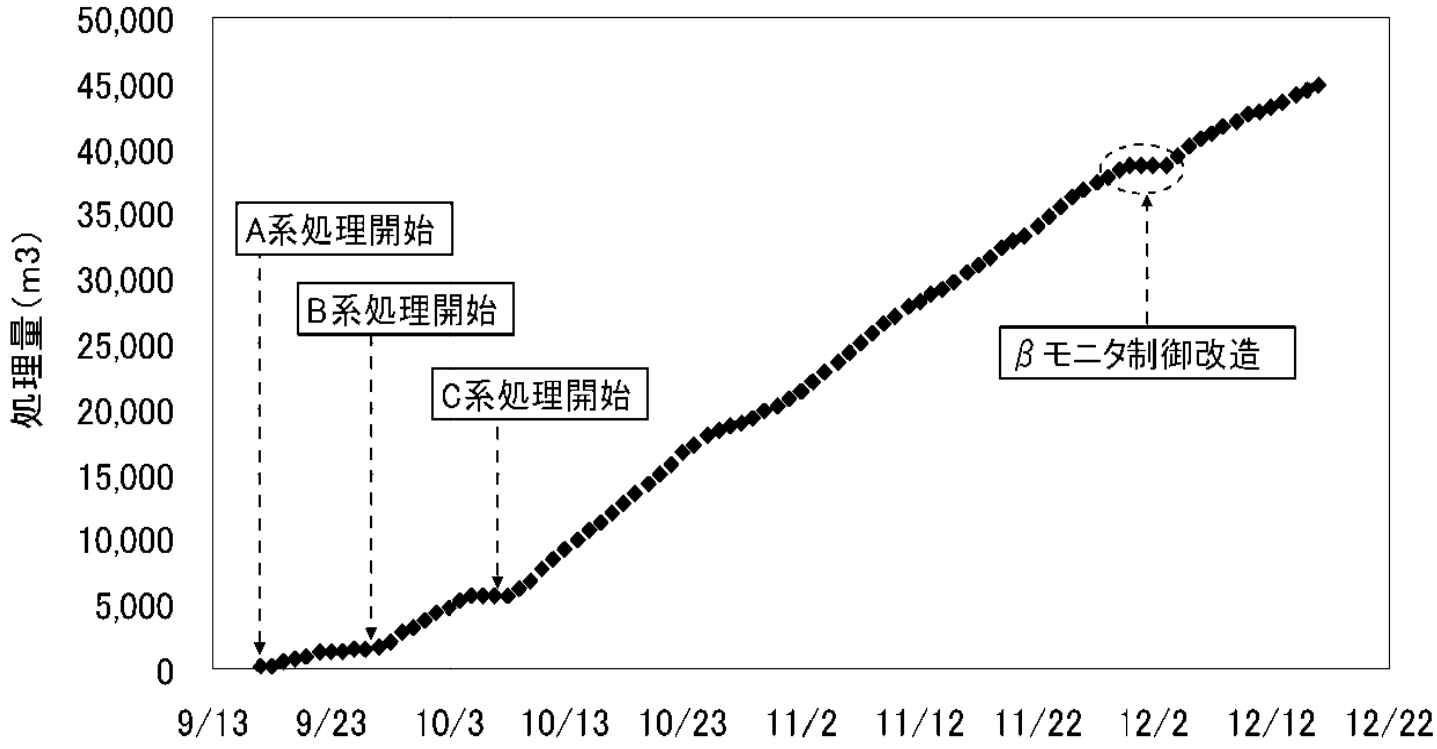
※２：性能に係る検査

2．ホット試験結果（処理量）

増設多核種除去設備は，A系から順次，ホット試験を開始し，これまで不具合による停止もなく，約45,000m^{3}の処理を実施

増設多核種除去設備の処理容量：250m3／日／3系列

（平成26年12月16日時点）



2．ホット試験結果（除去性能）

増設多核種除去設備は，ＲＯ濃縮塩水に含まれる６２核種の放射能濃度を，
告示濃度限度未満に低減できる性能を有していることを確認

増設多核種除去設備　主要核種の初期性能（約1,000m³処理後）

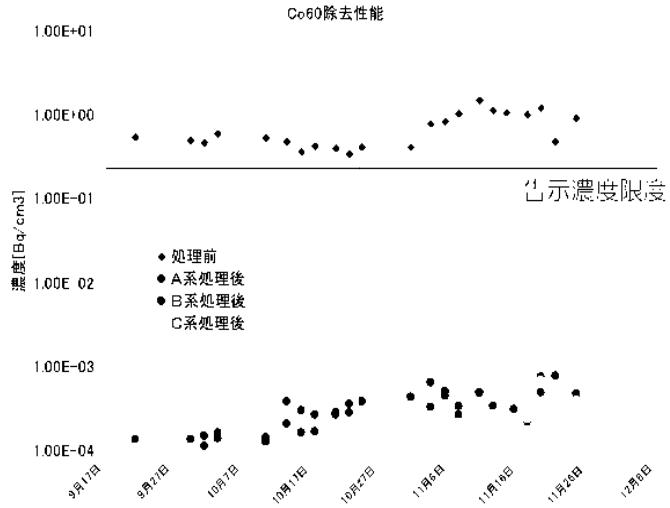
（単位：Bq/cm³）

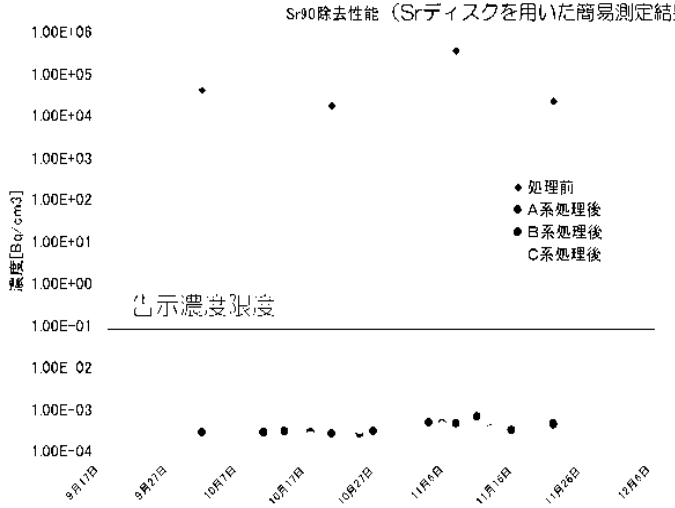
核種【告示濃度限度】		Co-60【2E-01】	Sr-90【3E-02】	Ru-106【1E-01】	Sb-125【8E-01】	I-129【9E-03】	Cs-137【9E-02】
A系	処理対象水放射能濃度	4.6E-01	3.0E+04	9.8E+00	1.1E+01	2.0E-02	2.6E+00
	処理済水放射能濃度【告示濃度限度比】	＜1.2E-04【＜0.0006】	＜1.1E-04【＜0.004】	1.6E-03※1【0.02】	＜4.8E-04【＜0.0006】	＜8.9E-04【＜0.1】	＜1.3E-04【＜0.001】
B系	処理対象水放射能濃度	4.6E-01	3.0E+04	9.8E+00	1.1E+01	2.0E-02	2.6E+00
	処理済水放射能濃度【告示濃度限度比】	＜1.5E-04【＜0.0008】	＜1.1E-04【＜0.004】	＜1.3E-03【＜0.01】	＜4.5E-04【＜0.0006】	＜8.9E-04【＜0.1】	＜1.4E-04【＜0.002】
C系	処理対象水放射能濃度	2.6E-01	1.3E+04	5.1E+00	9.7E+00	1.7E-02	4.0E+00
	処理済水放射能濃度【告示濃度限度比】	＜1.5E-04【＜0.0008】	＜1.1E-04【＜0.004】	2.0E-03※2【0.02】	＜4.2E-04【＜0.0005】	＜7.3E-04【＜0.08】	＜1.3E-04【＜0.001】

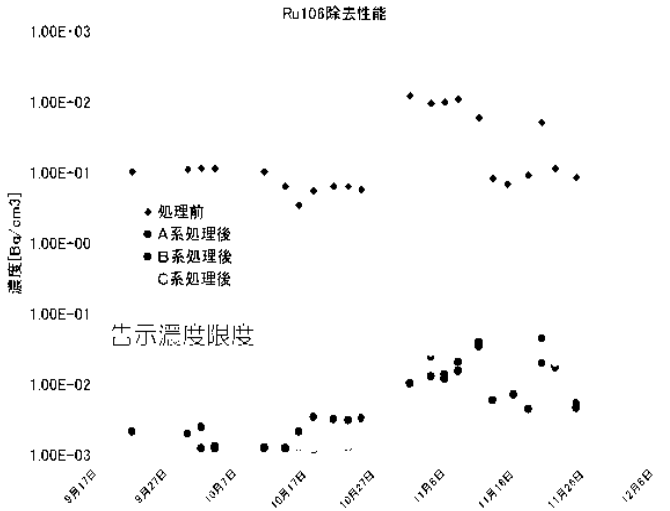
※1検出限界値：1.3E-03 Bq/cm³、　※2検出限界値：1.2E-03 Bq/cm³

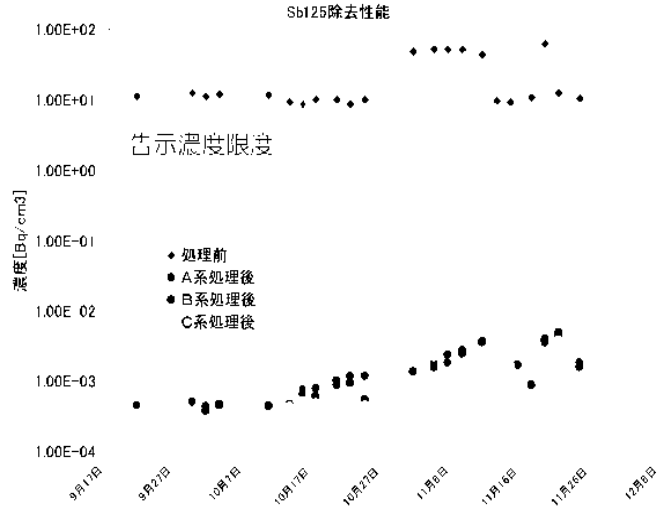
2．ホット試験結果（性能維持期間①）

約1万m³（1系列あたり）処理後においても，低いレベルまで除去性能が維持されていることを確認

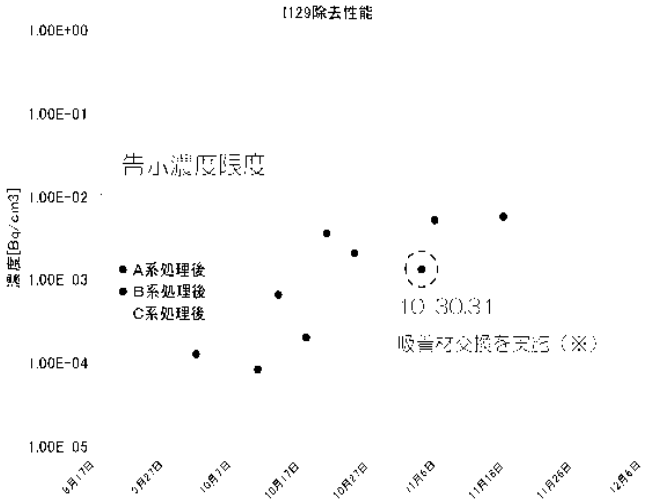


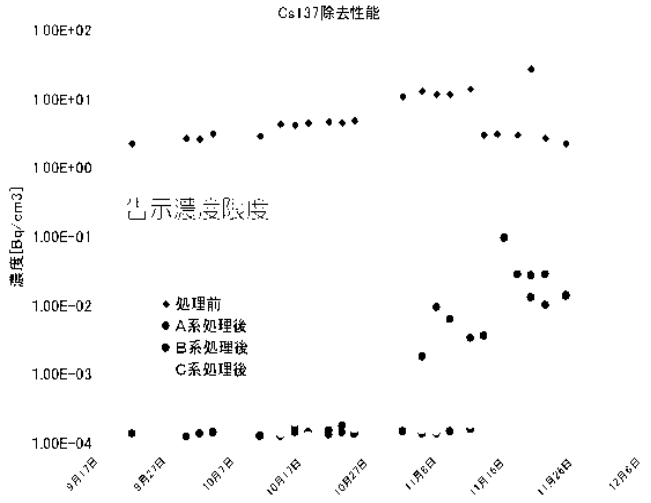






2．ホット試験結果（性能維持期間②）





※：1つの系統の吸着塔6塔中、1塔について吸着材を交換

I-129については，比較的早い傾向で性能の低下が見られるが，既設ALPSのインプラント試験で得られた性能維持期間と同等であることを確認。（想定通り）

Cs-137については，途中で急激な性能の低下が見られるが，これは処理対象とする入口水濃度が高い水から低い水に変更したことによって，吸着材から放射性核種が吐き出されたもの。（これまでの経験から予測済み）

3．本格運転移行後の運転方針について

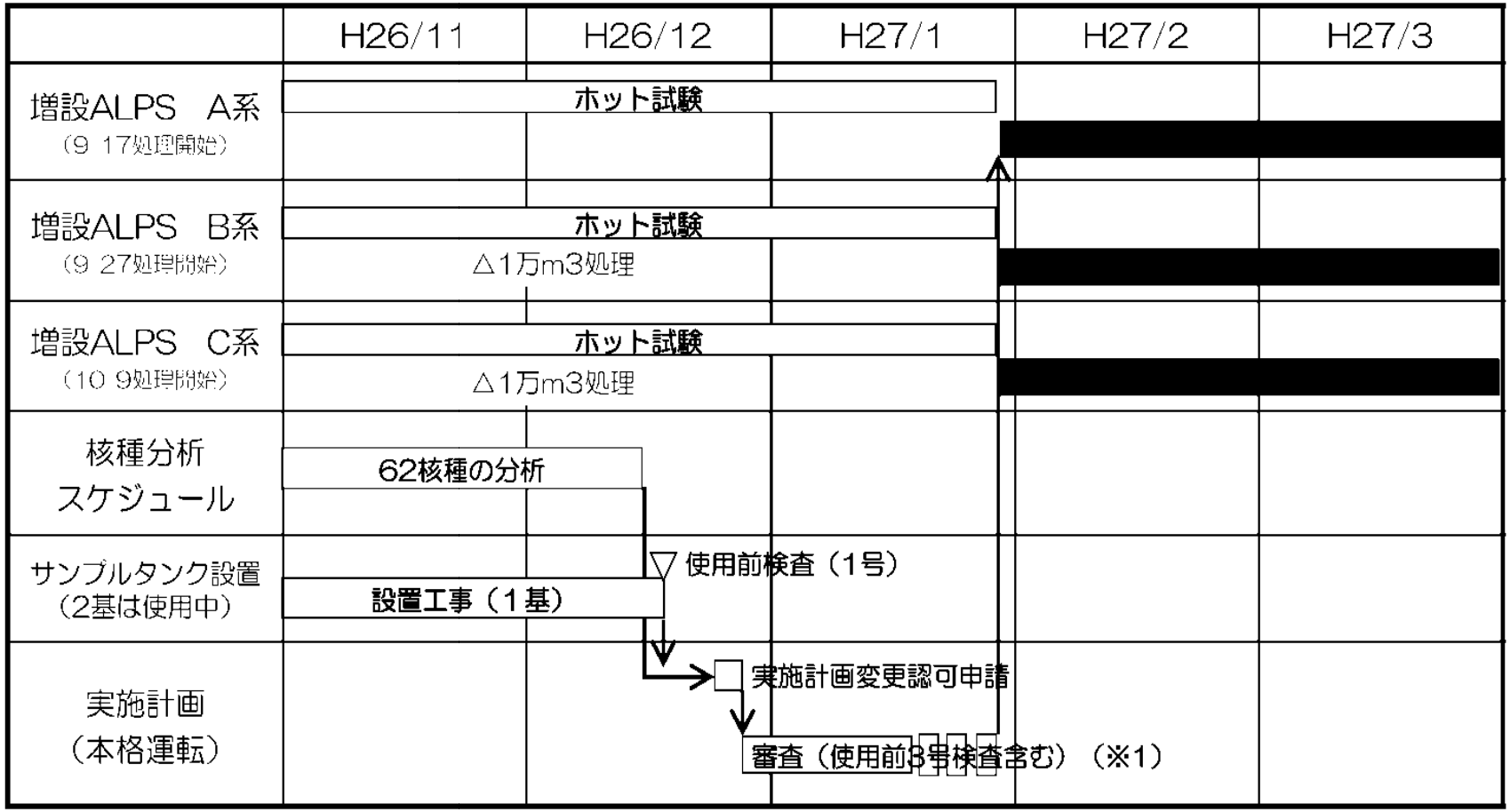
前項のとおり，増設ALPSは，処理済水が告示濃度限度を下回る濃度まで低減できる性能を有することを確認できたものの，Ru-106，I-129などの核種を長期間維持するためには，吸着材を高い頻度で交換する必要があり，その場合，稼働率低下の懸案が発生。

一方，敷地境界における実効線量として，平成27年3月末時点で2mSv/年未満，平成28年3月末時点で1mSv/年未満を達成することが必須であるため，汚染水タンク貯留時におけるリスクおよび線量を考慮すると，当面の間は，稼働率を低下させないことが重要。

【本格運転移行後の運転方針】

汚染水貯留時におけるリスク・線量を早期に低減するため、敷地境界における実行線量へ影響を与えない範囲で、（告示濃度限度にとらわれずに）放射性核種を十分低い濃度まで除去する運転を実施

5．今後のスケジュール（案）



※1：認可取得後，3号検査（性能に係る検査）を受検し，本格運転へ移行

（参考１）実施計画変更認可申請の内容

【実施計画の主な変更内容】

増設多核種除去設備の「**設置の目的**」において，ホット試験に係る記載を削除するとともに，増設多核種除去設備の除去性能について記載

ホット試験結果（P２～P5）を添付資料に記載

先行運用としていたサンプルタンクの残り１基の設置工事および使用前検査が１２月17日に終了したことから、先行運用の記載を削除

実施計画記載（案）

2.16.2.1.1 設置の目的

増設多核種除去設備は，『2.5 汚染水処理設備等』で処理した液体状の放射性物質の処理を早期に完了させる目的から設置することとする。

増設多核種除去設備は，これまで実施した確認試験において，汚染水処理設備の処理済水に含まれる放射性物質（トリチウムを除く）を『実用発電用原子炉の設置，運転等に関する規則の規定に基づく線量限度等を定める告示』に定める周辺監視区域外の水中の濃度限度（以下，「告示濃度限度」という。）を下回る濃度まで低減できることを確認した。

本格運転においては，汚染水貯留時におけるリスク低減を目的とした汚染水の早期処理および敷地境界における実効線量を踏まえた放射性核種の十分な濃度低減を両立した運転を実施する。

（参考２）増設多核種除去設備Ａ系における除去性能評価まとめ

増設多核種除去設備Ａ系における除去性能評価（1/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
1	Rb-86（約19日）	3E-01	＜ 1.8E+00	＜ 1.4E-03	＜ 5E-03	
2	Sr-89（約51日）	3E-01	＜ 4.0E+03	＜ 5.8E-05	＜ 2E-04	
3	Sr-90（約29年）	3E-02	3.0E+04	＜ 1.1E-04	＜ 4E-03	
4	Y-90（約64時間）	3E-01	3.0E+04	＜ 1.1E-04	＜ 4E-04	Sr-90と放射平衡
5	Y-91（約59日）	3E-01	＜ 4.6E+01	＜ 4.4E-02	＜ 1E-01	
6	Nb-95（約35日）	1E+00	＜ 2.1E-01	＜ 9.8E-05	＜ 1E-04	
7	Tc-99（約210000年）	1E+00	2.6E-02	＜ 1.0E-03	＜ 1E-03	
8	Ru-103（約40日）	1E+00	＜ 3.2E-01	＜ 1.4E-04	＜ 1E-04	
9	Ru-106（約370日）	1E-01	9.8E+00	1.6E-03	2E-02	
10	Rh-103m（約56分）	2E+02	＜ 3.2E-01	＜ 1.4E-04	＜ 7E-07	Ru-103と放射平衡
11	Rh-106（約30秒）	3E+02	9.8E+00	1.6E-03	5E-06	Ru-106と放射平衡
12	Ag-110m（約250日）	3E-01	＜ 2.7E-01	＜ 1.2E-04	＜ 4E-04	
13	Cd-113m（約15年）	4E-02	＜ 1.5E+03	＜ 1.0E-04	＜ 3E-03	

（参考２）増設多核種除去設備Ａ系における除去性能評価まとめ

増設多核種除去設備Ａ系における除去性能評価（2/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
14	Cd-115m（約45日）	3E-01	＜1.1E+01	＜6.4E-03	＜2E-02	
15	Sn-119m（約290日）	2E+00	＜2.3E+01	＜1.8E-02	＜9E-03	Sn-123の放射能濃度より評価
16	Sn-123（約130日）	4E-01	＜2.3E+01	＜1.8E-02	＜5E-02	
17	Sn-126（約100000年）	2E-01	＜2.6E+00	＜7.2E-04	＜4E-03	
18	Sb-124（約60日）	3E-01	＜1.4E-01	＜2.7E-04	＜9E-04	
19	Sb-125（約3年）	8E-01	1.1E+01	＜4.8E-04	＜6E-04	
20	Te-123m（約120日）	6E-01	＜5.2E-01	＜1.9E-04	＜3E-04	
21	Te-125m（約58日）	9E-01	1.1E+01	＜4.8E-04	＜5E-04	Sb-125と放射平衡
22	Te-127（約9時間）	5E+00	＜3.2E+01	＜1.3E-02	＜3E-03	
23	Te-127m（約110日）	3E-01	＜3.3E+01	＜1.3E-02	＜4E-02	Te-127の放射能濃度より評価
24	Te-129（約70分）	1E+01	＜4.3E+00	＜1.9E-03	＜2E-04	
25	Te-129m（約34日）	3E-01	＜7.8E+00	＜3.5E-03	＜1E-02	
26	I-129（約16000000年）	9E-03	2.0E-02	＜8.9E-04	＜1E-01	

（参考２）増設多核種除去設備Ａ系における除去性能評価まとめ

増設多核種除去設備Ａ系における除去性能評価（3/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
27	Cs-134 （約2年）	6E-02	8.0E-01	＜ 1.7E-04	＜ 3E-03	
28	Cs-135 （約3000000年）	6E-01	1.6E-05	＜ 7.9E-10	＜ 1E-09	Cs-137の放射能濃度より評価
29	Cs-136 （約13日）	3E-01	＜ 2.0E-01	＜ 1.1E-04	＜ 4E-04	
30	Cs-137 （約30年）	9E-02	2.6E+00	＜ 1.3E-04	＜ 1E-03	
31	Ba-137m （約3分）	8E+02	2.6E+00	＜ 1.3E-04	＜ 2E-07	Cs-137と放射平衡
32	Ba-140 （約13日）	3E-01	＜ 1.2E+00	＜ 4.3E-04	＜ 1E-03	
33	Ce-141 （約32日）	1E+00	＜ 9.5E-01	＜ 4.1E-04	＜ 4E-04	
34	Ce-144 （約280日）	2E-01	＜ 4.4E+00	＜ 1.5E-03	＜ 8E-03	
35	Pr-144 （約17分）	2E+01	＜ 4.4E+00	＜ 1.5E-03	＜ 8E-05	Ce-144と放射平衡
36	Pr-144m （約7分）	4E+01	＜ 4.4E+00	＜ 1.5E-03	＜ 4E-05	Ce-144と放射平衡
37	Pm-146 （約6年）	9E-01	＜ 4.6E-01	＜ 1.9E-04	＜ 2E-04	
38	Pm-147 （約3年）	3E+00	＜ 2.9E+00	＜ 4.4E-03	＜ 1E-03	Eu-154の放射能濃度より評価
39	Pm-148 （約5日）	3E-01	＜ 4.9E-01	＜ 1.3E-03	＜ 4E-03	

（参考２）増設多核種除去設備Ａ系における除去性能評価まとめ

増設多核種除去設備Ａ系における除去性能評価（4/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
40	Pm-148m （約41日）	5E-01	＜ 2.8E-01	＜ 1.0E-04	＜ 2E-04	
41	Sm-151 （約87年）	8E+00	＜ 2.4E-02	＜ 3.6E-05	＜ 5E-06	Eu-154の放射能濃度より評価
42	Eu-152 （約13年）	6E-01	＜ 1.5E+00	＜ 5.8E-04	＜ 1E-03	
43	Eu-154 （約9年）	4E-01	＜ 2.7E-01	＜ 4.1E-04	＜ 1E-03	
44	Eu-155 （約5年）	3E+00	＜ 3.2E+00	＜ 8.7E-04	＜ 3E-04	
45	Gd-153 （約240日）	3E+00	＜ 2.5E+00	＜ 8.3E-04	＜ 3E-04	
46	Tb-160 （約72日）	5E-01	＜ 6.1E-01	＜ 3.6E-04	＜ 7E-04	
47	Pu-238 （約88年）	4E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
48	Pu-239 （約24000年）	4E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
49	Pu-240 （約6600年）	4E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
50	Pu-241 （約14年）	2E-01	＜ 3.7E-01	＜ 2.7E-03	＜ 1E-02	Pu-238の放射能濃度から評価
51	Am-241 （約430年）	5E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
52	Am-242m （約150年）	5E-03	＜ 2.5E-04	＜ 1.8E-06	＜ 4E-04	Am-241の放射能濃度より評価

（参考２）増設多核種除去設備Ａ系における除去性能評価まとめ

増設多核種除去設備Ａ系における除去性能評価（5/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
53	Am-243 （約7400年）	5E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
54	Cm-242 （約160日）	6E-02	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-03	全α放射能の測定値に包絡されるものとし評価
55	Cm-243 （約29年）	6E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
56	Cm-244 （約18年）	7E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
57	Mn-54 （約310日）	1E+00	＜ 1.9E-01	＜ 1.3E-04	＜ 1E-04	
58	Fe-59 （約45日）	4E-01	＜ 2.7E-01	＜ 1.9E-04	＜ 5E-04	
59	Co-58 （約71日）	1E+00	＜ 2.0E-01	＜ 1.1E-04	＜ 1E-04	
60	Co-60 （約5年）	2E-01	4.6E-01	＜ 1.2E-04	＜ 6E-04	
61	Ni-63 （約100年）	6E+00	3.0E+00	＜ 1.5E-02	＜ 3E-03	
62	Zn-65 （約240日）	2E-01	＜ 2.9E-01	＜ 2.5E-04	＜ 1E-03	
全α			＜ 9.2E-03	＜ 6.7E-05	－	

（参考２）増設多核種除去設備B系における除去性能評価まとめ

増設多核種除去設備B系における除去性能評価（1/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
1	Rb-86（約19日）	3E-01	< 1.8E+00	< 1.3E-03	< 4E-03	
2	Sr-89（約51日）	3E-01	< 4.0E+03	< 6.1E-05	< 2E-04	
3	Sr-90（約29年）	3E-02	3.0E+04	< 1.1E-04	< 4E-03	
4	Y-90（約64時間）	3E-01	3.0E+04	< 1.1E-04	< 4E-04	Sr-90と放射平衡
5	Y-91（約59日）	3E-01	< 4.6E+01	< 5.1E-02	< 2E-01	
6	Nb-95（約35日）	1E+00	< 2.1E-01	< 1.0E-04	< 1E-04	
7	Tc-99（約210000年）	1E+00	2.6E-02	< 1.0E-03	< 1E-03	
8	Ru-103（約40日）	1E+00	< 3.2E-01	< 2.0E-04	< 2E-04	
9	Ru-106（約370日）	1E-01	9.8E+00	< 1.3E-03	< 1E-02	
10	Rh-103m（約56分）	2E+02	< 3.2E-01	< 2.0E-04	< 1E-06	Ru-103と放射平衡
11	Rh-106（約30秒）	3E+02	9.8E+00	< 1.3E-03	< 4E-06	Ru-106と放射平衡
12	Ag-110m（約250日）	3E-01	< 2.7E-01	< 1.5E-04	< 5E-04	
13	Cd-113m（約15年）	4E-02	< 1.5E+03	< 1.2E-04	< 3E-03	

（参考２）増設多核種除去設備B系における除去性能評価まとめ

増設多核種除去設備B系における除去性能評価（2/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
14	Cd-115m（約45日）	3E-01	＜ 1.1E+01	＜ 8.1E-03	＜ 3E-02	
15	Sn-119m（約290日）	2E+00	＜ 2.3E+01	＜ 2.2E-02	＜ 1E-02	Sn-123の放射能濃度より評価
16	Sn-123（約130日）	4E-01	＜ 2.3E+01	＜ 2.2E-02	＜ 6E-02	
17	Sn-126（約100000年）	2E-01	＜ 2.6E+00	＜ 7.4E-04	＜ 4E-03	
18	Sb-124（約60日）	3E-01	＜ 1.4E-01	＜ 2.8E-04	＜ 9E-04	
19	Sb-125（約3年）	8E-01	1.1E+01	＜ 4.5E-04	＜ 6E-04	
20	Te-123m（約120日）	6E-01	＜ 5.2E-01	＜ 2.0E-04	＜ 3E-04	
21	Te-125m（約58日）	9E-01	1.1E+01	＜ 4.5E-04	＜ 5E-04	Sb-125と放射平衡
22	Te-127（約9時間）	5E+00	＜ 3.2E+01	＜ 1.3E-02	＜ 3E-03	
23	Te-127m（約110日）	3E-01	＜ 3.3E+01	＜ 1.3E-02	＜ 4E-02	Te-127の放射能濃度より評価
24	Te-129（約70分）	1E+01	＜ 4.3E+00	＜ 2.0E-03	＜ 2E-04	
25	Te-129m（約34日）	3E-01	＜ 7.8E+00	＜ 4.0E-03	＜ 1E-02	
26	I-129（約16000000年）	9E-03	2.0E-02	＜ 8.9E-04	＜ 1E-01	

（参考２）増設多核種除去設備B系における除去性能評価まとめ

増設多核種除去設備B系における除去性能評価（3/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
27	Cs-134 （約2年）	6E-02	8.0E-01	＜ 1.5E-04	＜ 3E-03	
28	Cs-135 （約3000000年）	6E-01	1.6E-05	＜ 8.7E-10	＜ 1E-09	Cs-137の放射能濃度より評価
29	Cs-136 （約13日）	3E-01	＜ 2.0E-01	＜ 1.1E-04	＜ 4E-04	
30	Cs-137 （約30年）	9E-02	2.6E+00	＜ 1.4E-04	＜ 2E-03	
31	Ba-137m （約3分）	8E+02	2.6E+00	＜ 1.4E-04	＜ 2E-07	Cs-137と放射平衡
32	Ba-140 （約13日）	3E-01	＜ 1.2E+00	＜ 4.7E-04	＜ 2E-03	
33	Ce-141 （約32日）	1E+00	＜ 9.5E-01	＜ 3.2E-04	＜ 3E-04	
34	Ce-144 （約280日）	2E-01	＜ 4.4E+00	＜ 1.4E-03	＜ 7E-03	
35	Pr-144 （約17分）	2E+01	＜ 4.4E+00	＜ 1.4E-03	＜ 7E-05	Ce-144と放射平衡
36	Pr-144m （約7分）	4E+01	＜ 4.4E+00	＜ 1.4E-03	＜ 4E-05	Ce-144と放射平衡
37	Pm-146 （約6年）	9E-01	＜ 4.6E-01	＜ 1.8E-04	＜ 2E-04	
38	Pm-147 （約3年）	3E+00	＜ 2.9E+00	＜ 4.1E-03	＜ 1E-03	Eu-154の放射能濃度より評価
39	Pm-148 （約5日）	3E-01	＜ 4.9E-01	＜ 6.7E-04	＜ 2E-03	

（参考２）増設多核種除去設備B系における除去性能評価まとめ

増設多核種除去設備B系における除去性能評価（4/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
40	Pm-148m （約41日）	5E-01	＜ 2.8E-01	＜ 1.1E-04	＜ 2E-04	
41	Sm-151 （約87年）	8E+00	＜ 2.4E-02	＜ 3.3E-05	＜ 4E-06	Eu-154の放射能濃度より評価
42	Eu-152 （約13年）	6E-01	＜ 1.5E+00	＜ 5.4E-04	＜ 9E-04	
43	Eu-154 （約9年）	4E-01	＜ 2.7E-01	＜ 3.8E-04	＜ 1E-03	
44	Eu-155 （約5年）	3E+00	＜ 3.2E+00	＜ 9.7E-04	＜ 3E-04	
45	Gd-153 （約240日）	3E+00	＜ 2.5E+00	＜ 6.6E-04	＜ 2E-04	
46	Tb-160 （約72日）	5E-01	＜ 6.1E-01	＜ 3.6E-04	＜ 7E-04	
47	Pu-238 （約88年）	4E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
48	Pu-239 （約24000年）	4E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
49	Pu-240 （約6600年）	4E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
50	Pu-241 （約14年）	2E-01	＜ 3.7E-01	＜ 2.7E-03	＜ 1E-02	Pu-238の放射能濃度から評価
51	Am-241 （約430年）	5E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
52	Am-242m （約150年）	5E-03	＜ 2.5E-04	＜ 1.8E-06	＜ 4E-04	Am-241の放射能濃度より評価

（参考２）増設多核種除去設備B系における除去性能評価まとめ

増設多核種除去設備B系における除去性能評価（5/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
53	Am-243（約7400年）	5E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
54	Cm-242（約160日）	6E-02	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-03	全α放射能の測定値に包絡されるものとし評価
55	Cm-243（約29年）	6E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
56	Cm-244（約18年）	7E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
57	Mn-54（約310日）	1E+00	＜ 1.9E-01	＜ 1.3E-04	＜ 1E-04	
58	Fe-59（約45日）	4E-01	＜ 2.7E-01	＜ 2.0E-04	＜ 5E-04	
59	Co-58（約71日）	1E+00	＜ 2.0E-01	＜ 1.1E-04	＜ 1E-04	
60	Co-60（約5年）	2E-01	4.6E-01	＜ 1.5E-04	＜ 8E-04	
61	Ni-63（約100年）	6E+00	3.0E+00	＜ 1.5E-02	＜ 3E-03	
62	Zn-65（約240日）	2E-01	＜ 2.9E-01	＜ 2.4E-04	＜ 1E-03	
全α			＜ 9.2E-03	＜ 6.7E-05	－	

（参考２）増設多核種除去設備C系における除去性能評価まとめ

増設多核種除去設備C系における除去性能評価（1/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EAエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
1	Rb-86（約19日）	3E-01	< 2.6E+00	< 1.4E-03	< 5E-03	
2	Sr-89（約51日）	3E-01	< 2.2E+03	< 5.9E-05	< 2E-04	
3	Sr-90（約29年）	3E-02	1.3E+04	< 1.1E-04	< 4E-03	
4	Y-90（約64時間）	3E-01	1.3E+04	< 1.1E-04	< 4E-04	Sr-90と放射平衡
5	Y-91（約59日）	3E-01	< 8.1E+01	< 4.6E-02	< 2E-01	
6	Nb-95（約35日）	1E+00	< 3.0E-01	< 1.1E-04	< 1E-04	
7	Tc-99（約210000年）	1E+00	2.1E-02	< 1.0E-03	< 1E-03	
8	Ru-103（約40日）	1E+00	< 4.7E-01	< 1.4E-04	< 1E-04	
9	Ru-106（約370日）	1E-01	5.1E+00	2.0E-03	2E-02	
10	Rh-103m（約56分）	2E+02	< 4.7E-01	< 1.4E-04	< 7E-07	Ru-103と放射平衡
11	Rh-106（約30秒）	3E+02	5.1E+00	2.0E-03	7E-06	Ru-106と放射平衡
12	Ag-110m（約250日）	3E-01	< 3.9E-01	< 1.1E-04	< 4E-04	
13	Cd-113m（約15年）	4E-02	< 2.1E+03	< 1.7E-04	< 4E-03	

（参考２）増設多核種除去設備C系における除去性能評価まとめ

増設多核種除去設備C系における除去性能評価（2/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EAエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
14	Cd-115m （約45日）	3E-01	＜ 1.7E+01	＜ 7.2E-03	＜ 2E-02	
15	Sn-119m （約290日）	2E+00	＜ 3.7E+01	＜ 2.2E-02	＜ 1E-02	Sn-123の放射能濃度より評価
16	Sn-123 （約130日）	4E-01	＜ 3.7E+01	＜ 2.2E-02	＜ 6E-02	
17	Sn-126 （約100000年）	2E-01	＜ 3.5E+00	＜ 6.3E-04	＜ 3E-03	
18	Sb-124 （約60日）	3E-01	＜ 3.2E-01	＜ 3.2E-04	＜ 1E-03	
19	Sb-125 （約3年）	8E-01	9.7E+00	＜ 4.2E-04	＜ 5E-04	
20	Te-123m （約120日）	6E-01	＜ 6.9E-01	＜ 1.9E-04	＜ 3E-04	
21	Te-125m （約58日）	9E-01	9.7E+00	＜ 4.2E-04	＜ 5E-04	Sb-125と放射平衡
22	Te-127 （約9時間）	5E+00	＜ 4.3E+01	＜ 1.3E-02	＜ 3E-03	
23	Te-127m （約110日）	3E-01	＜ 4.5E+01	＜ 1.3E-02	＜ 4E-02	Te-127の放射能濃度より評価
24	Te-129 （約70分）	1E+01	＜ 6.3E+00	＜ 1.9E-03	＜ 2E-04	
25	Te-129m （約34日）	3E-01	＜ 1.1E+01	＜ 3.5E-03	＜ 1E-02	
26	I-129 （約16000000年）	9E-03	1.7E-02	＜ 7.3E-04	＜ 8E-02	

（参考２）増設多核種除去設備C系における除去性能評価まとめ

増設多核種除去設備C系における除去性能評価（3/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EAエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
27	Cs-134（約2年）	6E-02	9.2E-01	＜ 2.0E-04	＜ 3E-03	
28	Cs-135（約3000000年）	6E-01	2.4E-05	＜ 7.6E-10	＜ 1E-09	Cs-137の放射能濃度より評価
29	Cs-136（約13日）	3E-01	＜ 2.3E-01	＜ 1.1E-04	＜ 4E-04	
30	Cs-137（約30年）	9E-02	4.0E+00	＜ 1.3E-04	＜ 1E-03	
31	Ba-137m（約3分）	8E+02	4.0E+00	＜ 1.3E-04	＜ 2E-07	Cs-137と放射平衡
32	Ba-140（約13日）	3E-01	＜ 1.7E+00	＜ 5.9E-04	＜ 2E-03	
33	Ce-141（約32日）	1E+00	＜ 1.2E+00	＜ 3.3E-04	＜ 3E-04	
34	Ce-144（約280日）	2E-01	＜ 5.8E+00	＜ 1.3E-03	＜ 7E-03	
35	Pr-144（約17分）	2E+01	＜ 5.8E+00	＜ 1.3E-03	＜ 7E-05	Ce-144と放射平衡
36	Pr-144m（約7分）	4E+01	＜ 5.8E+00	＜ 1.3E-03	＜ 3E-05	Ce-144と放射平衡
37	Pm-146（約6年）	9E-01	＜ 6.2E-01	＜ 2.0E-04	＜ 2E-04	
38	Pm-147（約3年）	3E+00	＜ 5.4E+00	＜ 3.6E-03	＜ 1E-03	Eu-154の放射能濃度より評価
39	Pm-148（約5日）	3E-01	＜ 1.1E+00	＜ 7.5E-04	＜ 3E-03	

（参考２）増設多核種除去設備C系における除去性能評価まとめ

増設多核種除去設備C系における除去性能評価（4/5）

	核種 （半減期）	炉規則告示濃度限度 (別表第2第六欄 周辺監視区域外の 水中の濃度限度) [Bq/cm^3]	処理対象水（EAエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
40	Pm-148m （約41日）	5E-01	＜ 3.8E-01	＜ 1.3E-04	＜ 3E-04	
41	Sm-151 （約87年）	8E+00	＜ 4.4E-02	＜ 2.9E-05	＜ 4E-06	Eu-154の放射能濃度より評価
42	Eu-152 （約13年）	6E-01	＜ 1.8E+00	＜ 6.1E-04	＜ 1E-03	
43	Eu-154 （約9年）	4E-01	＜ 5.1E-01	＜ 3.3E-04	＜ 8E-04	
44	Eu-155 （約5年）	3E+00	＜ 3.8E+00	＜ 7.8E-04	＜ 3E-04	
45	Gd-153 （約240日）	3E+00	＜ 3.4E+00	＜ 7.3E-04	＜ 2E-04	
46	Tb-160 （約72日）	5E-01	＜ 1.0E+00	＜ 4.0E-04	＜ 8E-04	
47	Pu-238 （約88年）	4E-03	＜ 1.1E-02	＜ 8.2E-05	＜ 2E-02	全α放射能の測定値に 包絡されるものとし評価
48	Pu-239 （約24000年）	4E-03	＜ 1.1E-02	＜ 8.2E-05	＜ 2E-02	全α放射能の測定値に 包絡されるものとし評価
49	Pu-240 （約6600年）	4E-03	＜ 1.1E-02	＜ 8.2E-05	＜ 2E-02	全α放射能の測定値に 包絡されるものとし評価
50	Pu-241 （約14年）	2E-01	＜ 4.5E-01	＜ 3.3E-03	＜ 2E-02	Pu-238の放射能濃度から評価
51	Am-241 （約430年）	5E-03	＜ 1.1E-02	＜ 8.2E-05	＜ 2E-02	全α放射能の測定値に 包絡されるものとし評価
52	Am-242m （約150年）	5E-03	＜ 3.0E-04	＜ 2.2E-06	＜ 4E-04	Am-241の放射能濃度より評価

（参考２）増設多核種除去設備C系における除去性能評価まとめ

増設多核種除去設備C系における除去性能評価（5/5）

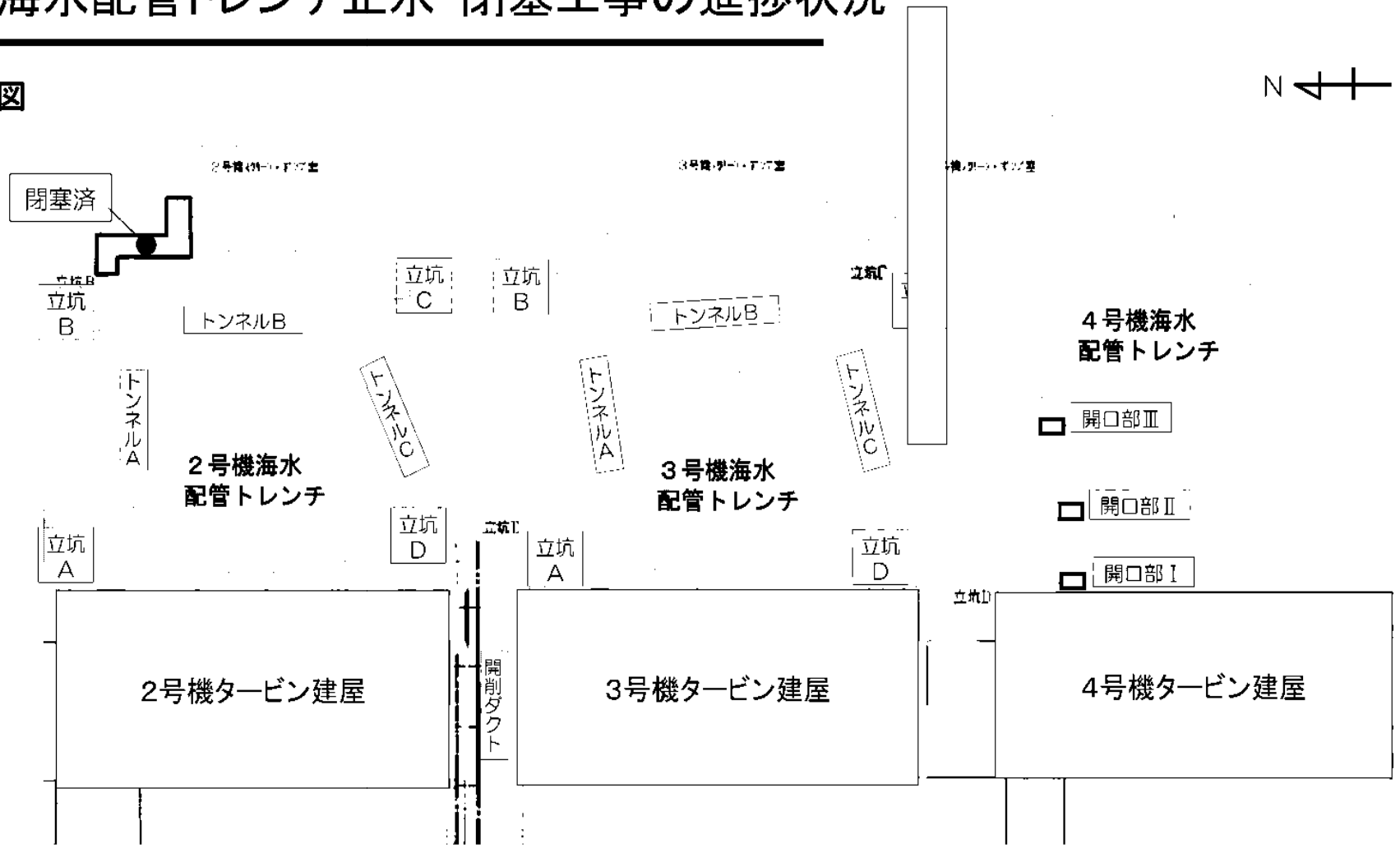
	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EAエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
53	Am-243 （約7400年）	5E-03	＜ 1.1E-02	＜ 8.2E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
54	Cm-242 （約160日）	6E-02	＜ 1.1E-02	＜ 8.2E-05	＜ 1E-03	全α放射能の測定値に包絡されるものとし評価
55	Cm-243 （約29年）	6E-03	＜ 1.1E-02	＜ 8.2E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
56	Cm-244 （約18年）	7E-03	＜ 1.1E-02	＜ 8.2E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
57	Mn-54 （約310日）	1E+00	＜ 3.0E-01	＜ 1.1E-04	＜ 1E-04	
58	Fe-59 （約45日）	4E-01	＜ 3.7E-01	＜ 2.5E-04	＜ 6E-04	
59	Co-58 （約71日）	1E+00	＜ 2.9E-01	＜ 1.2E-04	＜ 1E-04	
60	Co-60 （約5年）	2E-01	2.6E-01	＜ 1.5E-04	＜ 8E-04	
61	Ni-63 （約100年）	6E+00	1.8E+00	＜ 1.5E-02	＜ 3E-03	
62	Zn-65 （約240日）	2E-01	＜ 4.9E-01	＜ 2.9E-04	＜ 1E-03	
全α			＜ 1.1E-02	＜ 8.2E-05	－	

2、3号機海水配管トレンチ　止水・閉塞工事の進捗について

平成26年12月25日

1. 海水配管トレンチ止水・閉塞工事の進捗状況

■位置図



■進捗状況（平成26年12月24日現在）

2号機	3号機	4号機
12/18 トンネル部閉塞充填完了	12/15 揚水試験完了、充填準備中	12/19 揚水試験完了

2.（1） 2号機海水配管トレンチ・トンネル閉塞の施工手順

充填孔・ポンプ設置孔の削孔、水位計の設置

※一部の孔の削孔はトンネルA天井部充填までに実施

トンネルA、B、C一般部充填　※トンネルの中・下部を一般部とする

数回にわけて水抜きと充填を繰り返し

トンネルA、B、C天井部充填

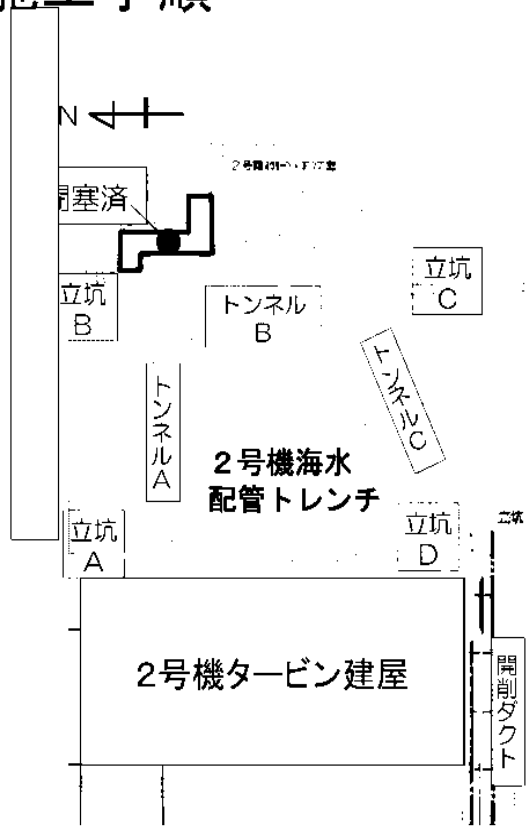
12/18完了

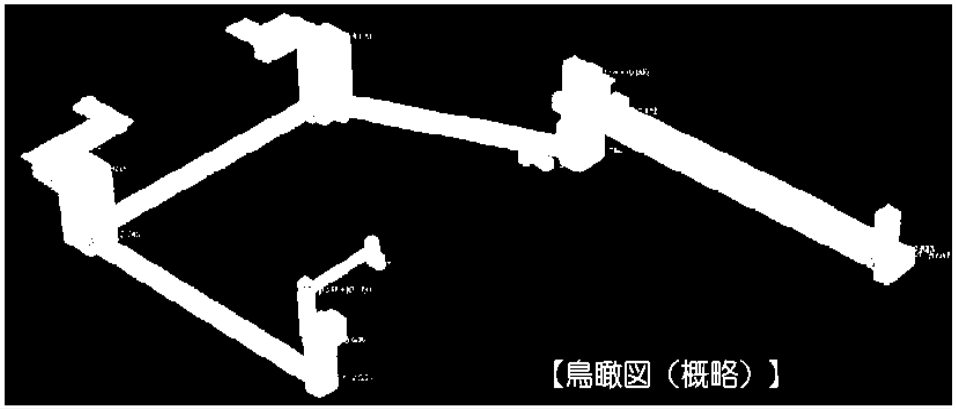
揚水試験による充填状況の確認

立坑A、立坑D、開削ダクトの充填

立坑B、立坑Cの充填

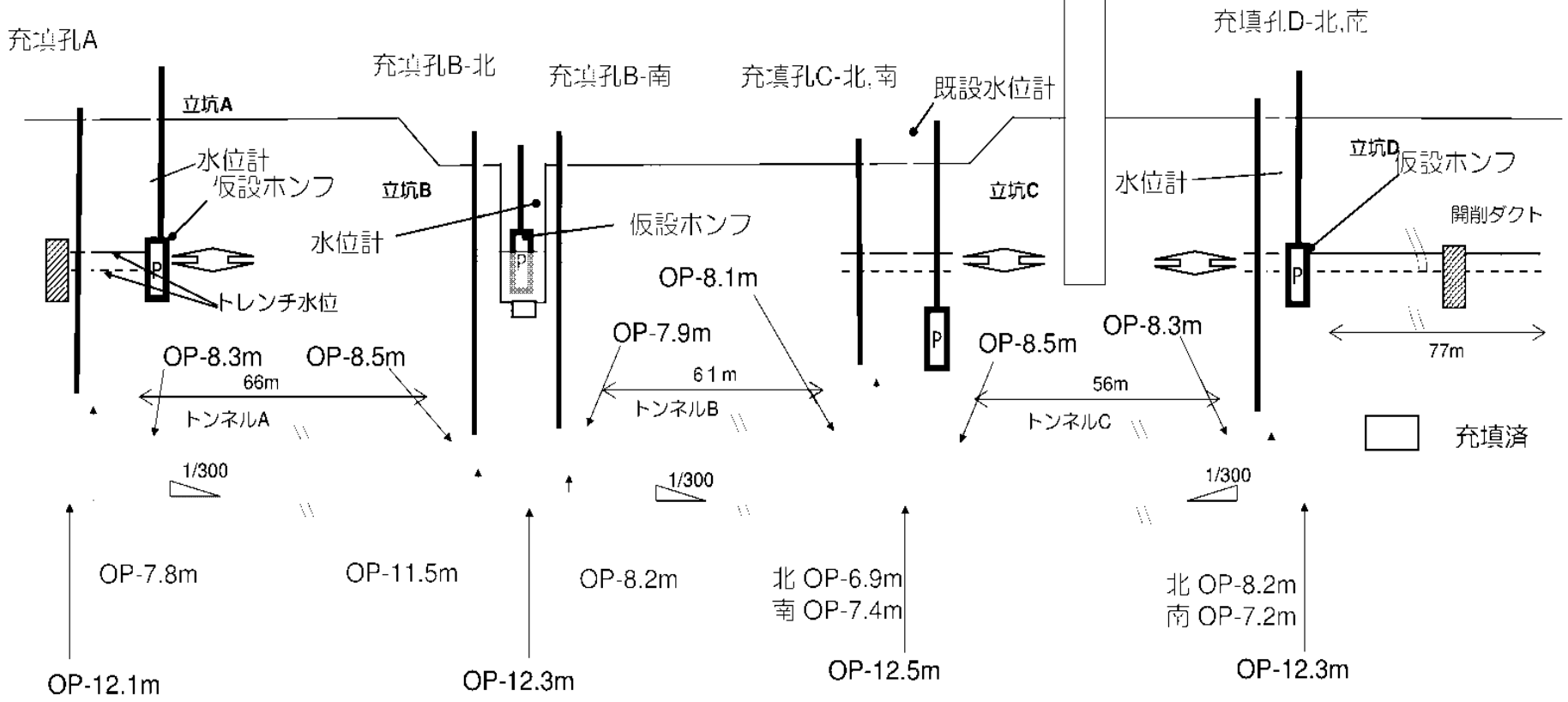
※今後、海水配管トレンチ内の配管の残水については、状況を考慮し、検討していく。




【鳥瞰図（概略）】

2.（2） 2号機海水配管トレンチ・閉塞充填の状況

11/25からトンネル部の閉塞充填を開始し、12/18に充填完了。充填量の累計は、2,510m^3。
12/24に立坑から揚水し、トンネル部における充填状況を確認。



【2号機海水配管トレンチ概略断面展開図】

12月20日現在

3.（1） 3号機海水配管トレンチ・揚水試験（連通性の確認）

(1)実施日時：12月15日　10:43～13:15

(2)実施方法

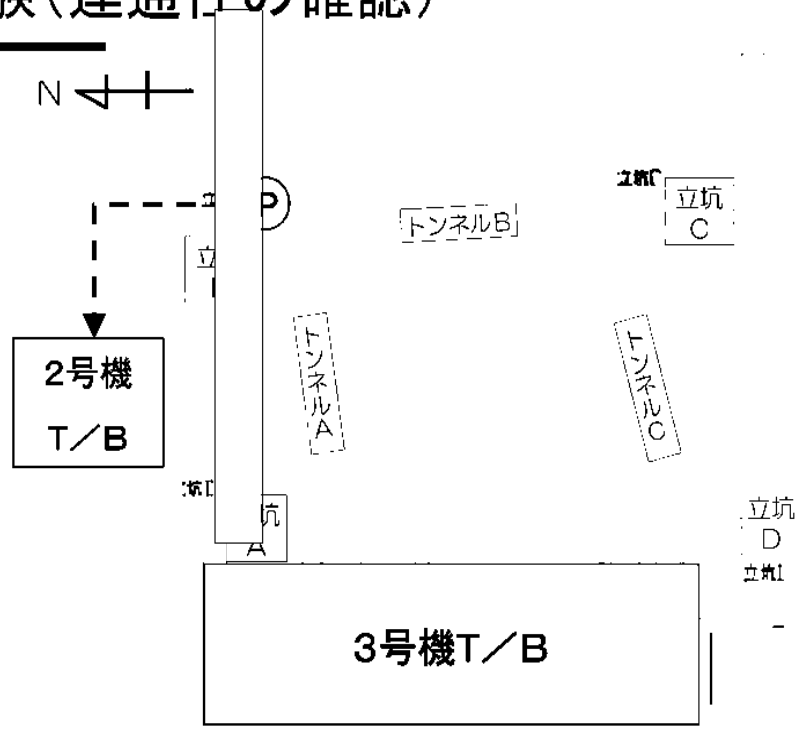
・３号機立坑Ｂより揚水→２号機T/Bへ移送

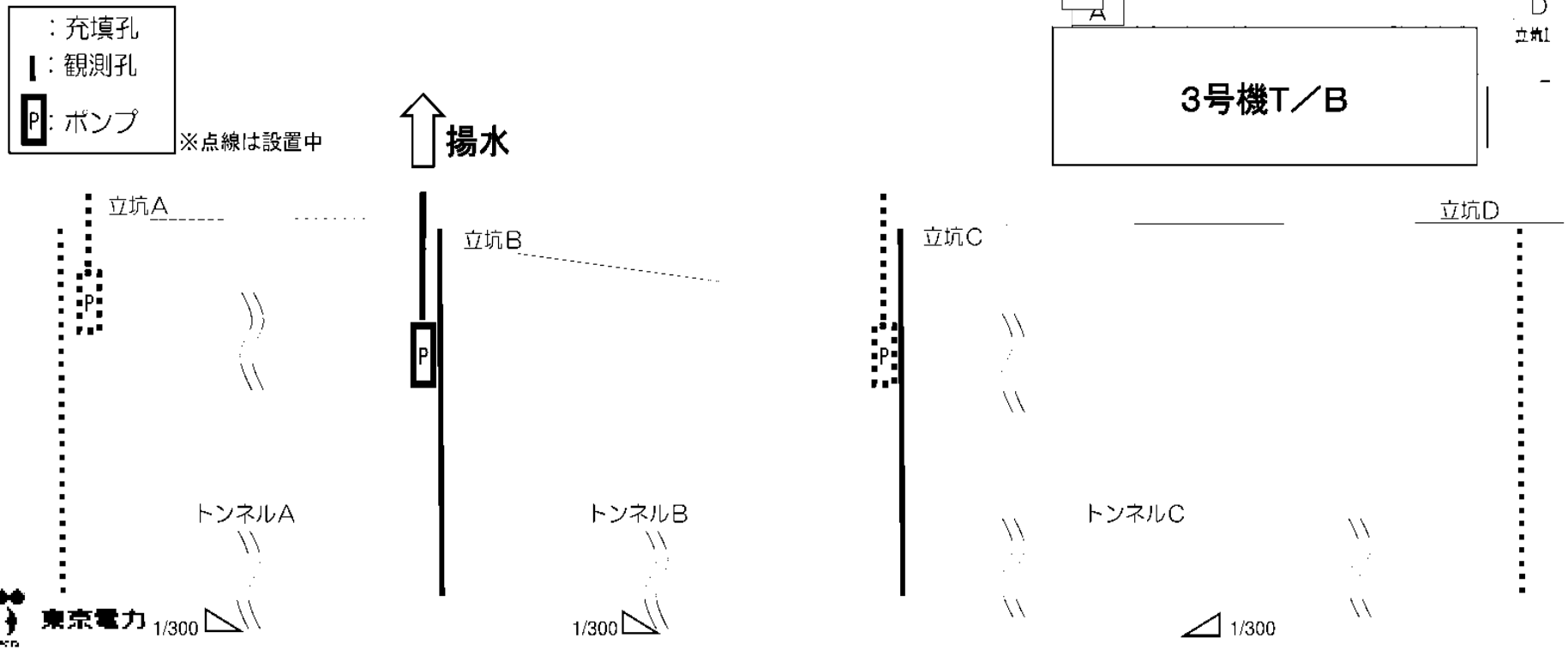
・揚水量：105m^3

・水位低下量（連通なしの場合）：約30cm

(3)結果

・立坑Ｂの水位低下量：約8cm



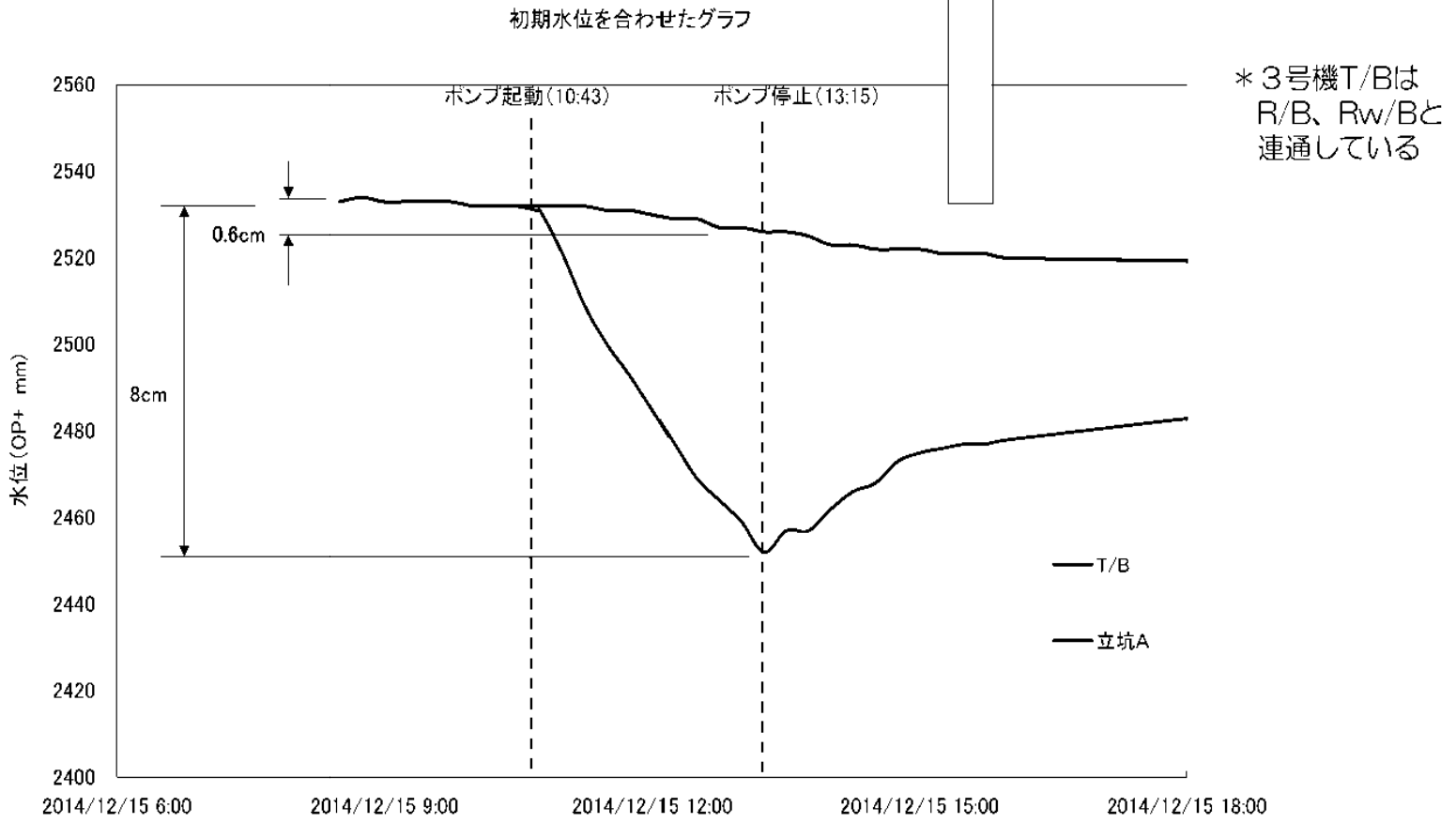


3.（2） 3号機海水配管トレンチ・揚水試験（連通性の確認）

３号機立坑Ｂから105m³揚水した結果、連通なしと想定した水位低下量：30[illegible]mに対して、約8cm（28m³）の低下であった。

一方、揚水試験の間、３号機T/Bの水位は0.6cm低下しており、T/Bの面積：[illegible]7,000m²より低下量は42m³。よって、トレンチからの揚水分は、T/Bから流入したと想定。

揚水試験の結果に基づき、今後の進め方を判断する。



＊３号機T/Bは R/B、Rw/Bと 連通している

※揚水試験開始前（10時30分）の水位を、T／B水位に合わせている。

4.　4号機海水配管トレンチの調査結果（水位・水質）

12/19に揚水試験を実施し、開口部Ⅲから約105m³揚水。結果として、タービン建屋とトレンチの水位に変化は生じなかった

水質（Cs濃度）は、２号機トレンチ（H25.11、浄化開始時）及び３号機トレンチ（H25.11、浄化開始時）より２～３桁低い。揚水試験後の水質については分析中。

【揚水試験の概要】

12月19日（金）　10:00　揚水開始(約35m³/h)
13:00　揚水終了

【水質】

区分	４号機T/B	４号機トレンチ	２号機トレンチ（浄化開始時）	３号機トレンチ（浄化開始時）	備　考
採取日	H26.10	H26.12	H25.11	H25.11	
全γ	480 Bq/cm³	270 Bq/cm³	—	—	
Cs-134	120 Bq/cm³	63 Bq/cm³	67,000 Bq/cm³	15,000 Bq/cm³	
Cs-137	360 Bq/cm³	206 Bq/cm³	170,000 Bq/cm³	23,000 Bq/cm³	
全β	590 Bq/cm³	285 Bq/cm³	—	—	
トリチウム	4.4 Bq/cm³	3.3 Bq/cm³	—	—	

Ｊ６タンクエリアにおける
多核種除去設備処理水の漏えいについて

平成26年12月25日
東京電力株式会社

東京電力
TEPCO

1．発生事象

■概要

- J6-A1タンクが竣工したことから、多核種除去設備から当該タンクへ移送を実施することにしていた。
- その際、系統構成を誤り（施工中の配管につながる弁を開けていた）、施工中の配管端部（開口していた）から、移送していた多核種除去設備の処理水が漏えいした。
- 本事象については、汚染水が管理区域内に漏えいした事象であることから、法令報告事象と判断した。（今後、事故報告書を作成し、規制庁へ報告する）

■時系列（12月17日）

- 午後2時56分　多核種除去設備からJ6-A1へ移送を開始（初移送）
- 午後3時頃　F765弁の先の施工中の配管から多核種除去設備の処理水が漏えいしていることを当社社員が発見（耐圧漏えい検査に合格の後、初めて当該は移管を使用してのタンクへの移送を行う際に、社員を配置して確認していた）
- 午後3時03分　F765弁を閉止した後、多核種除去設備からの移送を停止
- 午後4時40分～　周辺の土砂を回収
  （12月18日も引き続き実施し、合計約5.7m^3の土砂を回収）
- 午後６時53分
  ～7時35分　配管トレンチ内等の漏えい水※を回収（約9m^3）
  ※当初から配管トレンチ内に入っていた雨水を含む

1．発生事象

■漏えい状況

- 漏えい量　：最大約6m^3
- 漏えい水　：多核種除去設備での処理水
- 漏えい範囲：漏えい箇所周辺（約2m×約25m）
  漏えい箇所南側配管トレンチ内（長さ約16m）
  ※漏えい水は上記エリアに留まっており、海洋への流出はない
- 漏えいエリアの雰囲気線量：2～8μSv/h
  ※バックグランドと同等な値
- 漏えい水の分析結果（平成26年12月17日　採取・分析）

	多核種処理設備 処理水	漏えい箇所周辺の 漏えい水	配管トレンチ内の 漏えい水※
トリチウム	8.8×10^{5}Bq/L	5.0×10^{5}Bq/L	3.3×10^2～ 3.8×10^{5}Bq/L
全β	1.1×10^{2}Bq/L	4.7×10^{1}Bq/L	2.2×10^0～ 6.6×10^{1}Bq/L

※ 5箇所ある配管トレンチの
最大値と最小値

2．原因と対策

■原因

- 当社設備運用部署は、当社工事実施部署から提供された施工図面を用いて、J6エリアへの移送に向けた手順書の作成していたが、施工図面の配管の見方を誤り、J6エリアへの配管ラインを誤認してしまった。更に設備運用部署は、この配管ラインを誤認した図面を元に、間違えた手順書を作成してしまった。

- 設備運用部署は、間違えた手順書に従い、施工中の配管につながる弁（F765弁）を開としてしまった。

- 設備運用部署は、手順書に基づき現場にて弁の開閉操作・開閉状態の確認を実施したが、配管の行き先までの確認は実施していなかった。

2．原因と対策

■対策

「 施工図面の配管の見方を誤り、間違えた手順書を作成したこと」の対策

- 工事実施部署は、配管の接続箇所が明示されている図面を作成して設備運用部署に提示することとし、設備運用部署は、この図面を用いて手順書を作成する。

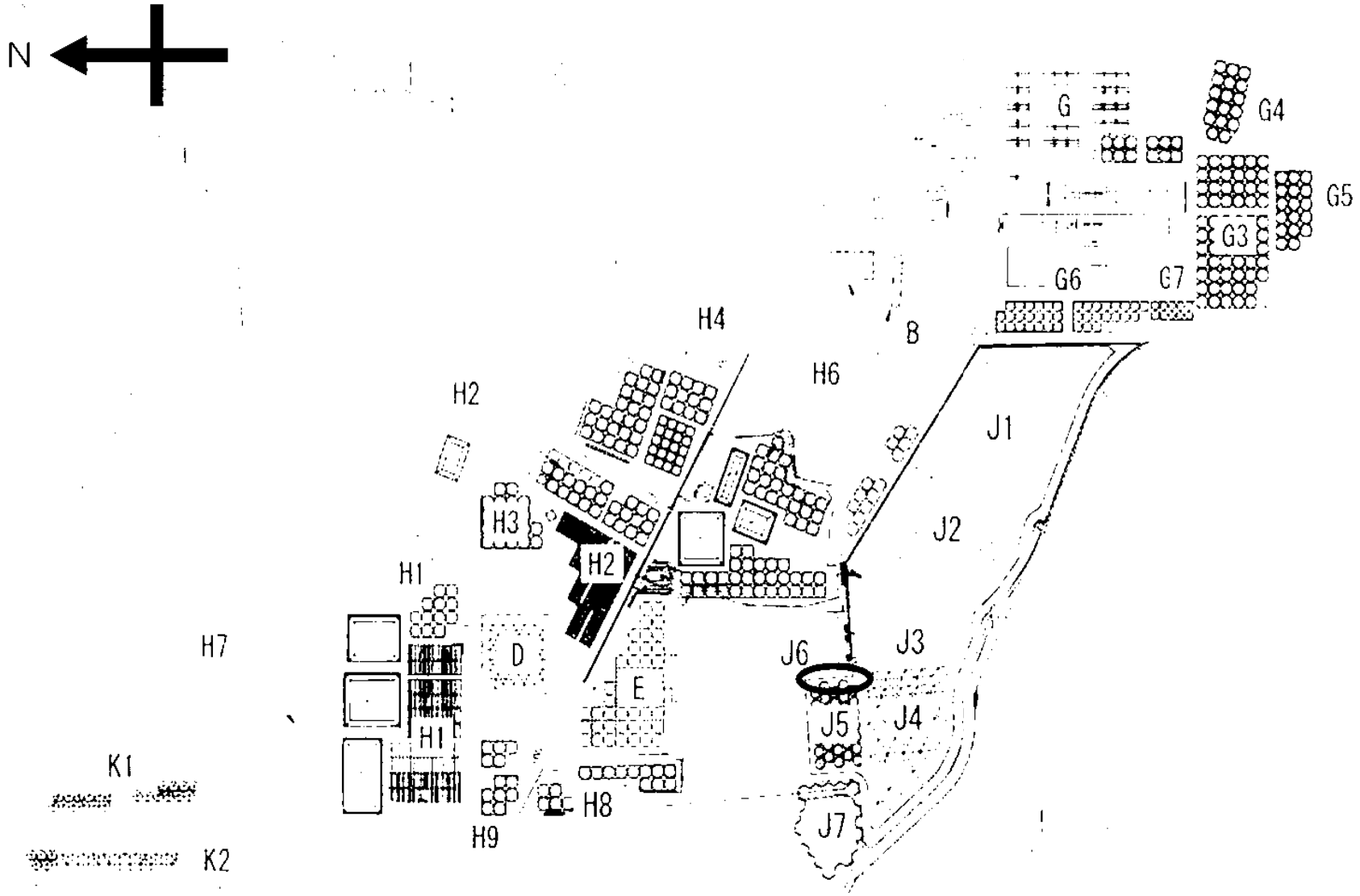
「施工中の配管につながる弁を開としたこと」の対策

- 工事実施部署は、施工中の配管と運用中の配管を仕切る弁について、設備運用部署で間違えて操作できないよう、弁を閉とした上で施錠管理を行う。

「現場にて配管の行き先の確認を実施しなかったこと」の対策

- 設備運用部署は、今後初めて使用する配管を用いて移送する際には、現場にて当該配管を追い、配管の行き先の確認を行うこととする。（12月18日に手順書改定済み）

（参考１）発生位置


N
G
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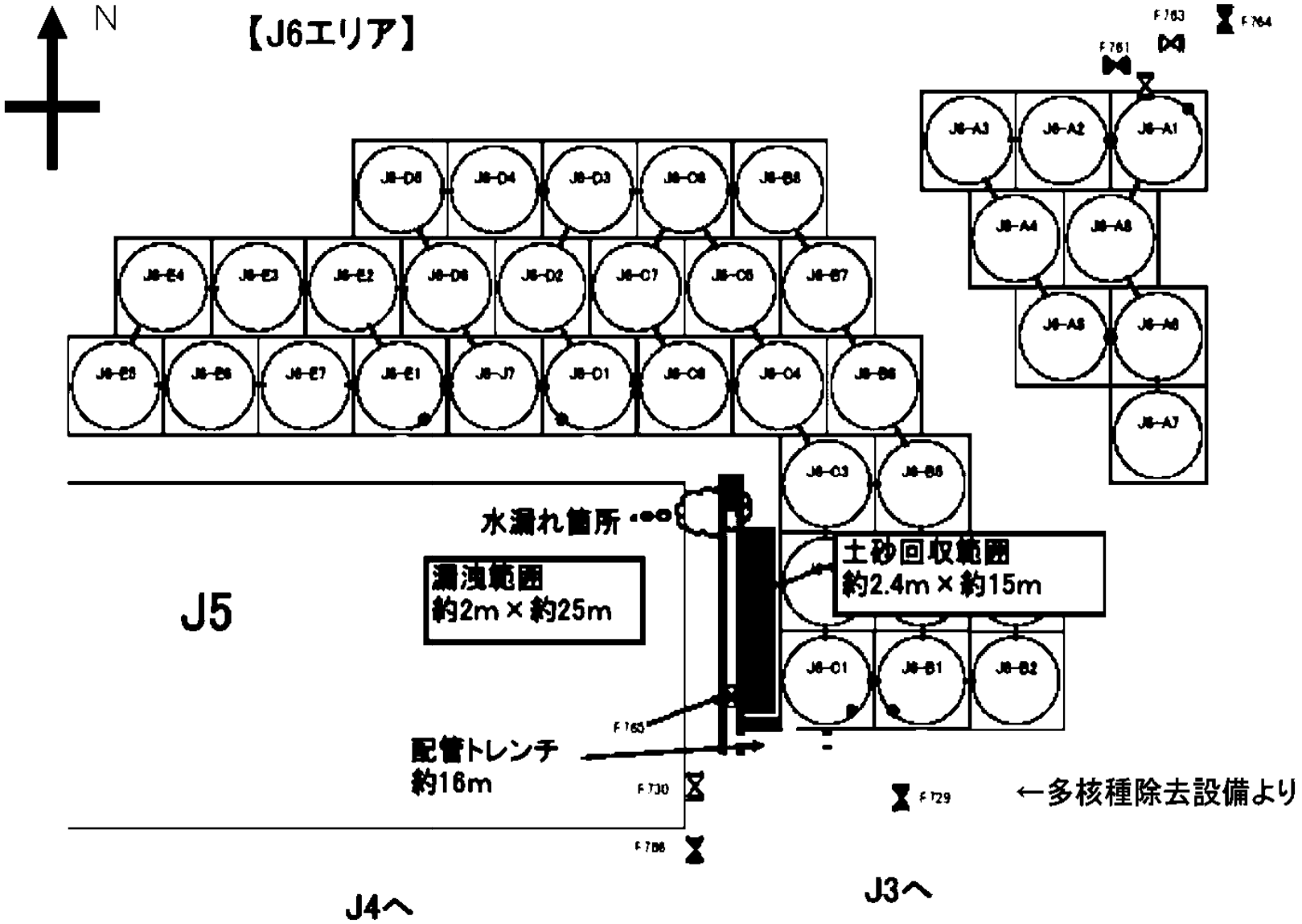
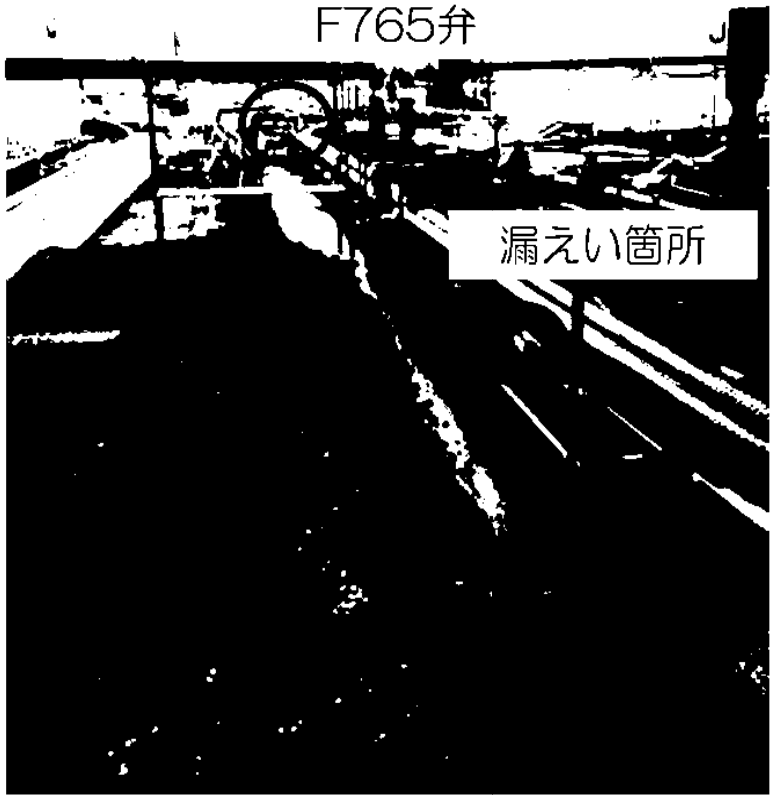
H1
H7
D
J6
J3
E
J5
J4
H1
K1
H8
H9
J7
K2

（参考2）発生位置


N
【J6エリア】
J6-A3
J6-A2
J6-A1
J6-A4
J6-A8
J6-A5
J6-A6
J6-A7
J6-D5
J6-D4
J6-D3
J6-C8
J6-B8
J6-E4
J6-E3
J6-E2
J6-D6
J6-D2
J6-C7
J6-C6
J6-B7
J6-E5
J6-E6
J6-E7
J6-E1
J6-J7
J6-C1
J6-C8
J6-C4
J6-B6
J6-C3
J6-B5
J6-C1
J6-B1
J6-B2
水漏れ箇所
漏洩範囲
約2m×約25m
土砂回収範囲
約2.4m×約15m
J5
配管トレンチ
約16m
←多核種除去設備より
J4へ
J3へ

（参考３）現場状況写真



漏えい水の流れ

（参考４）漏えい量について

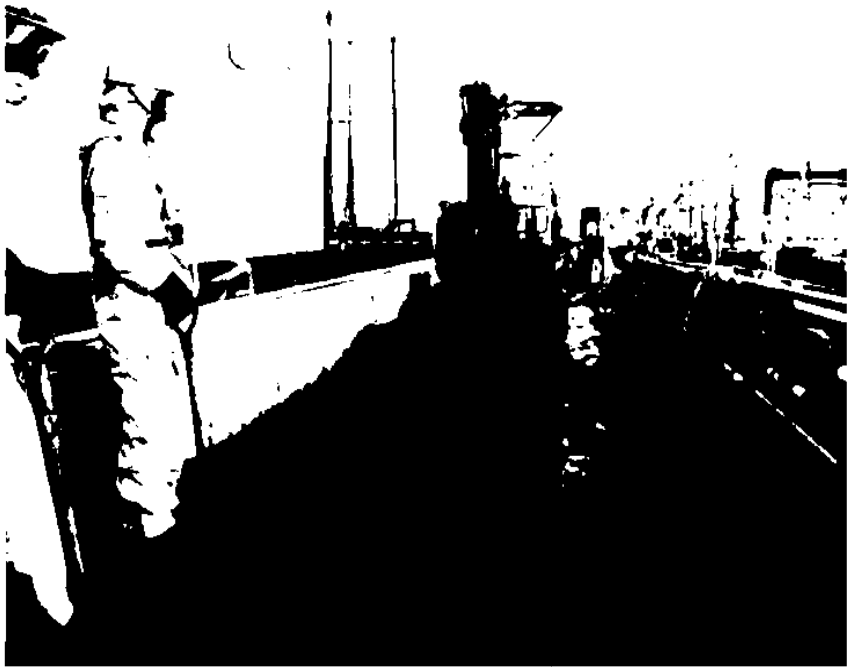
- 多核種除去設備からの移送量は50m^3/h

- 移送開始から移送停止まで7分であったことから、漏えい量は最大で6m^3と想定（実際には移送停止前に弁閉を実施し、漏えいを停止させている）

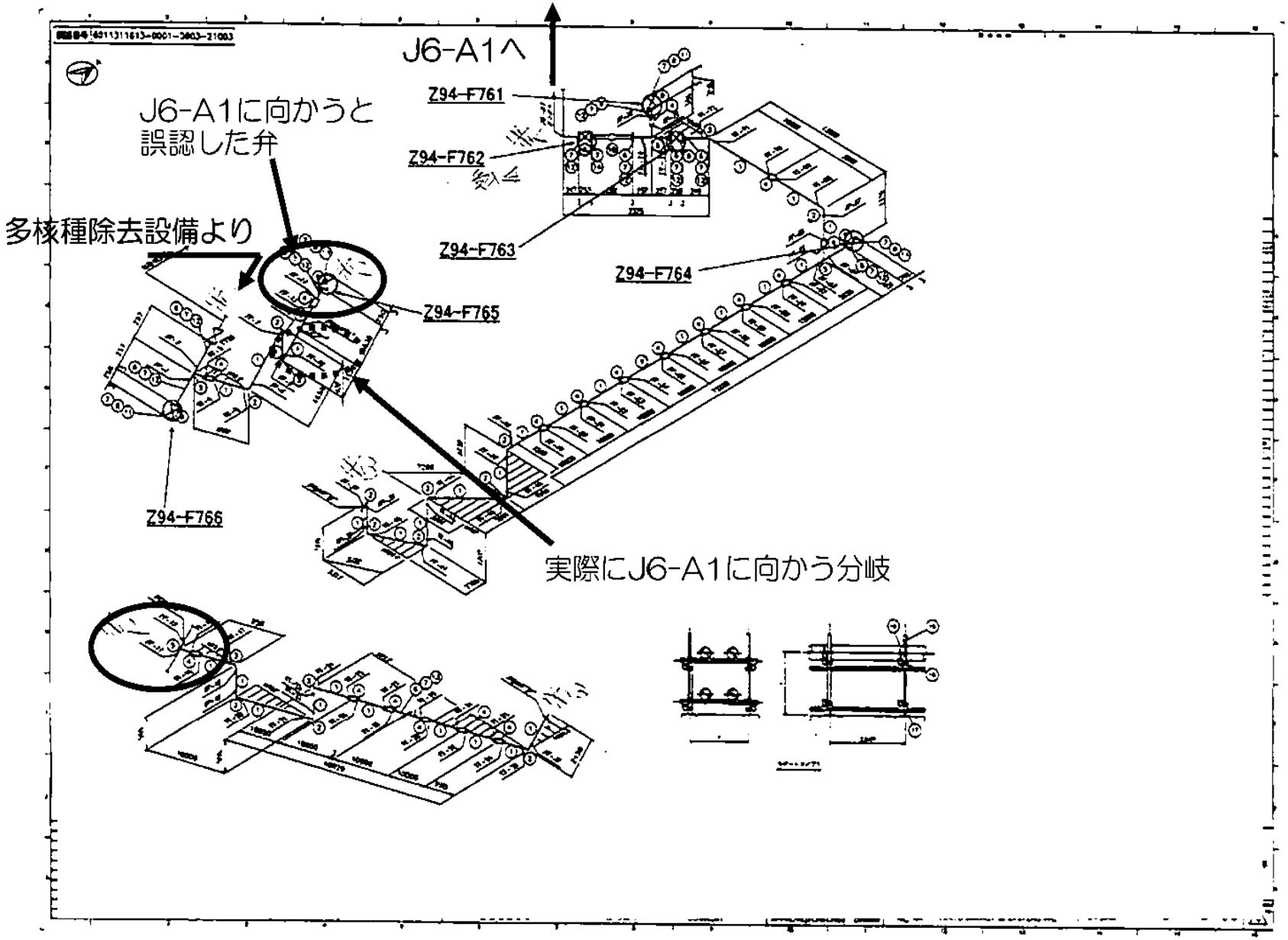
  50m^3/h×7分÷60分＝6m^3

（参考５）周辺の土砂の除去状況

- 水たまりなど、漏えい水が流れた痕跡のある箇所については、12月17日,18日にかけて土砂の回収を実施　（回収範囲：約2.4m×約15m）



（参考６）手順書作成の際に使用した施工図面



地下水バイパスの運用状況について

平成26年12月25日

東京電力株式会社

東京電力 TEPCO

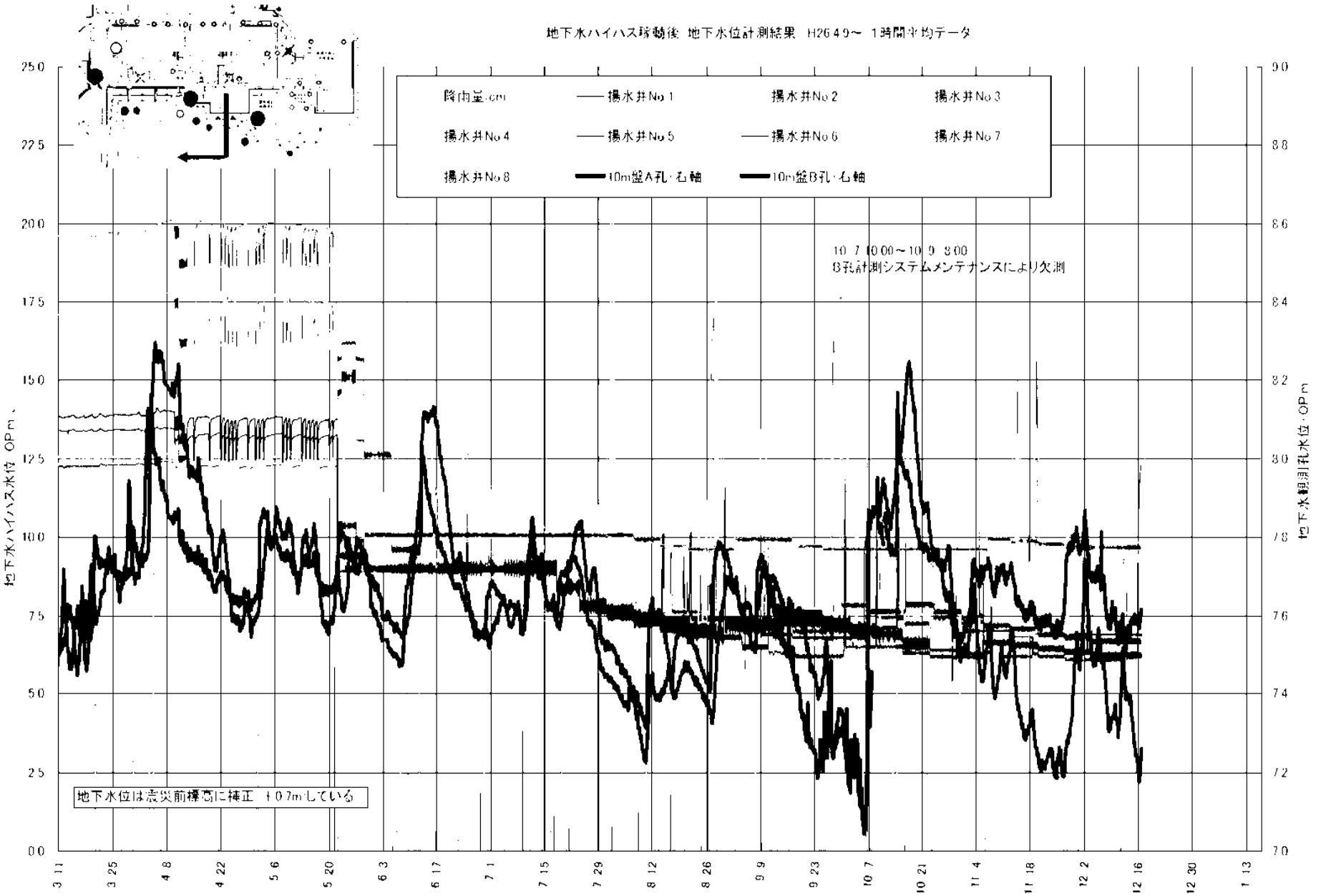
地下水バイパスの運用状況について

地下水バイパスは、5月21日に排水を開始し、40回目の排水を完了
排水量は、合計 64,048m^3

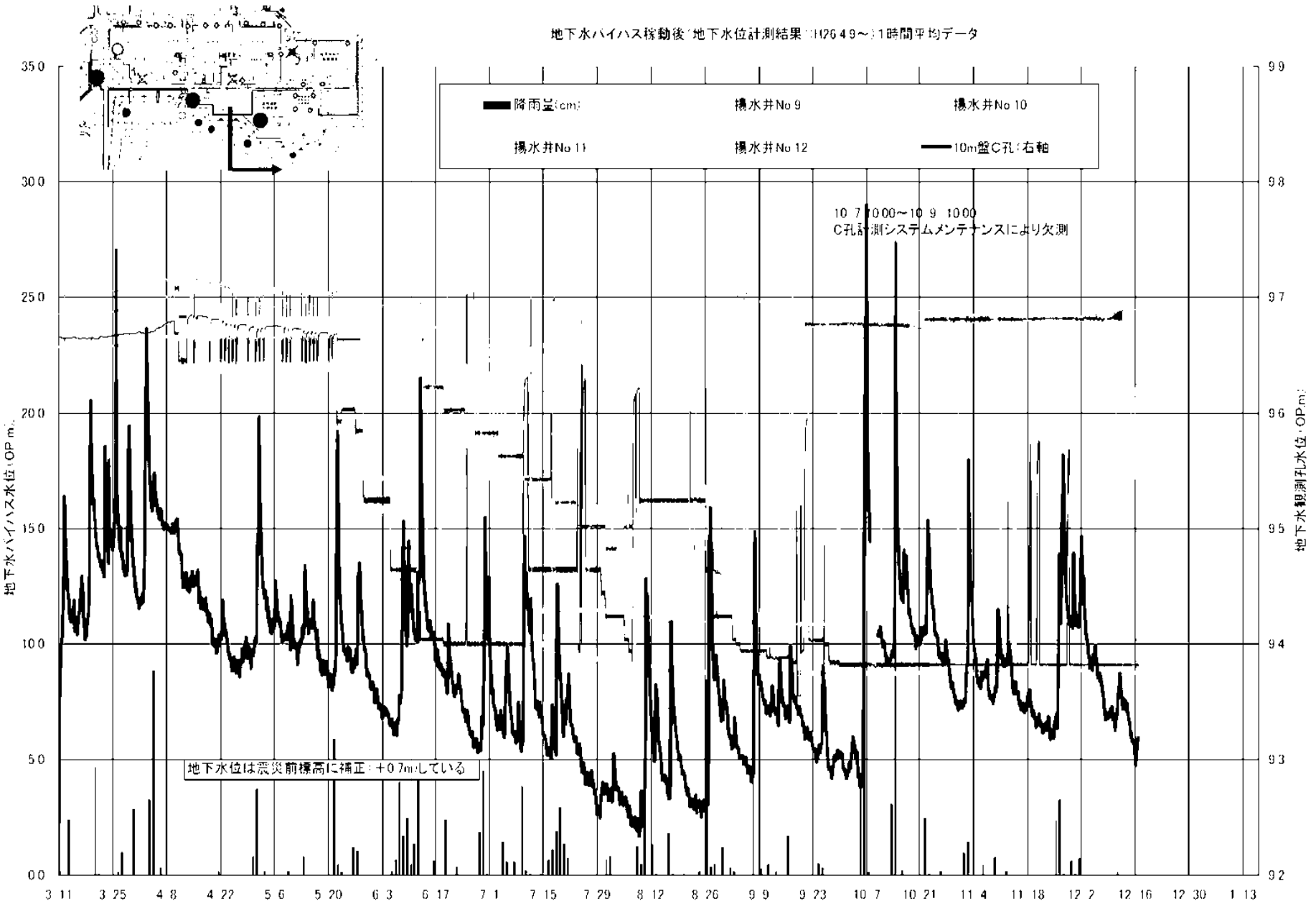
採水日	11月18日		11月23日		11月29日		12月5日		12月11日		運用目標	※1 告示濃度限度	WHO飲料水水質ガイドライン
分析機関	東京電力	第三者機関	東京電力	第三者機関	東京電力	第三者機関	東京電力	第三者機関	東京電力	第三者機関			
セシウム134（単位：Bq/L）	ND(0.73)	ND(0.75)	ND(0.49)	ND(0.64)	ND(0.60)	ND(0.71)	ND(0.62)	ND(0.79)	ND(0.70)	ND(0.72)	1	60	10
セシウム137（単位：Bq/L）	ND(0.69)	ND(0.64)	ND(0.46)	ND(0.71)	ND(0.68)	ND(0.59)	ND(0.60)	ND(0.55)	ND(0.45)	ND(0.71)	1	90	10
その他ガンマ核種（単位：Bq/L）	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出されないこと※2		
全ベータ（単位：Bq/L）	ND(0.78)	ND(0.54)	ND(0.90)	ND(0.58)	ND(0.83)	ND(0.57)	ND(0.88)	ND(0.55)	ND(0.80)	ND(0.67)	5(1)(注)		
トリチウム（単位：Bq/L）	110	110	100	110	99	93	110	110	110	110	1,500	60,000	10,000
排水日	11月28日		12月4日		12月10日		12月16日		12月22日				
排水量（単位：m3）	1,442		1,386		1,722		1,806		1,784				

＊第三者機関：日本分析センター
＊NDは検出限界値未満を表し、（ ）内に検出限界値を示す。
(注) 運用目標の全ベータについては、10日に1回程度の分析では、検出限界値を 1 Bq/Lに下げて実施。
※1 東京電力株式会社福島第一原子力発電所原子炉施設の保安及び特定核燃料物質の防護に関する規則に定める告示濃度限度（別表第2第六欄：周辺監視区域外の水中の濃度限度[本表では、Bq/cm^{3}の表記をBq/Lに換算した値を記載]）
※2 セシウム134,セシウム137の検出限界値「1Bq/L未満」を確認する測定にて検出されないこと（天然核種を除く）。

揚水井稼働実績（揚水井Ｎｏ．１～８）

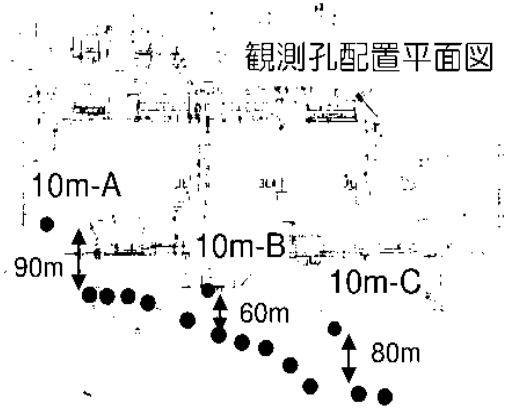


揚水井稼働実績（揚水井Ｎｏ．９～１２）



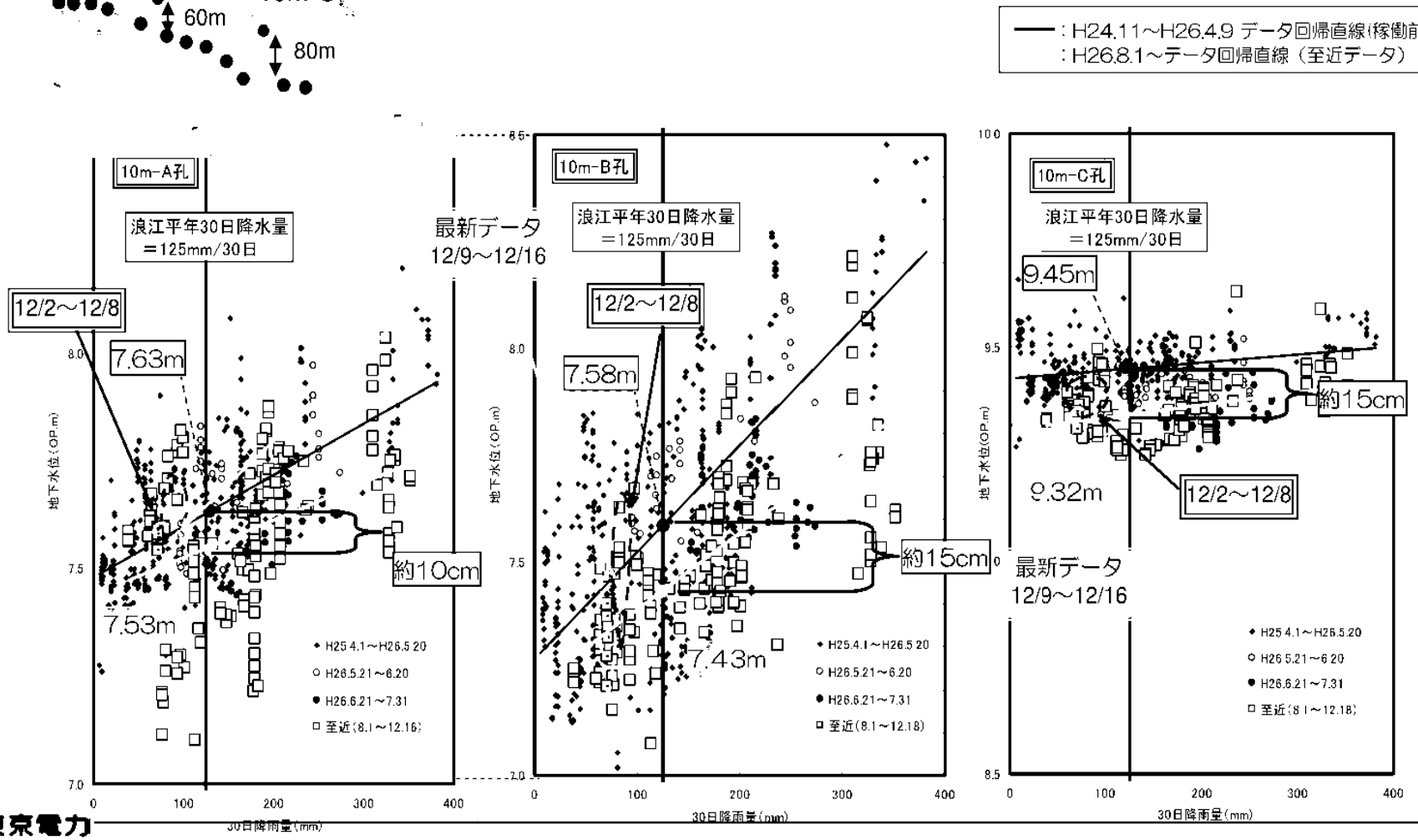
地下水バイパス稼働後における10m盤観測孔単回帰分析結果（累計雨量30日）

H26. 12.16現在



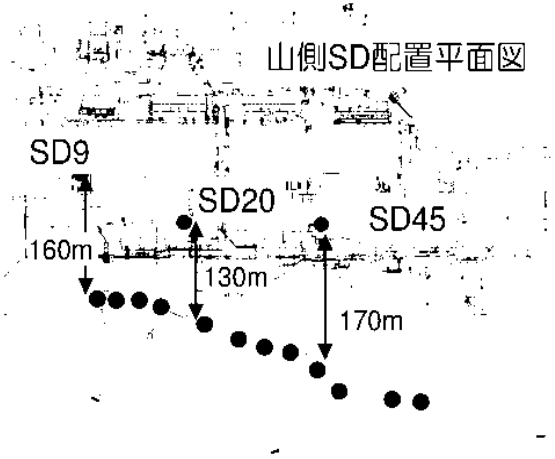
10m盤観測孔は１～２ヶ月累計雨量との相関が高いことから、30日累計雨量で地下水バイパス稼働の影響を評価した。

地下水バイパス稼働後のA～C孔全ての観測孔の地下水位において平均して10～15cm程度の地下水位の低下が認められる。



地下水バイパス稼働後における山側SD地下水位評価結果（累計雨量60日）

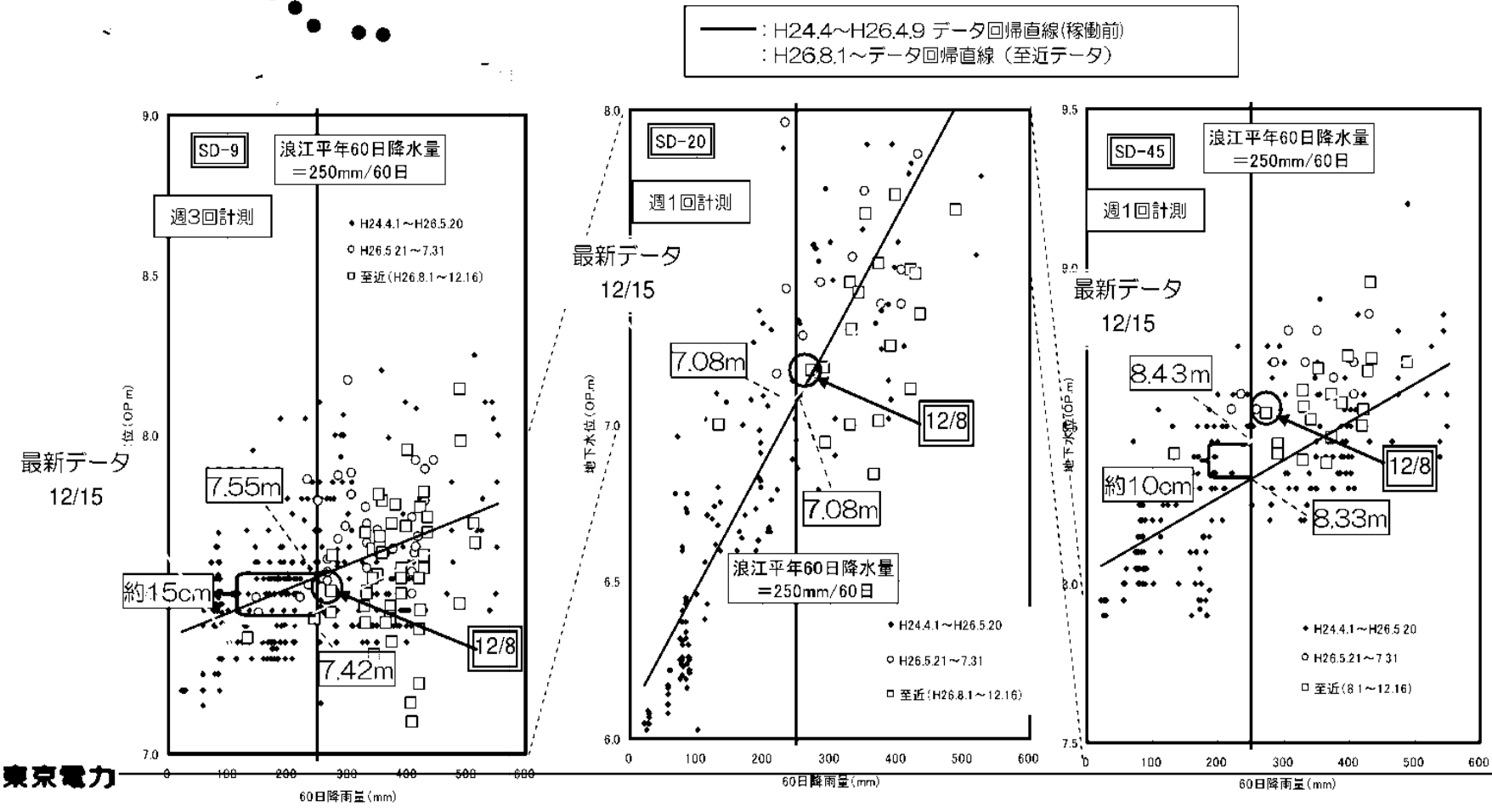
H26. 12.15現在



SDの地下水位は２ヶ月累計雨量との相関が高いことから、60日累計雨量で地下水バイパス稼働の影響を評価した。

H26.8.1以降のデータが蓄積されてきたことから、回帰直線による比較を行った。

その結果、SD9においては約10cmの水位低下と評価され、SD20では同程度、SD45では、約10cm上昇していると評価された。



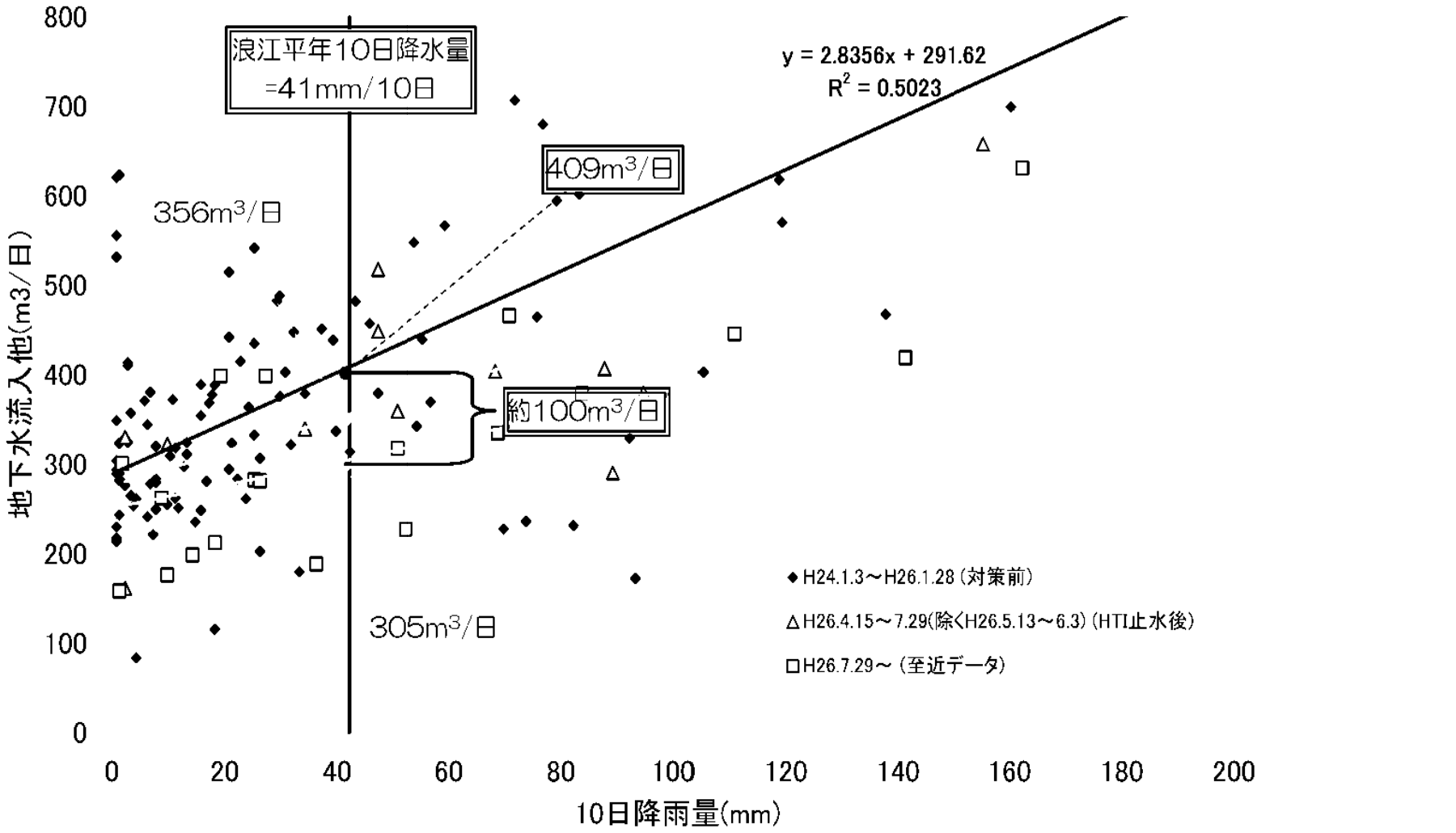
地下水バイパス稼働後における建屋流入量評価結果（累計雨量10日）

H26. 12. 16現在

雨量累計期間　毎週火曜7:00迄の10日間

建屋への地下水流入量は１０日累計雨量との相関が高いことから、10日累計雨量で地下水バイパス稼働の影響を評価した。

高温焼却炉建屋（以下、HTI建屋）止水に加え、地下水バイパスの稼動により合計100m³/日程度の建屋流入量の抑制が認められる。



平成26年12月25日
東京電力株式会社

Ｈ４・Ｈ６エリアタンク漏えいによる汚染の影響調査

①追加ボーリング観測孔の放射性物質濃度推移

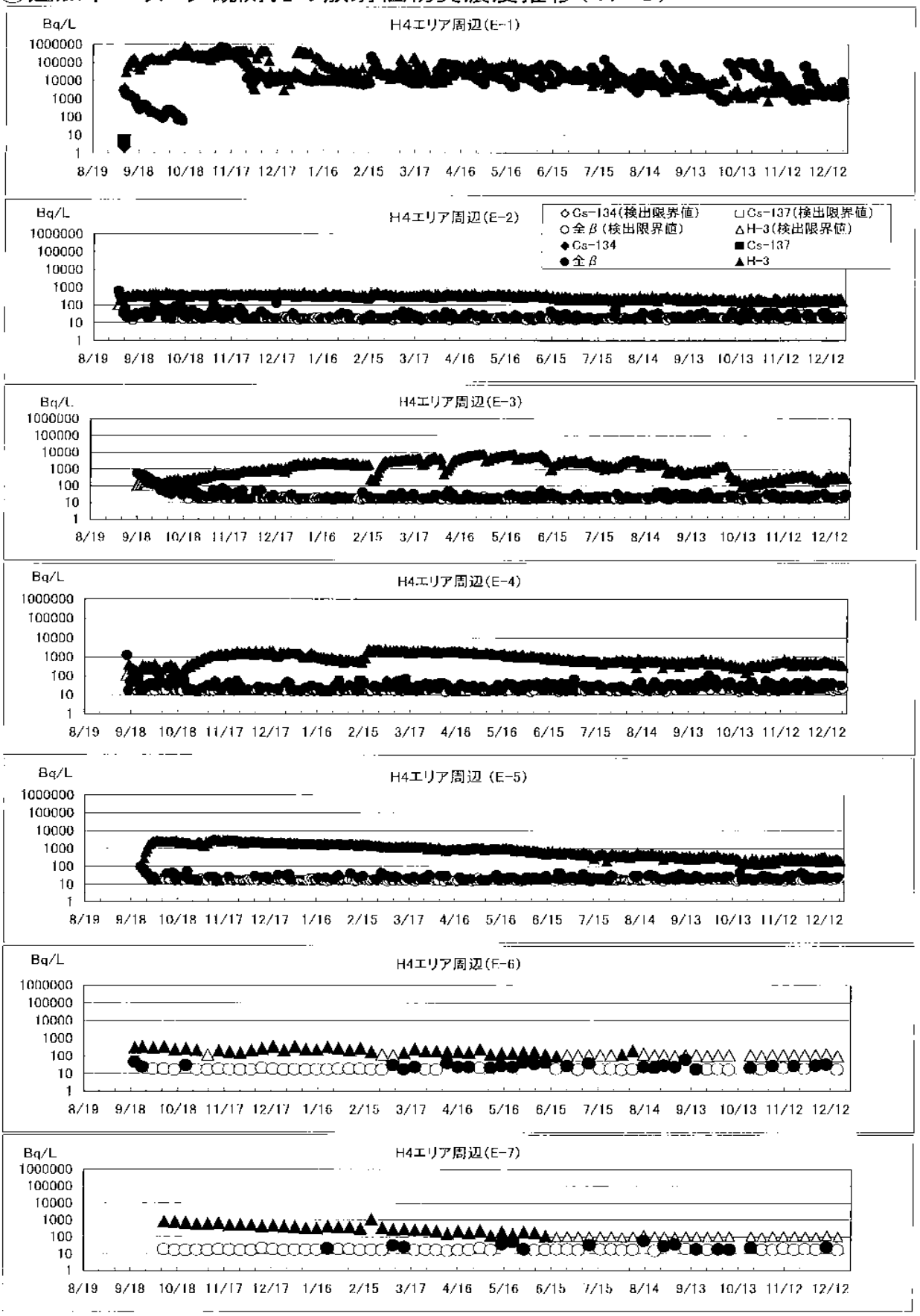
②地下水バイパス調査孔・揚水井の放射性物質濃度推移

③排水路の放射性物質濃度推移

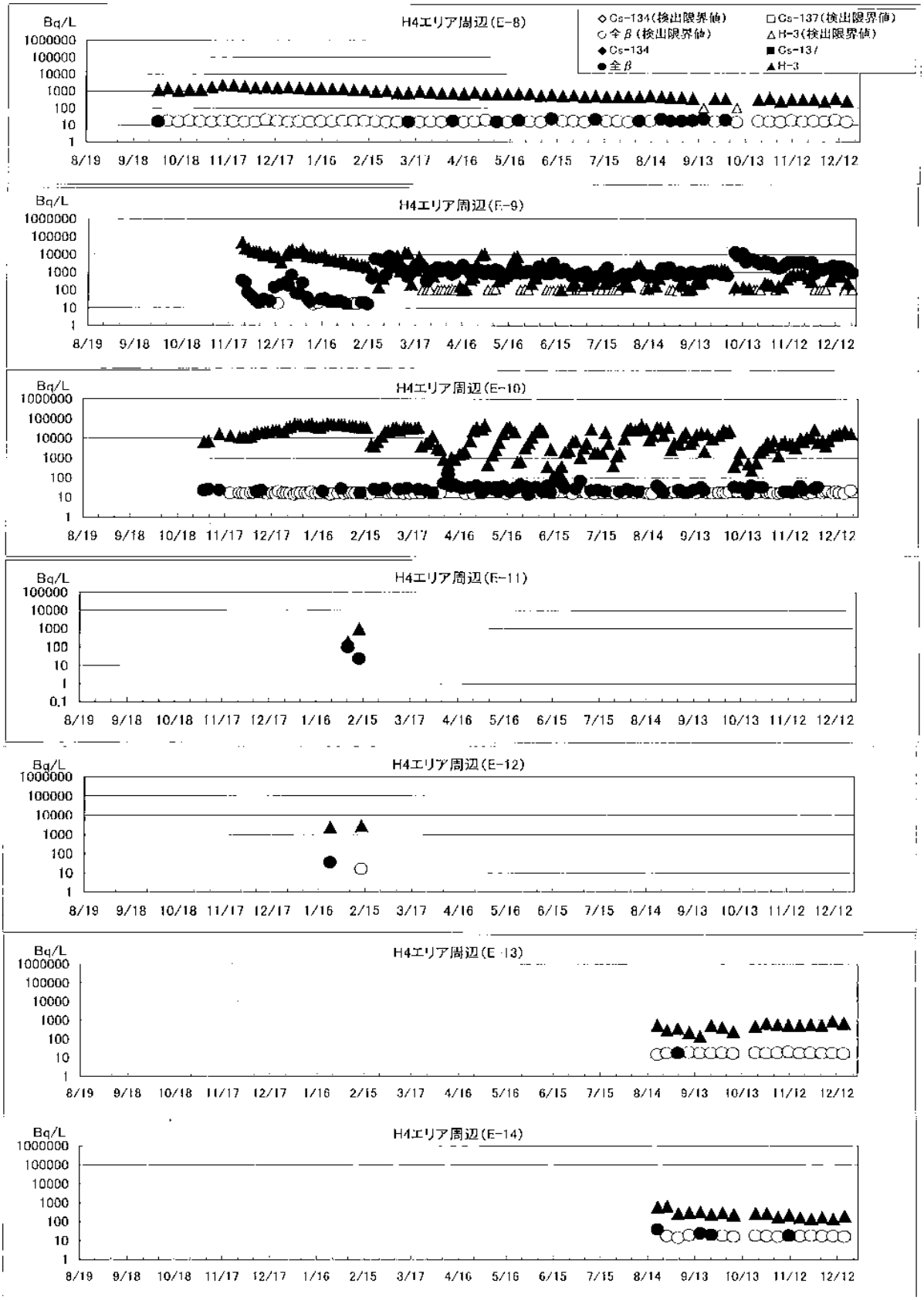
④海水の放射性物質濃度推移

サンプリング箇所

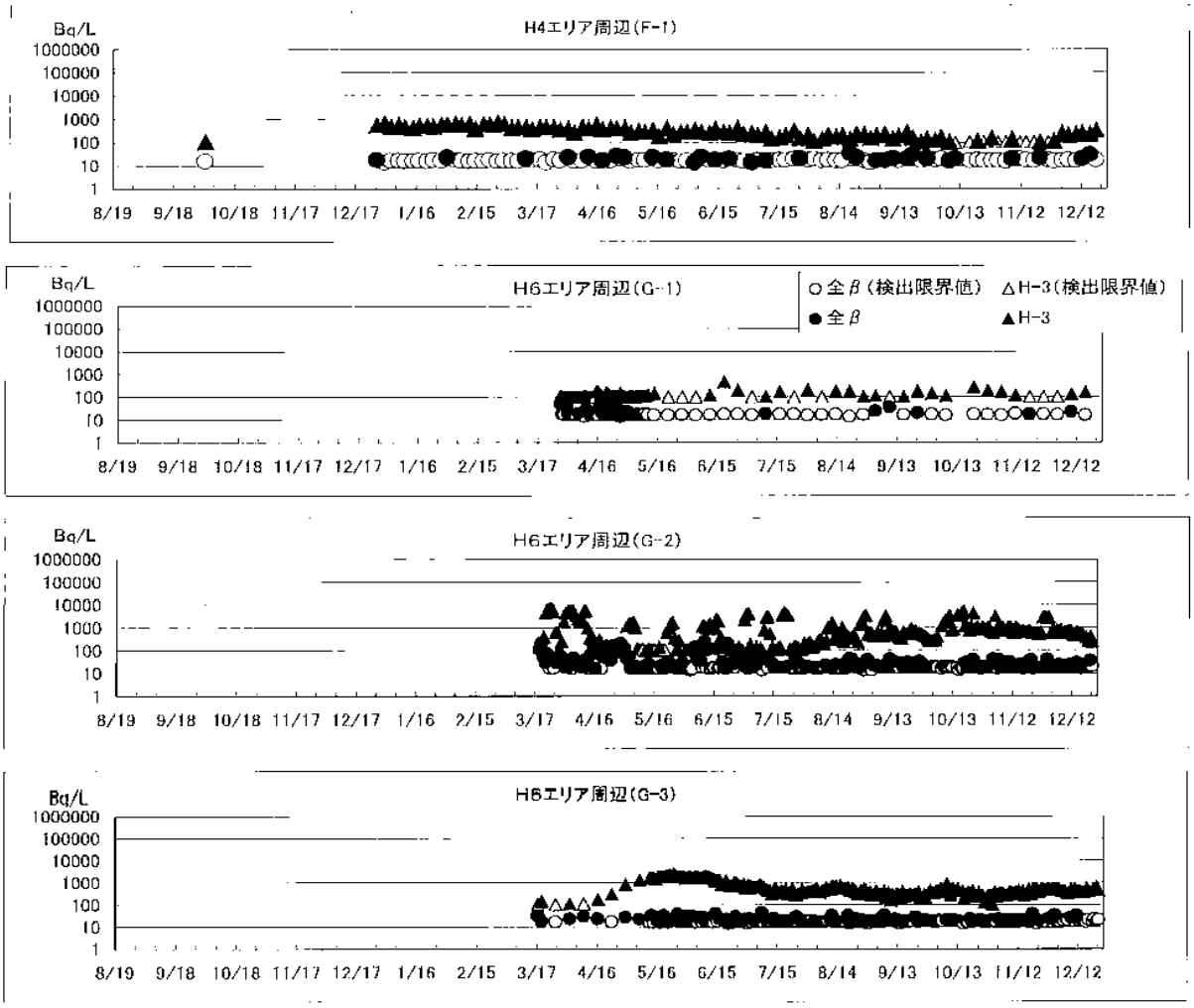
①追加ボーリング観測孔の放射性物質濃度推移（1／3）



①追加ボーリング調査孔の放射性物質濃度推移（2／3）

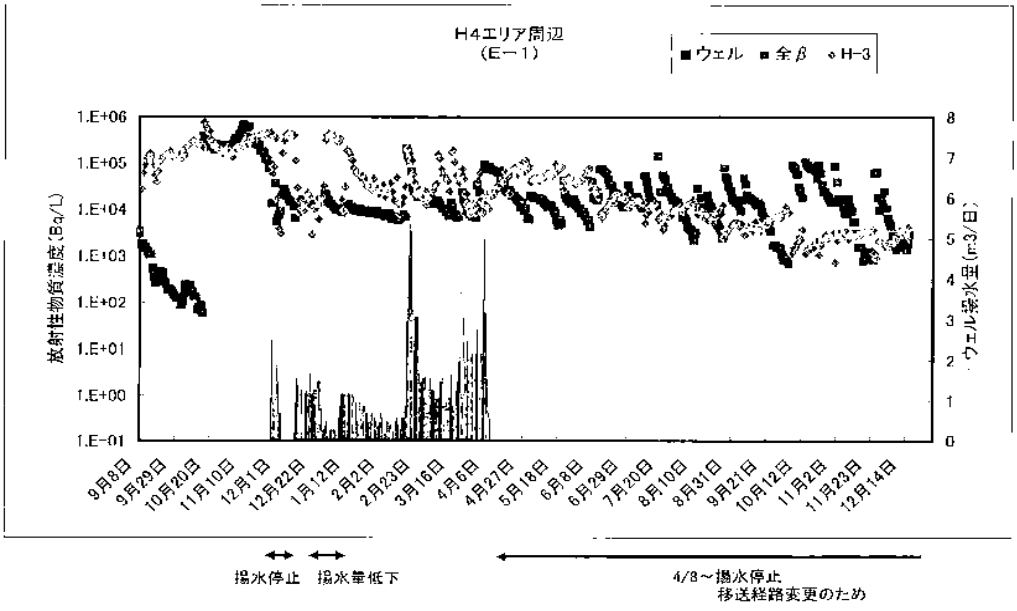


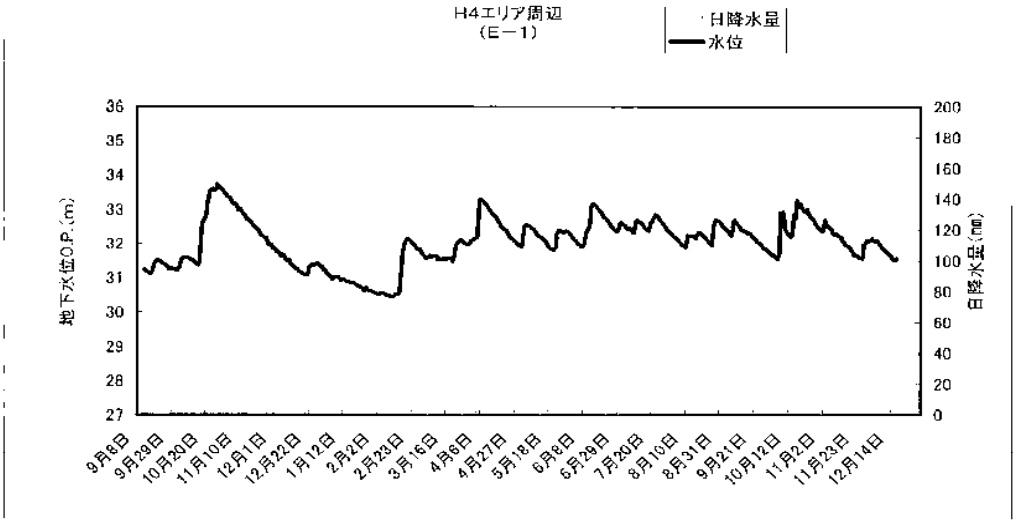
①追加ボーリング観測孔の放射性物質濃度推移（3／3）



＜H26.5.12より採取頻度変更＞
G-1：毎日→1回/週
　　検出限界値未満で安定していることから頻度減
G-3：1回/週→毎日
　　H-3が上昇傾向にあることから頻度増

観測孔E－１の放射性物質濃度と降水量、地下水位との関係

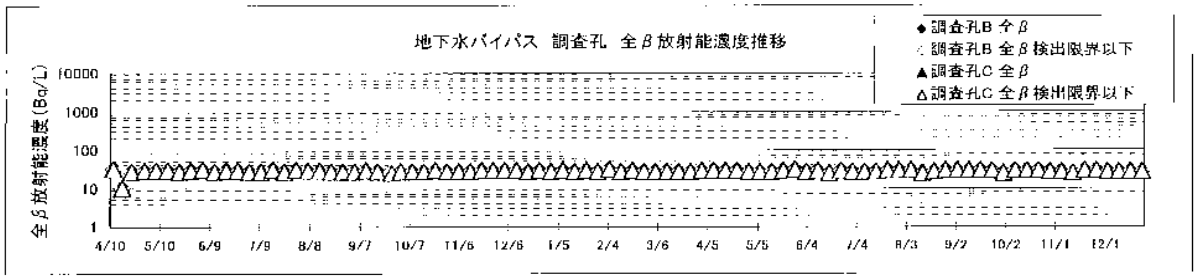




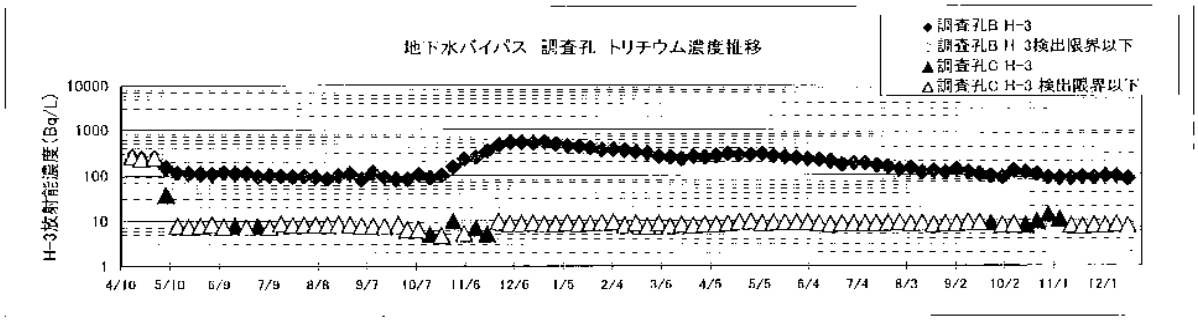
②地下水バイパス調査孔・揚水井の放射性物質濃度推移（1／2）

地下水バイパス調査孔

【全β】



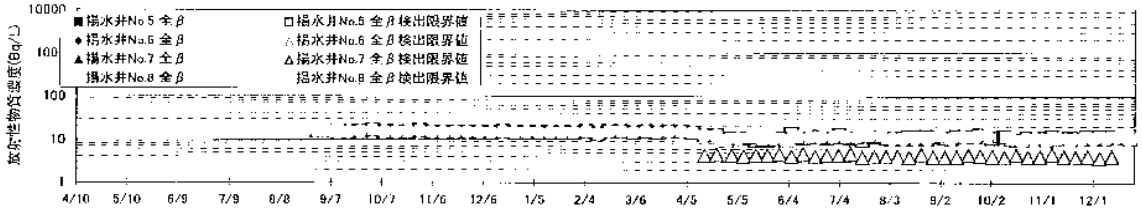
【トリチウム】

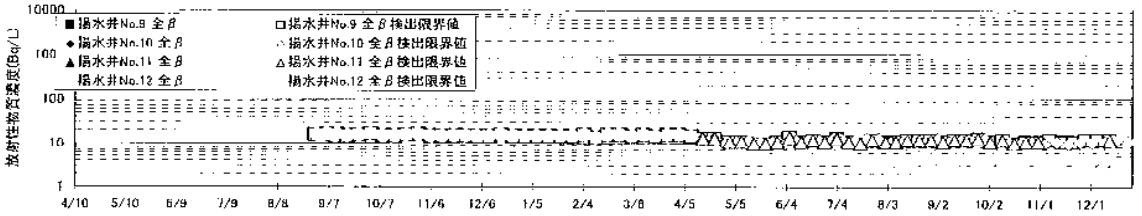


②地下水バイパス調査孔・揚水井の放射性物質濃度推移（2／2）

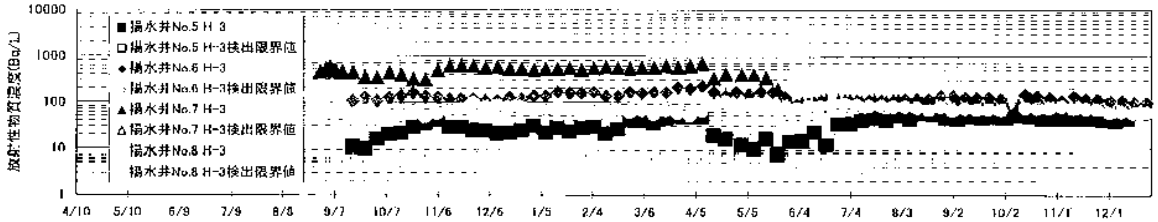
地下水バイパス揚水井

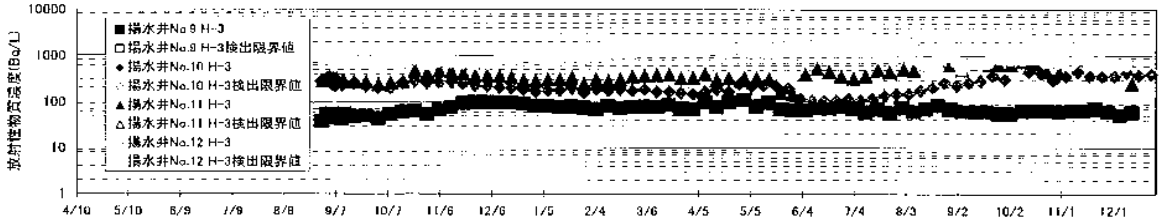
【全β】

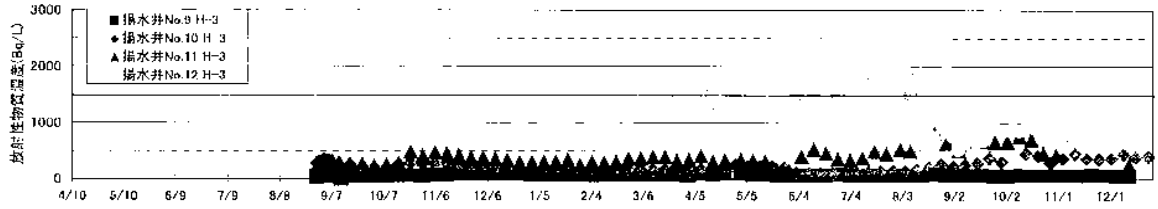




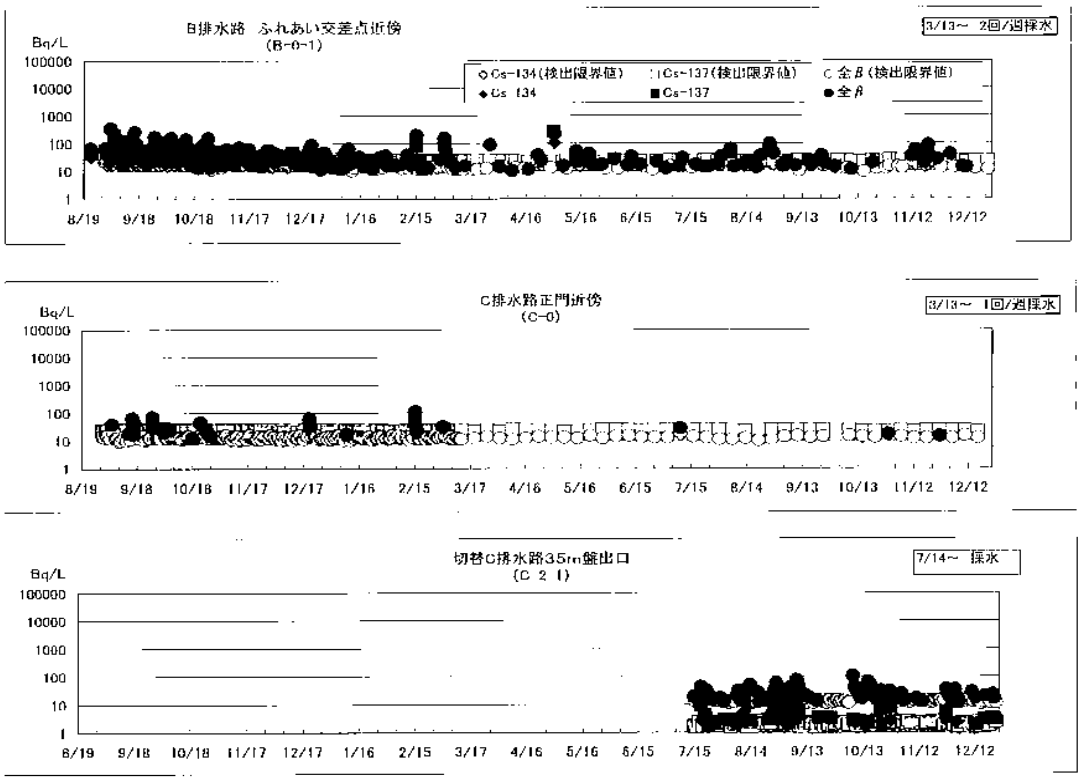
【トリチウム】



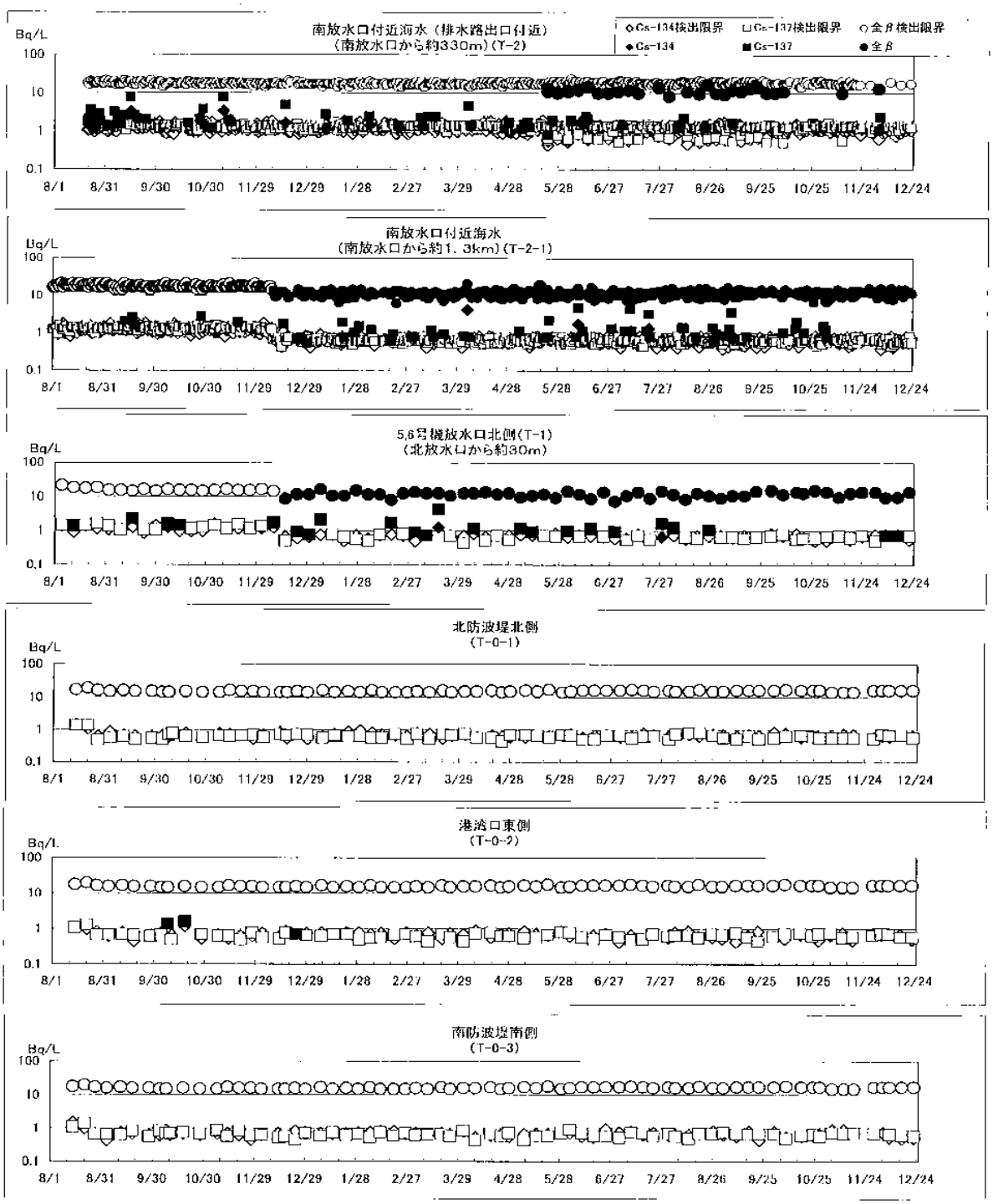




③排水路の放射性物質濃度推移

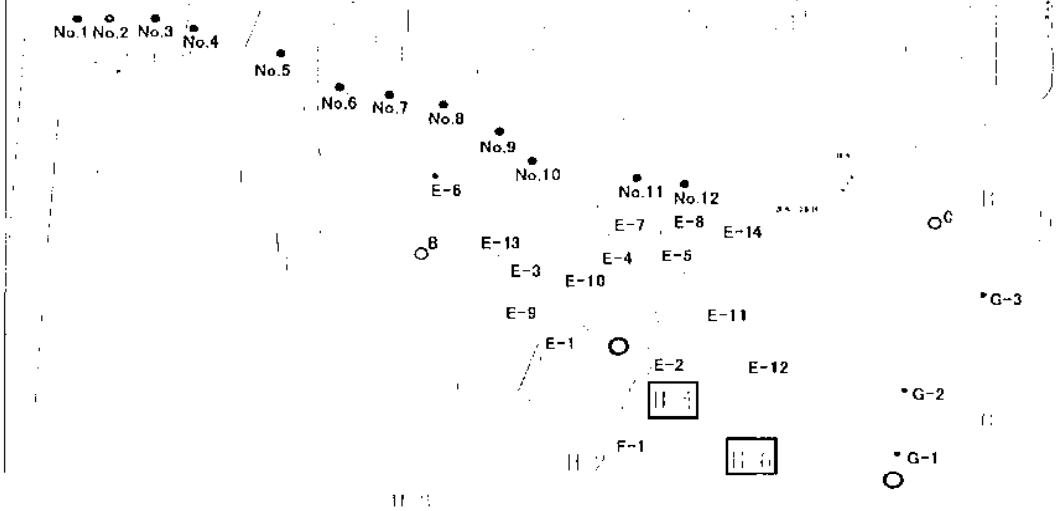


④海水の放射性物質濃度推移

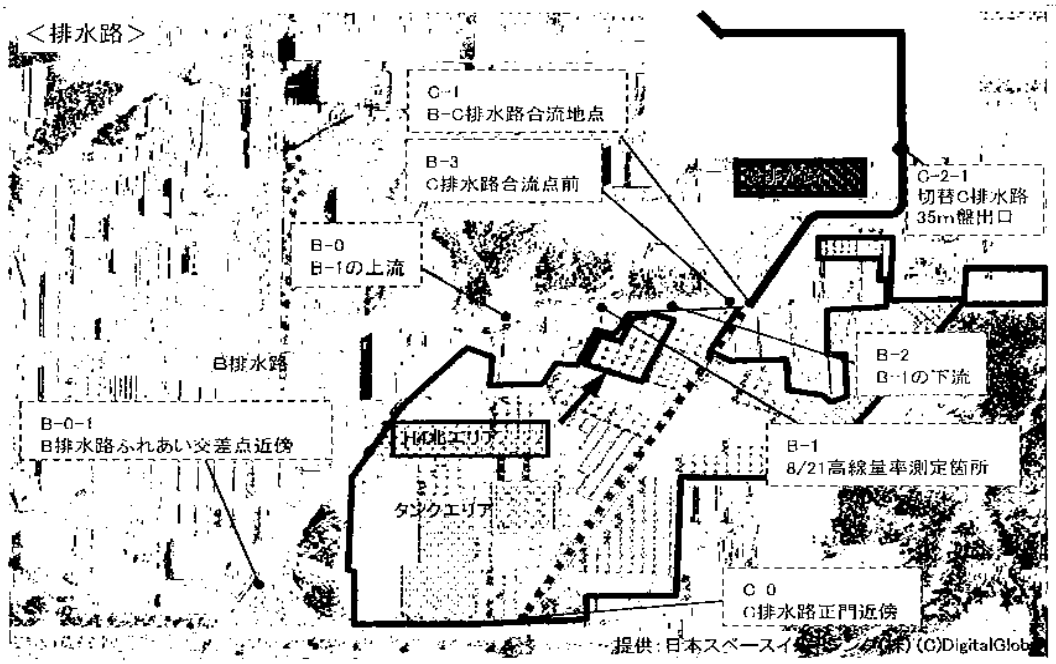


サンプリング箇所

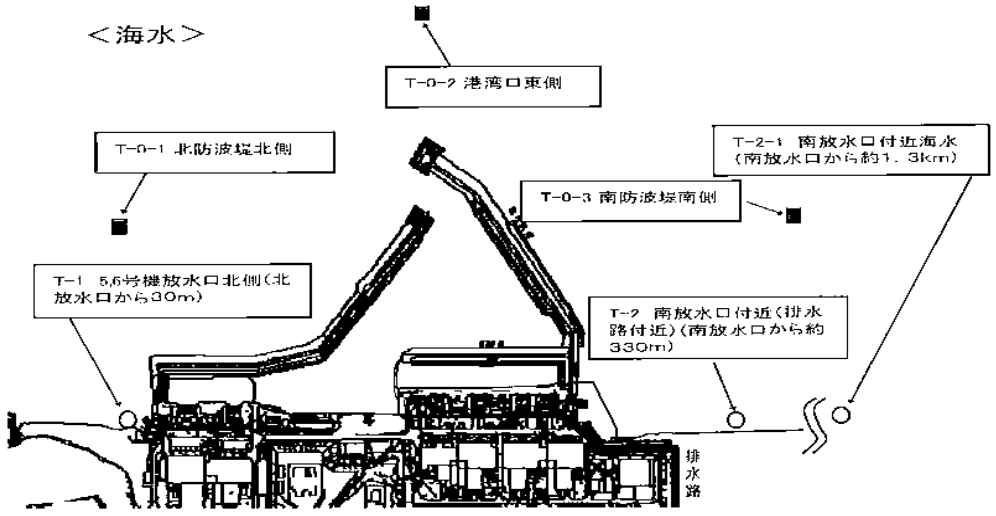
＜追加ボーリング観測孔、地下水バイパス揚水井＞



＜排水路＞



＜海水＞



多核種除去設備
β線連続モニタ設置について

平成26年12月25日

東京電力株式会社

東京電力
TEPCO

β線連続モニタ設置の目的

本年3月、多核種除去設備Ｂ系統のクロスフローフィルタ（以下、ＣＦＦ）パッキン損傷に伴う炭酸塩スラリー流出事象により、下流側設備（サンプルタンク、移送配管等）において、放射能（全β）濃度の上昇を確認。

改良型ＣＦＦの採用※1、バックパルスポットの圧力調整※1等、信頼性向上対策を実施しているものの、更なる信頼性向上として、出口放射能濃度が上昇した際の早期検知※2を目的とし、出口側にβ線連続モニタを設置。

増設多核種除去設備は、β線連続モニタ設置工事を完了し、準備が整い次第運用を開始予定。

多核種除去設備は、β線連続モニタ制御改造を実施中。

高性能多核種除去設備は、β線連続モニタの設置工事を実施中。

※１高性能多核種除去設備では、CFF、バックパルスポットを採用していないため対象外。
※２定例サンプリングで処理水の性状を適宜確認しており、かつサンプルタンクで処理性能に問題ないことを確認してから、処理済水貯蔵タンク群への移送を実施しているものの、更なる早期検知を目的とする。

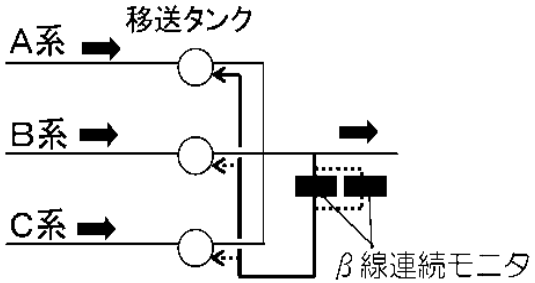
β線連続モニタの概略仕様

測定核種：全β

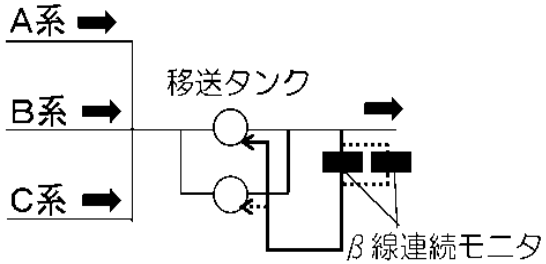
設置台数：２台（１台予備）

検出感度：数十Ｂｑ／Ｌ※1

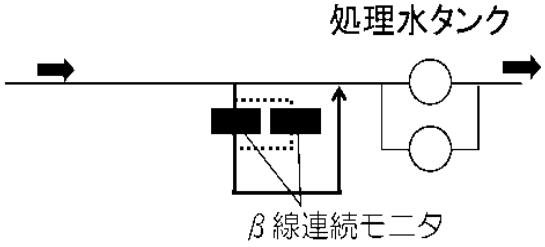
設置箇所：吸着塔出口に設置



多核種除去設備系統構成



増設多核種除去設備系統構成

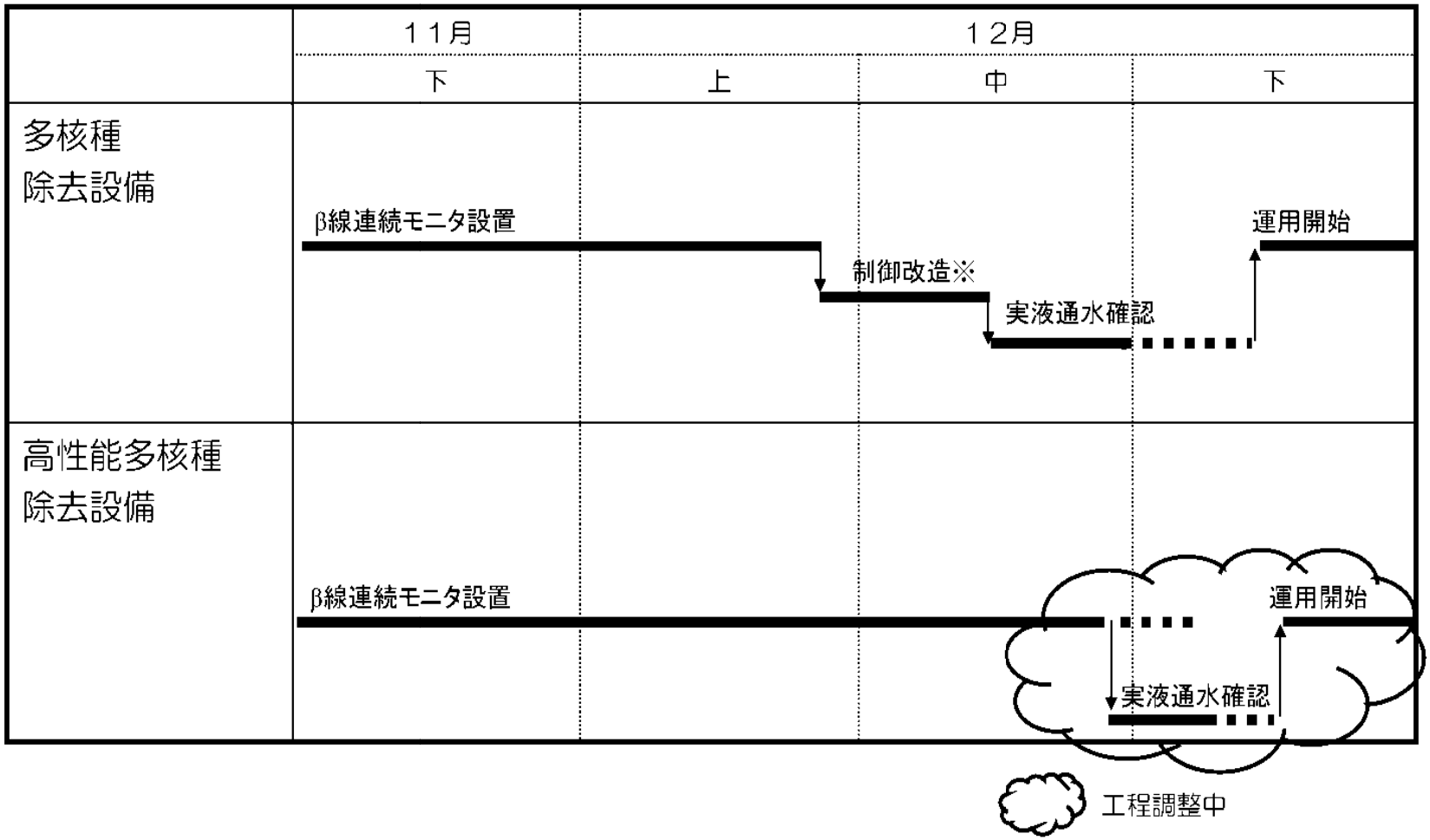


高性能多核種除去設備系統構成

※１　炭酸塩スラリー流出等に起因する異常な線量上昇検知を目的として設定

スケジュール

スケジュール



※制御改造中は、処理運転を停止

2号機西側サブドレン放射能濃度上昇への対策について

平成26年12月25日

東京電力株式会社

東京電力 TEPCO

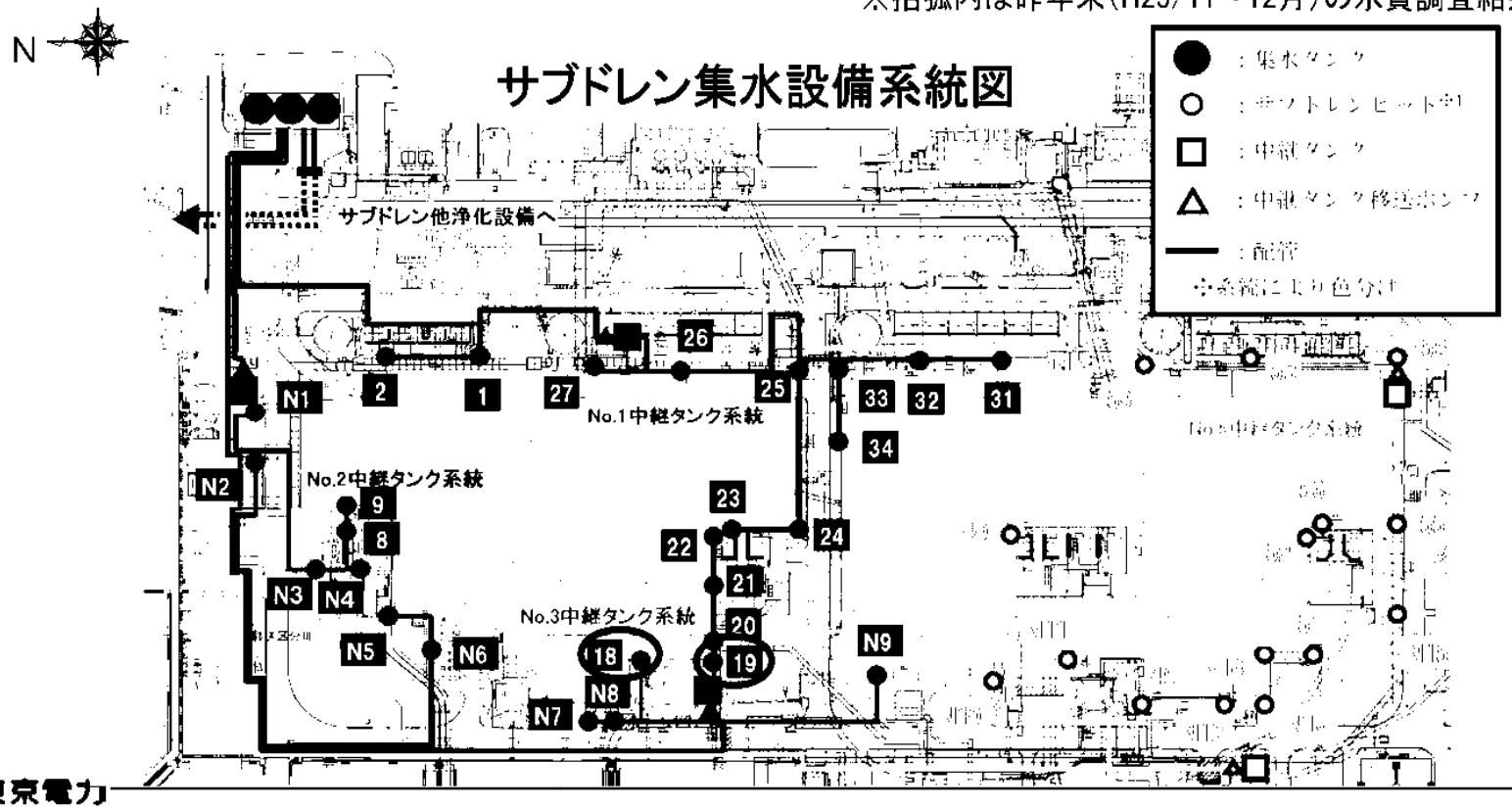
はじめに

■サブドレン水処理施設の運用に先立ち，汲み上げ対象の全ピットの水質状況の把握を10/22に実施した。
調査の結果，2号機西側No.18，19において，セシウム及び全βの濃度が上昇していることを確認。

（単位：ベクレル／リットル）

ピット	セシウム134	セシウム137	全β	トリチウム
No.18	94,000 （140）	330,000 （340）	390,000 （690）	6,800 （3,200）
No.19	100,000 （150）	360,000 （350）	390,000 （490）	8,000 （2,700）

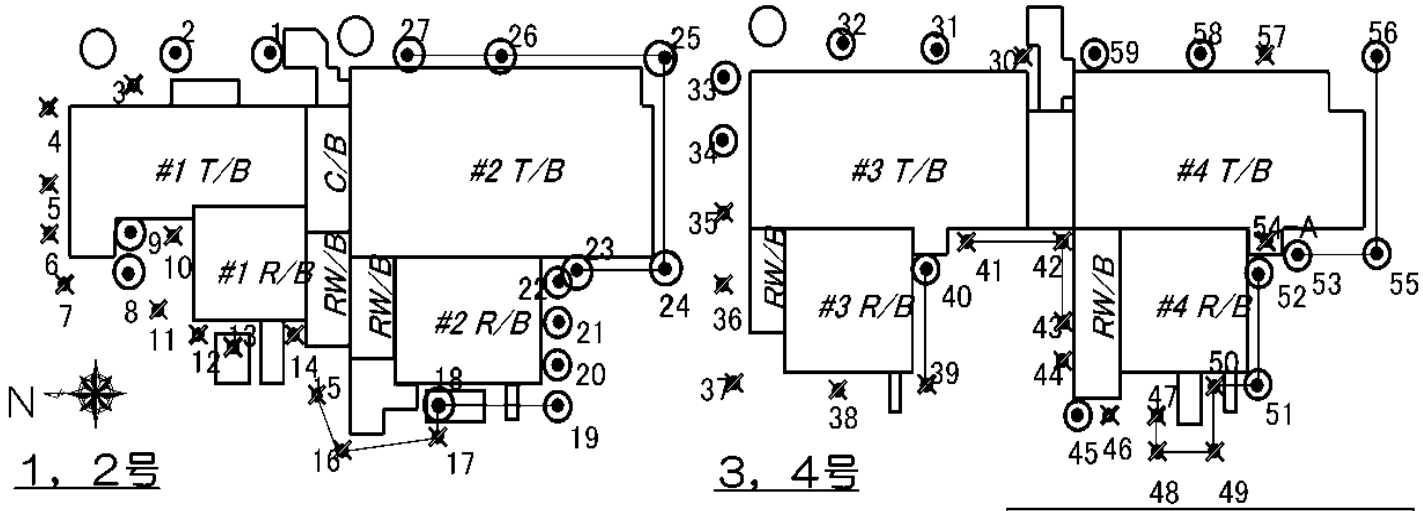
※括弧内は昨年末（H25/11～12月）の水質調査結果。

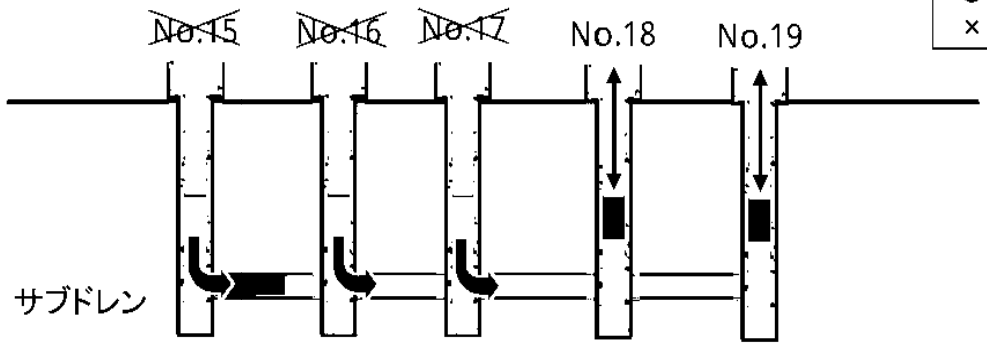


放射能濃度上昇の要因について

- 昨年末の水質調査結果から，Cs137の濃度が3桁上昇しているが，H3は変動が少ないことから，地下水からの移行ではなく，フォールアウトによる汚染が混入したと考えられる。
- いずれも建屋より山側に位置しているが，地下水位は建屋滞留水水位より十分に高く，建屋滞留水が山側に逆流したとは考えられない。
- 他のピットも水質調査を進めているが，同様の放射性物質濃度の上昇は確認されていない。

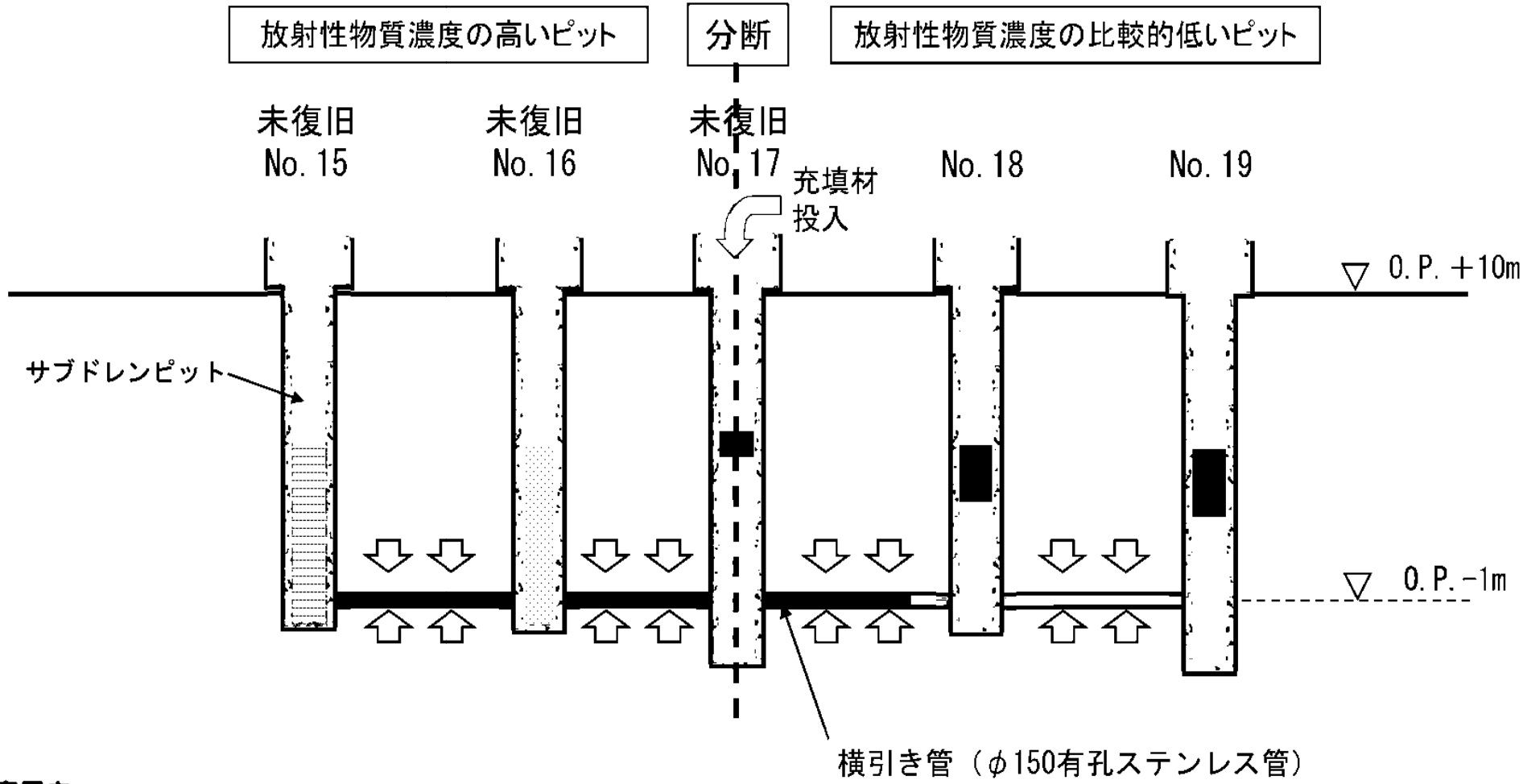
→ No.18とNo.19は，高線量等で復旧が困難であったNo.15，16，17とピット底部で横引き管で連結しており，ポンプ稼働により，No.15，16，17から放射性物質を徐々に引き込んだと考えられる。



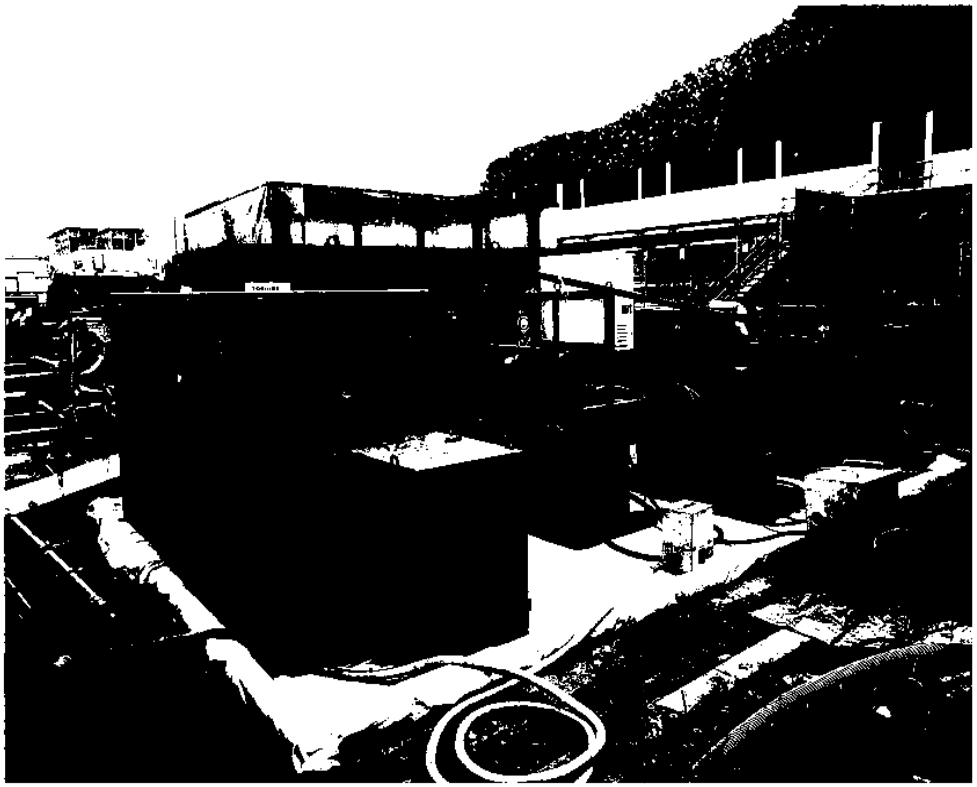


No.18，19放射性物質濃度上昇への対策

- No.15～No.19ピットは，横引き管（φ150有孔ステンレス管）で集水する構造であり，ピット側面からの集水機能は無い。
- 比較的放射性物質濃度の低いNo.17ピットに充填材を投入し閉塞（11/14～21実施）することにより，未復旧ピット（No.15，16）と復旧ピット（No.18，19）を分断。



No.17ピット閉塞状況



充填材（可塑性グラウトモルタル）プラント設置状況

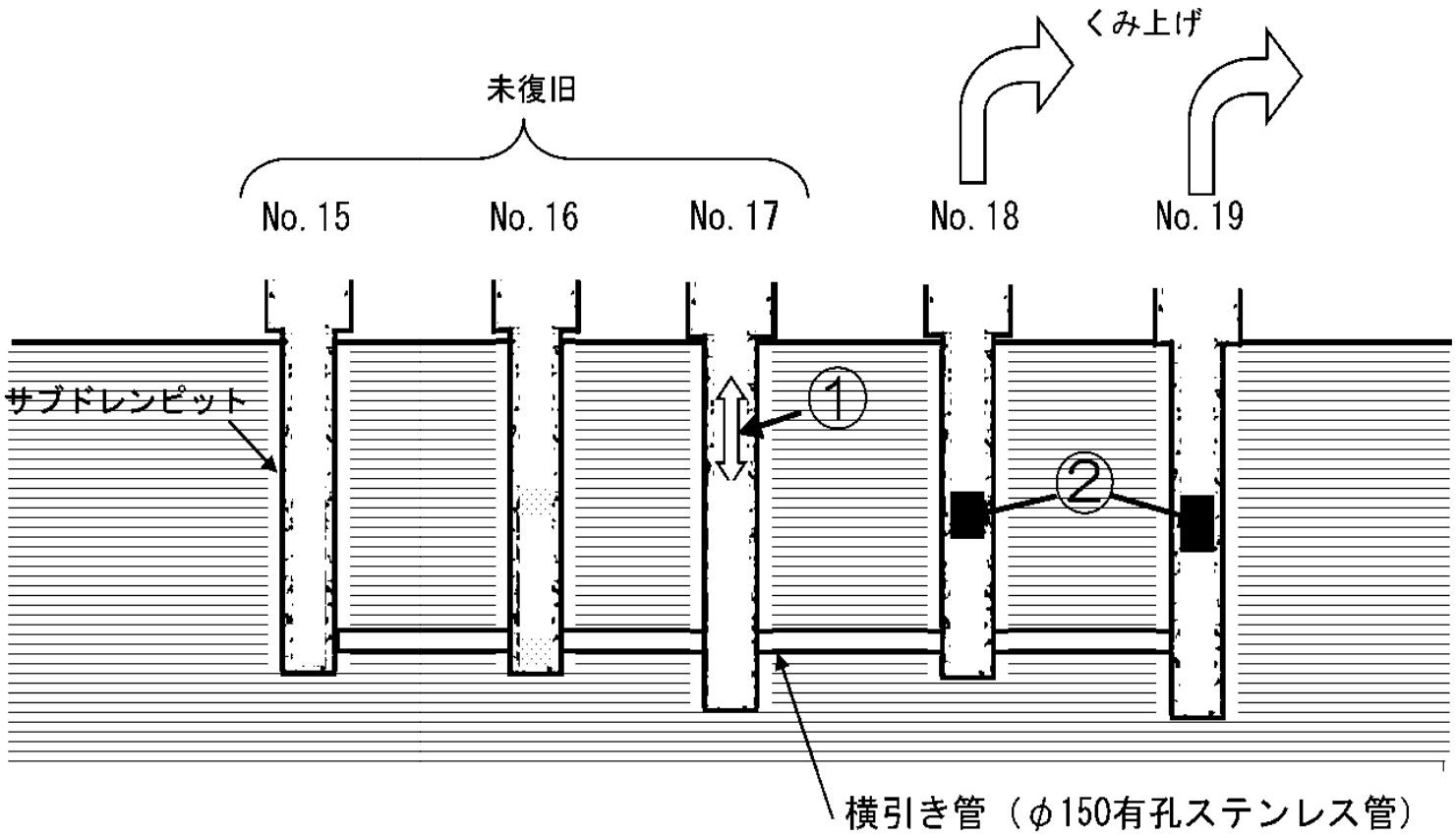
充填材打設状況

No.17ピット閉塞による分断効果の確認

●No.17へ充填材を打設した後，No.18，19ピットから地下水を汲み上げ，以下の確認を行うことにより横引き管の閉塞確認を実施。

①No.17ピットの水位低下がないこと。

②No.18，19ピットの放射能濃度が徐々に低下すること。



No.17ピット閉塞による分断効果の確認結果

■No.18，19ピット内及び横引き管内の溜まり水の量（約23m3）を上回る地下水の汲み上げを2回実施。

1回目（11月27～28日）　：　30m3（15m3/日×2日）
2回目（12月2～3日）　　：　30m3（15m3/日×2日）　　合計　60m3

①No.17ピットの水位低下がないこと。

11月27～28日の2日間、No.18，19ピットから地下水の汲み上げを実施し，No.17ピットの水位に変動がないことを確認した。

表1　No.17サブドレンピットの水位
（ピット天端レベルから水面までの深さ，単位：mm）

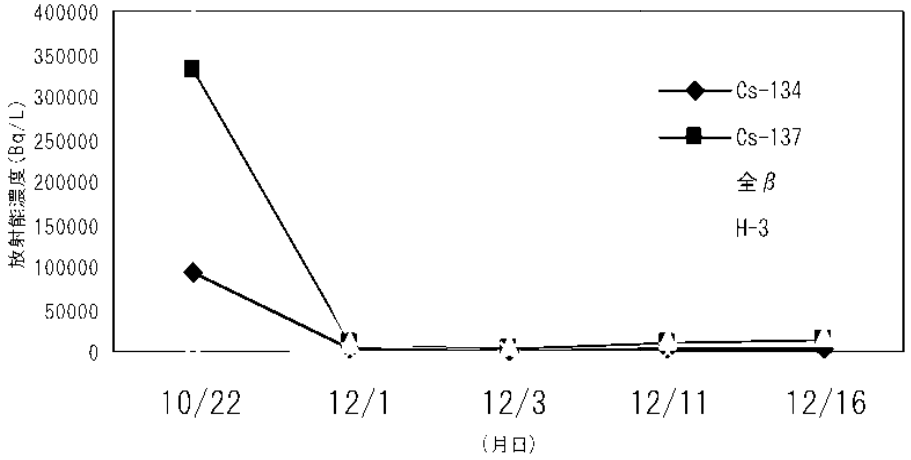
	11月27日	11月28日
汲み上げ開始前	2,100	2,100
汲み上げ開始30分後	2,100	2,100
汲み上げ終了時	2,100	2,100

No.17ピット閉塞による分断効果の確認結果

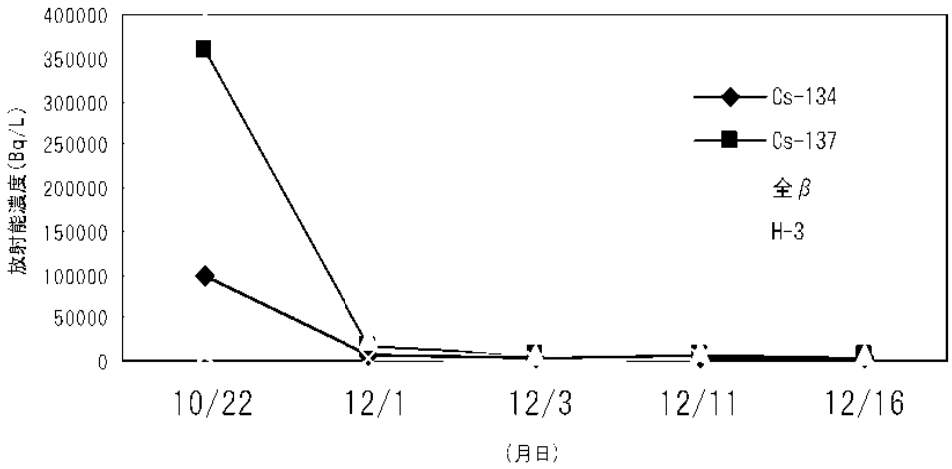
②No.18，19ピットの放射能濃度が徐々に低下すること。

No.18，19ピットからの地下水汲み上げ時に揚水ポンプを用いてサンプリングした地下水の放射能濃度は，No.17ピット閉塞後低下し，その後有意な変動は見られない。

No.18サブドレンピット放射能濃度変化

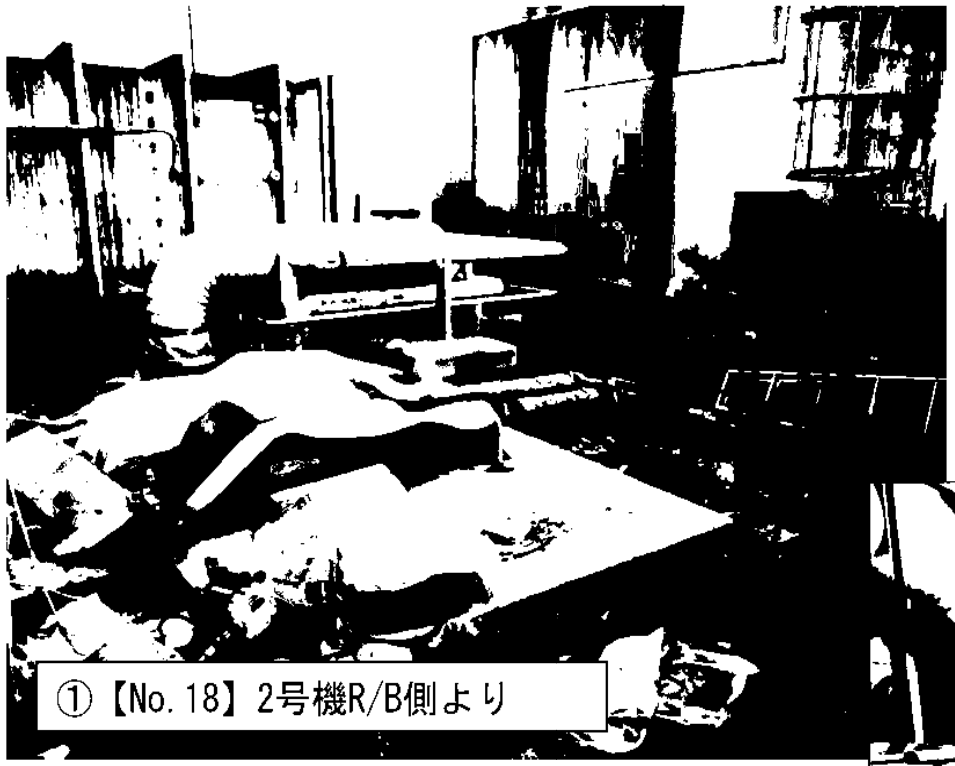


No.19サブドレンピット放射能濃度変化

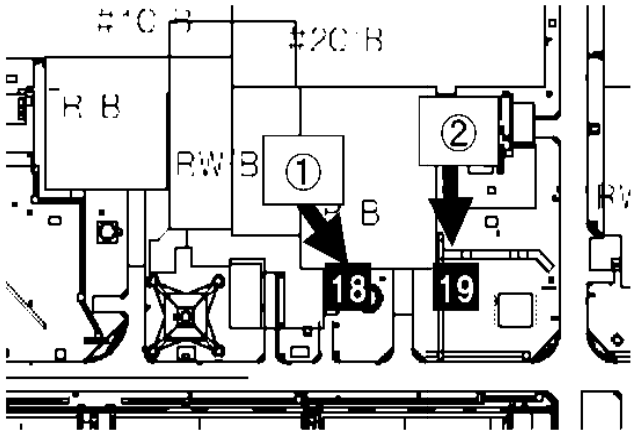


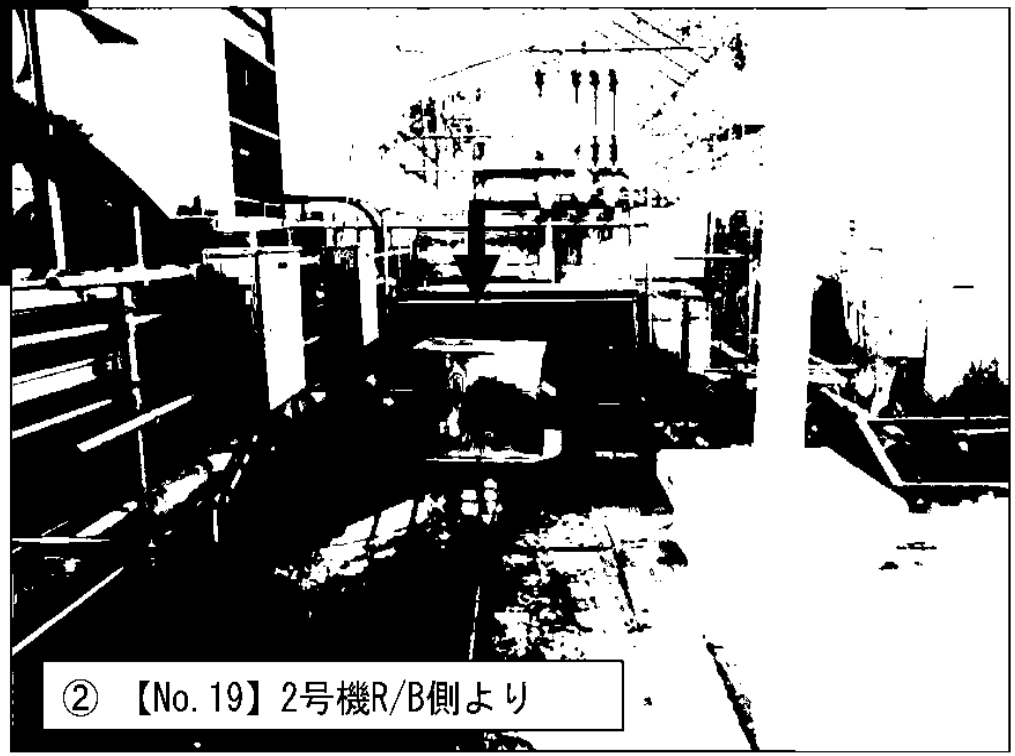
10/22： No.15～19が連結した状態でNo.18，19のポンプを起動
11/21： No.17閉塞
12/1 ： No.18，19から地下水30m3（１回目）汲み上げ後
12/3 ： No.18，19から地下水30m3（２回目）汲み上げ後
12/11，16： 経過観察

【参考】サブドレンNo.18、19の状況



① 【No.18】2号機R/B側より

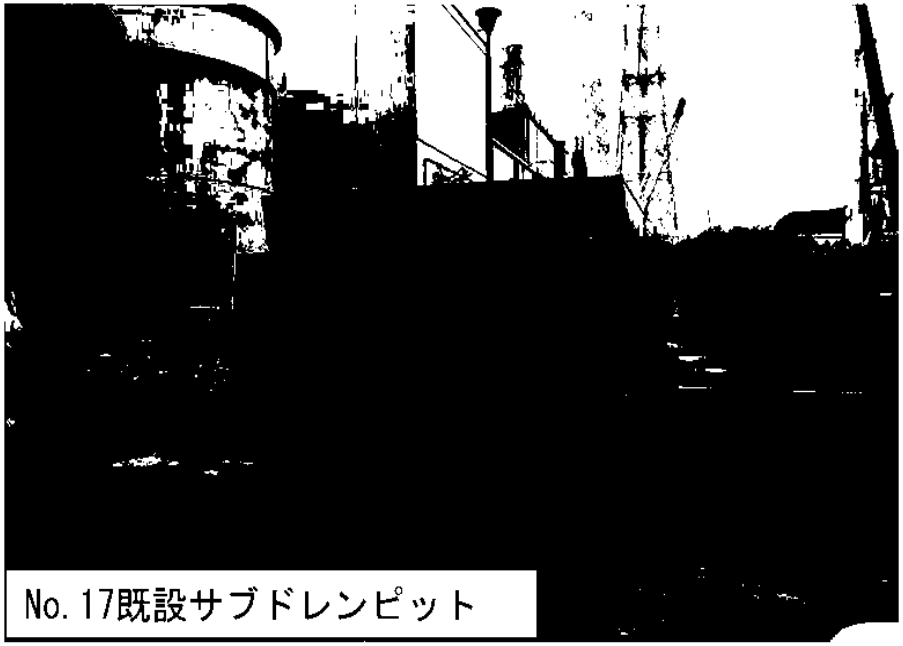




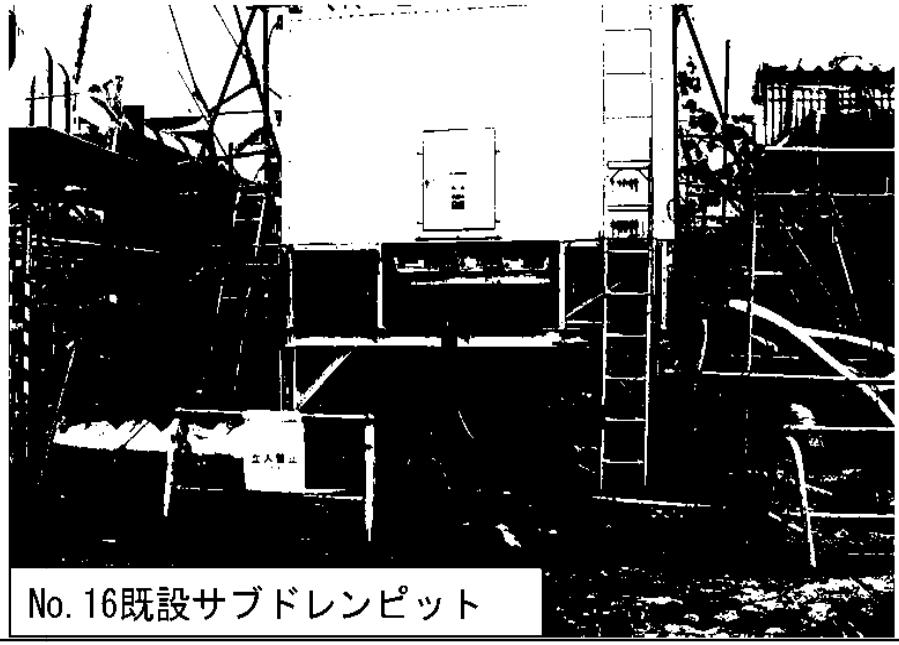
② 【No.19】2号機R/B側より

【参考】サブドレンNo.15、16、17の状況

No.15既設サブドレンピット



No.17既設サブドレンピット



No.16既設サブドレンピット

高性能多核種除去設備
除去性能評価（経過報告）

平成26年12月25日

東京電力株式会社

東京電力
TEPCO

高性能多核種除去設備 除去性能評価（経過報告）

■高性能多核種除去設備 除去性能評価

・10月18日より，汚染水（RO濃縮塩水）の処理運転を開始

・ 運転初期の処理済水について，除去対象とする62核種のうち，主要な核種であるγ核種，ストロンチウム，ヨウ素 等について評価した結果，以下を確認。

➢主要な核種であるSr-90の放射能濃度は，1/100,000,000 程度まで低減（多核種除去設備・増設多核種除去設備と同程度）

➢既設の多核種除去設備で告示濃度限度と同程度もしくは高い濃度で検出されていたI-129については，告示の1/10程度にまで低減

➢その他の分析を完了した核種についても，告示濃度限度を十分下回る濃度であることを確認。なお，Tc99，Ni63，Cd113mについては分析中（参考１参照）

・現在，除去性能維持の確認を行いながら，処理運転を継続中

高性能多核種除去設備 除去性能

■高性能多核種除去設備 除去性能

単位：Bq/cm^3

核種 【告示濃度限度】	Co-60 【2E-01】	Sr-90 【3E-02】	Ru-106 【1E-01】	Sb-125 【8E-01】	I-129 【9E-03】	Cs-137 【9E-02】
処理対象水 放射能濃度	＜1.2E-00	9.2E+04	2.4E+01	3.0E+01	7.1E-02	5.5E+00
処理済水 放射能濃度 【告示濃度限度比】	＜1.3E-04 【＜0.0008】	＜1.6E-04 【＜0.005】	7.7E-03※1 【0.08】	＜4.9E-04 【＜0.0006】	＜9.1E-04 【＜0.1】	＜1.8E-04 【＜0.002】

※1検出限界値：1.2E-03 Bq/cm^3

■（参考データ）既設多核種除去設備 除去性能

単位：Bq/cm^3

核種 【告示濃度限度】		Co-60 【2E-01】	Sr-90 【3E-02】	Ru-106 【1E-01】	Sb-125 【8E-01】	I-129 【9E-03】	Cs-137 【9E-02】
A系	処理済水 放射能濃度 【告示濃度限度比】	7.0E-04※2 【0.004】	＜1.5E-04 【＜0.005】	6.9E-03※3 【0.07】	9.8E-04※4 【0.001】	6.9E-03※5 【0.8】	＜2.8E-04 【＜0.003】

※2 検出限界値：1.1E-04 Bq/cm^3，※3 検出限界値：1.2E-03 Bq/cm^3，※4 検出限界値：4.0E-04 Bq/cm^3，※5 検出限界値：9.9E-04 Bq/cm^3

（参考データ）増設多核種除去設備 除去性能

■（参考データ）増設多核種除去設備 除去性能

単位：Bq/cm^3

核種 【告示濃度限度】		Co-60 【2E-01】	Sr-90 【3E-02】	Ru-106 【1E-01】	Sb-125 【8E-01】	I-129 【9E-03】	Cs-137 【9E-02】
A系	処理対象水 放射能濃度	4.6E-01	3.0E+04	9.8E+00	1.1E+01	2.0E-02	2.6E+00
	処理済水 放射能濃度 【告示濃度限度比】	＜1.2E-04 【＜0.0006】	＜1.1E-04 【＜0.004】	1.6E-03※1 【0.02】	＜4.8E-04 【＜0.0006】	＜8.9E-04 【＜0.1】	＜1.3E-04 【＜0.001】
B系	処理対象水 放射能濃度	4.6E-01	3.0E+04	9.8E+00	1.1E+01	2.0E-02	2.6E+00
	処理済水 放射能濃度 【告示濃度限度比】	＜1.5E-04 【＜0.0008】	＜1.1E-04 【＜0.004】	＜1.3E-03 【＜0.01】	＜4.5E-04 【＜0.0006】	＜8.9E-04 【＜0.1】	＜1.4E-04 【＜0.002】
C系	処理対象水 放射能濃度	2.6E-01	1.3E+04	5.1E+00	9.7E+00	1.7E-02	4.0E+00
	処理済水 放射能濃度 【告示濃度限度比】	＜1.5E-04 【＜0.0008】	＜1.1E-04 【＜0.004】	2.0E-03※2 【0.02】	＜4.2E-04 【＜0.0005】	＜7.3E-04 【＜0.08】	＜1.3E-04 【＜0.001】

※1検出限界値：1.3E-03 Bq/cm^3，※2検出限界値： 1.2E-03 Bq/cm^3

廃炉・汚染水対策チーム会合 事務局会議（第１１回）での報告において評価中であった核種を含め，６２核種全ての分析結果が得られた。

６２核種の全ての分析結果については，参考２を参照。

高性能多核種除去設備分析予定

高性能多核種除去設備分析予定

	9月			10月			11月			12月			H27.1月			2月		
	上	中	下	上	中	下	上	中	下	上	中	下	上	中	下	上	中	下
高性能					▼10/18 処理開始		γ核種，Sr，I，全α											
									Tc，Ni，Cd									

（参考1）高性能多核種除去設備における除去性能評価まとめ

高性能多核種除去設備における除去性能評価（1/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（H8Aエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
1	Rb-86 （約19日）	3E-01	＜ 1.6E+01	＜ 1.4E-03	＜ 5E-03	
2	Sr-89 （約51日）	3E-01	＜ 4.1E+03	＜ 8.9E-05	＜ 3E-04	
3	Sr-90 （約29年）	3E-02	9.2E+04	＜ 1.6E-04	＜ 5E-03	
4	Y-90 （約64時間）	3E-01	9.2E+04	＜ 1.6E-04	＜ 5E-04	Sr-90と放射平衡
5	Y-91 （約59日）	3E-01	＜ 3.8E+02	＜ 4.7E-02	＜ 2E-01	
6	Nb-95 （約35日）	1E+00	＜ 1.9E+00	＜ 1.7E-04	＜ 2E-04	
7	Tc-99 （約210000年）	1E+00	評価中	評価中	評価中	
8	Ru-103 （約40日）	1E+00	＜ 2.7E+00	＜ 1.5E-04	＜ 2E-04	
9	Ru-106 （約370日）	1E-01	2.4E+01	7.7E-03	8E-02	
10	Rh-103m （約56分）	2E+02	＜ 2.7E+00	＜ 1.5E-04	＜ 8E-07	Ru-103と放射平衡
11	Rh-106 （約30秒）	3E+02	2.4E+01	7.7E-03	3E-05	Ru-106と放射平衡
12	Ag-110m （約250日）	3E-01	＜ 2.1E+00	＜ 1.6E-04	＜ 5E-04	
13	Cd-113m （約15年）	4E-02	＜ 1.3E+04	評価中	評価中	

（参考1）高性能多核種除去設備における除去性能評価まとめ

高性能多核種除去設備における除去性能評価（2/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（H8Aエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
14	Cd-115m（約45日）	3E-01	< 9.6E+01	< 7.6E-03	< 3E-02	
15	Sn-119m（約290日）	2E+00	< 2.3E+02	< 1.9E-02	< 1E-02	Sn-123の放射能濃度より評価
16	Sn-123（約130日）	4E-01	< 2.3E+02	< 1.9E-02	< 5E-02	
17	Sn-126（約100000年）	2E-01	< 2.0E+01	< 7.7E-04	< 4E-03	
18	Sb-124（約60日）	3E-01	< 1.9E+00	< 2.9E-04	< 1E-03	
19	Sb-125（約3年）	8E-01	3.0E+01	< 4.9E-04	< 6E-04	
20	Te-123m（約120日）	6E-01	< 4.0E+00	< 2.1E-04	< 4E-04	
21	Te-125m（約58日）	9E-01	3.0E+01	< 4.9E-04	< 5E-04	Sb-125と放射平衡
22	Te-127（約9時間）	5E+00	< 2.3E+02	< 1.5E-02	< 3E-03	
23	Te-127m（約110日）	3E-01	< 2.4E+02	< 1.5E-02	< 5E-02	Te-127の放射能濃度より評価
24	Te-129（約70分）	1E+01	< 3.4E+01	< 2.1E-03	< 2E-04	
25	Te-129m（約34日）	3E-01	< 6.4E+01	< 3.9E-03	< 1E-02	
26	I-129（約16000000年）	9E-03	7.1E-02	< 9.1E-04	< 1E-01	

（参考1）高性能多核種除去設備における除去性能評価まとめ

高性能多核種除去設備における除去性能評価（3/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（H8Aエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
27	Cs-134（約2年）	6E-02	< 3.0E+00	< 1.5E-04	< 3E-03	
28	Cs-135（約3000000年）	6E-01	3.4E-05	< 1.1E-09	< 2E-09	Cs-137の放射能濃度より評価
29	Cs-136（約13日）	3E-01	< 1.9E+00	< 1.3E-04	< 4E-04	
30	Cs-137（約30年）	9E-02	5.5E+00	< 1.8E-04	< 2E-03	
31	Ba-137m（約3分）	8E+02	5.5E+00	< 1.8E-04	< 2E-07	Cs-137と放射平衡
32	Ba-140（約13日）	3E-01	< 9.0E+00	< 5.3E-04	< 2E-03	
33	Ce-141（約32日）	1E+00	< 7.2E+00	< 3.5E-04	< 4E-04	
34	Ce-144（約280日）	2E-01	< 3.4E+01	< 1.6E-03	< 8E-03	
35	Pr-144（約17分）	2E+01	< 3.4E+01	< 1.6E-03	< 8E-05	Ce-144と放射平衡
36	Pr-144m（約7分）	4E+01	< 3.4E+01	< 1.6E-03	< 4E-05	Ce-144と放射平衡
37	Pm-146（約6年）	9E-01	3.6E+00	< 2.1E-04	< 2E-04	
38	Pm-147（約3年）	3E+00	< 3.7E+01	< 4.5E-03	< 2E-03	Eu-154の放射能濃度より評価
39	Pm-148（約5日）	3E-01	< 5.6E+00	< 7.4E-04	< 2E-03	

（参考1）高性能多核種除去設備における除去性能評価まとめ

高性能多核種除去設備における除去性能評価（4/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（H8Aエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
40	Pm-148m（約41日）	5E-01	< 2.2E+00	< 1.3E-04	< 3E-04	
41	Sm-151（約87年）	8E+00	< 3.0E-01	< 3.7E-05	< 5E-06	Eu-154の放射能濃度より評価
42	Eu-152（約13年）	6E-01	< 1.1E+01	< 6.7E-04	< 1E-03	
43	Eu-154（約9年）	4E-01	< 3.5E+00	< 4.3E-04	< 1E-03	
44	Eu-155（約5年）	3E+00	< 2.5E+01	< 9.2E-04	< 3E-04	
45	Gd-153（約240日）	3E+00	< 2.0E+01	< 7.5E-04	< 3E-04	
46	Tb-160（約72日）	5E-01	< 5.9E+00	< 4.5E-04	< 9E-04	
47	Pu-238（約88年）	4E-03	< 9.2E-03	< 8.4E-05	< 2E-02	全α放射能の測定値に包絡されるものとし評価
48	Pu-239（約24000年）	4E-03	< 9.2E-03	< 8.4E-05	< 2E-02	全α放射能の測定値に包絡されるものとし評価
49	Pu-240（約6600年）	4E-03	< 9.2E-03	< 8.4E-05	< 2E-02	全α放射能の測定値に包絡されるものとし評価
50	Pu-241（約14年）	2E-01	< 3.7E-01	< 3.4E-03	< 2E-02	Pu-238の放射能濃度から評価
51	Am-241（約430年）	5E-03	< 9.2E-03	< 8.4E-05	< 2E-02	全α放射能の測定値に包絡されるものとし評価
52	Am-242m（約150年）	5E-03	< 2.5E-04	< 2.3E-06	< 5E-04	Am-241の放射能濃度より評価

（参考1）高性能多核種除去設備における除去性能評価まとめ

高性能多核種除去設備における除去性能評価（5/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（H8Aエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
53	Am-243 （約7400年）	5E-03	＜ 9.2E-03	8.4E-05	2E-02	全α放射能の測定値に包絡されるものとし評価
54	Cm-242 （約160日）	6E-02	＜ 9.2E-03	8.4E-05	1E-03	全α放射能の測定値に包絡されるものとし評価
55	Cm-243 （約29年）	6E-03	＜ 9.2E-03	8.4E-05	1E-02	全α放射能の測定値に包絡されるものとし評価
56	Cm-244 （約18年）	7E-03	＜ 9.2E-03	8.4E-05	1E-02	全α放射能の測定値に包絡されるものとし評価
57	Mn-54 （約310日）	1E+00	＜ 1.4E+00	＜ 1.1E-04	＜ 1E-04	
58	Fe-59 （約45日）	4E-01	＜ 2.3E+00	＜ 2.3E-04	＜ 6E-04	
59	Co-58 （約71日）	1E+00	＜ 1.7E+00	＜ 1.3E-04	＜ 1E-04	
60	Co-60 （約5年）	2E-01	＜ 1.2E+00	＜ 1.6E-04	＜ 8E-04	
61	Ni-63 （約100年）	6E+00	評価中	評価中	評価中	
62	Zn-65 （約240日）	2E-01	＜ 2.5E+00	＜ 2.3E-04	＜ 1E-03	
全α			＜ 9.2E-03	＜ 8.4E-05	－	

（参考２）増設多核種除去設備Ａ系における除去性能評価まとめ

増設多核種除去設備Ａ系における除去性能評価（1/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
1	Rb-86（約19日）	3E-01	＜1.8E+00	＜1.4E-03	＜5E-03	
2	Sr-89（約51日）	3E-01	＜4.0E+03	＜5.8E-05	＜2E-04	
3	Sr-90（約29年）	3E-02	3.0E+04	＜1.1E-04	＜4E-03	
4	Y-90（約64時間）	3E-01	3.0E+04	＜1.1E-04	＜4E-04	Sr-90と放射平衡
5	Y-91（約59日）	3E-01	＜4.6E+01	＜4.4E-02	＜1E-01	
6	Nb-95（約35日）	1E+00	＜2.1E-01	＜9.8E-05	＜1E-04	
7	Tc-99（約210000年）	1E+00	2.6E-02	＜1.0E-03	＜1E-03	
8	Ru-103（約40日）	1E+00	＜3.2E-01	＜1.4E-04	＜1E-04	
9	Ru-106（約370日）	1E-01	9.8E+00	1.6E-03	2E-02	
10	Rh-103m（約56分）	2E+02	＜3.2E-01	＜1.4E-04	＜7E-07	Ru-103と放射平衡
11	Rh-106（約30秒）	3E+02	9.8E+00	1.6E-03	5E-06	Ru-106と放射平衡
12	Ag-110m（約250日）	3E-01	＜2.7E-01	＜1.2E-04	＜4E-04	
13	Cd-113m（約15年）	4E-02	＜1.5E+03	＜1.0E-04	＜3E-03	

（参考２）増設多核種除去設備Ａ系における除去性能評価まとめ

増設多核種除去設備Ａ系における除去性能評価（2/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
14	Cd-115m（約45日）	3E-01	＜1.1E+01	＜6.4E-03	＜2E-02	
15	Sn-119m（約290日）	2E+00	＜2.3E+01	＜1.8E-02	＜9E-03	Sn-123の放射能濃度より評価
16	Sn-123（約130日）	4E-01	＜2.3E+01	＜1.8E-02	＜5E-02	
17	Sn-126（約100000年）	2E-01	＜2.6E+00	＜7.2E-04	＜4E-03	
18	Sb-124（約60日）	3E-01	＜1.4E-01	＜2.7E-04	＜9E-04	
19	Sb-125（約3年）	8E-01	1.1E+01	＜4.8E-04	＜6E-04	
20	Te-123m（約120日）	6E-01	＜5.2E-01	＜1.9E-04	＜3E-04	
21	Te-125m（約58日）	9E-01	1.1E+01	＜4.8E-04	＜5E-04	Sb-125と放射平衡
22	Te-127（約9時間）	5E+00	＜3.2E+01	＜1.3E-02	＜3E-03	
23	Te-127m（約110日）	3E-01	＜3.3E+01	＜1.3E-02	＜4E-02	Te-127の放射能濃度より評価
24	Te-129（約70分）	1E+01	＜4.3E+00	＜1.9E-03	＜2E-04	
25	Te-129m（約34日）	3E-01	＜7.8E+00	＜3.5E-03	＜1E-02	
26	I-129（約16000000年）	9E-03	2.0E-02	＜8.9E-04	＜1E-01	

（参考２）増設多核種除去設備Ａ系における除去性能評価まとめ

増設多核種除去設備Ａ系における除去性能評価（3/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
27	Cs-134 （約2年）	6E-02	8.0E-01	＜ 1.7E-04	＜ 3E-03	
28	Cs-135 （約3000000年）	6E-01	1.6E-05	＜ 7.9E-10	＜ 1E-09	Cs-137の放射能濃度より評価
29	Cs-136 （約13日）	3E-01	＜ 2.0E-01	＜ 1.1E-04	＜ 4E-04	
30	Cs-137 （約30年）	9E-02	2.6E+00	＜ 1.3E-04	＜ 1E-03	
31	Ba-137m （約3分）	8E+02	2.6E+00	＜ 1.3E-04	＜ 2E-07	Cs-137と放射平衡
32	Ba-140 （約13日）	3E-01	＜ 1.2E+00	＜ 4.3E-04	＜ 1E-03	
33	Ce-141 （約32日）	1E+00	＜ 9.5E-01	＜ 4.1E-04	＜ 4E-04	
34	Ce-144 （約280日）	2E-01	＜ 4.4E+00	＜ 1.5E-03	＜ 8E-03	
35	Pr-144 （約17分）	2E+01	＜ 4.4E+00	＜ 1.5E-03	＜ 8E-05	Ce-144と放射平衡
36	Pr-144m （約7分）	4E+01	＜ 4.4E+00	＜ 1.5E-03	＜ 4E-05	Ce-144と放射平衡
37	Pm-146 （約6年）	9E-01	＜ 4.6E-01	＜ 1.9E-04	＜ 2E-04	
38	Pm-147 （約3年）	3E+00	＜ 2.9E+00	＜ 4.4E-03	＜ 1E-03	Eu-154の放射能濃度より評価
39	Pm-148 （約5日）	3E-01	＜ 4.9E-01	＜ 1.3E-03	＜ 4E-03	

（参考２）増設多核種除去設備Ａ系における除去性能評価まとめ

増設多核種除去設備Ａ系における除去性能評価（4/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
40	Pm-148m （約41日）	5E-01	＜ 2.8E-01	＜ 1.0E-04	＜ 2E-04	
41	Sm-151 （約87年）	8E+00	＜ 2.4E-02	＜ 3.6E-05	＜ 5E-06	Eu-154の放射能濃度より評価
42	Eu-152 （約13年）	6E-01	＜ 1.5E+00	＜ 5.8E-04	＜ 1E-03	
43	Eu-154 （約9年）	4E-01	＜ 2.7E-01	＜ 4.1E-04	＜ 1E-03	
44	Eu-155 （約5年）	3E+00	＜ 3.2E+00	＜ 8.7E-04	＜ 3E-04	
45	Gd-153 （約240日）	3E+00	＜ 2.5E+00	＜ 8.3E-04	＜ 3E-04	
46	Tb-160 （約72日）	5E-01	＜ 6.1E-01	＜ 3.6E-04	＜ 7E-04	
47	Pu-238 （約88年）	4E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
48	Pu-239 （約24000年）	4E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
49	Pu-240 （約6600年）	4E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
50	Pu-241 （約14年）	2E-01	＜ 3.7E-01	＜ 2.7E-03	＜ 1E-02	Pu-238の放射能濃度から評価
51	Am-241 （約430年）	5E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
52	Am-242m （約150年）	5E-03	＜ 2.5E-04	＜ 1.8E-06	＜ 4E-04	Am-241の放射能濃度より評価

（参考２）増設多核種除去設備Ａ系における除去性能評価まとめ

増設多核種除去設備Ａ系における除去性能評価（5/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
53	Am-243（約7400年）	5E-03	< 9.2E-03	< 6.7E-05	< 1E-02	全α放射能の測定値に包絡されるものとし評価
54	Cm-242（約160日）	6E-02	< 9.2E-03	< 6.7E-05	< 1E-03	全α放射能の測定値に包絡されるものとし評価
55	Cm-243（約29年）	6E-03	< 9.2E-03	< 6.7E-05	< 1E-02	全α放射能の測定値に包絡されるものとし評価
56	Cm-244（約18年）	7E-03	< 9.2E-03	< 6.7E-05	< 1E-02	全α放射能の測定値に包絡されるものとし評価
57	Mn-54（約310日）	1E+00	< 1.9E-01	< 1.3E-04	< 1E-04	
58	Fe-59（約45日）	4E-01	< 2.7E-01	< 1.9E-04	< 5E-04	
59	Co-58（約71日）	1E+00	< 2.0E-01	< 1.1E-04	< 1E-04	
60	Co-60（約5年）	2E-01	4.6E-01	< 1.2E-04	< 6E-04	
61	Ni-63（約100年）	6E+00	3.0E+00	< 1.5E-02	< 3E-03	
62	Zn-65（約240日）	2E-01	< 2.9E-01	< 2.5E-04	< 1E-03	
全α			< 9.2E-03	< 6.7E-05	－	

（参考２）増設多核種除去設備B系における除去性能評価まとめ

増設多核種除去設備B系における除去性能評価（1/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
1	Rb-86（約19日）	3E-01	< 1.8E+00	< 1.3E-03	< 4E-03	
2	Sr-89（約51日）	3E-01	< 4.0E+03	< 6.1E-05	< 2E-04	
3	Sr-90（約29年）	3E-02	3.0E+04	< 1.1E-04	< 4E-03	
4	Y-90（約64時間）	3E-01	3.0E+04	< 1.1E-04	< 4E-04	Sr-90と放射平衡
5	Y-91（約59日）	3E-01	< 4.6E+01	< 5.1E-02	< 2E-01	
6	Nb-95（約35日）	1E+00	< 2.1E-01	< 1.0E-04	< 1E-04	
7	Tc-99（約210000年）	1E+00	2.6E-02	< 1.0E-03	< 1E-03	
8	Ru-103（約40日）	1E+00	< 3.2E-01	< 2.0E-04	< 2E-04	
9	Ru-106（約370日）	1E-01	9.8E+00	< 1.3E-03	< 1E-02	
10	Rh-103m（約56分）	2E+02	< 3.2E-01	< 2.0E-04	< 1E-06	Ru-103と放射平衡
11	Rh-106（約30秒）	3E+02	9.8E+00	< 1.3E-03	< 4E-06	Ru-106と放射平衡
12	Ag-110m（約250日）	3E-01	< 2.7E-01	< 1.5E-04	< 5E-04	
13	Cd-113m（約15年）	4E-02	< 1.5E+03	< 1.2E-04	< 3E-03	

（参考２）増設多核種除去設備B系における除去性能評価まとめ

増設多核種除去設備B系における除去性能評価（2/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
14	Cd-115m（約45日）	3E-01	< 1.1E+01	< 8.1E-03	< 3E-02	
15	Sn-119m（約290日）	2E+00	< 2.3E+01	< 2.2E-02	< 1E-02	Sn-123の放射能濃度より評価
16	Sn-123（約130日）	4E-01	< 2.3E+01	< 2.2E-02	< 6E-02	
17	Sn-126（約100000年）	2E-01	< 2.6E+00	< 7.4E-04	< 4E-03	
18	Sb-124（約60日）	3E-01	< 1.4E-01	< 2.8E-04	< 9E-04	
19	Sb-125（約3年）	8E-01	1.1E+01	< 4.5E-04	< 6E-04	
20	Te-123m（約120日）	6E-01	< 5.2E-01	< 2.0E-04	< 3E-04	
21	Te-125m（約58日）	9E-01	1.1E+01	< 4.5E-04	< 5E-04	Sb-125と放射平衡
22	Te-127（約9時間）	5E+00	< 3.2E+01	< 1.3E-02	< 3E-03	
23	Te-127m（約110日）	3E-01	< 3.3E+01	< 1.3E-02	< 4E-02	Te-127の放射能濃度より評価
24	Te-129（約70分）	1E+01	< 4.3E+00	< 2.0E-03	< 2E-04	
25	Te-129m（約34日）	3E-01	< 7.8E+00	< 4.0E-03	< 1E-02	
26	I-129（約16000000年）	9E-03	2.0E-02	< 8.9E-04	< 1E-01	

（参考２）増設多核種除去設備B系における除去性能評価まとめ

増設多核種除去設備B系における除去性能評価（3/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
27	Cs-134（約2年）	6E-02	8.0E-01	＜ 1.5E-04	＜ 3E-03	
28	Cs-135（約3000000年）	6E-01	1.6E-05	＜ 8.7E-10	＜ 1E-09	Cs-137の放射能濃度より評価
29	Cs-136（約13日）	3E-01	＜ 2.0E-01	＜ 1.1E-04	＜ 4E-04	
30	Cs-137（約30年）	9E-02	2.6E+00	＜ 1.4E-04	＜ 2E-03	
31	Ba-137m（約3分）	8E+02	2.6E+00	＜ 1.4E-04	＜ 2E-07	Cs-137と放射平衡
32	Ba-140（約13日）	3E-01	＜ 1.2E+00	＜ 4.7E-04	＜ 2E-03	
33	Ce-141（約32日）	1E+00	＜ 9.5E-01	＜ 3.2E-04	＜ 3E-04	
34	Ce-144（約280日）	2E-01	＜ 4.4E+00	＜ 1.4E-03	＜ 7E-03	
35	Pr-144（約17分）	2E+01	＜ 4.4E+00	＜ 1.4E-03	＜ 7E-05	Ce-144と放射平衡
36	Pr-144m（約7分）	4E+01	＜ 4.4E+00	＜ 1.4E-03	＜ 4E-05	Ce-144と放射平衡
37	Pm-146（約6年）	9E-01	＜ 4.6E-01	＜ 1.8E-04	＜ 2E-04	
38	Pm-147（約3年）	3E+00	＜ 2.9E+00	＜ 4.1E-03	＜ 1E-03	Eu-154の放射能濃度より評価
39	Pm-148（約5日）	3E-01	＜ 4.9E-01	＜ 6.7E-04	＜ 2E-03	

（参考２）増設多核種除去設備B系における除去性能評価まとめ

増設多核種除去設備B系における除去性能評価（4/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
40	Pm-148m（約41日）	5E-01	< 2.8E-01	< 1.1E-04	< 2E-04	
41	Sm-151（約87年）	8E+00	< 2.4E-02	< 3.3E-05	< 4E-06	Eu-154の放射能濃度より評価
42	Eu-152（約13年）	6E-01	< 1.5E+00	< 5.4E-04	< 9E-04	
43	Eu-154（約9年）	4E-01	< 2.7E-01	< 3.8E-04	< 1E-03	
44	Eu-155（約5年）	3E+00	< 3.2E+00	< 9.7E-04	< 3E-04	
45	Gd-153（約240日）	3E+00	< 2.5E+00	< 6.6E-04	< 2E-04	
46	Tb-160（約72日）	5E-01	< 6.1E-01	< 3.6E-04	< 7E-04	
47	Pu-238（約88年）	4E-03	< 9.2E-03	< 6.7E-05	< 2E-02	全α放射能の測定値に包絡されるものとし評価
48	Pu-239（約24000年）	4E-03	< 9.2E-03	< 6.7E-05	< 2E-02	全α放射能の測定値に包絡されるものとし評価
49	Pu-240（約6600年）	4E-03	< 9.2E-03	< 6.7E-05	< 2E-02	全α放射能の測定値に包絡されるものとし評価
50	Pu-241（約14年）	2E-01	< 3.7E-01	< 2.7E-03	< 1E-02	Pu-238の放射能濃度から評価
51	Am-241（約430年）	5E-03	< 9.2E-03	< 6.7E-05	< 1E-02	全α放射能の測定値に包絡されるものとし評価
52	Am-242m（約150年）	5E-03	< 2.5E-04	< 1.8E-06	< 4E-04	Am-241の放射能濃度より評価

（参考２）増設多核種除去設備B系における除去性能評価まとめ

増設多核種除去設備B系における除去性能評価（5/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EEエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
53	Am-243 （約7400年）	5E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
54	Cm-242 （約160日）	6E-02	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-03	全α放射能の測定値に包絡されるものとし評価
55	Cm-243 （約29年）	6E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
56	Cm-244 （約18年）	7E-03	＜ 9.2E-03	＜ 6.7E-05	＜ 1E-02	全α放射能の測定値に包絡されるものとし評価
57	Mn-54 （約310日）	1E+00	＜ 1.9E-01	＜ 1.3E-04	＜ 1E-04	
58	Fe-59 （約45日）	4E-01	＜ 2.7E-01	＜ 2.0E-04	＜ 5E-04	
59	Co-58 （約71日）	1E+00	＜ 2.0E-01	＜ 1.1E-04	＜ 1E-04	
60	Co-60 （約5年）	2E-01	4.6E-01	＜ 1.5E-04	＜ 8E-04	
61	Ni-63 （約100年）	6E+00	3.0E+00	＜ 1.5E-02	＜ 3E-03	
62	Zn-65 （約240日）	2E-01	＜ 2.9E-01	＜ 2.4E-04	＜ 1E-03	
全α			＜ 9.2E-03	＜ 6.7E-05	－	

（参考２）増設多核種除去設備C系における除去性能評価まとめ

増設多核種除去設備C系における除去性能評価（1/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EAエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
1	Rb-86 （約19日）	3E-01	＜ 2.6E+00	＜ 1.4E-03	＜ 5E-03	
2	Sr-89 （約51日）	3E-01	＜ 2.2E+03	＜ 5.9E-05	＜ 2E-04	
3	Sr-90 （約29年）	3E-02	1.3E+04	＜ 1.1E-04	＜ 4E-03	
4	Y-90 （約64時間）	3E-01	1.3E+04	＜ 1.1E-04	＜ 4E-04	Sr-90と放射平衡
5	Y-91 （約59日）	3E-01	＜ 8.1E+01	＜ 4.6E-02	＜ 2E-01	
6	Nb-95 （約35日）	1E+00	＜ 3.0E-01	＜ 1.1E-04	＜ 1E-04	
7	Tc-99 （約210000年）	1E+00	2.1E-02	＜ 1.0E-03	＜ 1E-03	
8	Ru-103 （約40日）	1E+00	＜ 4.7E-01	＜ 1.4E-04	＜ 1E-04	
9	Ru-106 （約370日）	1E-01	5.1E+00	2.0E-03	2E-02	
10	Rh-103m （約56分）	2E+02	＜ 4.7E-01	＜ 1.4E-04	＜ 7E-07	Ru-103と放射平衡
11	Rh-106 （約30秒）	3E+02	5.1E+00	2.0E-03	7E-06	Ru-106と放射平衡
12	Ag-110m （約250日）	3E-01	＜ 3.9E-01	＜ 1.1E-04	＜ 4E-04	
13	Cd-113m （約15年）	4E-02	＜ 2.1E+03	＜ 1.7E-04	＜ 4E-03	

（参考２）増設多核種除去設備C系における除去性能評価まとめ

増設多核種除去設備C系における除去性能評価（2/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EAエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
14	Cd-115m （約45日）	3E-01	< 1.7E+01	< 7.2E-03	< 2E-02	
15	Sn-119m （約290日）	2E+00	< 3.7E+01	< 2.2E-02	< 1E-02	Sn-123の放射能濃度より評価
16	Sn-123 （約130日）	4E-01	< 3.7E+01	< 2.2E-02	< 6E-02	
17	Sn-126 （約100000年）	2E-01	< 3.5E+00	< 6.3E-04	< 3E-03	
18	Sb-124 （約60日）	3E-01	< 3.2E-01	< 3.2E-04	< 1E-03	
19	Sb-125 （約3年）	8E-01	9.7E+00	< 4.2E-04	< 5E-04	
20	Te-123m （約120日）	6E-01	< 6.9E-01	< 1.9E-04	< 3E-04	
21	Te-125m （約58日）	9E-01	9.7E+00	< 4.2E-04	< 5E-04	Sb-125と放射平衡
22	Te-127 （約9時間）	5E+00	< 4.3E+01	< 1.3E-02	< 3E-03	
23	Te-127m （約110日）	3E-01	< 4.5E+01	< 1.3E-02	< 4E-02	Te-127の放射能濃度より評価
24	Te-129 （約70分）	1E+01	< 6.3E+00	< 1.9E-03	< 2E-04	
25	Te-129m （約34日）	3E-01	< 1.1E+01	< 3.5E-03	< 1E-02	
26	I-129 （約16000000年）	9E-03	1.7E-02	< 7.3E-04	< 8E-02	

（参考２）増設多核種除去設備C系における除去性能評価まとめ

増設多核種除去設備C系における除去性能評価（3/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EAエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
27	Cs-134（約2年）	6E-02	9.2E-01	＜ 2.0E-04	＜ 3E-03	
28	Cs-135（約3000000年）	6E-01	2.4E-05	＜ 7.6E-10	＜ 1E-09	Cs-137の放射能濃度より評価
29	Cs-136（約13日）	3E-01	＜ 2.3E-01	＜ 1.1E-04	＜ 4E-04	
30	Cs-137（約30年）	9E-02	4.0E+00	＜ 1.3E-04	＜ 1E-03	
31	Ba-137m（約3分）	8E+02	4.0E+00	＜ 1.3E-04	＜ 2E-07	Cs-137と放射平衡
32	Ba-140（約13日）	3E-01	＜ 1.7E+00	＜ 5.9E-04	＜ 2E-03	
33	Ce-141（約32日）	1E+00	＜ 1.2E+00	＜ 3.3E-04	＜ 3E-04	
34	Ce-144（約280日）	2E-01	＜ 5.8E+00	＜ 1.3E-03	＜ 7E-03	
35	Pr-144（約17分）	2E+01	＜ 5.8E+00	＜ 1.3E-03	＜ 7E-05	Ce-144と放射平衡
36	Pr-144m（約7分）	4E+01	＜ 5.8E+00	＜ 1.3E-03	＜ 3E-05	Ce-144と放射平衡
37	Pm-146（約6年）	9E-01	＜ 6.2E-01	＜ 2.0E-04	＜ 2E-04	
38	Pm-147（約3年）	3E+00	＜ 5.4E+00	＜ 3.6E-03	＜ 1E-03	Eu-154の放射能濃度より評価
39	Pm-148（約5日）	3E-01	＜ 1.1E+00	＜ 7.5E-04	＜ 3E-03	

（参考２）増設多核種除去設備C系における除去性能評価まとめ

増設多核種除去設備C系における除去性能評価（4/5）

	核種 （半減期）	炉規則告示濃度限度 （別表第2第六欄 周辺監視区域外の 水中の濃度限度） [Bq/cm^3]	処理対象水（EAエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
40	Pm-148m （約41日）	5E-01	＜ 3.8E-01	＜ 1.3E-04	＜ 3E-04	
41	Sm-151 （約87年）	8E+00	＜ 4.4E-02	＜ 2.9E-05	＜ 4E-06	Eu-154の放射能濃度より評価
42	Eu-152 （約13年）	6E-01	＜ 1.8E+00	＜ 6.1E-04	＜ 1E-03	
43	Eu-154 （約9年）	4E-01	＜ 5.1E-01	＜ 3.3E-04	＜ 8E-04	
44	Eu-155 （約5年）	3E+00	＜ 3.8E+00	＜ 7.8E-04	＜ 3E-04	
45	Gd-153 （約240日）	3E+00	＜ 3.4E+00	＜ 7.3E-04	＜ 2E-04	
46	Tb-160 （約72日）	5E-01	＜ 1.0E+00	＜ 4.0E-04	＜ 8E-04	
47	Pu-238 （約88年）	4E-03	＜ 1.1E-02	＜ 8.2E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
48	Pu-239 （約24000年）	4E-03	＜ 1.1E-02	＜ 8.2E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
49	Pu-240 （約6600年）	4E-03	＜ 1.1E-02	＜ 8.2E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
50	Pu-241 （約14年）	2E-01	＜ 4.5E-01	＜ 3.3E-03	＜ 2E-02	Pu-238の放射能濃度から評価
51	Am-241 （約430年）	5E-03	＜ 1.1E-02	＜ 8.2E-05	＜ 2E-02	全α放射能の測定値に包絡されるものとし評価
52	Am-242m （約150年）	5E-03	＜ 3.0E-04	＜ 2.2E-06	＜ 4E-04	Am-241の放射能濃度より評価

（参考２）増設多核種除去設備C系における除去性能評価まとめ

増設多核種除去設備C系における除去性能評価（5/5）

	核種（半減期）	炉規則告示濃度限度（別表第2第六欄 周辺監視区域外の水中の濃度限度）[Bq/cm^3]	処理対象水（EAエリアタンク）の放射能濃度 [Bq/cm^3]	処理済水		備考
				放射能濃度 [Bq/cm^3]	告示濃度限度比	
53	Am-243（約7400年）	5E-03	＜1.1E-02	＜8.2E-05	＜2E-02	全α放射能の測定値に包絡されるものとし評価
54	Cm-242（約160日）	6E-02	＜1.1E-02	＜8.2E-05	＜1E-03	全α放射能の測定値に包絡されるものとし評価
55	Cm-243（約29年）	6E-03	＜1.1E-02	＜8.2E-05	＜1E-02	全α放射能の測定値に包絡されるものとし評価
56	Cm-244（約18年）	7E-03	＜1.1E-02	＜8.2E-05	＜1E-02	全α放射能の測定値に包絡されるものとし評価
57	Mn-54（約310日）	1E+00	＜3.0E-01	＜1.1E-04	＜1E-04	
58	Fe-59（約45日）	4E-01	＜3.7E-01	＜2.5E-04	＜6E-04	
59	Co-58（約71日）	1E+00	＜2.9E-01	＜1.2E-04	＜1E-04	
60	Co-60（約5年）	2E-01	2.6E-01	＜1.5E-04	＜8E-04	
61	Ni-63（約100年）	6E+00	1.8E+00	＜1.5E-02	＜3E-03	
62	Zn-65（約240日）	2E-01	＜4.9E-01	＜2.9E-04	＜1E-03	
全α			＜1.1E-02	＜8.2E-05	－	

汚染水浄化処理設備の進捗状況

平成26年12月25日
東京電力株式会社

東京電力
TEPCO

1．モバイル型ストロンチウム除去装置（A系統）

設備概要

汚染水処理設備の処理済水を貯留する設備（タンク）のうち，逆浸透膜装置の廃液を貯留するRO濃縮水貯槽は，高濃度の放射性ストロンチウムを含むため，モバイル型ストロンチウム除去装置により放射性ストロンチウム濃度を低減する。

G4南タンク，G6南タンクのRO濃縮水を処理する計画。

処理能力：300m^3/日

除去能力：Srを10～1,000分の1へ低減（目標）

運転状況

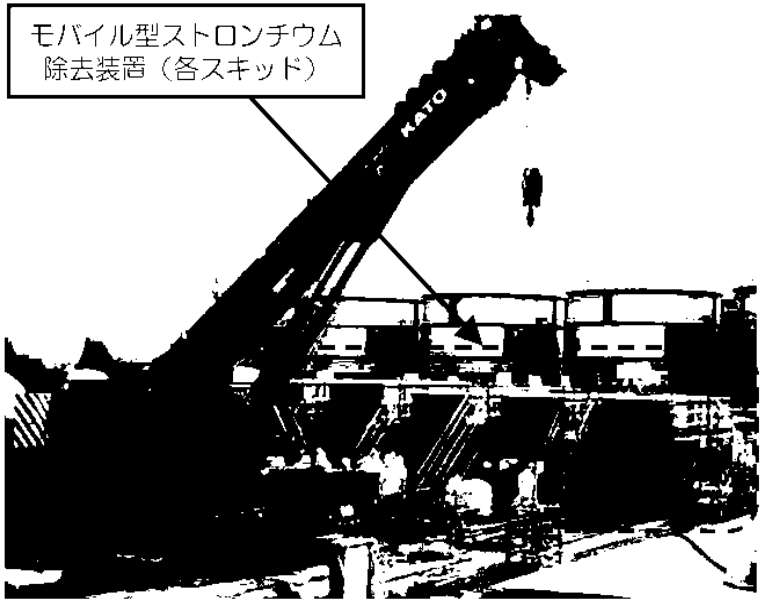
運転開始：10月2日

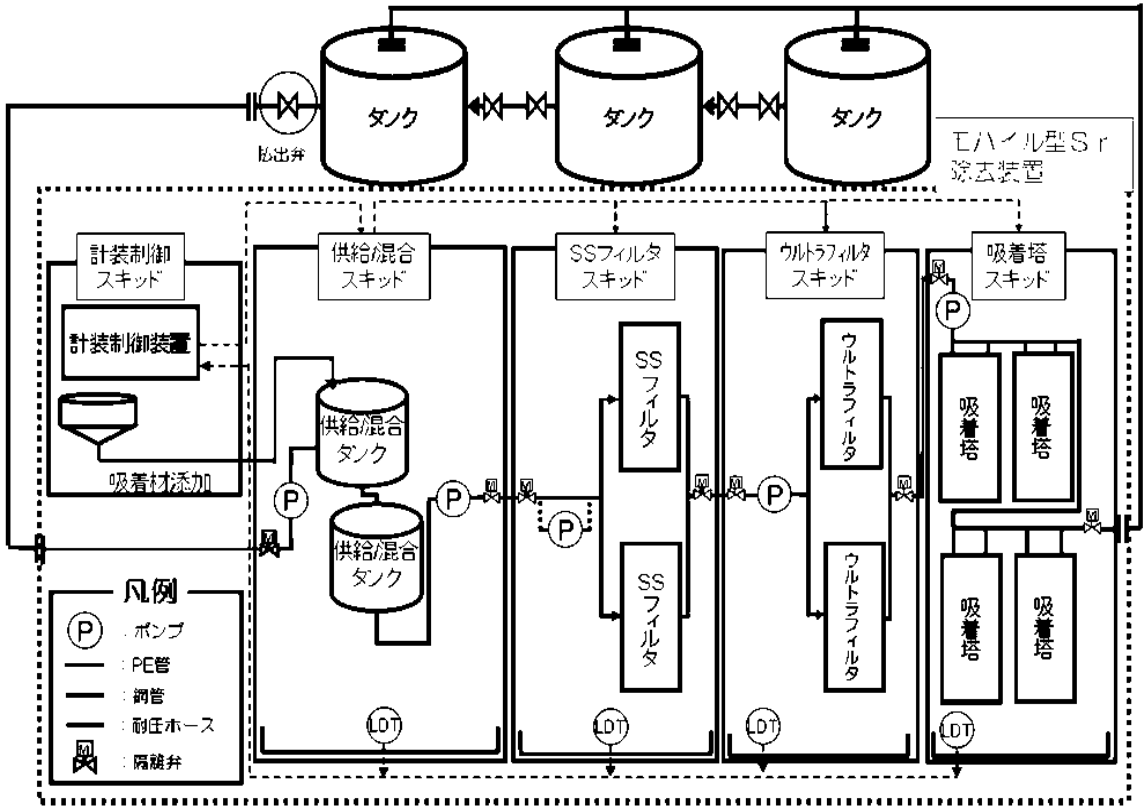
G4南エリア処理実施中

処理実績（H26.12.18現在）：

浄化処理量 約4,000m^3

（G4南タンク合計約14,000m^3）





装置概要図

2. モバイル型ストロンチウム除去装置(B系統)

設備概要

A系統と同様の装置構成により，RO濃縮水貯槽の放射性ストロンチウム濃度を低減する。
H5北タンクのRO濃縮水を処理する計画。
処理能力：300m^3/日
除去能力：Srを10～1,000分の1へ低減（目標）

工程

実施計画認可：12月12日
現地工事：11月中旬～H27年1月中旬
処理運転：H27年1月中旬～

装置設置エリア及び対象処理タンク

3. 第二モバイル型ストロンチウム除去装置

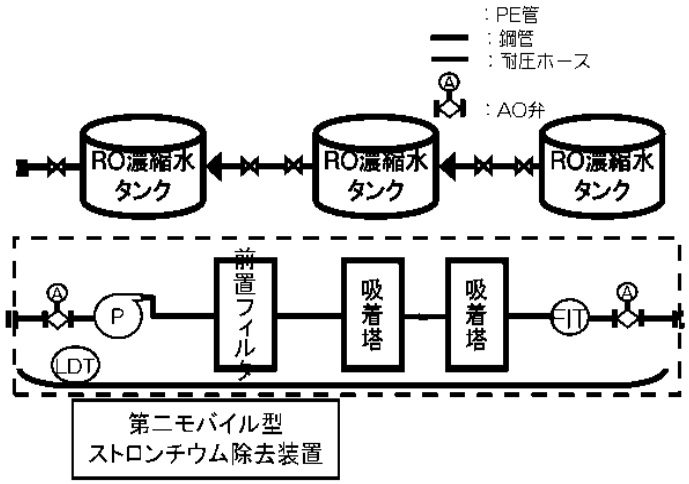
設備概要

モバイル型ストロンチウム除去装置A，B系統と同様，RO濃縮水貯槽の放射性ストロンチウム濃度を低減する。

C_A、C_B、G6_A/B、G6_C/Dタンクの RO濃縮水を処理する計画。

処理能力：480m^3/日/ユニット
（4ユニット設置）

除去能力：Srを10～1000分の1へ低減
（目標）



装置概要図

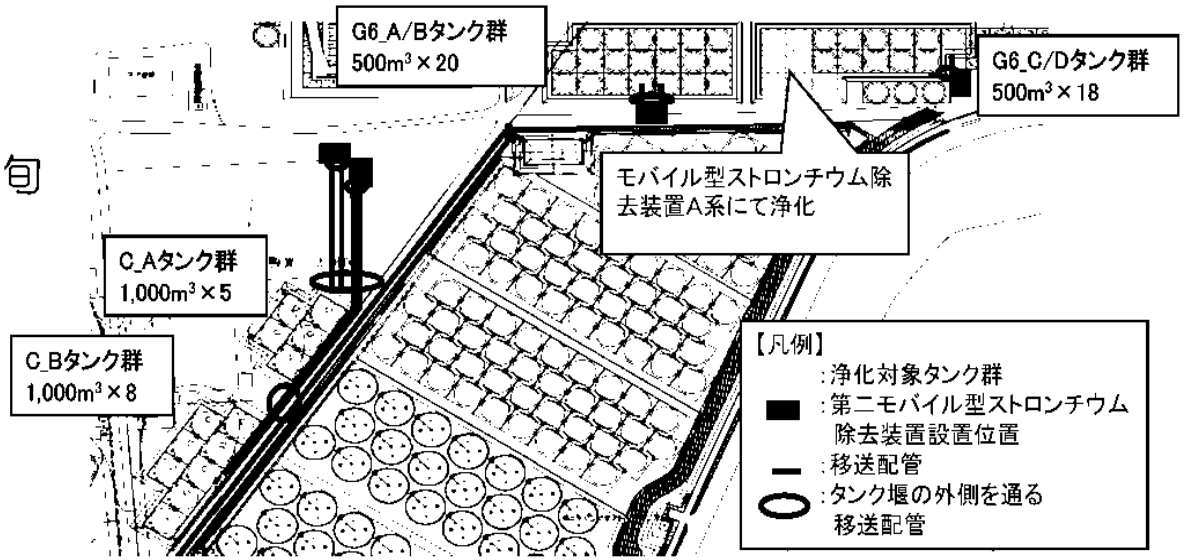
工程

実施計画変更手続き中（※1）

現地工事：11月上旬～H27年1月下旬

処理運転：H27年1月下旬～

（※1）１２月１２日変更申請実施



装置設置エリア及び対象処理タンク

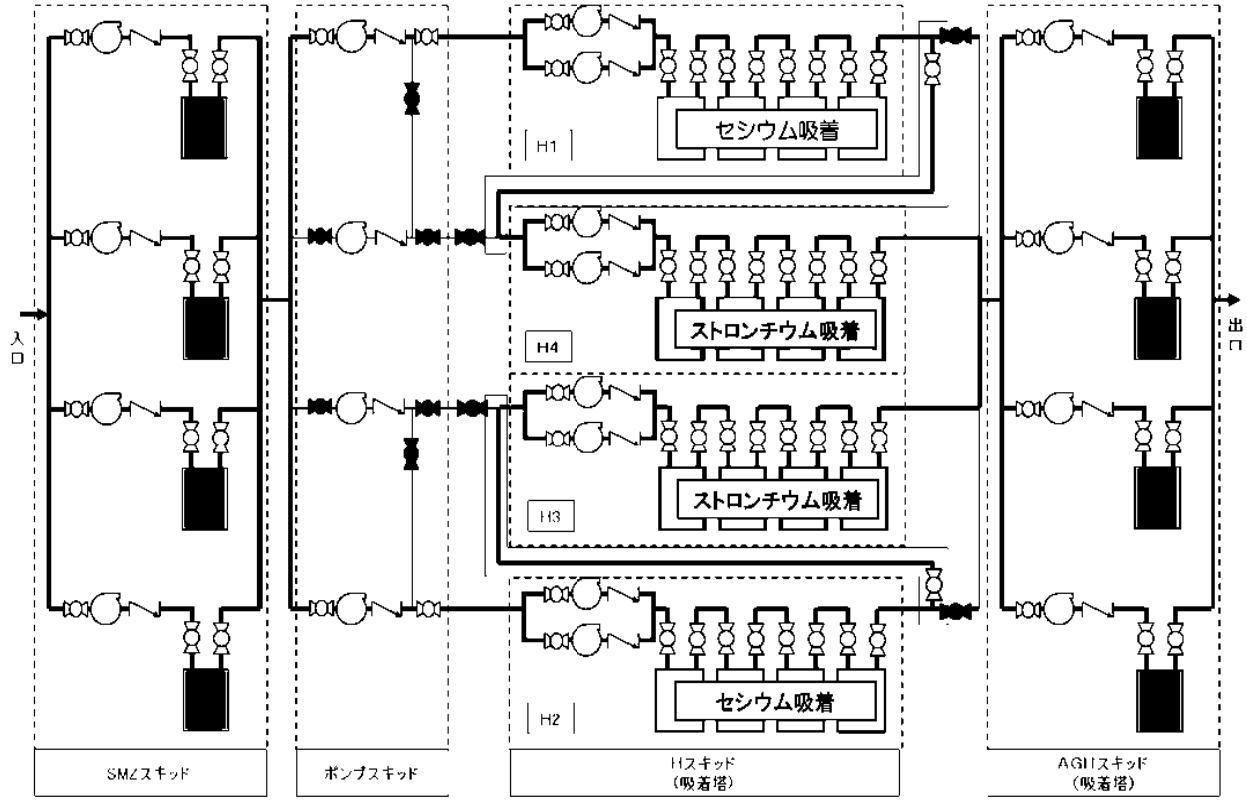
4. セシウム吸着装置でのストロンチウム除去

設備概要

セシウム吸着装置において，新たにSr吸着塔を装荷し，CsとともにSrを除去する。
Cs吸着塔とSr吸着塔の２段階で処理するため，Cs/Sr同時吸着用配管（連絡配管）を設置する。
処理能力：600m^3/日
除去能力：Srを100～1,000分の１へ低減（目標）

工程

実施計画認可：
11月7日
連絡配管使用前検査：
11月11～12日
（11/20修了証交付）
吸着塔使用前・溶接検査：
12月3～8日
（12/11修了証交付）
処理運転：
1月～ （予定）



装置概要図　　：連絡配管

5. 第二セシウム吸着装置でのストロンチウム除去

設備概要

第二セシウム吸着装置のCs吸着塔に変えてCs/Sr同時吸着塔を装荷し、CsとともにSrを除去する。

初期運用時は、２種類の同時吸着塔をそれぞれA系・B系に２塔ずつ装荷するとともに同時吸着塔の後段にはCs吸着塔２塔を装荷して、Cs濃度を確実に低減する 。

なお、本格運用時は、A系・B系に同時吸着塔を3塔ずつ装荷する計画。

処理能力：1,200m^3/日

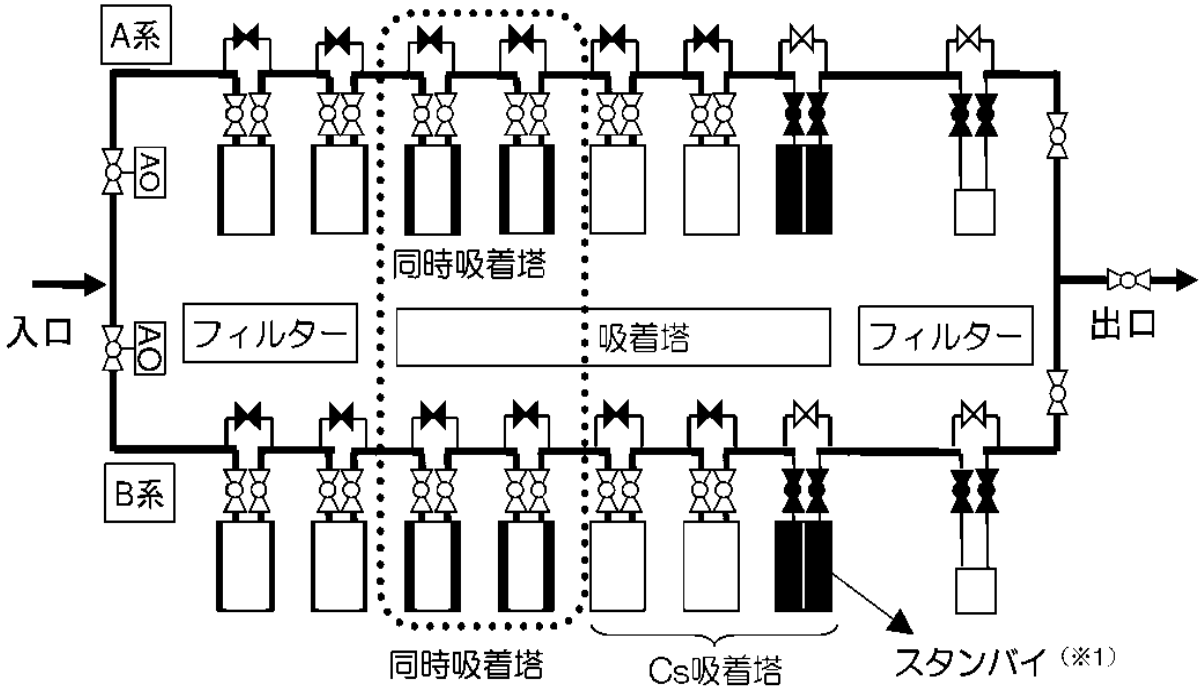
除去能力：Srを100～1,000分の1へ低減（目標）

工程

実施計画認可：12月10日

吸着塔使用前・溶接検査：12月16～22日

処理運転 12月下旬～ （予定）



吸着塔配列（初期運用時）

（※1）水質の変動に備えてCs吸着塔１塔をスタンバイとする。

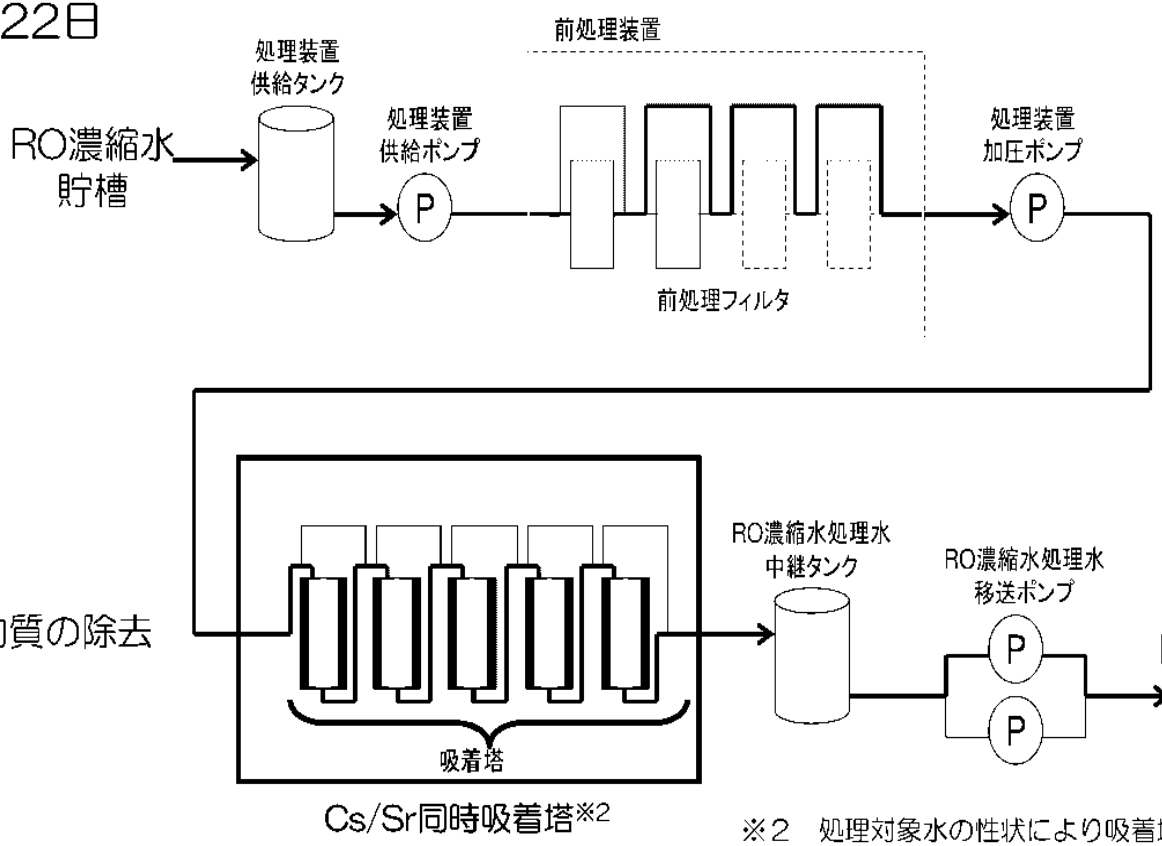
6. RO濃縮水処理設備

設備概要

RO濃縮塩水を前処理装置と核種除去装置にて処理後，再びタンクへと貯留する。
本設備で処理した水については，最終的に多核種除去設備等にて処理を行う。
処理能力：500～900m^3/日
除去能力：Srを100～1,000分の１へ低減（目標）

工程

実施計画認可：12月22日
使用前・溶接検査：
12月下旬～
1月上旬（予定）
処理運転：
1月上旬～（予定）



①前処理装置
：フィルタ処理による浮遊物質の除去

②核種除去装置
：吸着材による核種の除去

※２　処理対象水の性状により吸着塔構成は変更する。
なお、Cs/Sr同時吸着塔は少なくとも3 塔通水する。

【参考】汚染水のリスク低減策

モバイル型ストロンチウム除去装置

【A系】処理運転中
【B系】実施計画認可(12/12)
【第二】実施計画を申請中(12/12申請)
処理能力:300m^3/日×2系、480m^3/日×4台
除去能力:ストロンチウムを1/10～1/1,000へ低減

多核種除去設備

現在ホット試験中
処理能力:250m^3/日×3系列
除去能力:62核種を告示濃度限度未満へ

増設多核種除去設備

現在ホット試験中
処理能力:250m^3/日以上×3系列
除去能力: 62核種を告示濃度限度未満へ

セシウム吸着装置でのストロンチウム除去

実施計画認可(11/7)
処理能力:600m^3/日
除去能力:ストロンチウムを1/100～1/1,000へ低減

多重的なリスク低減策

高性能多核種除去設備

現在ホット試験中
処理能力:500m^3/日以上
除去能力: 62核種を告示濃度限度未満へ

第二セシウム吸着装置でのストロンチウム除去

実施計画認可(12/10)
処理能力:1,200m^3/日
除去能力:ストロンチウムを1/100～1/1,000へ低減

RO濃縮水処理設備

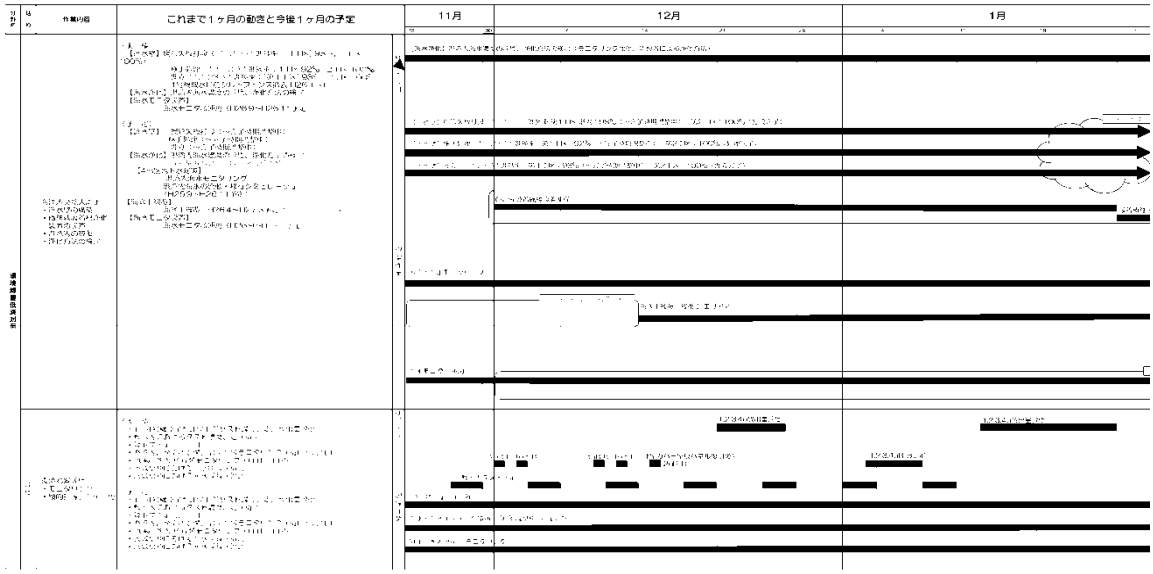
実施計画認可(12/22)
処理能力:500～900m^3/日
除去能力:ストロンチウムを1/100～1/1,000へ低減

★多重的な対策により、汚染水のリスク低減を図る。

環境負荷低減対策 メクジュール

対象エリア	協力会社	作業内容	これまで1ヶ月の動きと今後1ヶ月の予定	11月	12月	1月
敷地内全般	共通	共通仮設	・粉じん飛散防止のための各ゲート出入口散水設備設置 ・建築物・構築物等の解体等に伴う特定粉じん排出等作業実施届出書の提出 ・特定建設資材廃棄物の再資源化等に関する報告書の提出 ・仮囲い（防音パネル） ・トイレ（洋便器、和便器） ・トイレ（簡易水洗式） ・仮設ハウス（プレハブ） ・仮設ハウス（ユニットハウス） ・仮設ハウス（コンテナハウス） ・仮設ハウス（その他） ・現場事務所（現場事務所、現場休憩所、倉庫等） ・発電機（ガソリン、軽油） ・発電機（ガス） ・仮設電灯設備（投光器、LED照明） ・仮設電灯設備（その他） ・仮設電灯設備（分電盤、漏電遮断機） ・仮設水道（給水設備） ・仮設水道（排水設備） ・仮設水道（その他） ・仮設ガス設備（ガス配管） ・仮設ガス設備（その他） ・仮設冷暖房設備（エアコン、ストーブ） ・仮設冷暖房設備（その他） ・仮設通信設備（電話、インターネット） ・仮設通信設備（その他） ・仮設消火設備（消火器） ・仮設消火設備（その他） ・仮設防犯設備（防犯カメラ） ・仮設防犯設備（その他） ・仮設昇降設備（仮設エレベーター） ・仮設昇降設備（その他） ・仮設昇降設備（仮設階段） ・仮設昇降設備（その他） ・仮設昇降設備（仮設スロープ） ・仮設昇降設備（その他） ・仮設昇降設備（その他） ・仮設昇降設備（その他

環境負荷低減対策 メクジュール



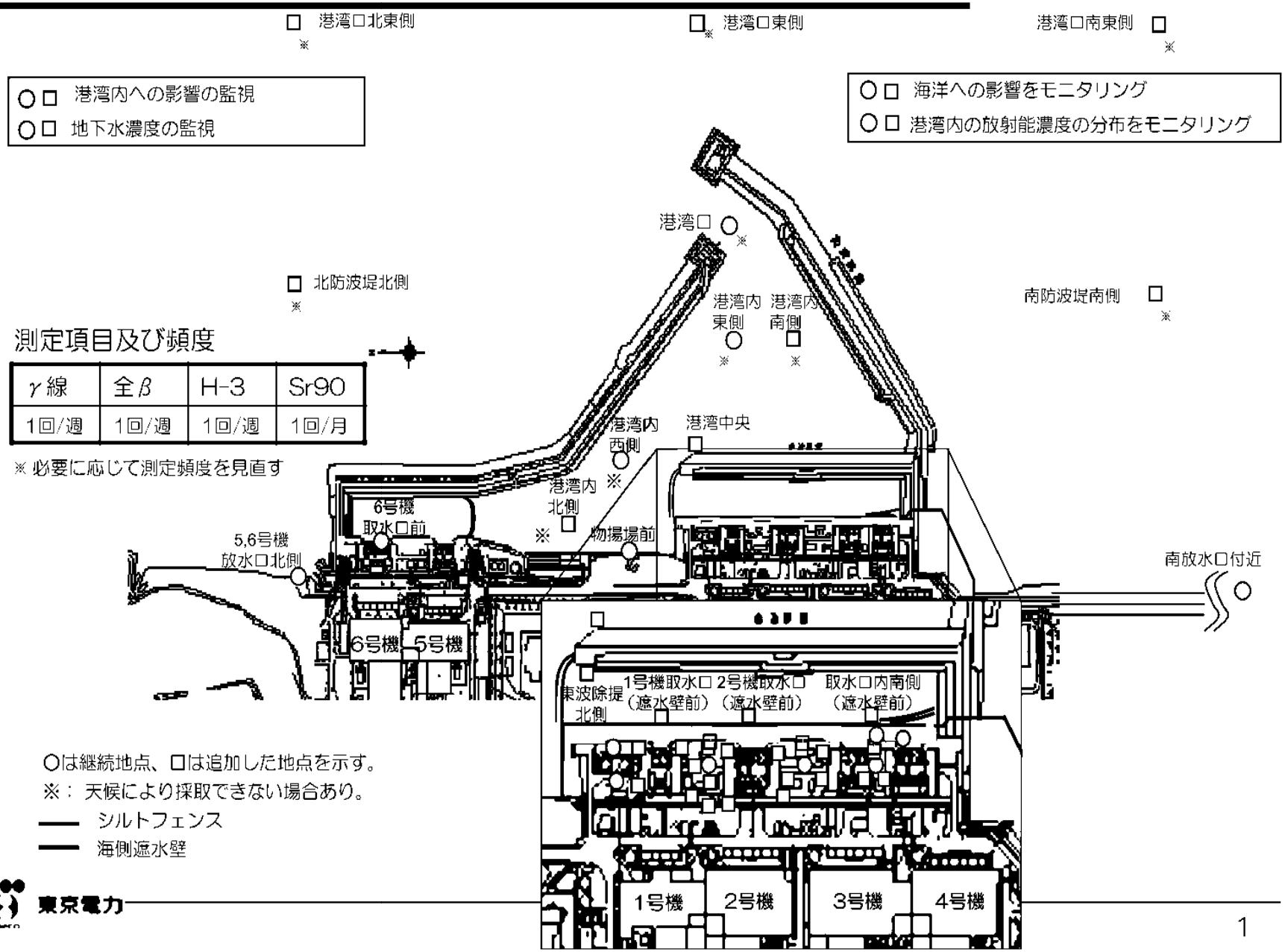
タービン建屋東側における
地下水及び海水中の放射性物質濃度の状況について

平成26年12月25日

東京電力株式会社

東京電力
TEPCO

モニタリング計画（サンプリング箇所）



測定項目及び頻度

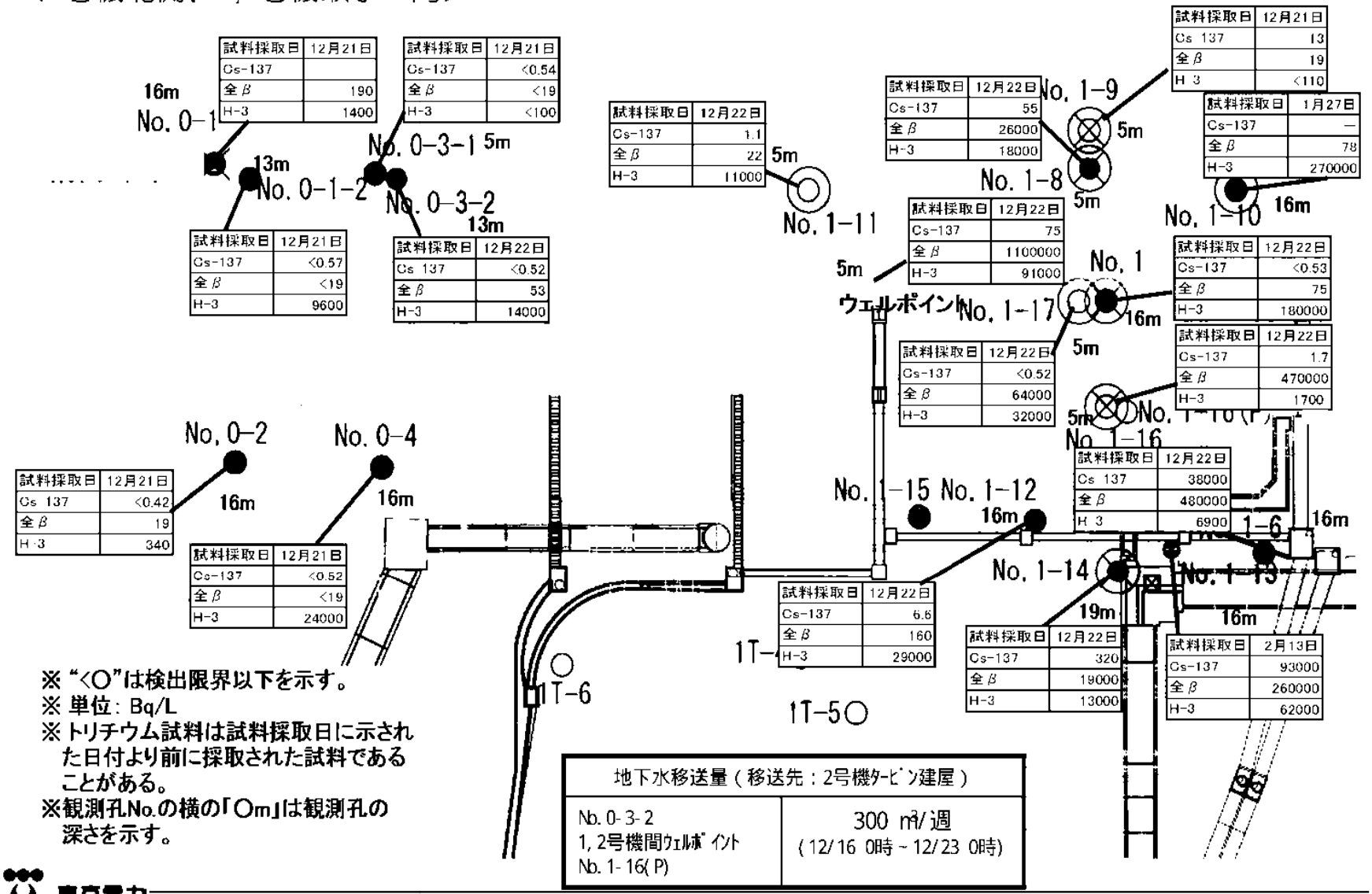
γ線	全β	H-3	Sr90
1回/週	1回/週	1回/週	1回/月

※必要に応じて測定頻度を見直す

○は継続地点、□は追加した地点を示す。
※： 天候により採取できない場合あり。
—— シルトフェンス
—— 海側遮水壁

タービン建屋東側の地下水濃度（1/2）

＜1号機北側、1,2号機取水口間＞

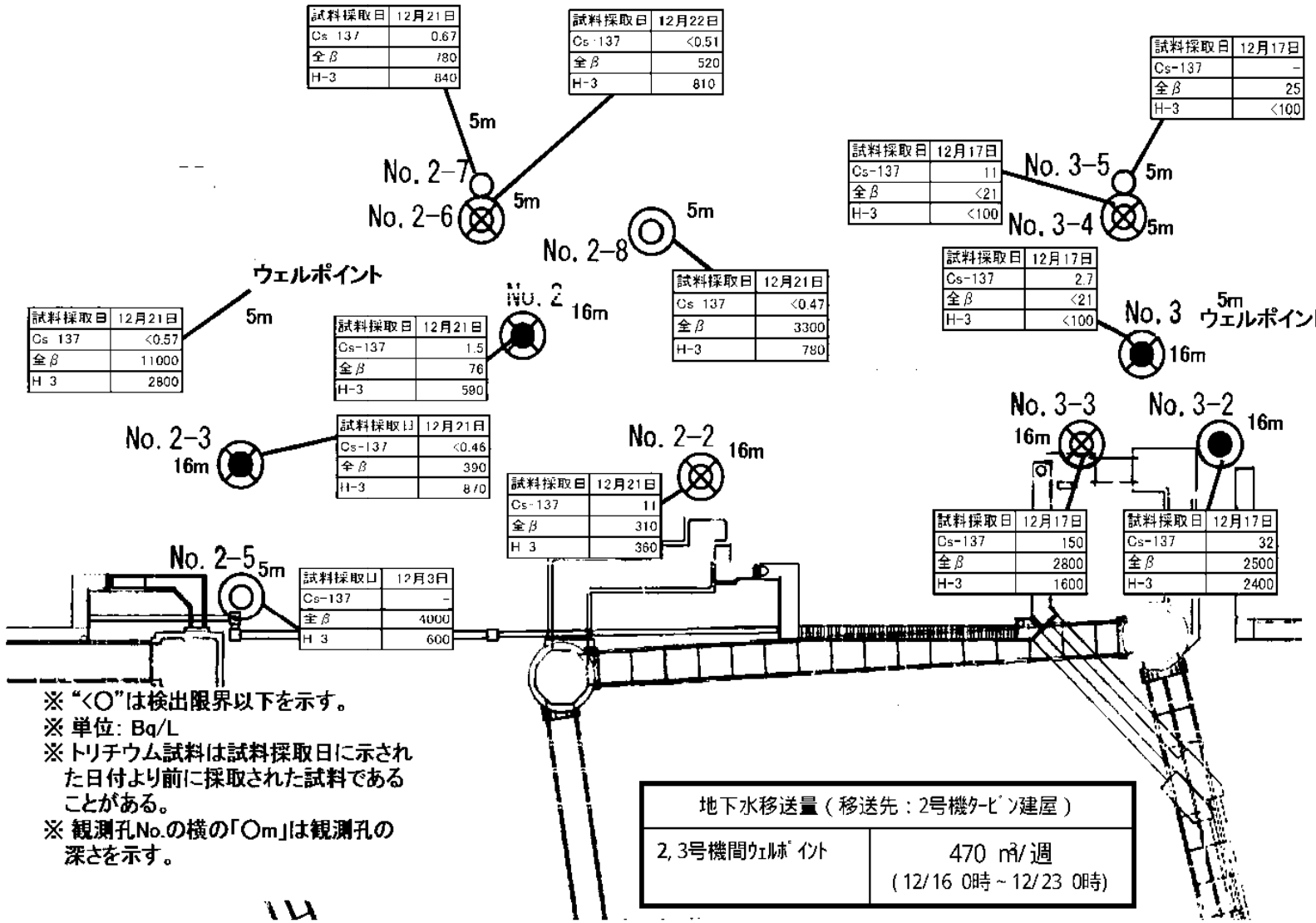


※ "<○"は検出限界以下を示す。
※ 単位：Bq/L
※ トリチウム試料は試料採取日に示された日付より前に採取された試料である ことがある。
※観測孔No.の横の「○m」は観測孔の 深さを示す。

地下水移送量（移送先：2号機ﾀｰﾋﾞﾝ建屋）	
No. 0-3-2 1, 2号機間ｳｪﾙﾎﾟｲﾝﾄ No. 1-16(P)	300 m³/週 (12/16 0時～12/23 0時)

タービン建屋東側の地下水濃度（2/2）

＜2,3号機取水口間、3,4号機取水口間＞



※ "<O"は検出限界以下を示す。
※ 単位: Bq/L
※ トリチウム試料は試料採取日に示された日付より前に採取された試料であることがある。
※ 観測孔No.の横の「Om」は観測孔の深さを示す。

地下水移送量（移送先：2号機ﾀｰﾋﾞﾝ建屋）	
2, 3号機間ｳｪﾙﾎﾟｲﾝﾄ	470 m³/週 (12/16 0時～12/23 0時)

タービン建屋東側の地下水濃度の状況(1/2)

＜1号機北側エリア＞

- H-3濃度が高い海側のNo.0-3-2 で、平成25年12/11より開始した地下水汲み上げによる効果を継続監視（1m^3/日）。H-3濃度は最大で 76,000Bq/L（2/6）だったが、その後低下傾向になり、現在は 12,000Bq/L程度で推移している。
- No.0-1-2、No.0-4で7月からH-3濃度が上昇傾向にあり、現在は、それぞれ9,000Bq/L程度、23,000Bq/L程度で推移している。

＜1,2号機取水口間エリア＞

- No.1-6で全β濃度が100万Bq/L前後で推移していたが、10月に780万Bq/Lまで上昇後低下し、現在50万Bq/L程度で推移している。
- No.1-8でH-3濃度が10,000Bq/L程度で推移していたが、6月以降大きく上下し、現在20,000Bq/L程度となっている。
- No.1-17でH-3濃度は10,000Bq/L前後で推移していたが、10月より上昇し16万Bq/Lとなり、現在は4万Bq/L前後となっている。全β濃度は3月より上昇傾向にあり10月に120万Bq/Lまで上昇後低下し、現在60,000Bq/L前後となっている。
- 1,2号機間ウェルポイントで全β濃度は3月以降30万Bq/l前後で推移していたが、11月に入って一時300万Bq/L前後まで上昇し、現在は110万Bq/L程度で推移している。（2,3号機取水口間エリアの地盤改良部の地表処理のため、揚水量を10月31日より50m^3/日から10m^3/日に変更）

タービン建屋東側の地下水濃度の状況(2/2)

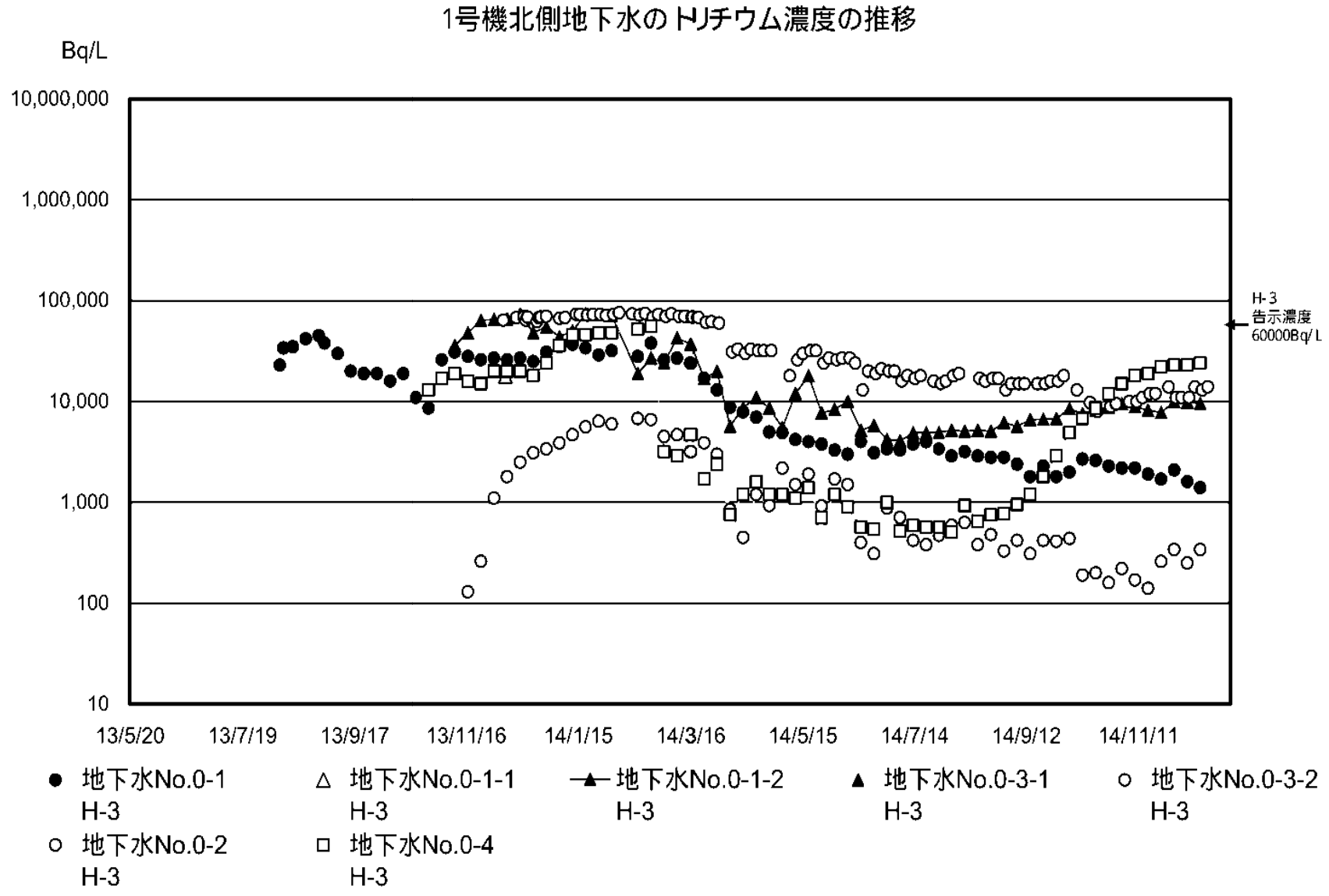
＜2,3号機取水口間エリア＞

- 2,3号機取水口間ウェルポイントのH-3濃度は4月から上昇し13,000Bq/L程度となったが、11月より低下し、現在3,000Bq/L前後となっている。全β濃度は10万Bq/L程度で推移していたが、11月より低下し、現在20,000Bq/L程度となっている。
- No.2、No.2-2、No.2-3では、全β、H-3濃度とも横ばいで推移し、上昇は見られていない。
- No.2-6で全β濃度が2,000Bq/L程度で推移していたが、11月以降低下し、現状1,000Bq/L程度となっている。
- 地盤改良の外側のNo.2-7は昨年11月からモニタリングを開始し、全β濃度は20Bq/L前後であったが、徐々に上昇し、1,000Bq/L程度で推移。
- No.2-8は今年2月よりモニタリングを開始し、全β濃度は1,000Bq/L前後だったが、徐々に上昇し、現在は4,000Bq/L前後で推移している。
- ウェルポイントの揚水量を地盤改良壁の地表処理のため10月31日より4m^3/日から50m^3/日に変更。（12/8～：2m^3/日、2/14～：4m^3/日、10/31～：50m^3/日）。

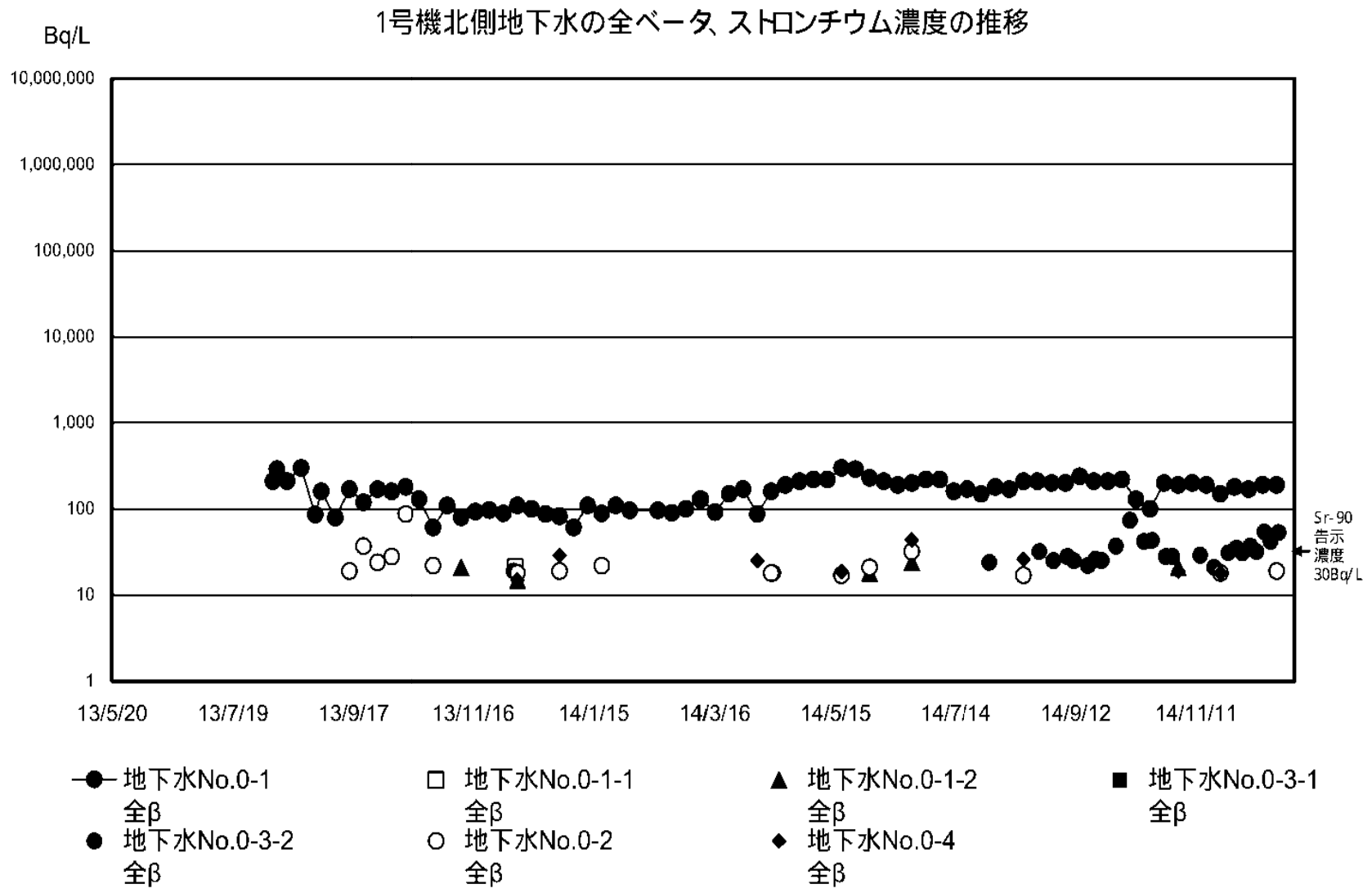
＜3,4号機取水口間エリア＞

- 各観測孔とも放射性物質濃度は低いレベルで推移。

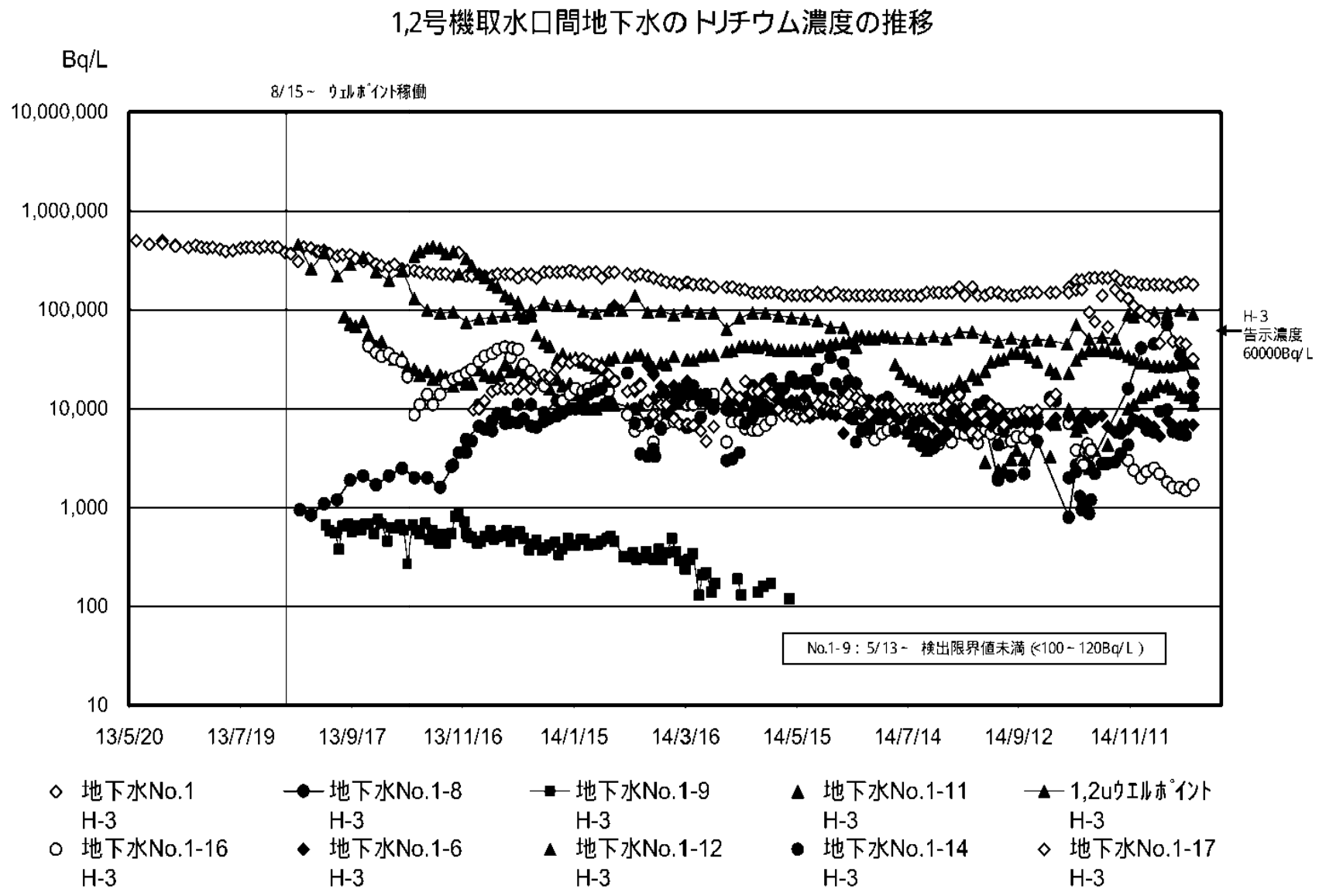
1号機北側の地下水の濃度推移(1/2)



1号機北側の地下水の濃度推移(2/2)

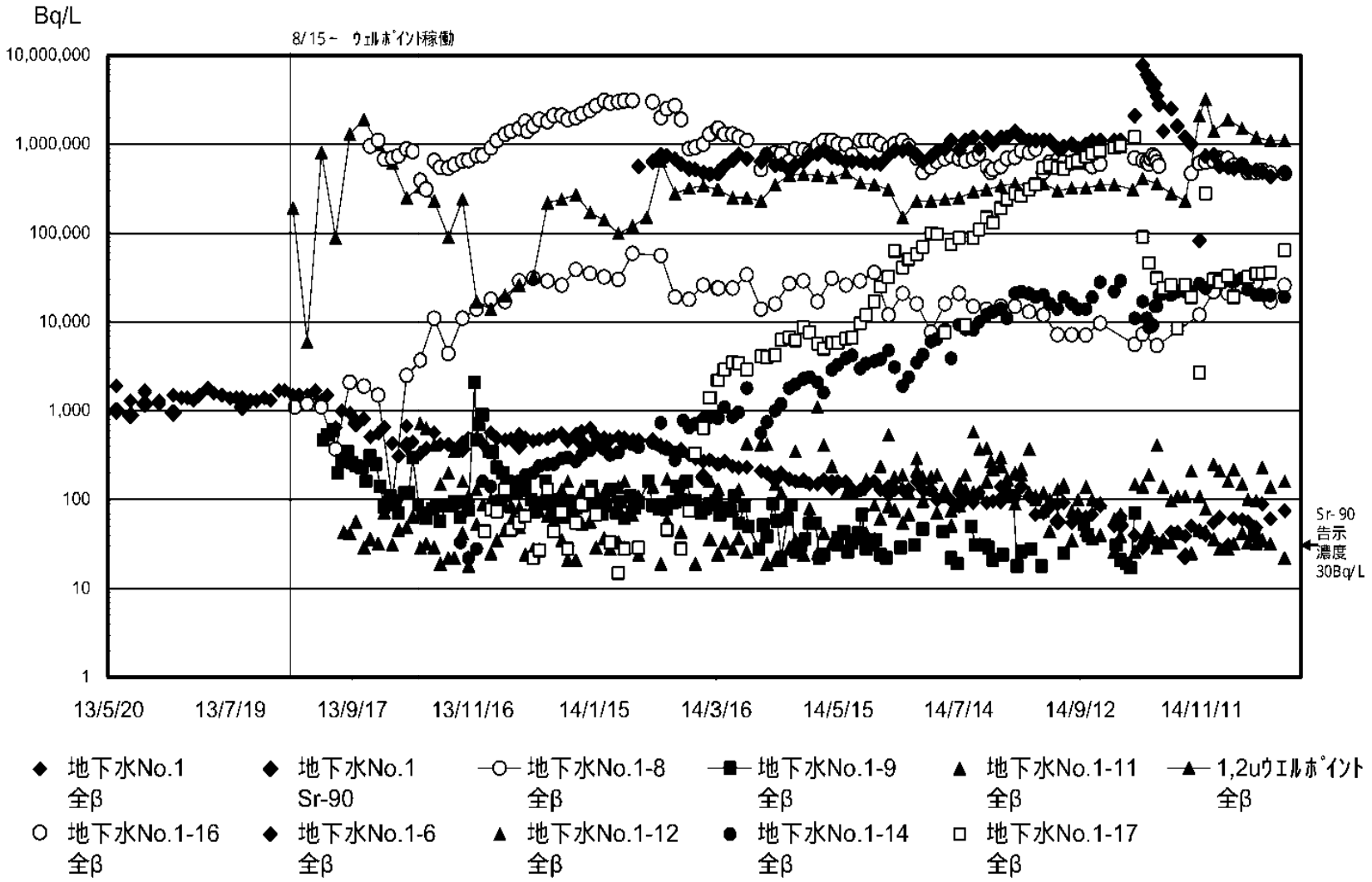


1,2号機取水口間の地下水の濃度推移(1/2)

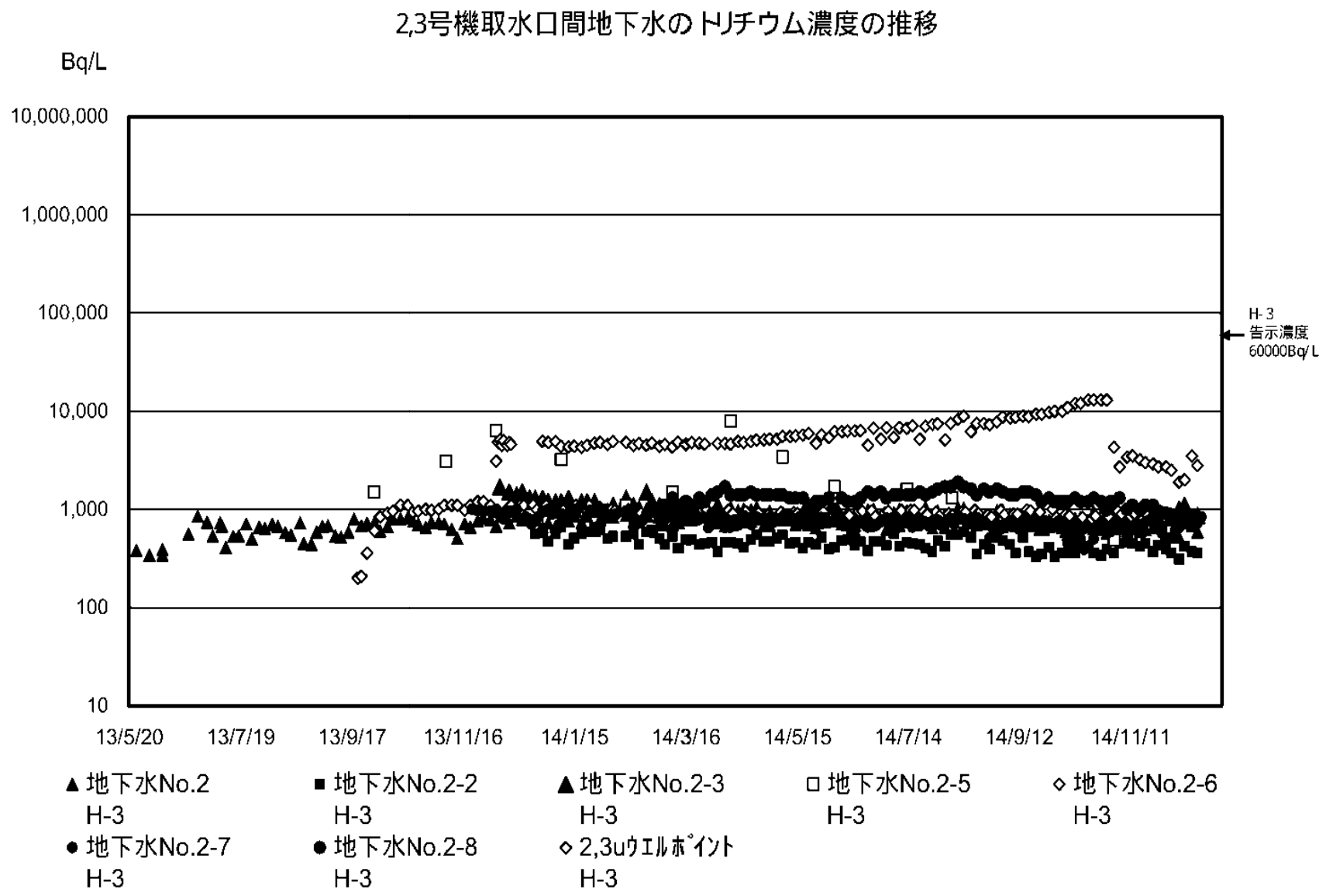


1,2号機取水口間の地下水の濃度推移(2/2)

1,2号機取水口間地下水の全ベータ、ストロンチウム濃度の推移

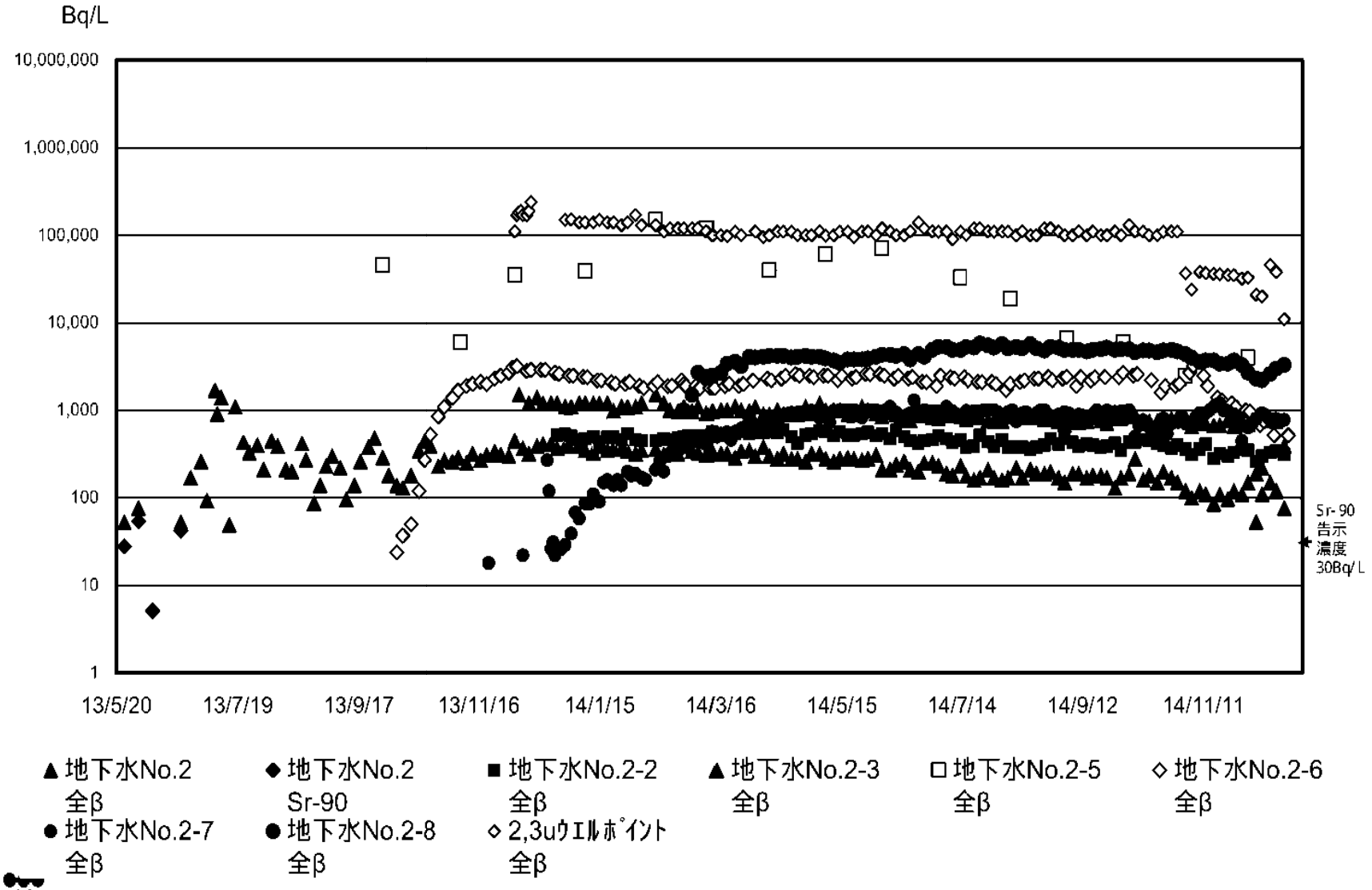


2,3号機取水口間の地下水の濃度推移(1/2)

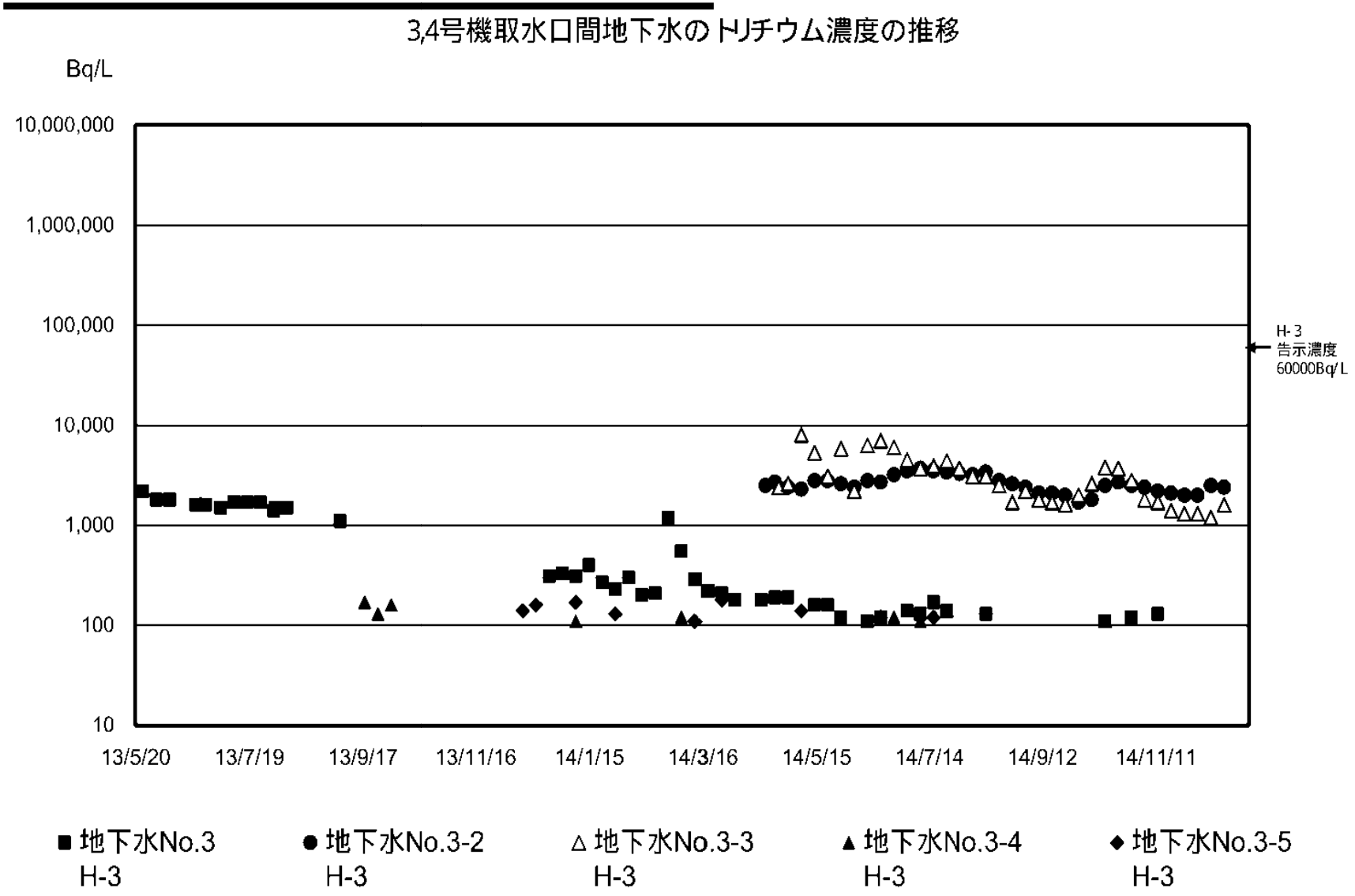


2,3号機取水口間の地下水の濃度推移(2/2)

2,3号機取水口間地下水の全ベータ、ストロンチウム濃度の推移

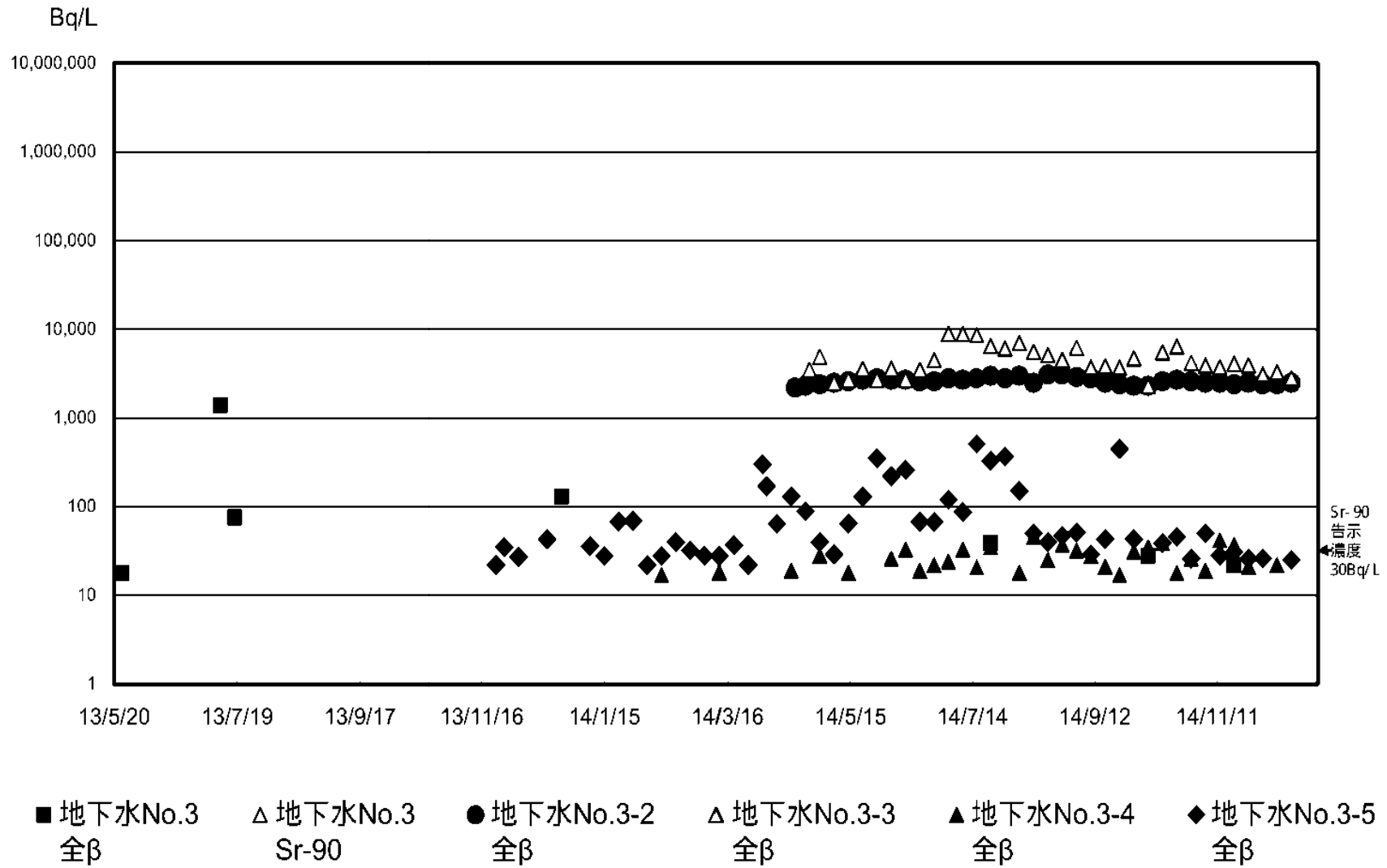


3,4号機取水口間の地下水の濃度推移(1/2)

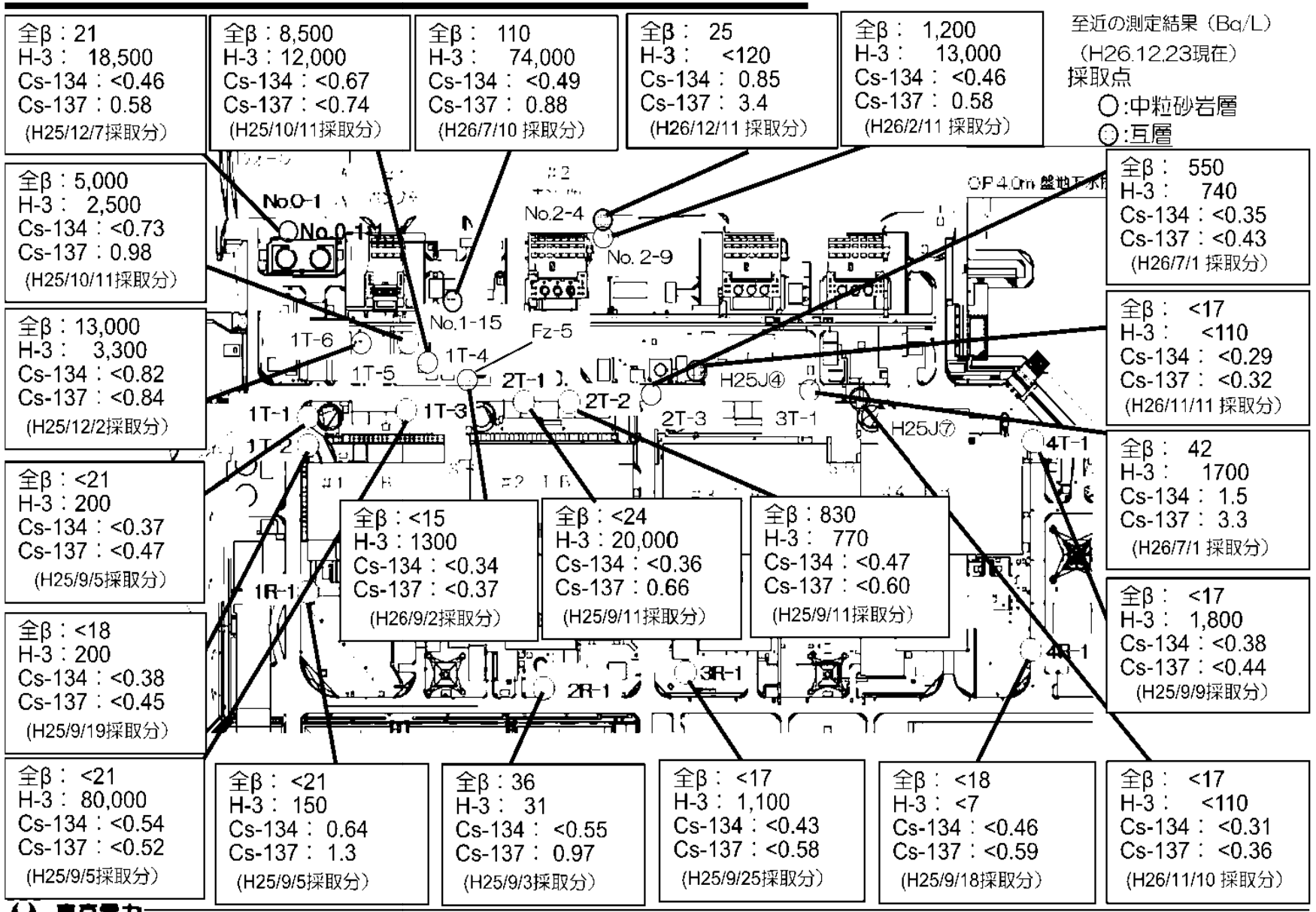


3,4号機取水口間の地下水の濃度推移(2/2)

3,4号機取水口間地下水の全ベータ、ストロンチウム濃度の推移

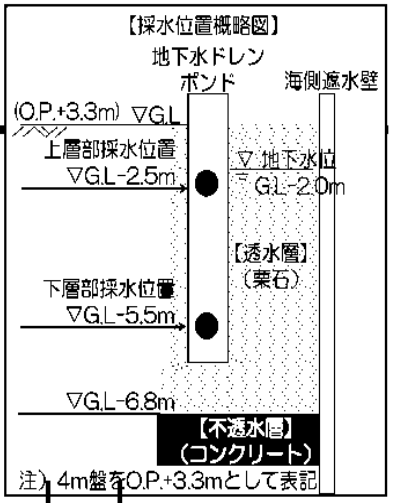


建屋周辺の地下水濃度測定結果



タービン建屋東側の地下水観測孔の位置（埋立エリア）

※ "<○ "は検出限界以下を示す。
※ 単位：放射性物質濃度　Bq/L
※ 埋立エリアの地下水はG.L.-5.5mから採水



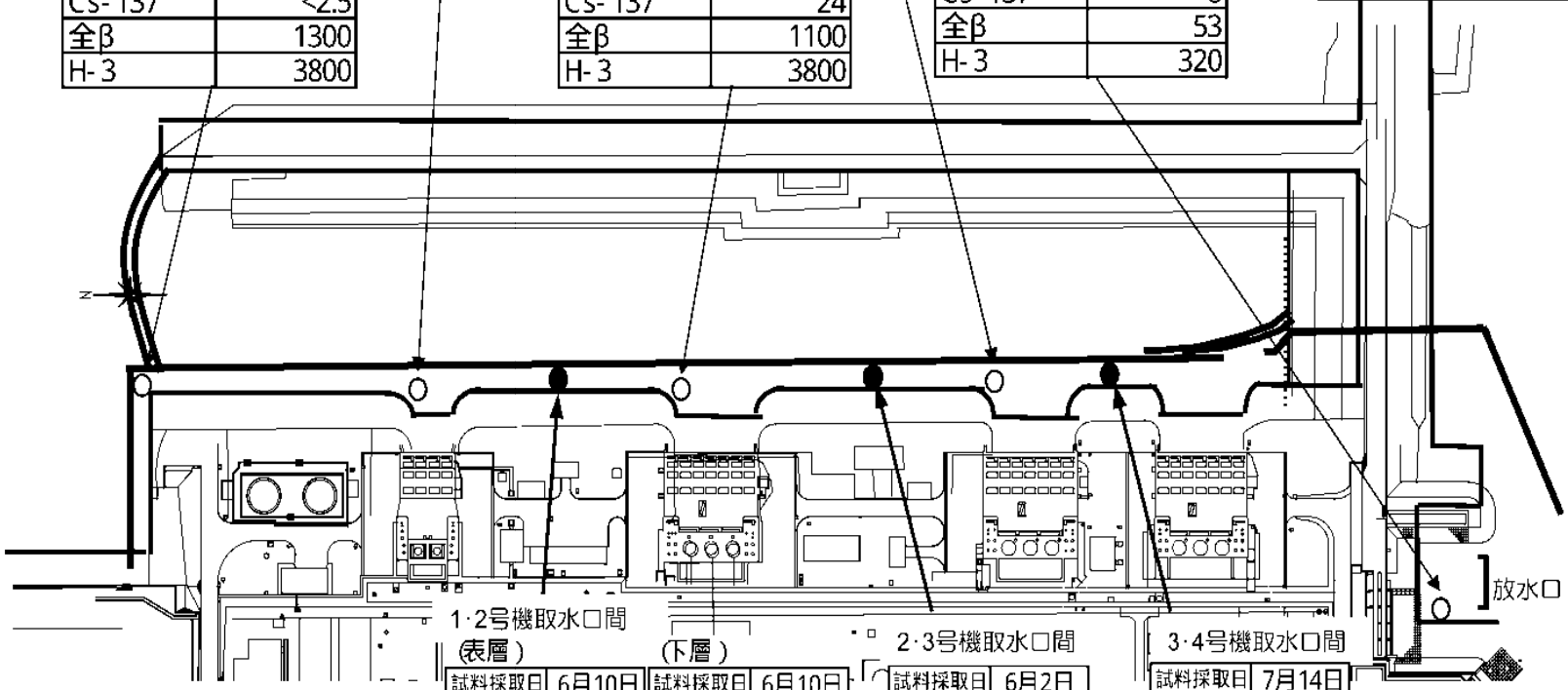
試料採取日	10月17日
Cs-137	<2.3
全β	1300
H-3	3300

試料採取日	10月17日
Cs-137	39
全β	770
H-3	2600

試料採取日	10月17日
Cs-137	<2.5
全β	1300
H-3	3800

試料採取日	10月17日
Cs-137	24
全β	1100
H-3	3800

試料採取日	10月17日
Cs-137	8
全β	53
H-3	320



1･2号機取水口間

(表層)

試料採取日	6月10日
Cs-137	7.6
全β	1300
H-3	3800

(下層)

試料採取日	6月10日
Cs-137	8.3
全β	1500
H-3	3900

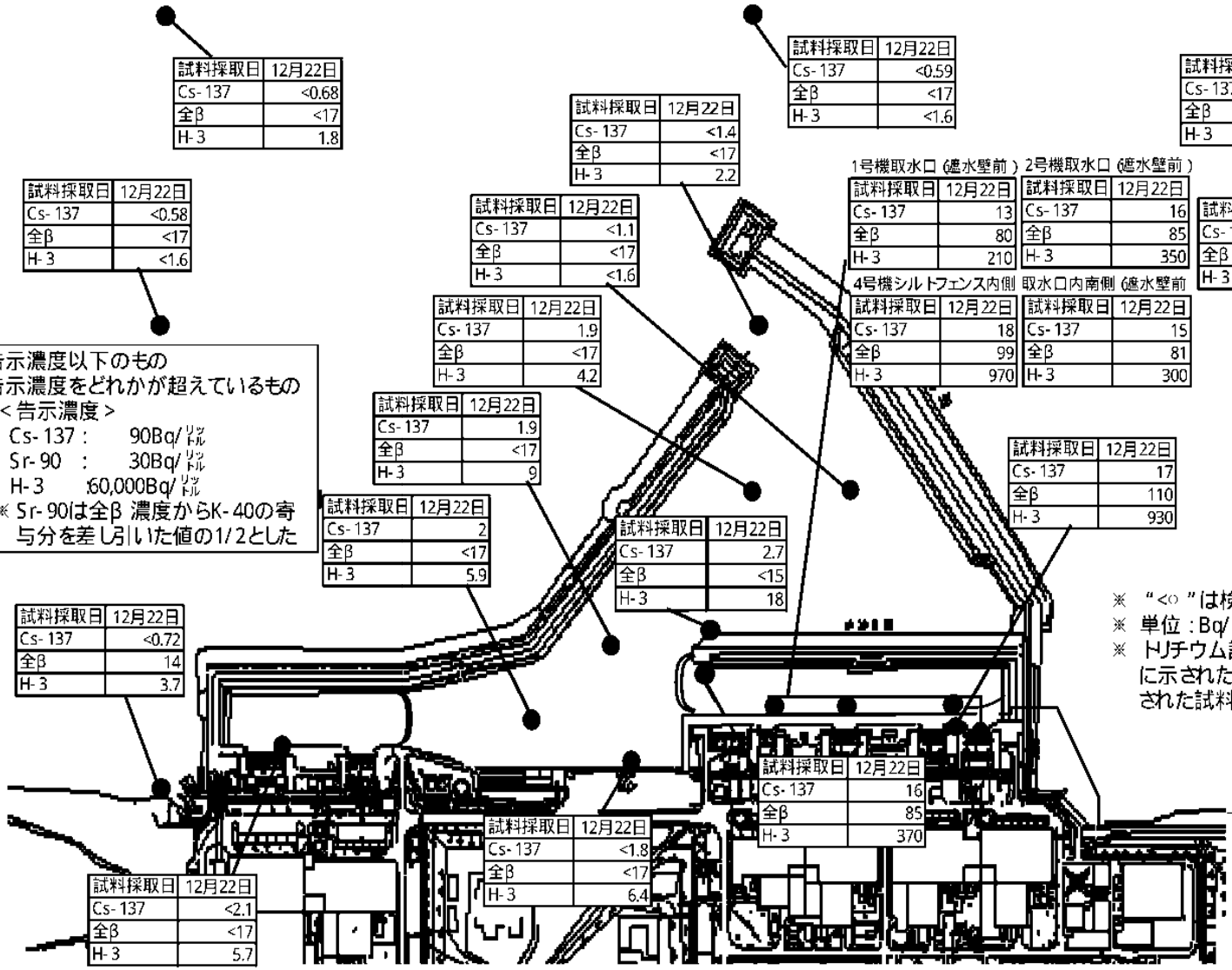
2･3号機取水口間

試料採取日	6月2日
Cs-137	56
全β	1000
H-3	2600

3･4号機取水口間

試料採取日	7月14日
Cs-137	38
全β	200
H-3	680

港湾内外の海水濃度



試料採取日	12月22日
Cs-137	<0.68
全β	<17
H-3	1.8

試料採取日	12月22日
Cs-137	<0.59
全β	<17
H-3	<1.6

試料採取日	12月22日
Cs-137	<0.64
全β	<17
H-3	<1.6

試料採取日	12月22日
Cs-137	<1.4
全β	<17
H-3	2.2

試料採取日	12月22日
Cs-137	<0.58
全β	<17
H-3	<1.6

試料採取日	12月22日
Cs-137	<1.1
全β	<17
H-3	<1.6

1号機取水口 (遮水壁前)

試料採取日	12月22日
Cs-137	13
全β	80
H-3	210

2号機取水口 (遮水壁前)

試料採取日	12月22日
Cs-137	16
全β	85
H-3	350

試料採取日	12月22日
Cs-137	<0.58
全β	<17
H-3	<1.6

試料採取日	12月22日
Cs-137	1.9
全β	<17
H-3	4.2

4号機シルトフェンス内側

試料採取日	12月22日
Cs-137	18
全β	99
H-3	970

取水口内南側 (遮水壁前)

試料採取日	12月22日
Cs-137	15
全β	81
H-3	300

試料採取日	12月22日
Cs-137	1.9
全β	<17
H-3	9

試料採取日	12月22日
Cs-137	17
全β	110
H-3	930

試料採取日	12月22日
Cs-137	2
全β	<17
H-3	5.9

試料採取日	12月22日
Cs-137	2.7
全β	<15
H-3	18

試料採取日	12月22日
Cs-137	<0.72
全β	14
H-3	3.7

試料採取日	12月22日
Cs-137	16
全β	85
H-3	370

試料採取日	12月22日
Cs-137	<1.8
全β	<17
H-3	6.4

試料採取日	12月22日
Cs-137	<2.1
全β	<17
H-3	5.7

試料採取日	12月22日
Cs-137	<0.58
全β	12
H-3	2.2

● 告示濃度以下のもの
● 告示濃度をどれかが超えているもの
＜告示濃度＞
Cs-137 : 90Bq/リットル
Sr-90 : 30Bq/リットル
H-3 : 60,000Bq/リットル
※ Sr-90は全β 濃度からK-40の寄与分を差し引いた値の1/2とした

※ "<○"は検出限界以下を示す。
※ 単位：Bq/L
※ トリチウム試料は試料採取日に示された日付より前に採取された試料であることがある。

海水中放射性物質のモニタリングの考え方

- 港湾内外の海水に含まれる放射性物質のモニタリングは国のモニタリング調整会議で策定された「総合モニタリング計画」に基づき実施している。
  - ➢モニタリング項目
    - ✓日常分析：放射性物質が漏えいしていないかを監視することが目的
    - ✓詳細分析：環境中に放出された放射性物質の拡散や移動などの状況を把握することが目的
  - ➢分析項目と分析方法
    - ✓日常分析：南北放水口付近は毎日、港湾口は週1回の頻度でCsに代表されるγ核種をモニタリング
      迅速な傾向把握のため、Csで1Bq/ℓの検出限界値を目標
    - ✓詳細分析：週1回の頻度でγ核種、全β放射能、H-3をモニタリング（Srは月1回）
      放出された放射性物質の状況を評価するため、Csで0.001Bq/ℓの検出限界を目標（分析時間が長いため、結果が出るまでに約1ヶ月を要する）
  - ➢公表
    - ✓総合モニタリング計画に基づき、原子力規制庁で取り纏めて公表
    - ✓廃炉・汚染水対策チーム会合では日常分析の結果を報告
  - ➢これまでの結果
    - ✓詳細分析で検出されることはあるが、世界保健機関（WHO）の飲料水に関する基準値（Cs-137:10Bq/ℓ）よりも格段に小さな値

港湾内外の海水濃度の状況

＜１～４号機取水口エリア＞

- 遮水壁内側の埋立工事の進捗に伴い、海側遮水壁の内側では3月以降、H-3、全β濃度の上昇が見られ、現在は高めの濃度で推移している。
- 遮水壁の外側についてはCs-137、 H-3、全β濃度とも東波除堤北側と同レベルで低い濃度で推移している。

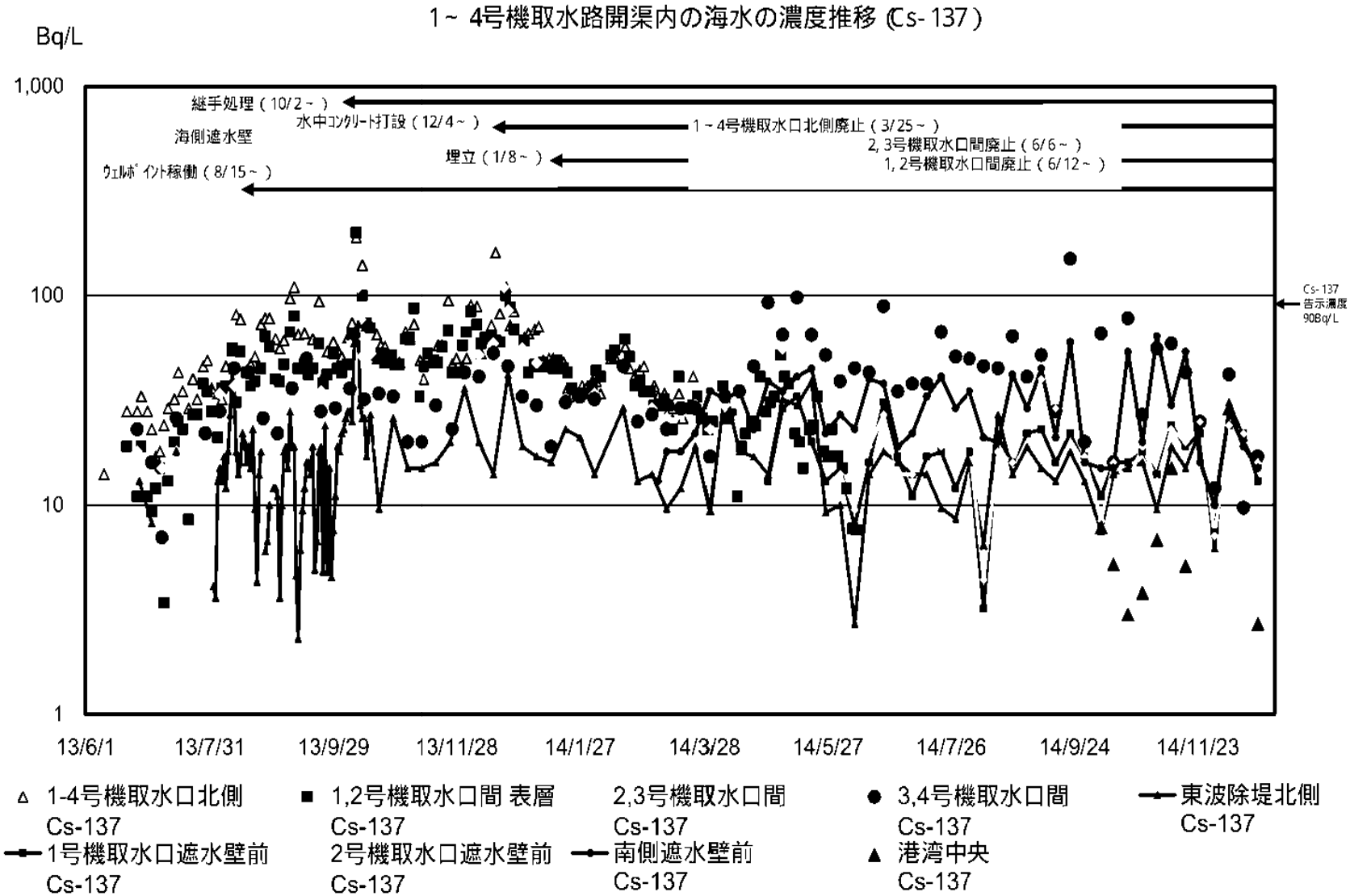
＜港湾内エリア＞

- 緩やかな低下が見られる。

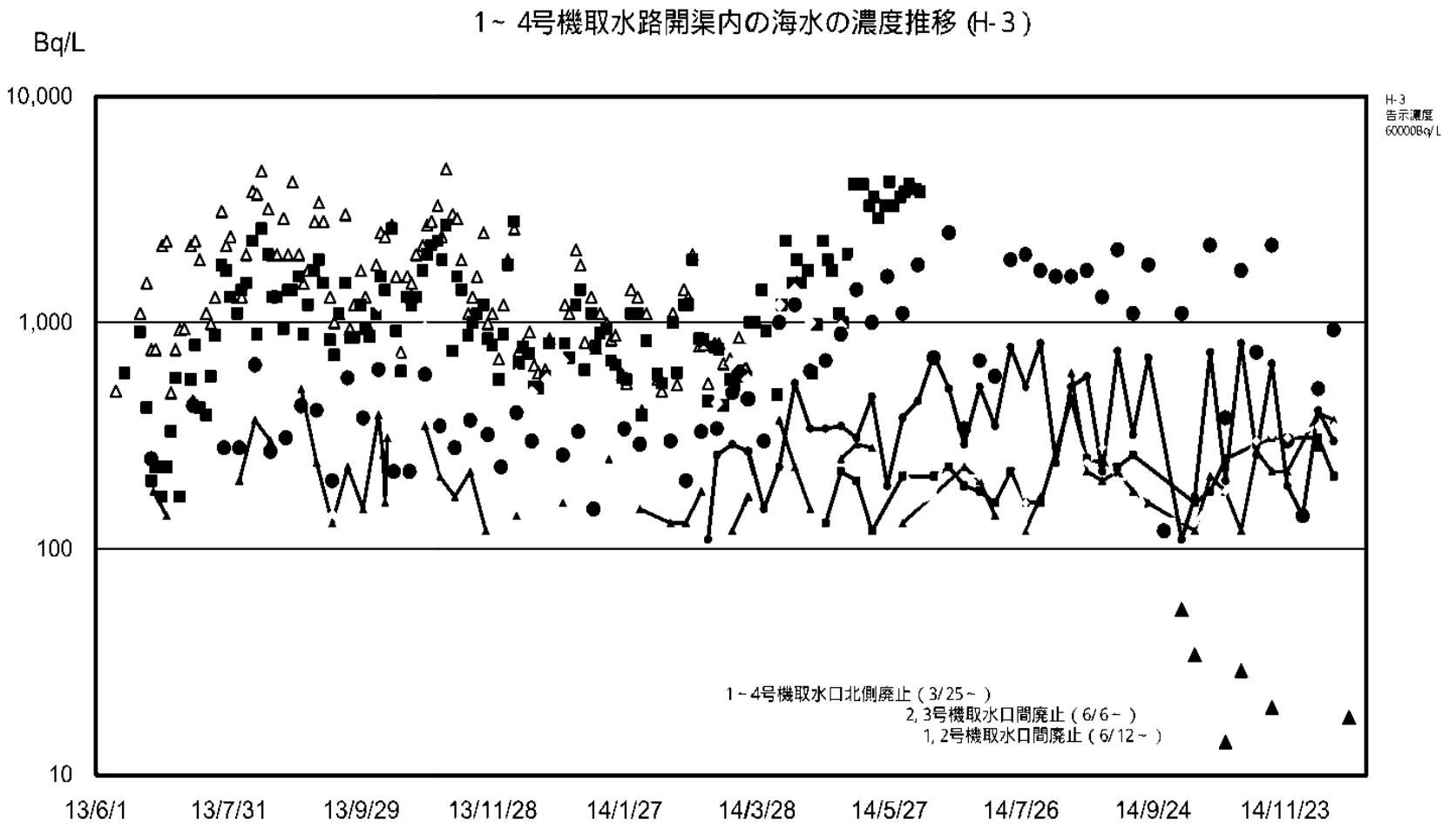
＜港湾口、港湾外エリア＞

- これまでの変動の範囲で推移。

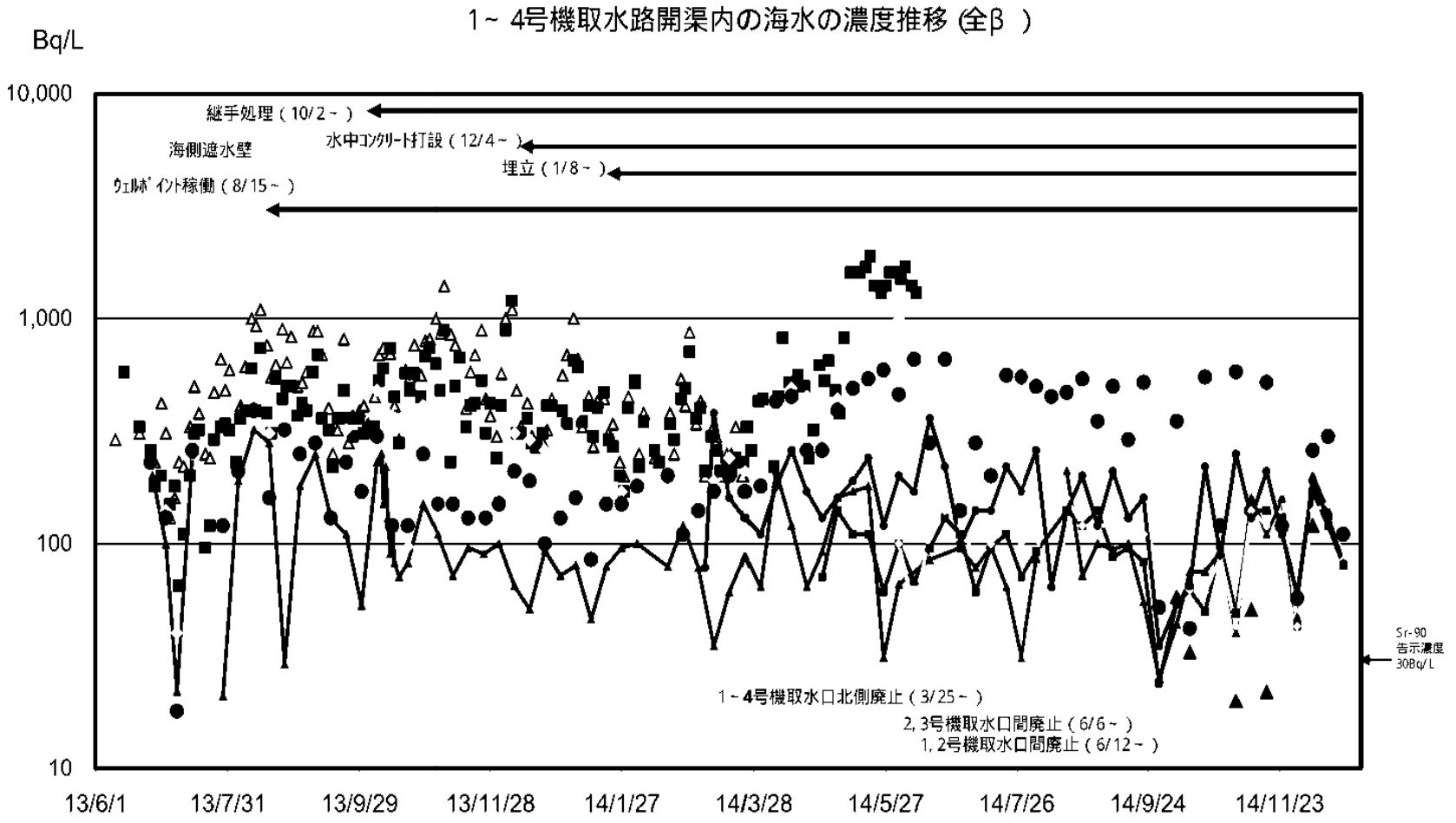
1～4号機取水路開渠内の海水の濃度推移(1/3)



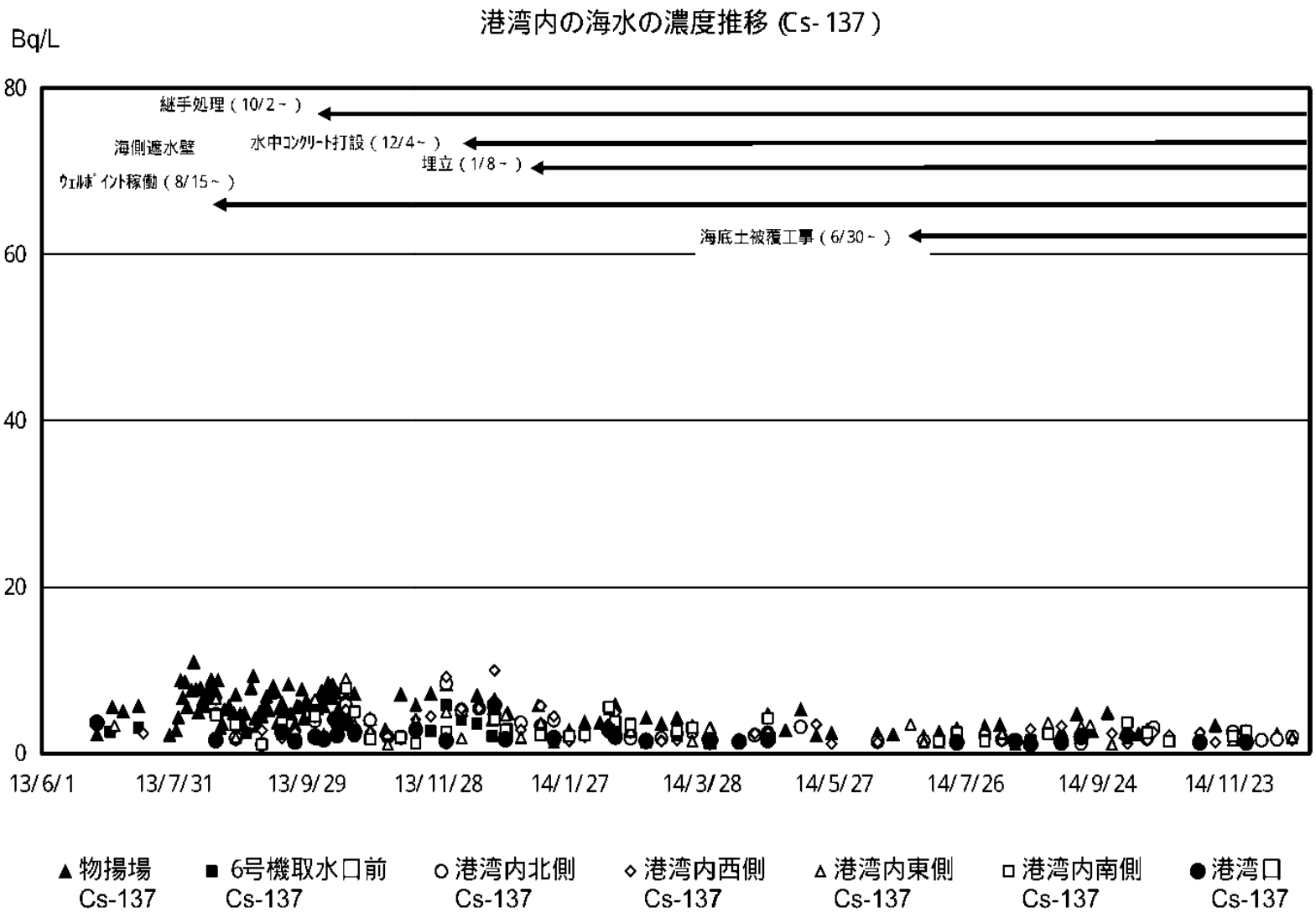
1～4号機取水路開渠内の海水の濃度推移(2/3)



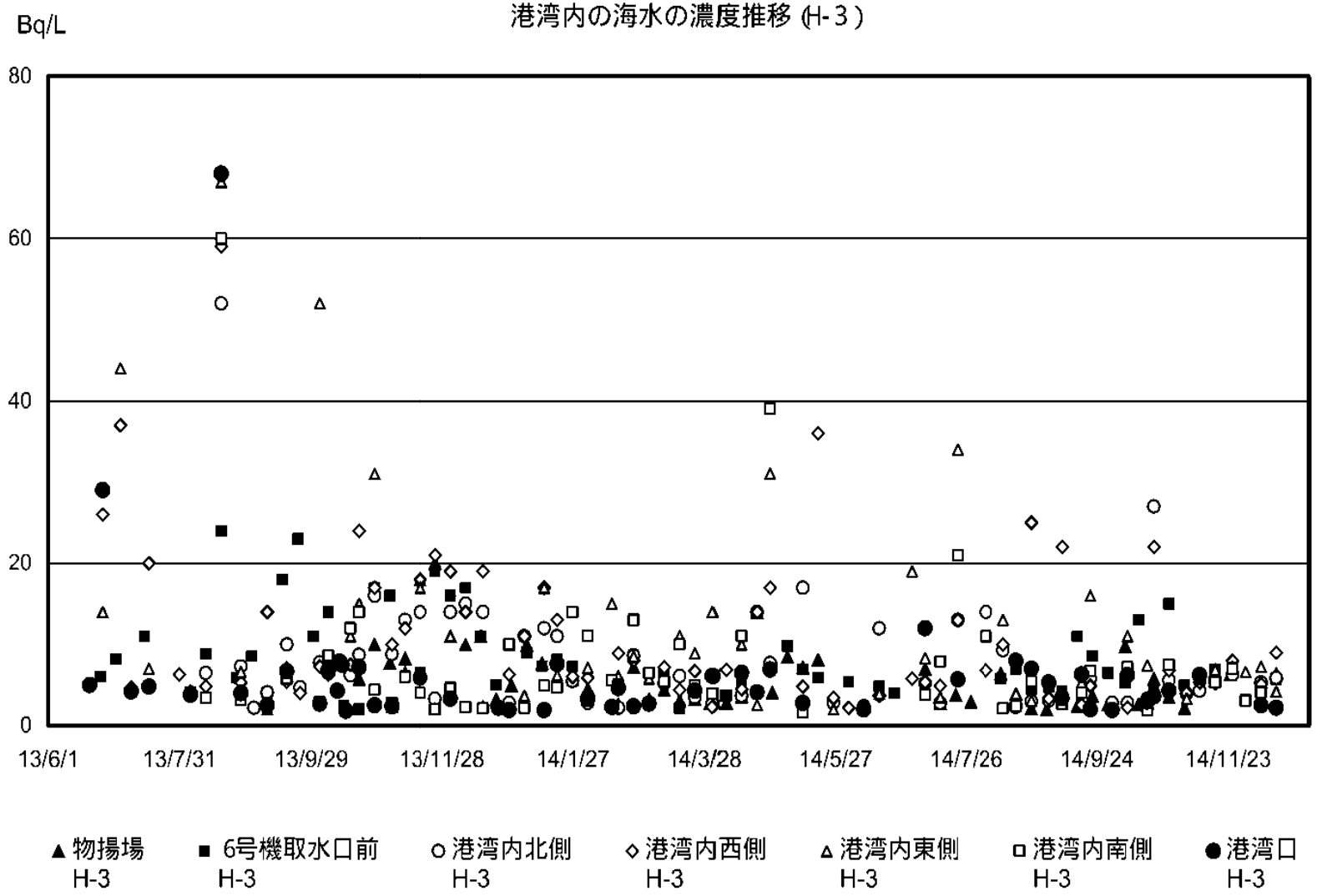
１～４号機取水路開渠内の海水の濃度推移(3/3)



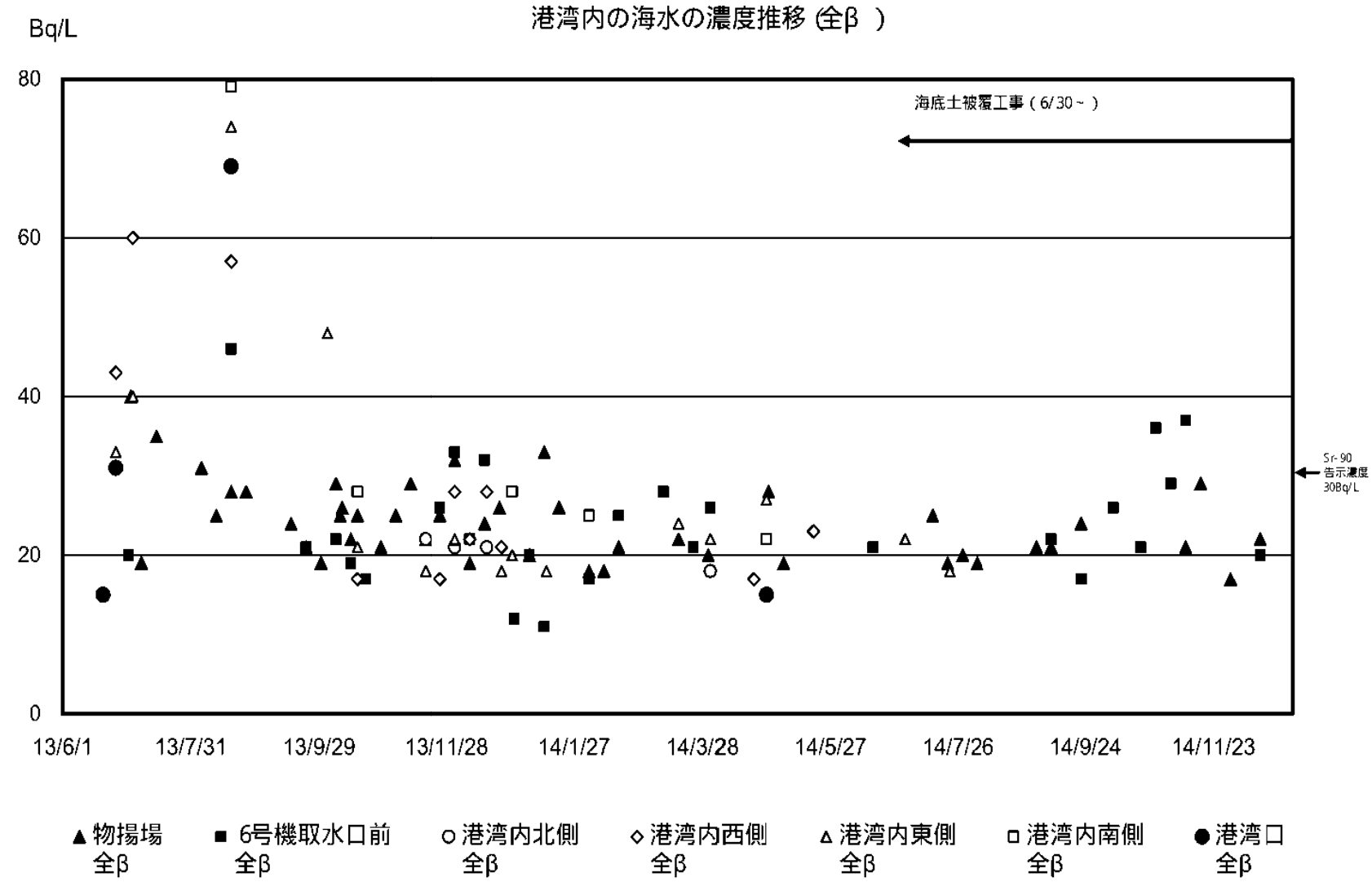
港湾内の海水の濃度推移(1/3)



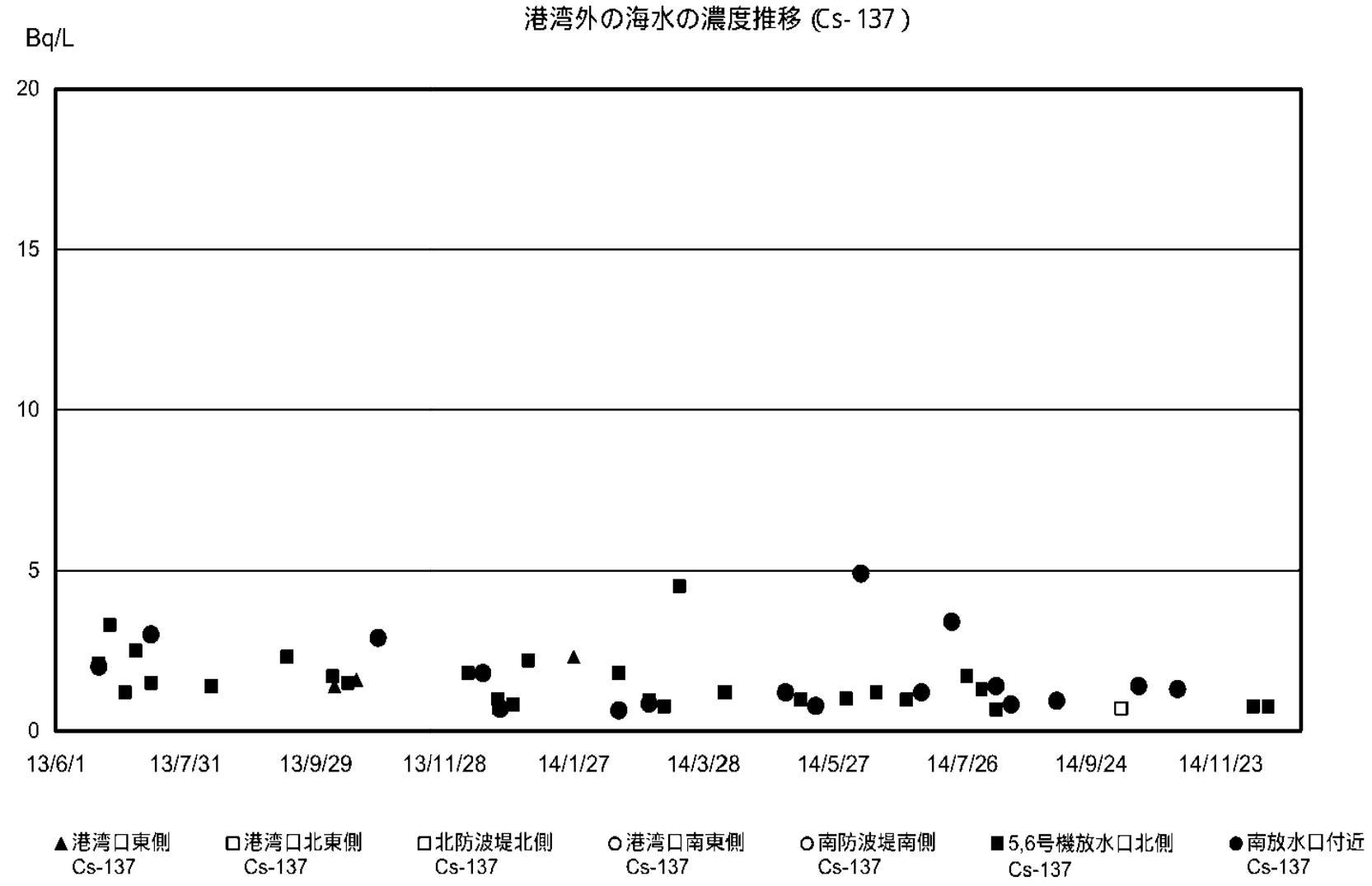
港湾内の海水の濃度推移(2/3)



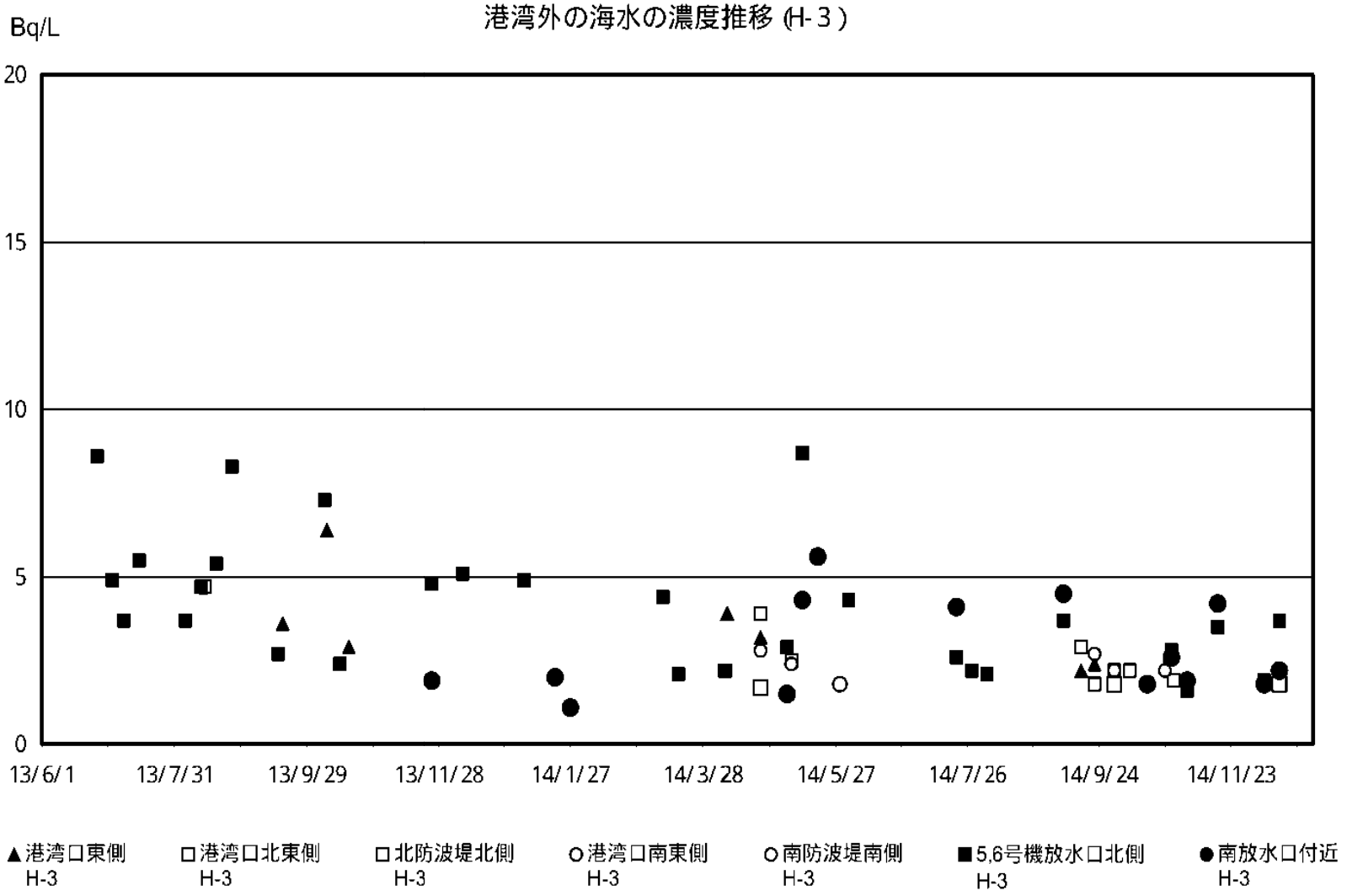
港湾内の海水の濃度推移(3/3)



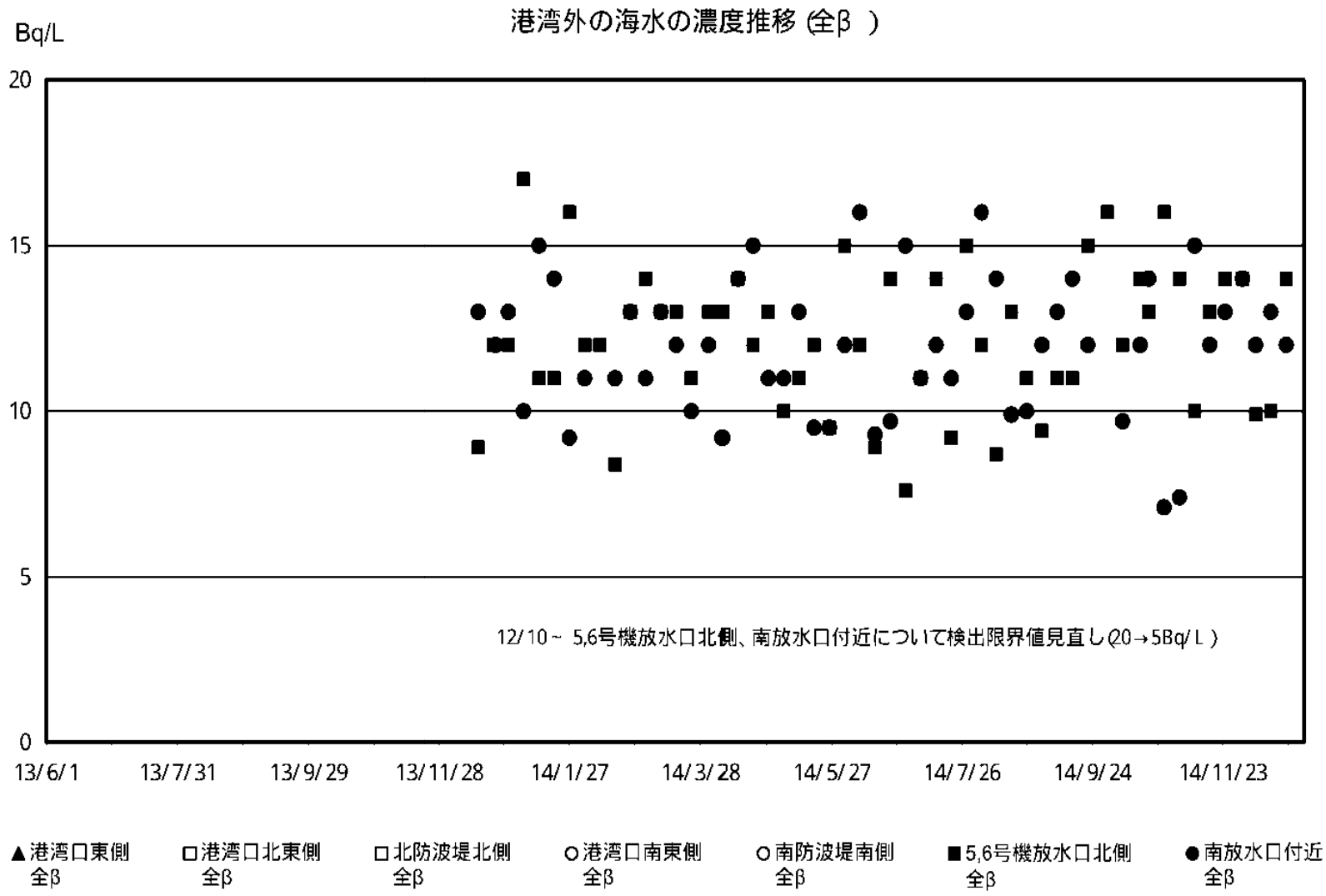
港湾外の海水の濃度推移(1/3)



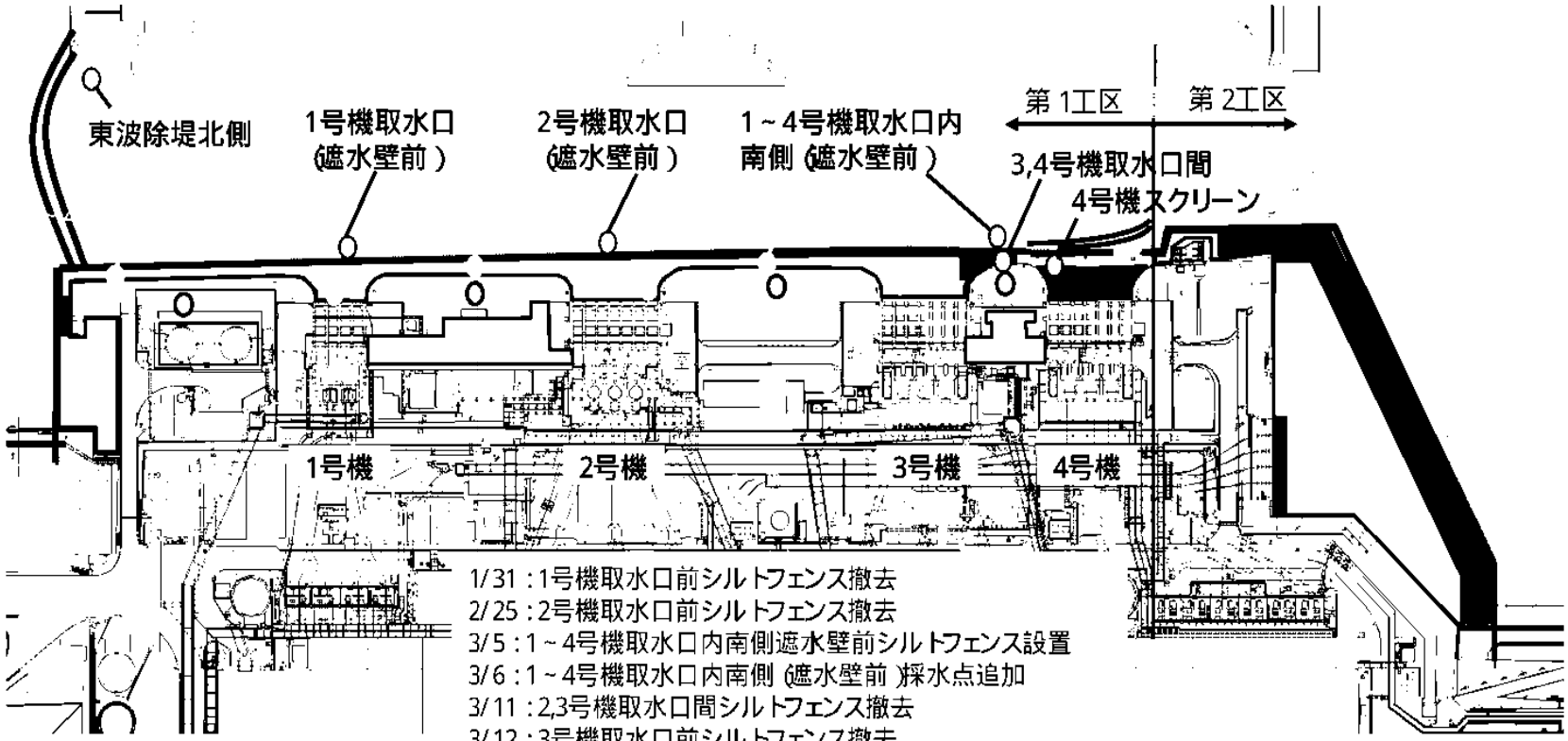
港湾外の海水の濃度推移(2/3)



港湾外の海水の濃度推移(3/3)



海側遮水壁設置工事の進捗と海水採取点の見直し



1/31 : 1号機取水口前シルトフェンス撤去
2/25 : 2号機取水口前シルトフェンス撤去
3/5 : 1~4号機取水口内南側遮水壁前シルトフェンス設置
3/6 : 1~4号機取水口内南側 (遮水壁前)採水点追加
3/11 : 2,3号機取水口間シルトフェンス撤去
3/12 : 3号機取水口前シルトフェンス撤去
3/25 : 1~4号機取水口北側採取点廃止
3/27 : 1号機取水口前シルトフェンス内側採取点廃止
4/19 : 2号機取水口前シルトフェンス内側採取点廃止
4/28 : 1号機取水口 (遮水壁前)採水点追加
5/18 : 3号機取水口前シルトフェンス内側採取点廃止
6/2 : 2号機取水口 (遮水壁前)採水点追加
6/6 : 2,3号機取水口間採取点廃止
6/12 : 1,2号機取水口間採取点廃止
6/23 : 4号機取水口前シルトフェンス撤去

	施工中	施工済
埋立 水中コン		
埋立 割栗石		
舗装		

(12月23日時点)

シルトフェンス
鋼管矢板打設完了
継手処理完了
(12月23日時点)

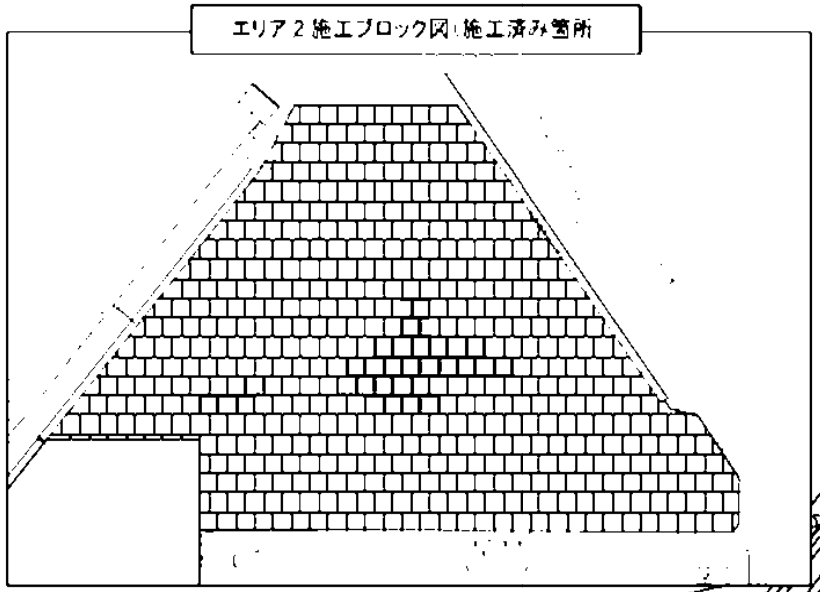
海水採取点
地下水採取点
(12月23日時点)

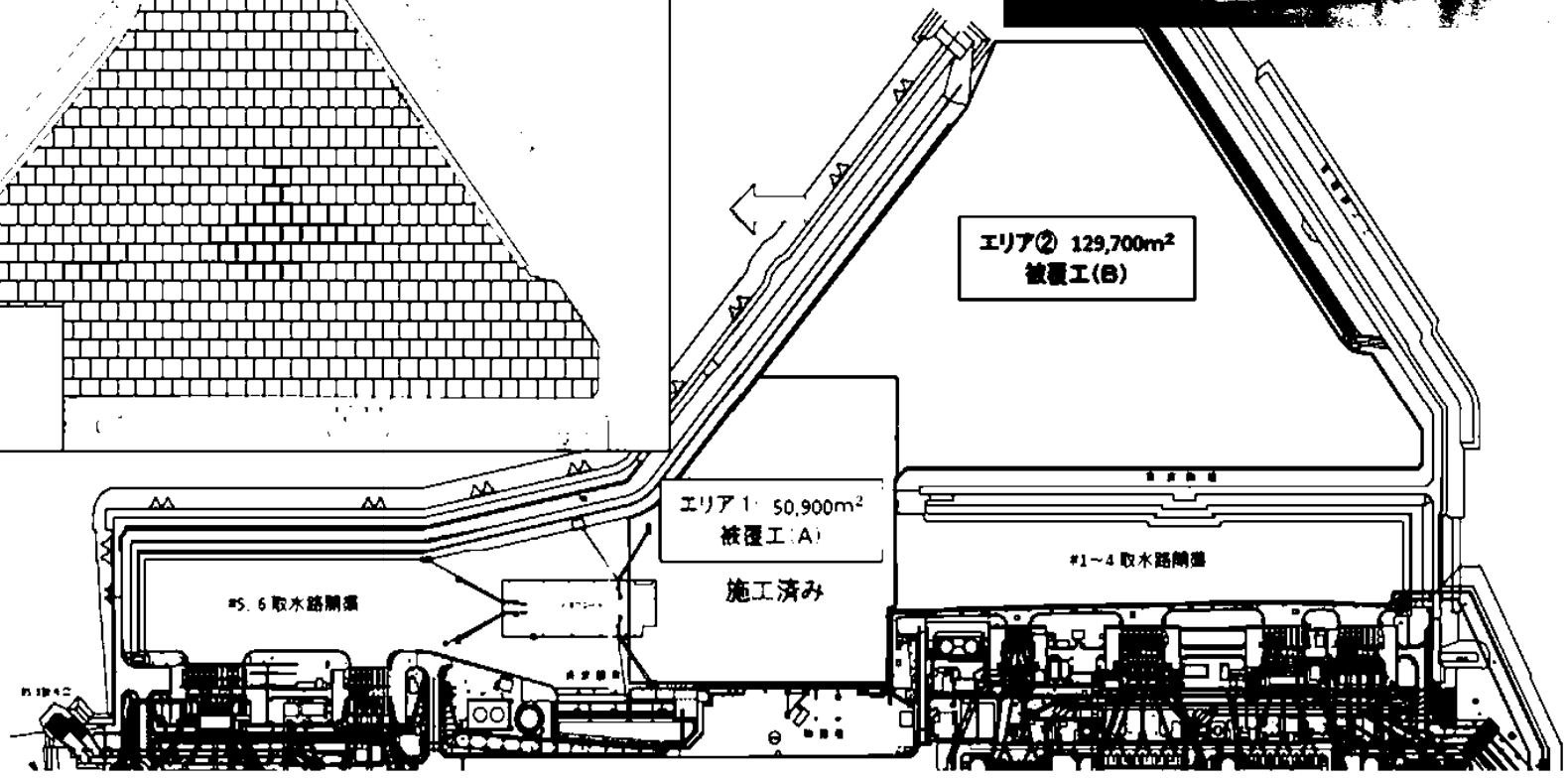
港湾内海底土被覆工事進捗状況

施工実績一覧表

施工エリア	施工完了面積 (m²)	施工面積 (m²)
エリア1　被覆工（A）	50,900　100.0%）	50,900
エリア2　被覆工（B）	7,936　6.1%）	129,700
合　計	58,836　32.6%）	180,600

12月23日現在：約32.6%





平成２６年１２月２５日
環境線量低減対策

原子炉建屋からの追加的放出量の評価結果（平成２６年１２月）

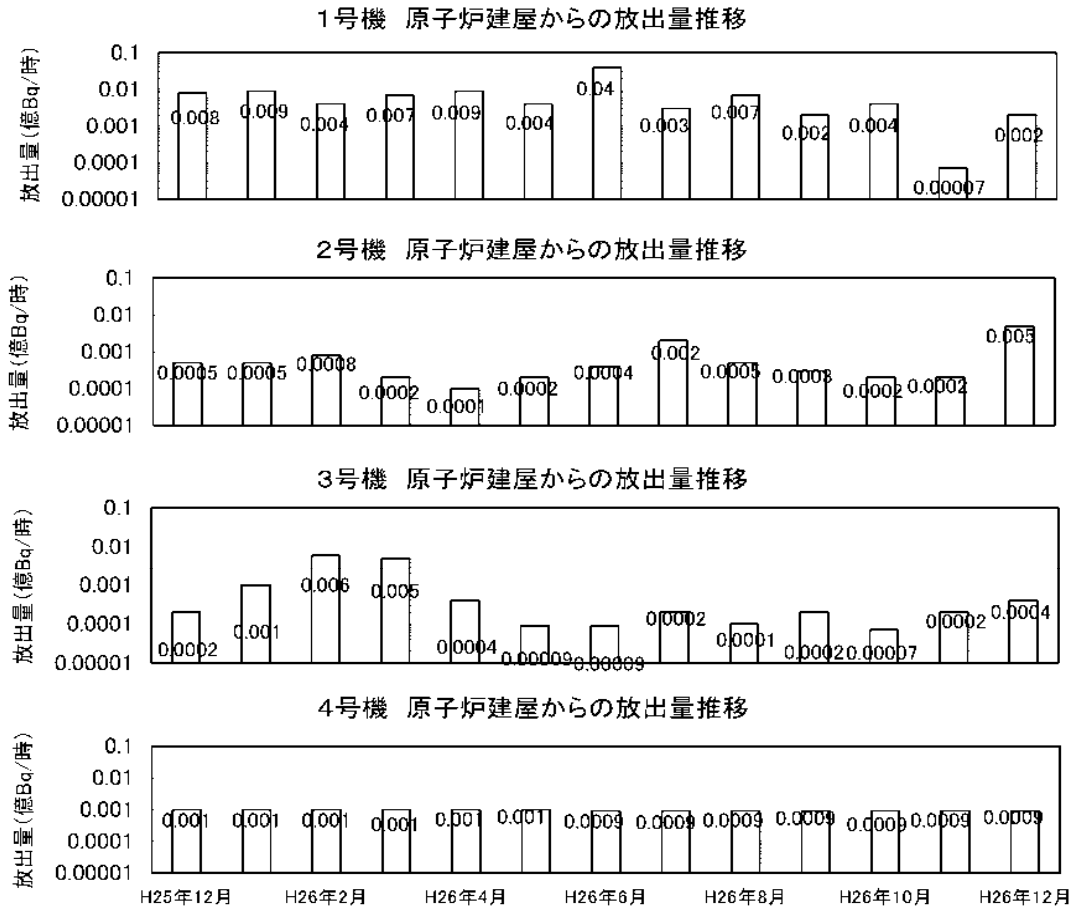
○ １～４号機原子炉建屋からの現時点の放出量（セシウム）を、原子炉建屋上部等の空気中放射性物質濃度（ダスト濃度）を基に評価。（各号機の採取地点は別紙参照）

○ １～４号機の大物搬入口は閉塞の状態で測定。

○ １～４号機建屋からの現時点の放出による敷地境界における被ばく線量は 0.03mSv/年以下と評価。

○ 被ばく線量は、原子炉建屋上部等の空気中放射性物質濃度を基に算出した１～４号機の放出量の合計値は0.009億ベクレル/時であり、原子炉の状態が安定していることから、0.１億ベクレル/時以下と評価している。

○ 号機毎の推移については下記のグラフの通り。



○ 本放出による敷地境界の空気中の濃度は、Cs-134及びCs-137ともに1.4× 10^{-9}（Bq/cm^3）と評価。

（※ 周辺監視区域外の空気中の濃度限度：Cs-134・・・2× 10^{-5}、Cs-137・・・3× 10^{-5}（Bq/cm^3）
※ １F敷地境界周辺のダスト濃度「実測値」：
Cs-134・・・ND（検出限界値：約1× 10^{-7}）、Cs-137・・・ND（検出限界値：約2× 10^{-7}）（Bq/cm^3））

（備考）

- 希ガスについては、格納容器ガス管理設備における分析結果から放出量を評価しているが、放出されるガンマ線実効エネルギーがセシウムに比べて小さく、被ばく経路も放射性雲の通過による外部被ばくのみとなるため、これによる被ばく線量は、セシウムによる線量に比べて極めて小さいと評価している。
- 1 号機の放出量の増加は、建屋カバー屋根パネル２枚復旧に伴う、ダスト採取点及び評価方法の変更によるものである。
  （建屋カバーが無いと仮定した状態（11/21～12/3）については、原子炉直上部でのダスト測定値と原子炉からの蒸気発生量及び機器ハッチ上部の測定値と評価期間の平均風速から求めた機器ハッチの漏えい量から放出量を求めた（11 月と同じ評価）。建屋カバーが有る状態（12/4～12/12）については、建屋カバー内でのダスト測定値と評価期間の平均風速から求めた建屋カバーの漏えい量から放出量を求めた（10 月と同じ評価）。評価期間全体の放出量は日数に応じて平均して求めた。）
- 2 号機の放出量の増加については、風速が大きかったことにより、建屋内のダスト濃度の上昇及びブローアウトパネル隙間の漏洩率の増加があったことによるものと評価している。
- 3 号機の放出量の増加については、機器ハッチにおける風速の増加による影響が大きかったものと評価している。

別紙

1～4号機原子炉建屋からの
追加的放出量評価結果　平成26年12月評価分
（詳細データ）

東京電力
TEPCO

1. 放出量評価について

放出量評価値（12月評価分）

単位：億Bq/時

	原子炉建屋上部		PCVガス管理sys	公表予定値
	原子炉直上部	機器ハッチ部		
1号機	0.0014以下		9.0E-7以下（希ガス0.19）	**0.002**
2号機	0.0049以下		9.2E-7以下（希ガス11以下）	**0.005**
3号機	0.000059	0.00025以下	1.3E-6（希ガス13以下）	**0.0004**
4号機	0.00083以下		-	**0.0009**
合計				約0.1以下(0.009)

放出量評価値（11月評価分）

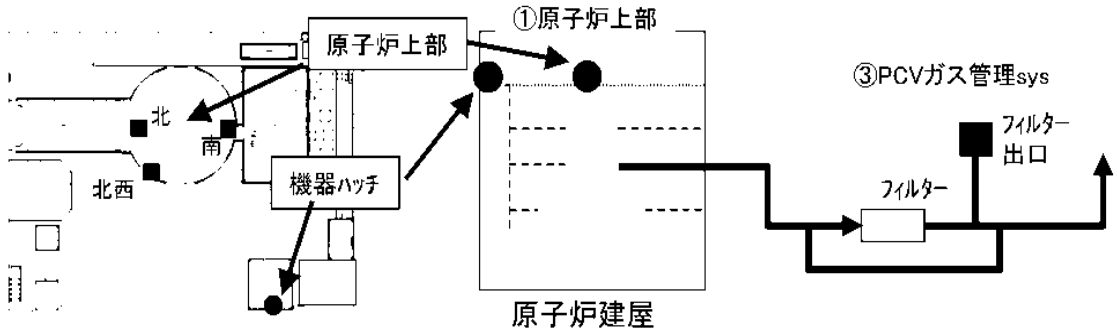
単位：億Bq/時

	原子炉建屋上部		PCVガス管理sys	公表予定値
	原子炉直上部	機器ハッチ部		
1号機	0.000041	0.000023以下	9.2E-7以下（希ガス0.20）	**0.00007**
2号機	0.00011以下		8.6E-7以下（希ガス11以下）	**0.0002**
3号機	0.000045	0.00011以下	9.3E-7以下（希ガス14）	**0.0002**
4号機	0.00082以下		-	**0.0009**
合計				約0.1以下(0.002)

2.1　1号機の放出量評価(1/3)

＜原子炉建屋　評価期間:11/21～12/3＞

1.ダスト等測定結果



①原子炉上部(単位Bq/cm^3)

採取日	核種	原子炉直上部			機器ハッチ
		北	北西	南	上部
前回	Cs-134	ND(1.4E-6)	ND(1.1E-6)	3.4E-6	ND(7.0E-7)
	Cs-137	ND(2.0E-6)	5.8E-6	1.3E-5	1.7E-6
12/3	Cs-134	-	-	**1.4E-6**	**ND(7.1E-7)**
	Cs-137	-	-	**3.2E-6**	**ND(1.1E-6)**

原子炉直上部のダスト採取点：前回、濃度が高かった地点

赤字の数値を放出量評価に使用
(複数の測定結果がある場合は、Cs134+Cs137合計値が一番高い箇所を採用)

2.機器ハッチ漏洩率評価

1,130m^3/h (11/21～12/3)

※原子炉直上部から放出流量は，H26.12.1現在の蒸気発生量(m^3/s)を適用

3.放出量評価

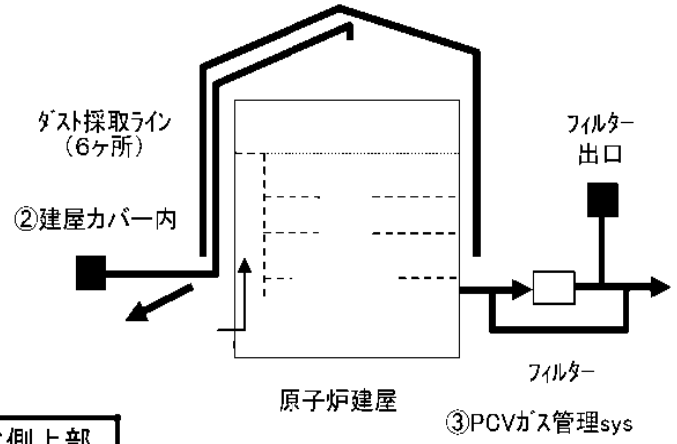
放出量(原子炉直上部)　=(1.4E-6+3.2E-6) × 0.07 ※ ×1E6 ×3600 ×1E-8　= 1.2E-5億Bq/時

放出量(機器ハッチ)　=(7.1E-7+1.1E-6) ×1130 × 1E6 ×1E-8　= 2.0E-5億Bq/時以下

2.1　1号機の放出量評価(2/3)

＜原子炉建屋　評価期間:12/4～12/12＞

1.ダスト等測定結果



②建屋カバー内(単位Bq/cm^3)

採取日	核種	北東 コーナー	北西 コーナー	南西 コーナー	南側 上部	機器 ハッチ上	北側上部 フィルター入口
10/2	Cs-134	7.2E-6	7.6E-6	6.8E-6	9.2E-6	6.8E-6	ND(8.2E-7)
	Cs-137	2.5E-5	2.8E-5	2.4E-5	3.0E-5	2.5E-5	ND(1.3E-6)
12/12	Cs-134	3.8E-6	4.2E-6	3.0E-6	6.8E-6	5.4E-6	ND(8.8E-7)
	Cs-137	1.6E-5	1.3E-5	1.0E-5	**2.5E-5**	2.1E-5	ND(1.3E-6)

赤字の数値を放出量評価に使用
（複数の測定結果がある場合は、Cs134+Cs137合計値が一番高い箇所を採用）

2.建屋カバー漏洩率評価

10,604m^3/h （12/4～12/12）

3.放出量評価

放出量(建屋カバー)　＝(6.8E-6+2.5E-5)×10604 ×1E6 ×1E-8　＝ 3.4E-3億Bq/時

2.1　1号機の放出量評価(3/3)

＜PCVガス管理システム　評価期間:11/21～12/12＞

ダスト等測定結果

③PCVガス管理sys

採取日	核種	PCVｶﾞｽ管理sys 出口 (Bq/cm^3)	流量 (m^3/h)
前回	Cs-134	ND(1.7E-6)	21
	Cs-137	ND(2.9E-6)	
12/3	Cs-134	ND(1.6E-6)	21
	Cs-137	ND(2.7E-6)	

採取日	核種	PCVｶﾞｽ管理sys 出口 (Bq/cm^3)	流量 (m^3/h)
前回	Kr-85	9.8E-1	21
12/3	Kr-85	**9.1E-1**	**21**

赤字の数値を放出量評価に使用

＜原子炉建屋、PCVガス管理システム合計　評価期間:11/21～12/12＞

放出量評価

原子炉建屋(建屋カバーの有無による評価結果を評価期間の日数で平均)

	＝((1.2E-5+2.0E-5)×13＋3.4E-3×9) / (13+9)	＝ 1.4E-3億Bq/時以下
PCVガス出口(Cs)	＝ (1.6E-6+2.7E-6) ×21E6 ×1E-8	＝ 9.0E-7億Bq/時以下
PCVガス出口(Kr)	＝ 9.1E-1 ×21E6 ×1E-8	＝ 1.9E-1億Bq/時
PCVガス出口(Kr被ばく線量)	＝ 1.9E+7 ×24 ×365 ×2.5E-19 ×0.0022 /0.5 ×1E3	＝ 1.8E-7mSv/年

（参考）1号機の放出量評価　11月と12月評価の相違点

○1号機については、11月と12月の測定でダスト測定箇所、放出流量評価方法を変更している。

11月評価：　屋根パネル2枚を取り外した状態で原子炉直上部でダスト採取を行い、建屋カバーが無い状態として蒸気発生量により原子炉直上部からの放出量を算出。機器ハッチは機器ハッチ上部のダスト測定値と評価期間の平均風速による建屋（機器ハッチ）からの漏洩量により放出量を算出。

12月評価：　評価期間のうち、建屋カバーが無い状態（11/21～12/3）については、11月と同じ評価方法により放出量を算出。建屋カバーが有る状態（12/4～12/12）については、10月と同じ評価方法により建屋カバー内の連続ダストモニタの採取場所のダスト測定値と評価期間の平均風速による建屋カバーからの漏洩量により放出量を算出。

10月,11月,12月の評価において使用したデータ

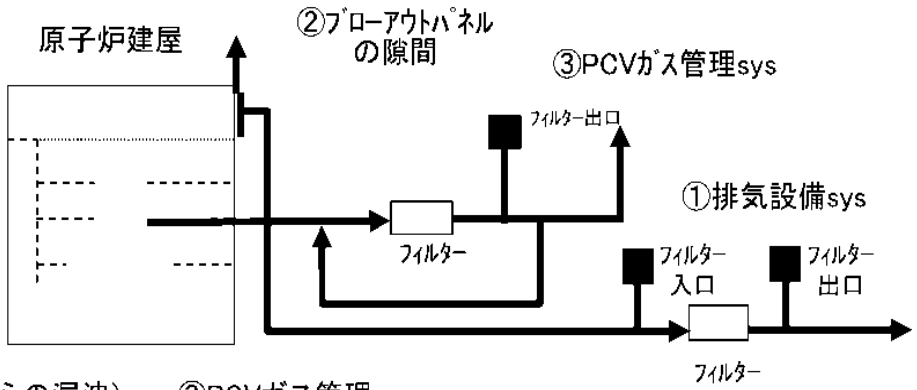
平成26年	10月評価	11月評価		12月評価		
評価期間	10/1～10/31	11/1～11/20		11/21～12/3		12/4～12/12
ダスト濃度[Bq/cm3](Cs-134+Cs-137)	建屋カバー内連続ダストモニタ採取口	原子炉直上部	機器ハッチ	原子炉直上部	機器ハッチ	建屋カバー内連続ダストモニタ採取口
	3.9E-5	1.6E-5	2.4E-6	4.6E-6	1.8E-6	3.2E-5
放出流量[m3/h]	建屋カバーからの漏洩量	蒸気発生量	機器ハッチからの漏洩量	蒸気発生量	機器ハッチからの漏洩量	建屋カバーからの漏洩量
	9,527	252	969	252	1,130	10,604

2.2 2号機の放出量評価

1.ダスト等測定結果

①排気設備sys出口ダスト測定結果

採取日	核種	(Bq/cm^3)	流量m^3/h)
前回	Cs-134	ND(2.1E-7)	10,000
	Cs-137	ND(3.2E-7)	
12/15	Cs-134	ND(3.1E-7)	10,000
	Cs-137	ND(5.4E-7)	



②排気設備sys入口ダスト測定結果(ﾌﾞﾛｰｱｳﾄﾊﾟﾈﾙの隙間からの漏洩)

採取日	核種	(Bq/cm^3)	採取日	核種	(Bq/cm^3)
前回	Cs-134	2.1E-7	12/15	Cs-134	7.3E-6
	Cs-137	6.1E-7		Cs-137	2.1E-5

③PCVガス管理sys

採取日	核種	(Bq/cm^3)	流量(m^3/h)
前回	Cs-134	ND(1.8E-6)	19
	Cs-137	ND(2.7E-6)	
12/8	Cs-134	ND(1.8E-6)	20
	Cs-137	ND(2.8E-6)	

採取日	核種	(Bq/cm^3)	流量(m^3/h)
前回	Kr-85	ND(5.8E1)	19
12/8	Kr-85	ND(5.7E1)	20

2.ﾌﾞﾛｰｱｳﾄﾊﾟﾈﾙの隙間の漏洩率評価

測定日	R/B1FL開口部の流入量(m^3/h)	漏洩率評価(m^3/h) (排気設備の流量10,000m^3/h)
前回	16,434	6,434
12/15	26,817	16,817

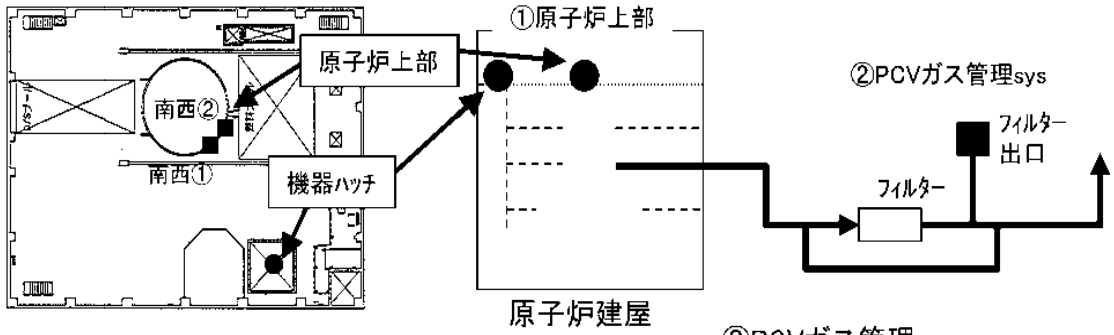
3.放出量評価

赤字の数値を放出量評価に使用

排気設備出口	=(3.1E-7+5.4E-7) × 10000 × 1E6 ×1E-8	= 8.5E-5億Bq/時以下
BOP隙間等	=(7.3E-6+2.1E-5) × 16817 ×1E6 ×1E-8	= 4.8E-3億Bq/時
PCVガス出口(Cs)	=(1.8E-6+2.8E-6) × 20E6 × 1E-8	= 9.2E-7億Bq/時以下
PCVガス出口(Kr)	= 5.7E1 ×20E6 ×1E-8	= 1.1E+1億Bq/時以下
PCVガス出口(Kr被ばく線量)	= 1.1E9 ×24 ×365 ×2.4E-19 ×0.0022 /0.5 ×1E3	= 1.0E-5mSv/年以下

2.3 3号機の放出量評価

1.ダスト等測定結果



①原子炉上部(単位Bq/cm³)

採取日	核種	原子炉直上部		機器ハッチ	
		南西①	南西②	上部	流量(m/s)
前回	Cs-134	ND(1.2E-6)	2.9E-6	ND(1.3E-6)	0.03
	Cs-137	ND(2.0E-6)	1.1E-5	ND(1.9E-6)	
12/10	Cs-134	3.6E-6	**4.3E-6**	ND(1.9E-6)	0.06
	Cs-137	1.3E-5	**1.4E-5**	**1.8E-6**	

赤字の数値を放出量評価に使用
(複数の測定結果がある場合は、Cs134+Cs137合計値が一番高い箇所を採用)

②PCVガス管理sys

採取日	核種	PCVガス管理sys出口 (Bq/cm³)	流量 (m³/h)
前回	Cs-134	ND(1.9E-6)	19
	Cs-137	ND(3.0E-6)	
12/10	Cs-134	**1.9E-6**	**21**
	Cs-137	**4.4E-6**	

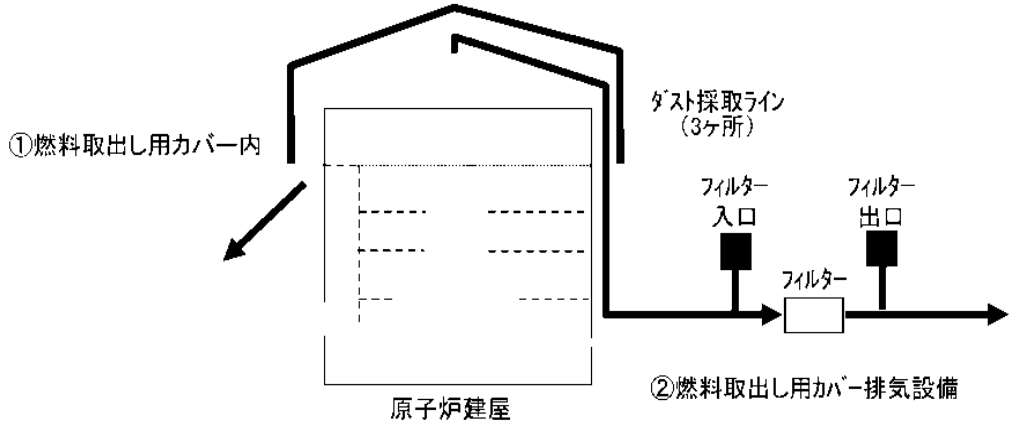
採取日	核種	PCVガス管理sys出口 (Bq/cm³)	流量 (m³/h)
前回	Kr-85	7.6E1	19
12/10	Kr-85	**ND(6.3E1)**	**21**

※原子炉直上部から放出流量は，H26.12.1現在の蒸気発生量(m³/s)を適用

2.放出量評価

放出量(原子炉直上部)	=(4.3E-6+1.4E-5) × 0.09※ ×1E6 ×3600 ×1E-8	= 5.9E-5億Bq/時
放出量(機器ハッチ)	=(1.9E-6+1.8E-6) ×(0.06×5.6 ×5.6)E6 × 3600 ×1E-8	= 2.5E-4億Bq/時以下
PCVガス出口(Cs)	=(1.9E-6+4.4E-6) ×21E6 ×1E-8	= 1.3E-6億Bq/時
PCVガス出口(Kr)	= 6.3E1 ×21E6 ×1E-8	= 1.3E1億Bq/時以下
PCVガス出口(Kr被ばく線量)	= 1.3E9 ×24 ×365 ×3.0E-19 ×0.0022 /0.5 ×1E3	= 1.5E-5mSv/年以下

2.4 4号機の放出量評価



1.ダスト等測定結果

①燃料取出し用カバー内
（燃料取出し用カバー排気設備入口）（単位Bq/cm³）

採取日	核種	SFP近傍	ﾁｪﾝｼﾞﾝｸﾞﾌﾟﾚｲｽ近傍	ｶﾊﾞｰ上部
前回	Cs-134	ND(5.5E-7)	ND(5.8E-7)	ND(5.5E-7)
	Cs-137	ND(9.1E-7)	ND(8.9E-7)	ND(8.8E-7)
12/1	Cs-134	**ND(5.9E-7)**	ND(5.7E-7)	ND(5.6E-7)
	Cs-137	**ND(9.4E-7)**	ND(8.7E-7)	ND(8.8E-7)

②燃料取出し用カバー排気設備出口

採取日	核種	燃料取出し用ｶﾊﾞｰ排気設備出口 (Bq/cm³)	流量 (m³/h)
前回	Cs-134	ND(5.7E-7)	50,000
	Cs-137	ND(9.0E-7)	
12/1	Cs-134	**ND(5.6E-7)**	50,000
	Cs-137	**ND(9.4E-7)**	

赤字の数値を放出量評価に使用
（複数の測定結果がある場合は、Cs134+Cs137合計値が一番高い箇所を採用）

2.建屋カバー漏洩率評価

5,233m³/h （11/8～12/1）

3.放出量評価

燃料取出し用カバーからの漏洩量　＝ (5.9E-7+9.4E-7) ×5233 ×1E6×1E-8　＝ 8.0E-5億Bq/時以下

燃料取出し用カバー排気設備　＝ (5.6E-7+9.4E-7) ×50000 ×1E6 ×1E-8　＝ 7.5E-4億Bq/時以下

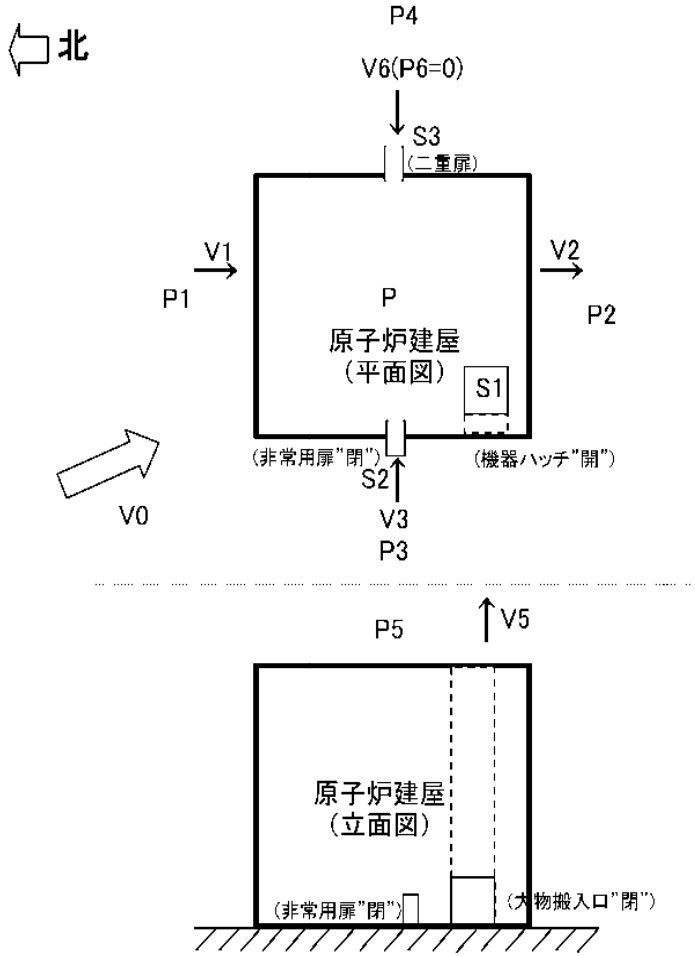
参考1　1号機機器ハッチの漏洩率評価

評価方法

空気漏洩量は外部風速、建屋内外圧差、隙間面積などから計算で求める。

計算例

12月3日　北北西　0.9m/s



V0：外気風速(m/s)
V1：建屋流出入風速(m/s)
V2：建屋流出入風速(m/s)
V3：建屋流出入風速(m/s)
V4：建屋流出入風速(m/s)
V5：建屋流出入風速(m/s)
V6：建屋流出入風速(m/s)
P1：上流側圧力(北風)(Pa)
P2：下流側圧力(北風)(Pa)
P3：上流側圧力(西風)(Pa)
P4：下流側圧力(西風)(Pa)
P5：上面部圧力(Pa)
P6：T/B内圧力(0Pa)
P：建屋内圧力(Pa)
S1：機器ハッチ隙間面積(m^2)
S2：R/B非常用扉開口面積(m^2)
S3：R/B二重扉開口面積(m^2)
ρ：空気密度(kg/m^3)
C1：風圧係数(北風上側)
C2：風圧係数(北風下側)
C3：風圧係数(西風上側)
C4：風圧係数(西風下側)
C5：風圧係数(上面部)
ζ：形状抵抗係数

参考1　1号機機器ハッチの漏洩率評価

風速をVとすると、上流側、下流側の圧力は次のとおりとなる。

上流側(北風):P1=C1×ρ×V0^2/(2g)　・・・(1)
下流側(北風):P2=C2×ρ×V0^2/(2g)　・・・(2)
上流側(西風):P3=C3×ρ×V0^2/(2g)　・・・(3)
下流側(西風):P4=C4×ρ×V0^2/(2g)　・・・(4)
上面部　　:P5=C5×ρ×V0^2/(2g)　・・・(5)

内圧をP、隙間部の抵抗係数をζとすると

P1-P=ζ×ρ×V1^2/(2g)　・・・(6)
P-P2=ζ×ρ×V2^2/(2g)　・・・(7)
P3-P=ζ×ρ×V3^2/(2g)　・・・(8)
P-P4=ζ×ρ×V4^2/(2g)　・・・(9)
P-P5=ζ×ρ×V5^2/(2g)　・・・(10)
P6-P=ζ×ρ×V6^2/(2g)　・・・(11)

空気流出入量のマスバランス式は

(V1×0+V3×S2+V6×S3)×3600=(V2×0+V4×0+V5×S1)×3600

左辺と右辺の差を「Y」とすると

Y=(V1×0+V3×S2+V6×S3)×3600-(V2×0+V4×0+V5×S1)×3600

V1, V2, V3, V4, V5, V6は(6), (7), (8), (9), (10), (11)式により、Pの関数なので、「Y」がゼロになるようにPの値を調整する

V0 (m/s)	C1	C2	C3	C4	C5	ζ	ρ (kg/m^3)
0.90	0.80	−0.50	0.10	−0.50	−0.40	2.00	1.20

S1 (m^2)	S2 (m^2)	S3 (m^2)
3.48	0.00	0.29

P1 (Pa)	P2 (Pa)	P3 (Pa)	P4 (Pa)	P5 (Pa)	P6 (Pa)	P (Pa)
0.039673	−0.0248	0.004959	−0.0248	−0.01984	0	−0.0197

V1 (m/s)	V2 (m/s)	V3 (m/s)	V4 (m/s)	V5 (m/s)	V6 (m/s)	Y (m^3/h)
0.70	0.20	0.45	0.20	0.03	0.40	0.00
IN	OUT	IN	OUT	OUT	IN	OK

※IN　:流入
OUT:流出

機器ハッチ漏えい量　　421　m^3/h

参考1　1号機機器ハッチの漏洩率評価

週ごとの漏洩量評価（一例）

	11月28日			11月29日			11月30日			12月1日			12月2日			12月3日			12月4日		
	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)
西風	2.1	4.8	971	2.0	1.8	949	1.1	1.0	492	1.9	1.8	890	5.4	15.0	2,517	1.8	2.7	855	0.0	0.0	
西北西風	1.4	2.7	664	2.3	1.8	1,086	1.6	4.8	772	3.2	4.2	1,506	4.3	5.0	1,990	2.6	3.3	1,227	0.0	0.0	
北西風	1.1	1.5	510	1.4	3.0	661	1.3	5.0	613	1.7	5.5	810	0.9	0.3	398	1.5	2.2	699	0.0	0.0	
北北西風	0.9	0.8	440	2.1	4.7	1,005	1.5	10.2	725	1.7	2.8	774	2.7	0.3	1,241	0.9	0.3	421	0.0	0.0	
北風	0.0	0.0	0	3.1	2.5	1,430	3.2	1.8	1,486	1.4	0.7	667	0.0	0.0	0	0.8	0.2	375	0.0	0.0	
北北東風	0.0	0.0	0	2.2	0.3	1,030	1.4	0.2	656	1.1	1.0	515	0.0	0.0	0	0.0	0.0	0	0.0	0.0	
北東風	0.0	0.0	0	0.6	0.2	281	0.0	0.0	0	0.9	0.2	421	0.0	0.0	0	0.8	0.2	375	0.0	0.0	
東北東風	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	1.1	0.2	515	0.0	0.0	0	0.0	0.0	0	0.0	0.0	
東風	1.9	1.2	870	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.6	0.2	281	0.0	0.0	
東南東風	2.1	0.7	960	2.0	0.5	937	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0	
南東風	2.6	0.3	1,218	2.3	0.2	1,077	0.0	0.0	0	0.9	0.2	421	0.0	0.0	0	0.0	0.0	0	0.0	0.0	
南南東風	3.3	5.0	1,564	3.3	2.5	1,542	0.0	0.0	0	2.6	1.5	1,218	0.0	0.0	0	1.8	0.5	859	0.0	0.0	
南風	2.1	2.8	986	3.2	2.8	1,504	0.0	0.0	0	2.1	1.8	992	0.0	0.0	0	2.1	1.5	999	0.0	0.0	
南南西風	1.6	1.3	761	1.2	1.5	541	0.0	0.0	0	1.5	0.7	679	1.0	0.2	468	3.1	3.8	1,450	0.0	0.0	
南西風	1.4	1.3	644	1.4	0.7	644	0.0	0.0	0	1.2	1.0	554	1.6	0.7	749	2.6	4.8	1,206	0.0	0.0	
西南西風	1.3	0.5	593	1.0	0.7	445	1.2	1.0	546	1.5	1.2	723	2.6	1.8	1,196	2.3	3.5	1,082	0.0	0.0	
漏洩日量 (m3)			22,440			24,672			18,038			21,238			51,030			25,296			0

16方位毎の平均風速から漏洩率を前頁のように評価する。

漏洩量合計

評価期間	11/21 ～ 11/27	11/28 ～ 12/3					漏洩量合計(m3)	評価対象期間(h)	漏洩率(m3/h)
週間漏洩量 (m3)	189,757	162,713					352,470	312	1,130

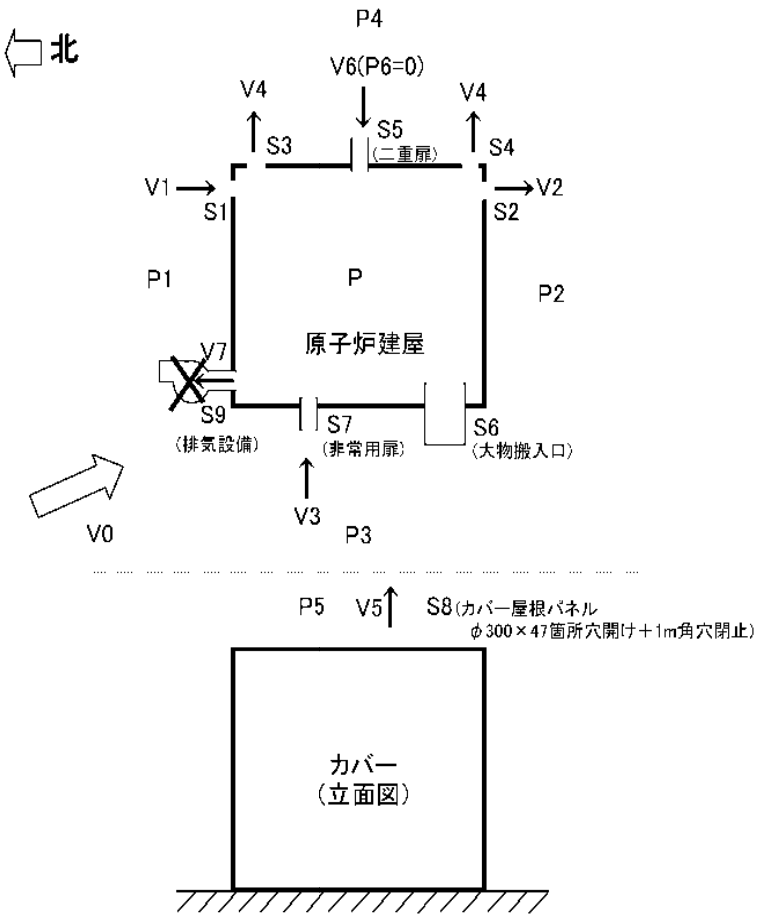
参考1　1号機建屋カバーの漏洩率評価

評価方法

空気漏洩量は外部風速、建屋内外圧差、隙間面積などから計算で求める。

計算例

12月12日　北北西　2.2m/s



V0:外気風速(m/s)
V1:カバー流出入風速(m/s)
V2:カバー流出入風速(m/s)
V3:カバー流出入風速(m/s)
V4:カバー流出入風速(m/s)
V5:カバー流出入風速(m/s)
V6:カバー流出入風速(m/s)
V7:排気風速(m/s)
P1:上流側圧力(北風)(Pa)
P2:下流側圧力(北風)(Pa)
P3:上流側圧力(西風)(Pa)
P4:下流側圧力(西風)(Pa)
P5:上部圧力(Pa)
P6:R/B内圧力(0Pa)
P:カバー内圧力(Pa)
S1:カバー隙間面積(m^2)
S2:カバー隙間面積(m^2)
S3:カバー隙間面積(m^2)
S4:カバー隙間面積(m^2)
S5:R/B二重扉開口面積(m^2)
S6:R/B大物搬入口開口面積(m^2)
S7:R/B非常用扉開口面積(m^2)
S8:カバー屋根開口面積(m^2)
S9:排気ダクト吸込面積(m^2)
ρ:空気密度(kg/m^3)
C1:風圧係数(北風上側)
C2:風圧係数(北風下側)
C3:風圧係数(西風上側)
C4:風圧係数(西風下側)
C5:風圧係数(上部)
ζ:形状抵抗係数

参考1　1号機建屋カバーの漏洩率評価

風速をVとすると、上流側、下流側の圧力は次のとおりとなる。

上流側（北風）：P1=C1×ρ×V0^2/(2g)　・・・(1)
下流側（北風）：P2=C2×ρ×V0^2/(2g)　・・・(2)
上流側（西風）：P3=C3×ρ×V0^2/(2g)　・・・(3)
下流側（西風）：P4=C4×ρ×V0^2/(2g)　・・・(4)
上部　　：P5=C5×ρ×V0^2/(2g)　・・・(5)

内圧をP、隙間部の抵抗係数をζとすると

P1−P=ζ×ρ×V1^2/(2g)　・・・(6)
P−P2=ζ×ρ×V2^2/(2g)　・・・(7)
P3−P=ζ×ρ×V3^2/(2g)　・・・(8)
P−P4=ζ×ρ×V4^2/(2g)　・・・(9)
P−P5=ζ×ρ×V5^2/(2g)　・・・(10)
P6−P=ζ×ρ×V6^2/(2g)　・・・(11)

空気流出入量のマスバランス式は

(V1×S1+V3×(S6+S7)+V6×S5)×3600=(V2×S2+V4×(S3+S4)+V5×S8)×3600

左辺と右辺の差を「Y」とすると

Y＝(V1×S1+V3×(S6+S7)+V6×S5)×3600−(V2×S2+V4×(S3+S4)+V5×S8)×3600

V1，V2，V3，V4，V5，V6は(6)，(7)，(8)，(9)，(10)，(11)式により、Pの関数なので、「Y」がゼロになるようにPの値を調整する

V0 (m/s)	C1	C2	C3	C4	C5	ζ	ρ (kg/m^3)	
2.22	0.80	−0.50	0.10	−0.50	−0.40	1.00	1.20	
S1 (m^2)	S2 (m^2)	S3 (m^2)	S4 (m^2)	S5 (m^2)	S6 (m^2)	S7 (m^2)	S8 (m^2)	S9 (m^2)
1.20	1.20	1.20	1.10	0.29	0.00	0.00	3.32	2.88

P1 (Pa)	P2 (Pa)	P3 (Pa)	P4 (Pa)	P5 (Pa)	P6 (Pa)	P (Pa)
0.242278	−0.15142	0.030285	−0.15142	−0.12114	0	−0.11813

V1 (m/s)	V2 (m/s)	V3 (m/s)	V4 (m/s)	V5 (m/s)	V6 (m/s)	V7 (m/s)	Y (m^3/h)
2.426	0.737	1.557	0.737	0.222	1.389	0.000	0.00
IN	OUT	IN	OUT	OUT	IN	OUT(排気)	OK

※IN　：流入
OUT：流出

給気風量	11,941	m^3/h
排気ファン風量	0	m^3/h
漏洩量	11,941	m^3/h

参考1　1号機建屋カバーの漏洩率評価

週ごとの漏洩量評価（一例）

	12月11日			12月12日			12月13日			12月14日			12月15日			12月16日			12月17日		
	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)
西風	2.8	1.8	1,890	1.3	0.2	863	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
西北西風	3.2	3.2	12,763	4.0	1.8	15,793	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北西風	2.4	2.3	11,300	2.0	2.7	9,482	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北北西風	3.0	2.0	15,973	2.2	9.0	11,941	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北風	2.9	0.2	15,272	2.8	4.5	14,491	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北北東風	0.0	0.0	0	2.7	2.2	23,651	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北東風	0.0	0.0	0	2.3	1.2	22,283	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
東北東風	0.0	0.0	0	2.4	0.8	23,585	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
東風	0.0	0.0	0	1.5	0.5	12,958	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
東南東風	0.0	0.0	0	2.0	0.7	19,004	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南東風	0.0	0.0	0	2.4	0.3	22,351	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南南東風	3.7	0.8	31,699	0.0	0.0	0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南風	3.4	3.3	17,668	0.0	0.0	0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南南西風	4.9	6.8	26,308	0.0	0.0	0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南西風	4.2	2.8	19,294	0.0	0.0	0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
西南西風	1.6	0.7	6,460	0.0	0.0	0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

漏洩日量 (m3)	428,794	350,558	0	0	0	0	0

16方位毎の平均風速から漏洩率を前頁のように評価する。

漏洩量合計

評価期間	12/4 ～ 12/10	12/11 ～ 12/12					漏洩量合計(m3)	評価対象期間(h)	漏洩率(m3/h)
週間漏洩量 (m3)	1,511.160	779.352					2,290.512	216	10.604

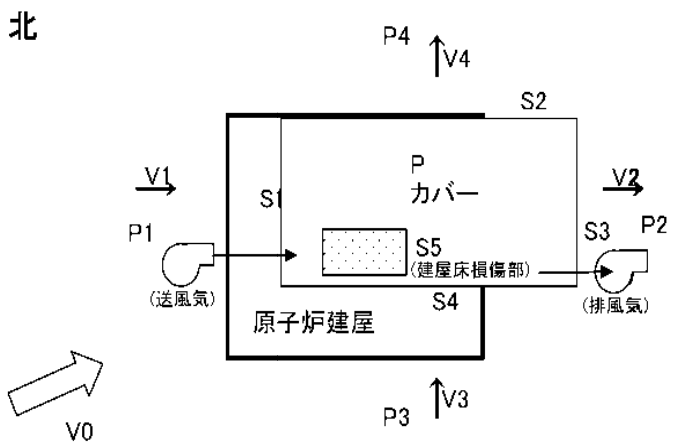
参考2　4号機燃料取出し用カバーの漏洩率評価

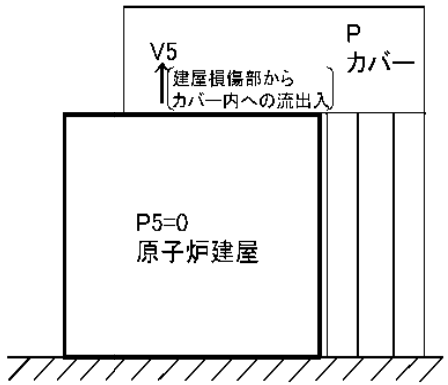
評価方法

空気漏洩量は外部風速、建屋内外圧差、隙間面積などから計算で求める。

計算例

12月1日　北北西　1.7m/s





V0:外気風速(m/s)
V1:カバー内流出入風速(m/s)
V2:カバー内流出入風速(m/s)
V3:カバー内流出入風速(m/s)
V4:カバー内流出入風速(m/s)
V5:カバー内流出入風速(m/s)
P:カバー内圧力(Pa)
P1:上流側圧力(北風)(Pa)
P2:下流側圧力(北風)(Pa)
P3:上流側圧力(西風)(Pa)
P4:下流側圧力(西風)(Pa)
P5:R/B内圧力(0Pa)
S1:カバー隙間面積(m^2)
S2:カバー隙間面積($m^{3)}$
S3:カバー隙間面積($m^{4)}$
S4:カバー隙間面積($m^{5)}$
S5:建屋床損傷部隙間面積(m^2)
ρ:空気密度(kg/m^3)
C1:風圧係数(北風上側)
C2:風圧係数(北風下側)
C3:風圧係数(西風上側)
C4:風圧係数(西風下側)
ζ:形状抵抗係数

参考2　4号機燃料取出し用カバーの漏洩率評価

風速をVとすると、上流側、下流側の圧力は次のとおりとなる。

上流側(北風):$P1=C1\times\rho\times V0^2/(2g)$ ・・・(1)
下流側(北風):$P2=C2\times\rho\times V0^2/(2g)$ ・・・(2)
上流側(西風):$P3=C3\times\rho\times V0^2/(2g)$ ・・・(3)
下流側(西風):$P4=C4\times\rho\times V0^2/(2g)$ ・・・(4)

内圧をP、隙間部の抵抗係数をζとすると

$P1-P=\zeta\times\rho\times V1^2/(2g)$ ・・・(5)
$P-P2=\zeta\times\rho\times V2^2/(2g)$ ・・・(6)
$P3-P=\zeta\times\rho\times V3^2/(2g)$ ・・・(7)
$P-P4=\zeta\times\rho\times V4^2/(2g)$ ・・・(8)
$P5-P=\zeta\times\rho\times V5^2/(2g)$ ・・・(9)

空気流出入量のマスバランス式は

$(V1\times S1+V3\times S4+V5\times S5)\times 3600=(V2\times S3+V4\times S2)\times 3600$

左辺と右辺の差を「Y」とすると

$Y=(V1\times S1+V3\times S4+V5\times S5)\times 3600-(V2\times S3+V4\times S2)\times 3600$

V1, V2, V3, V4, V5は(5), (6), (7), (8), (9)式により、Pの関数なので、「Y」がゼロになるように
Pの値を調整する

V0 (m/s)	C1	C2	C3	C4	ζ	ρ (kg/m^3)
1.65	0.80	−0.50	0.10	−0.50	2.00	1.20

S1 (m^2)	S2 (m^2)	S3 (m^2)	S4 (m^2)	S5 (m^2)
0.44	0.81	0.46	0.81	4.00

P1 (Pa)	P2 (Pa)	P3 (Pa)	P4 (Pa)	P5 (Pa)	P (Pa)
0.133823	−0.08364	0.016728	−0.08364	0	−0.00057

V1 (m/s)	V2 (m/s)	V3 (m/s)	V4 (m/s)	V5 (m/s)	Y (m^3/h)
1.05	0.82	0.38	0.82	0.07	0.00
IN	OUT	IN	OUT	IN	OK

※IN　:流入
OUT:流出

漏洩率　　3,742 m^3/h

参考2　4号機燃料取出し用カバーの漏洩率評価

週ごとの漏洩量評価（一例）

	11月29日			11月30日			12月1日			12月2日			12月3日			12月4日			12月5日		
	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)
西風	2.0	1.8	5,510	1.1	1.0	2,854	1.9	1.8	5,164	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
西北西風	2.3	1.8	5,266	1.6	4.8	3,744	3.2	4.2	7,305	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北西風	1.4	3.0	3,205	1.3	5.0	2,975	1.7	5.5	3,930	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北北西風	2.1	4.7	4,859	1.5	10.2	3,503	1.7	2.8	3,742	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北風	3.1	2.5	9,600	3.2	1.8	9,975	1.4	0.7	4,480	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北北東風	2.2	0.3	4,980	1.4	0.2	3,169	1.1	1.0	2,490	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北東風	0.6	0.2	1,363	0.0	0.0	0	0.9	0.2	2,044	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
東北東風	0.0	0.0	0	0.0	0.0	0	1.1	0.2	2,499	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
東風	0.0	0.0	0	0.0	0.0	0	0.0	0.0	0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
東南東風	2.0	0.5	4,489	0.0	0.0	0	0.0	0.0	0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南東風	2.3	0.2	5,162	0.0	0.0	0	0.9	0.2	2,020	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南南東風	3.3	2.5	7,371	0.0	0.0	0	2.6	1.5	5,820	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南風	3.2	2.8	10,052	0.0	0.0	0	2.1	1.8	6,629	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南南西風	1.2	1.5	2,586	0.0	0.0	0	1.5	0.7	3,246	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南西風	1.4	0.7	3,086	0.0	0.0	0	1.2	1.0	2,656	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
西南西風	1.0	0.7	2,132	1.2	1.0	2,619	1.5	1.2	3,463	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

漏洩日量 (m3)			135,303			92,877			108,434			0			0			0			0

16方位毎の平均風速から漏洩率を前頁のように評価する。

漏洩量合計

評価期間	11/8 ～ 11/14	11/15 ～ 11/21	11/22 ～ 11/28	11/29 ～ 12/1			漏洩量合計(m3)	評価対象期間(h)	漏洩率(m3/h)
週間漏洩量 (m3)	870,209	805,790	1,001,535	336,614			3,014,148	576	5,233

第16回　現地汚染水対策会議資料抜粋

Cs・Sr吸着繊維による海水浄化について

平成26年12月25日

東京電力株式会社

東京電力
TEPCO

セシウム・ストロンチウム吸着繊維による海水浄化について

目的

１～４号機取水口付近は、現在もセシウム、ストロンチウム濃度が高いレベル。

昨年度、３号機取水口前に繊維状セシウム吸着材を設置して浄化試験を実施したが、現在はストロンチウムの濃度がセシウムより高い状況。

今年度は、セシウム吸着材に加えてストロンチウム吸着材を併せて、海水中放射能濃度の高い４号機取水口付近に設置し、性能を評価。

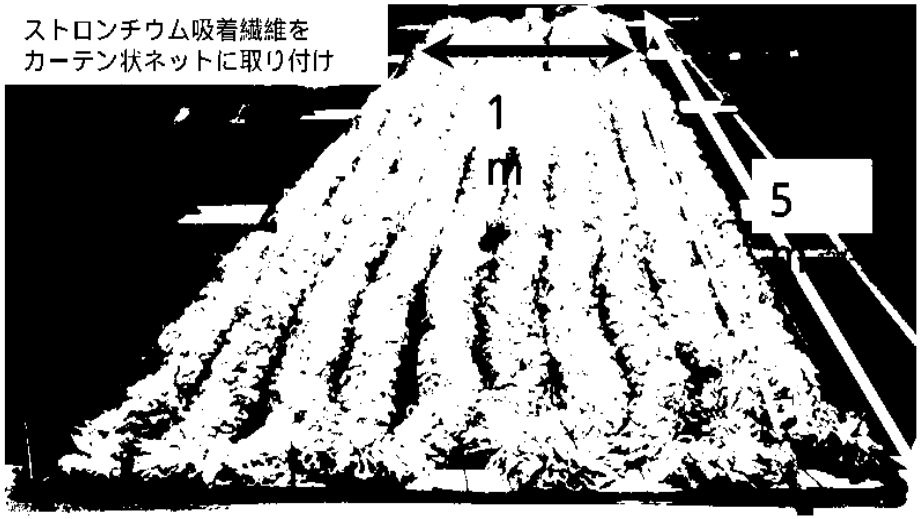
評価結果に応じて、設置範囲の拡大等を検討。

■期待される効果

セシウムに加え、ストロンチウムの除去能力について評価し、取水路のセシウム、ストロンチウムの濃度低減につなげる。

海水中の安定化ストロンチウムと放射性ストロンチウムの吸着割合を評価

セシウム・ストロンチウム吸着繊維装着カーテン状ネット

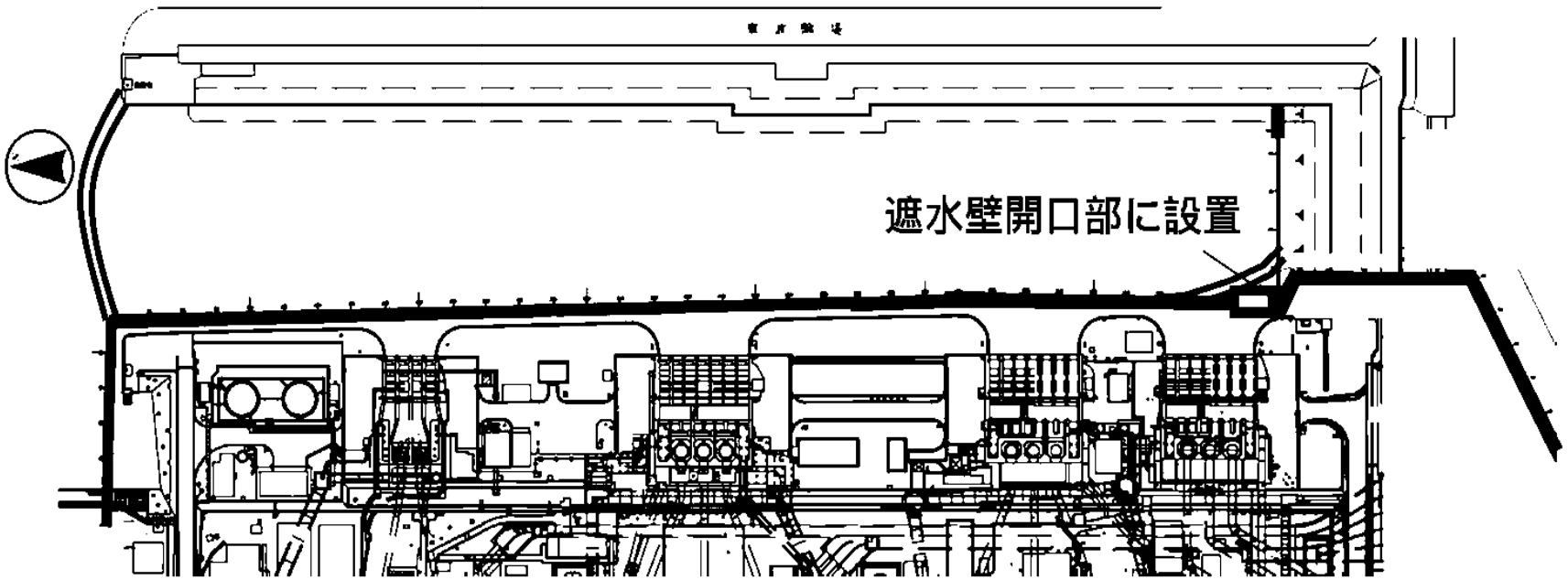


・セシウム吸着繊維とストロンチウム吸着繊維を重ね、２０ m× ５ m に成形

・ ネット上端部にフロートフェンス、下端部におもりを取り付け、
海中に立てて浸漬・設置

設置場所について(1/2)

・海水中放射能濃度が高く、潮汐による海水の流動が大きい、
遮水壁開口部 (4 号機取水路前) に設置予定。
(分析・性能評価用のサンプルも併せて設置)



設置場所について(2/2)

1～4号取水路開渠部南側

海側遮水壁開口部

ストロンチウム吸着繊維(簡易型)

H26年11月20日

海側遮水壁開口部

海側遮水壁開口部

海水浄化の実施スケジュール

■実施概要

H26年11月20日

・ストロンチウム吸着繊維 (簡易型、1 m× 1 m) を4号機取水路前の遮水壁開口部近傍に設置

(ストロンチウム吸着繊維は実海水中への投入実績がないため先行して実施)

H26年12月～H27年1月

・セシウム・ストロンチウム吸着繊維を取り付けたカーテン状ネット (20 m× 5 m) を遮水壁開口部に設置予定 (H26年12月: 準備、H27年1月: 浸漬)

・分析用として、セシウム・ストロンチウム吸着繊維単体 (5ｍ) も設置予定

・2週間～1ヶ月に1回引き揚げ、分析・性能評価を実施

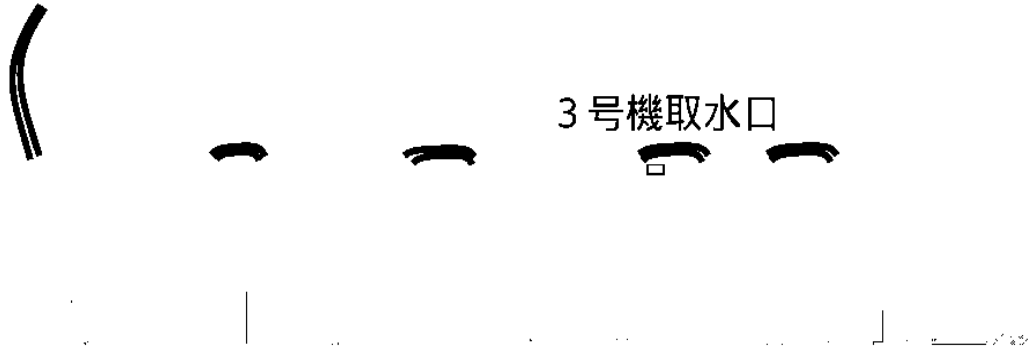
H27年1月～7月

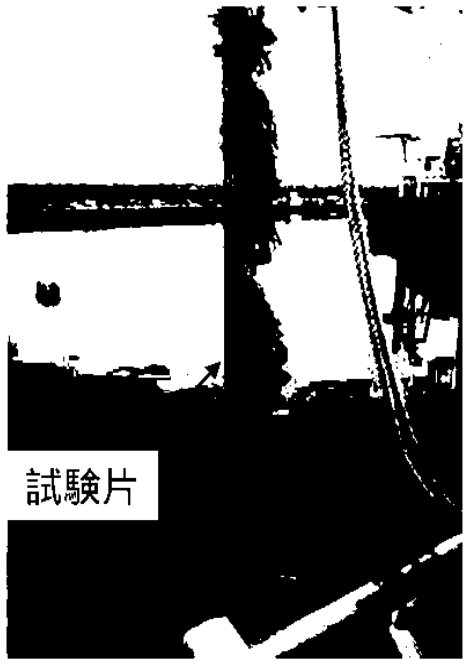
・繊維への核種吸着量の測定等の性能評価を実施 (約 6ヶ月)

【参考】繊維状吸着材によるセシウム浄化について (1)

港湾の海水中のセシウム浄化のため、H25年6月17日に3号機取水口前に繊維状吸着材浄化装置を設置

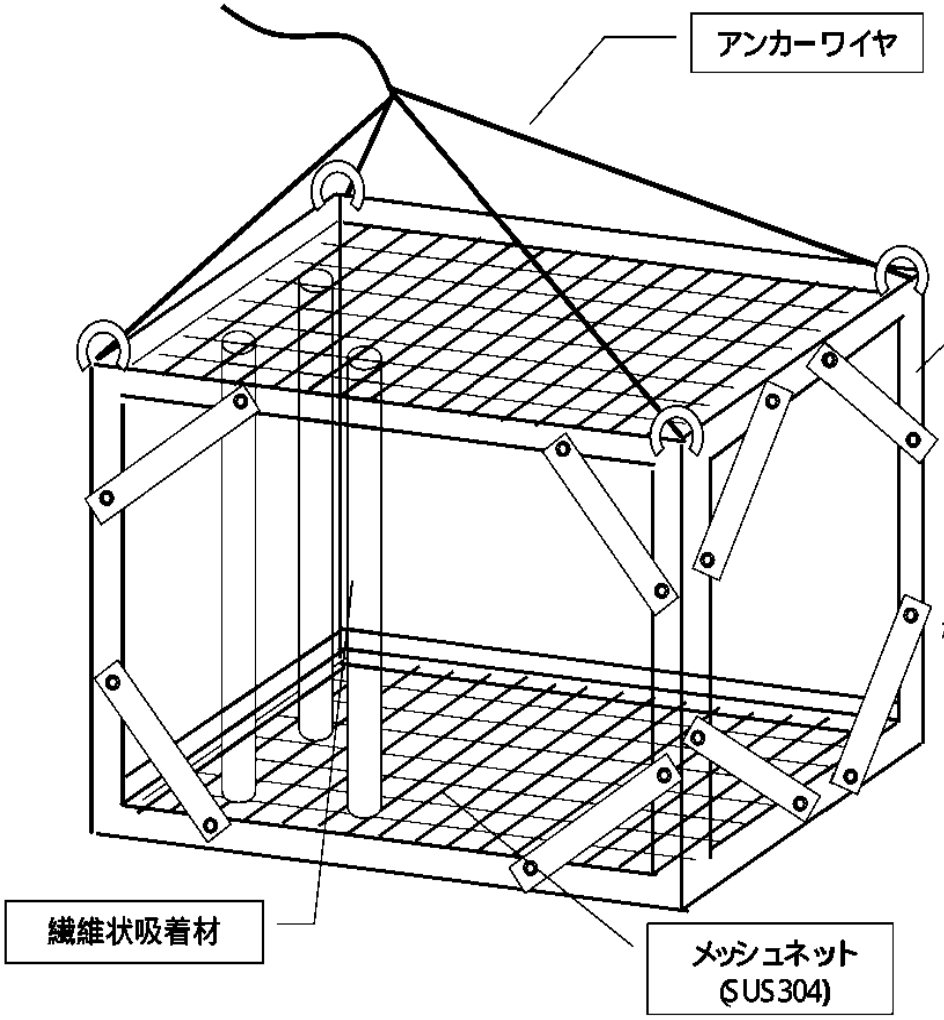
H25年8月22日より、追加試験片を投入し、4回に渡って一部を回収し、γ 線核種分析により放射性セシウム吸着量を確認





【参考】繊維状吸着材によるセシウム浄化について (2)

<繊維状吸着材浄化装置>



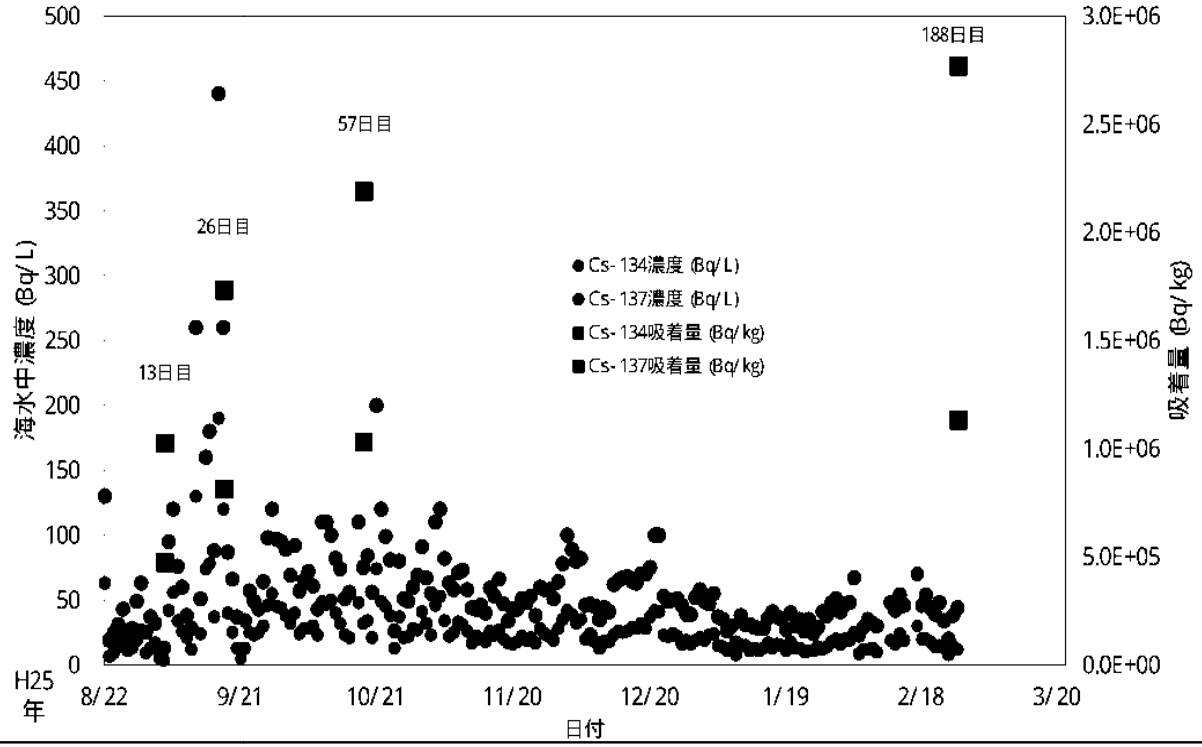
概略仕様

- 横1.7m× 幅0.85m× 高さ1.8m
- 浄化対象=約300m^3 (34m× 2m× 深さ4.5m)
- 吸着材=約70m (必要量の1/3)
- 吸着材着脱式 (フック)
- 総重量=約45kg
- 海水ポンプによる水流の付与 (吸着効率向上)

【参考】繊維状吸着材によるセシウム浄化について (3)

<吸着量確認の結果及び評価>

- 回収した試験片の一部を分析した結果、投入後188日 (約6ヶ月) 時点で、2.8×10^6 Bq/kgのCs-137を吸着したと評価された。
- 投入期間中の3号取水口前海水の平均濃度は約60 Bq/Lであり、室内実験で求めた分配係数とCs-137濃度から計算される吸着量6×10^6 Bq/kgの約47 %の吸着性能であった。
- 実際の海水環境で、海水浄化に使用可能であることを確認した。



第16回　現地汚染水対策会議資料抜粋

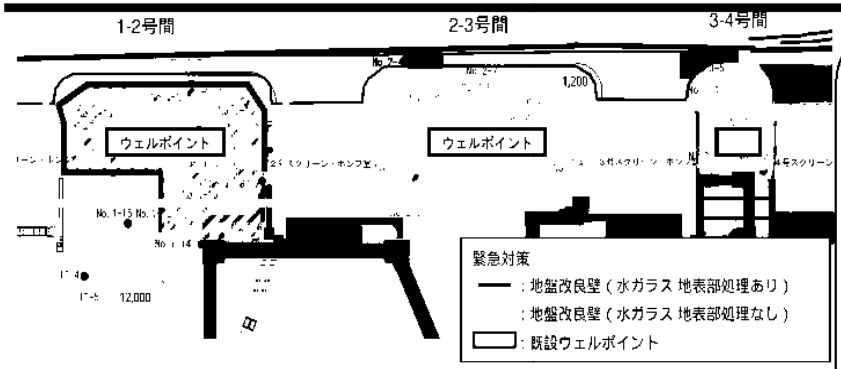
地盤改良壁の地表処理について

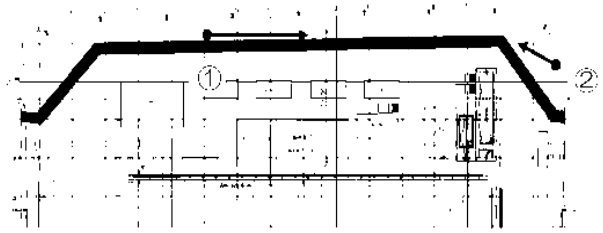
平成26年12月25日

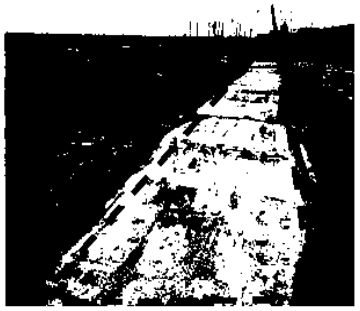
東京電力株式会社

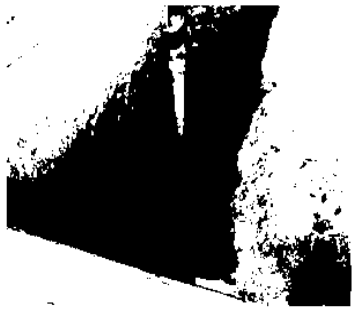
東京電力
TEPCO

地盤改良壁の地表処理





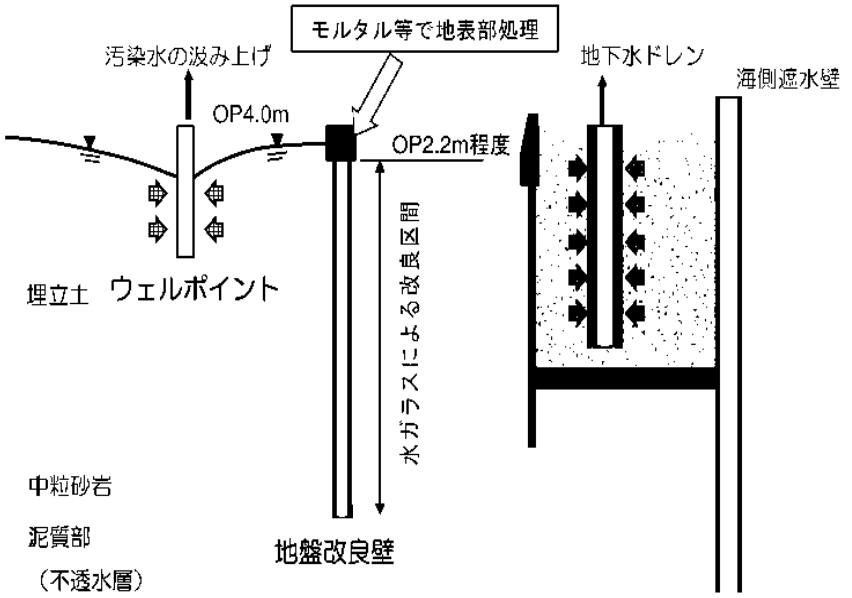




①モルタル置換完了　　②モルタル置換施工

1-2号間改良体天端から地表面までのモルタル置換作業はH26/1に完了。

1-2号間 地盤改良壁の施工状況



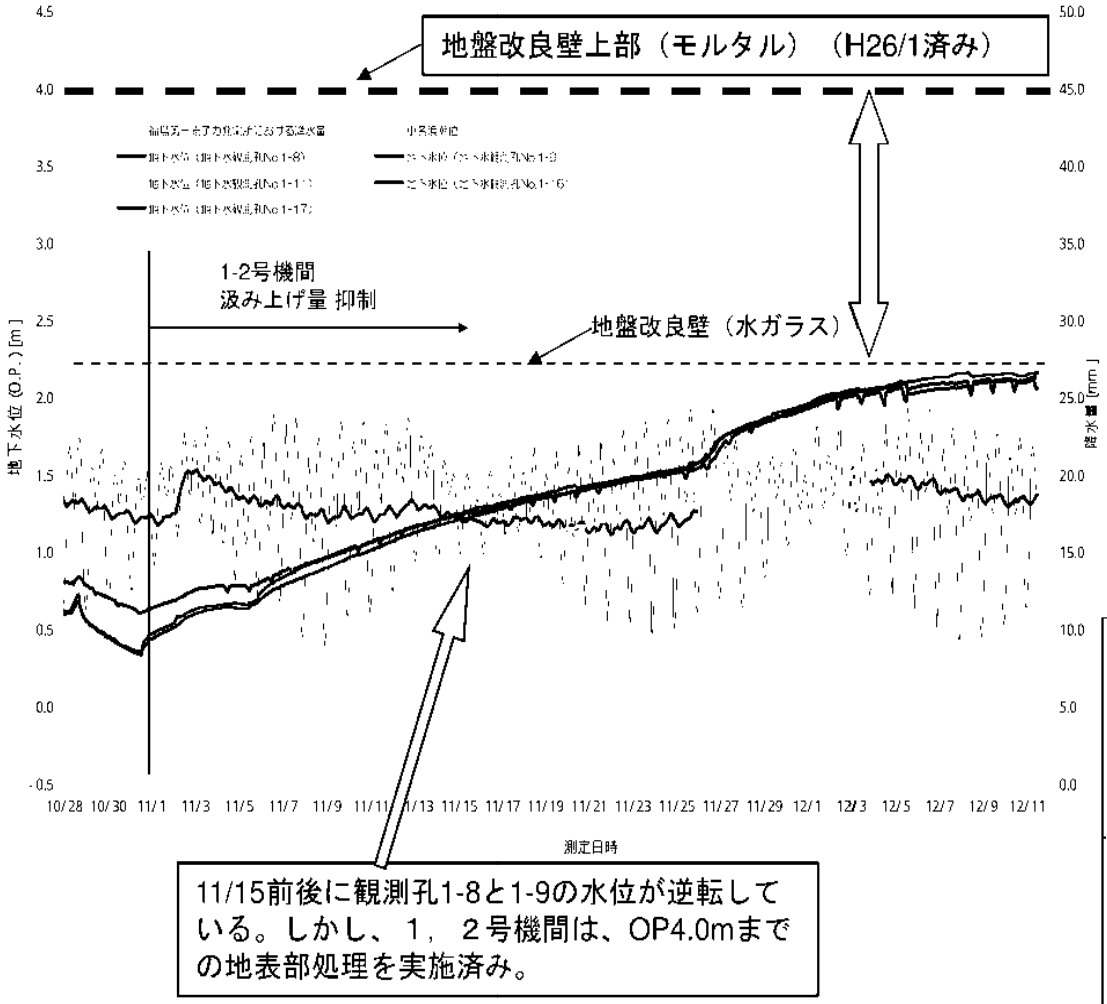
2-3号機間、3-4号機間では、地盤改良壁の天端がOP2.2m程度。地下水の越流を防止するため、1-2号機間と同様に地表部の処理を実施する。

2-3号機間の施工（掘削）にあたっては、当該箇所の地下水位を低下させる必要がある。そのため、10月末より1-2号機間の地下水くみ上げ量を抑制し、2-3号機間の汲み上げ量を増加させることで地下水位を低下させている。

3-4号機間については、2-3号機間の施工（地盤改良壁の地表部処理、ウェルポイント改修工事）に引き続き、年度末までを目途に実施する予定。

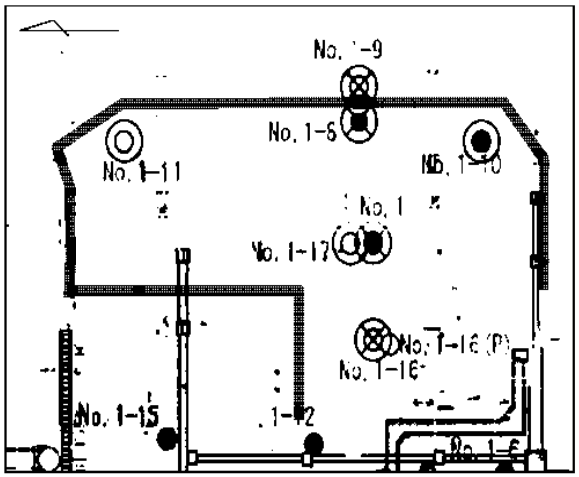
地盤改良壁の地表処理

1,2号機間 地下水位の状況

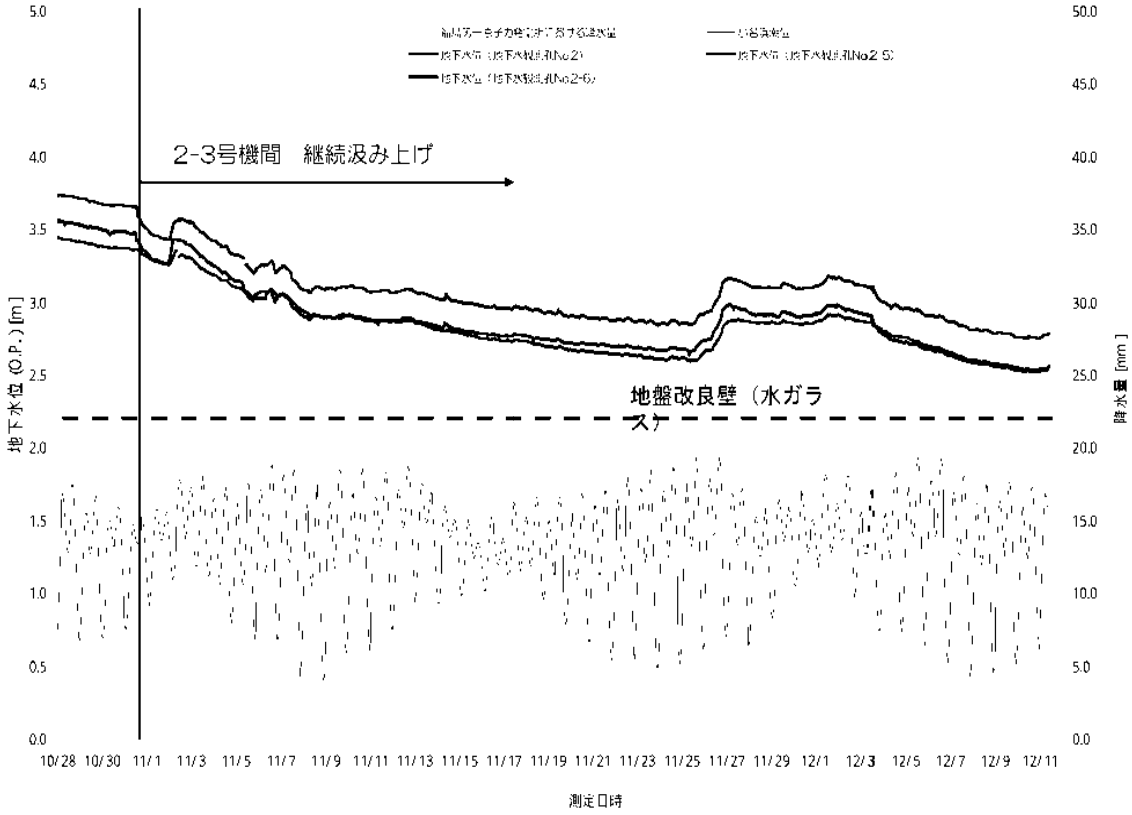


11/15前後に観測孔1-8と1-9の水位が逆転している。しかし、１，２号機間は、OP4.0mまでの地表部処理を実施済み。

- これまで、1-2号機間では、水ガラス地盤改良壁の天端を地下水位の目安としてくみ上げを実施していた。しかし、1-2号機間では地表部処理も完了していることから、2-3号機間の地表部処理等に向けて連続くみ上げを開始した際、1-2号機間の汲み上げ方も変更している。
- 10/31以降、ポンプの圧力調整を行い、11/6以降には南北に長い形状をしている1-2号間ウェルポイントのくみ上げ位置のうち、中央部を除き、南側と北側からくみ上げる形に変更してい

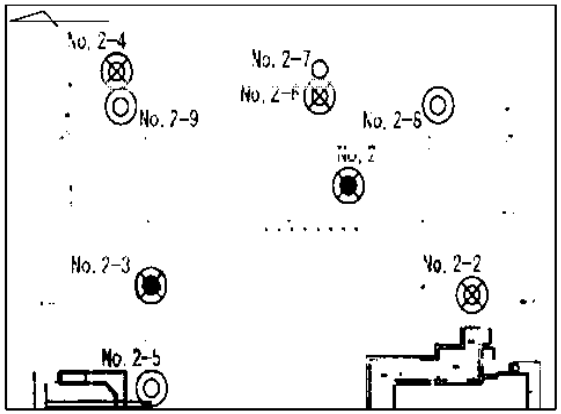


2,3号機間 地下水位の状況



10月末以降、2-3号機間のウェルポイント・地盤改良壁地表部工事にむけて、24時間連続汲み上げとして地下水位を低下させている。

- 2-3号機間は、1-2号機間に比べ汚染レベルが低いため、地下水の汚染レベルの高い北側エリアのウェルポイントのみくみ上げを実施してきた。
- 10月末以降、2-3号機間ウェルポイント・地盤改良壁地表部工事にむけて、北側以外にくみ上げの範囲、量を拡げ、水位を低下させている。



第16回　現地汚染水対策会議資料抜粋

1～3号機放水路溜まり水の調査状況について

平成26年12月25日

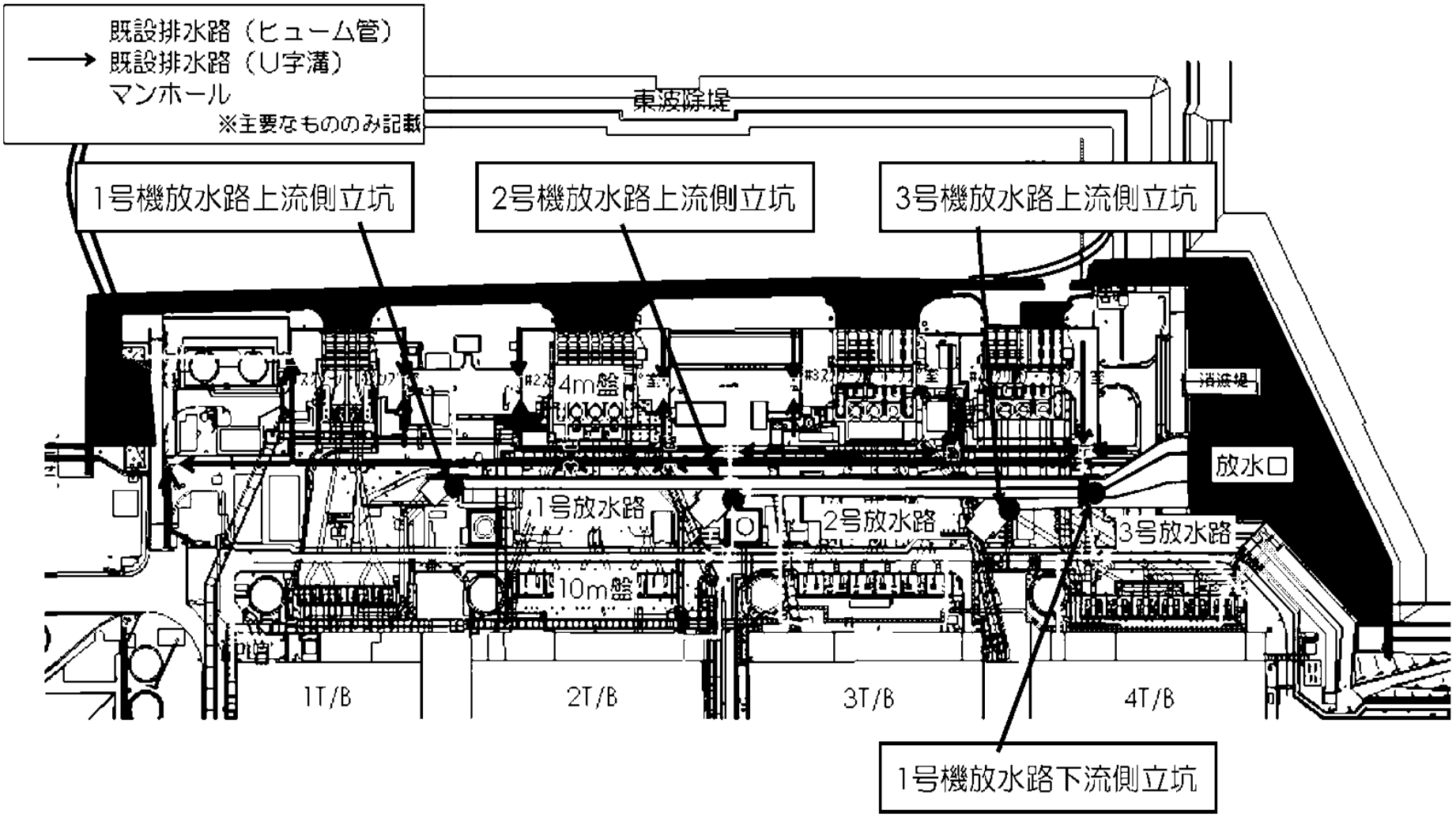
東京電力株式会社

東京電力
TEPCO

1- 1.1～3号機放水路溜まり水の調査状況について（概要）

1. 10m盤東側およびタービン建屋屋根に降った雨水対策を検討するための調査を4月より開始。現在、それらの雨水は1～3号機放水路に流入している。
2. 9月までに、放水路の立坑にて溜まり水及び降雨時の流入水の水質を調査した結果では、主にセシウムによる汚染が見られたが、建屋滞留水や海水配管トレンチに比べて、十分に低い濃度であった。
3. 10月初旬の台風18、19号通過の際の豪雨により、一時的に何らかの流れ込みがあり、1号機放水路上流側立坑のセシウム濃度が上昇。
4. 下流側立坑の濃度も若干上昇したものの、放水路出口の放水口は土砂により閉塞されており、さらに放水口出口は海側遮水壁の内側であり埋立も終了していること、および港湾内外の海水のセシウム137濃度に上昇等はみられていないことから、外部への影響は無いものと考えられる。
5. これまでに1号機上流側立坑周辺の追加調査を実施したが、汚染源の特定には至っていない。
6. 放水路への流入水の調査を引き続き実施すると共に、追加の汚染対策を実施しながら、溜まり水の本格浄化に向けた準備を進める。

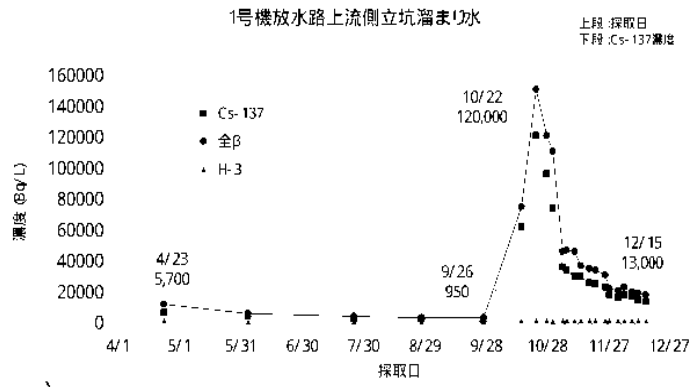
1- 2. 1～3号機放水路及びサンプリング位置図 (平面図)



1- 3. 1号機放水路調査結果

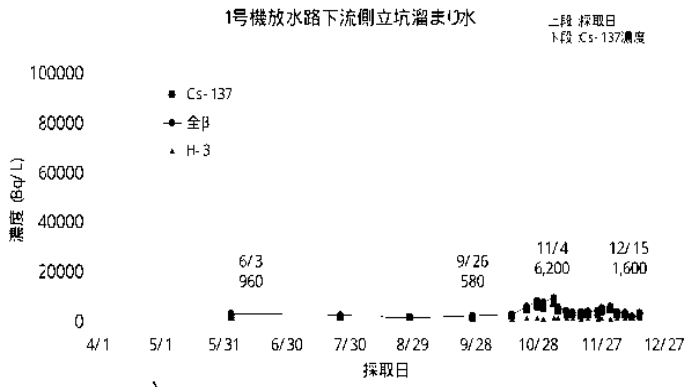
台風時の豪雨による放射性物質の流れ込みにより、最高12万Bq/Lまで上昇した1号機放水路上流側立坑溜まり水のセシウム137濃度は、現在は1万5千Bq/L程度まで低下。下流側立坑溜まり水のセシウム137濃度も、11/4に6,200Bq/Lまで上昇したが、現在は2,000Bq/L程度まで低下。

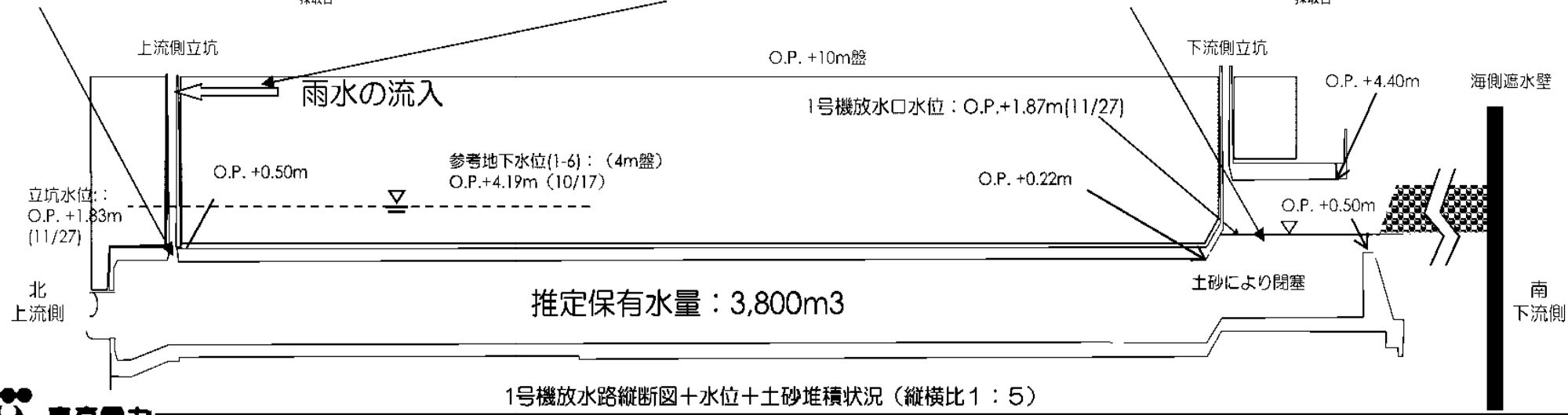
流入源の調査を継続するとともに、溜まり水の浄化対策を進める。



1号機上流側立坑流入水（1号T/Bルーフドレン・T/B東側地表）			
調査日：	6/12	8/26	10/6
Cs134：			420
Cs137：	採水時に		1500
全β ：	流入無くサンプリング できず		1400
H3 ：			9.9

（単位：Bq/L）





1号機放水路縦断図＋水位＋土砂堆積状況（縦横比１：５）

1- 4. 1号機放水路追加調査結果 (1号機上流側立坑下層濃度)

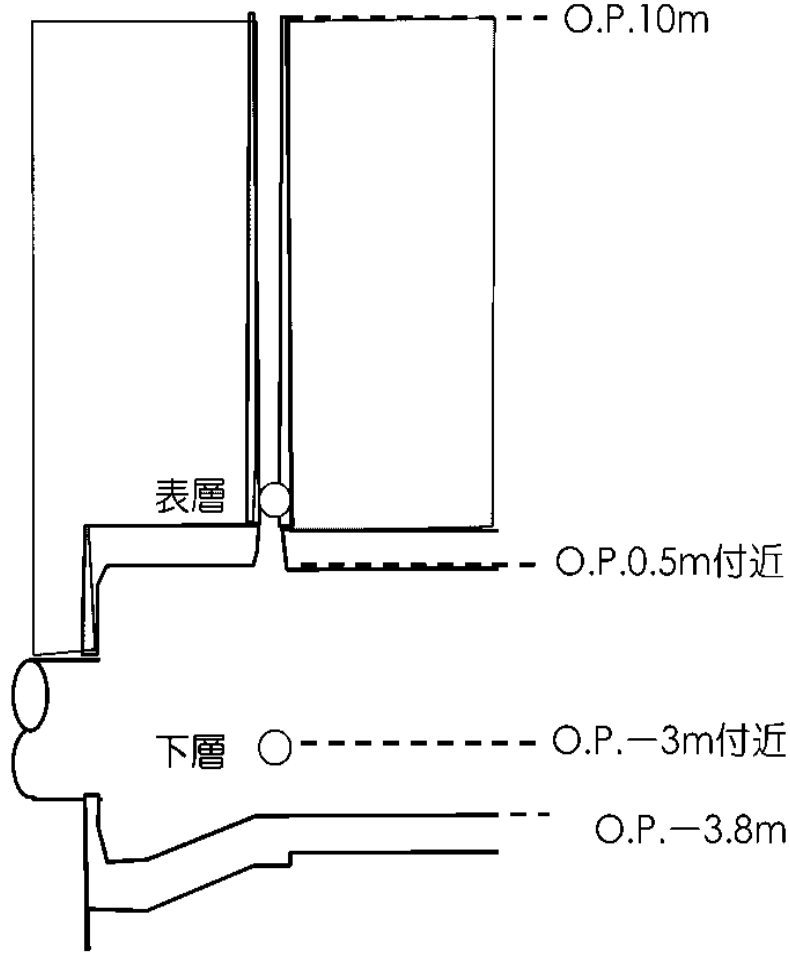
10/27に１号機放水路上流側立坑から、放水路内下層の採水を実施したが、濃度低下がゆるやかとなったことから、11/17に再度調査を実施した。

上流側立坑付近では、上層と同様に、下層も濃度が低下していた。

表１　1号機放水路上流側立坑下層の調査結果

1号機放水路上流側立坑 (表層)		
採取日	2014/ 10/ 27 15:20	2014/ 11/ 17 16:20
pH	7.5	7.4
塩素濃度(ppm)	125	190
Cs- 134 (Bq/ L)	31,000	8300
Cs- 137 (Bq/ L)	95,000	25000
全β (Bq/ L)	120,000	34000
H- 3 (Bq/ L)	320	450

1号機放水路上流側立坑 (下層)		
採取日	2014/ 10/ 27 15:30	2014/ 11/ 17 16:10
pH	7.4	7.4
塩素濃度(ppm)	980	1400
Cs- 134 (Bq/ L)	4,000	780
Cs- 137 (Bq/ L)	12,000	2600
全β (Bq/ L)	15,000	5600
H- 3 (Bq/ L)	2,700	1800



1号機放水路上流側立坑付近断面図

2-１.1号機放水路の濃度上昇の原因調査状況について

放水路につながる配管は途中で立ち上がっており、タービン建屋からの流入は無いものと考えられる。（次ページ参照）

また、溜まり水の全ベータ放射能は、セシウムの放射能濃度と変わらずストロンチウムはほとんど含まれていないと考えられること、さらにトリチウムの濃度上昇もほとんど無いことから、タービン建屋や海水配管トレンチ等の滞留水が流入した可能性は無いものと考えられる。

以上より、台風時の降雨による流れ込みを原因と考え、以下のとおり汚染源の調査を実施してきているが、現時点で汚染源は特定できていない。

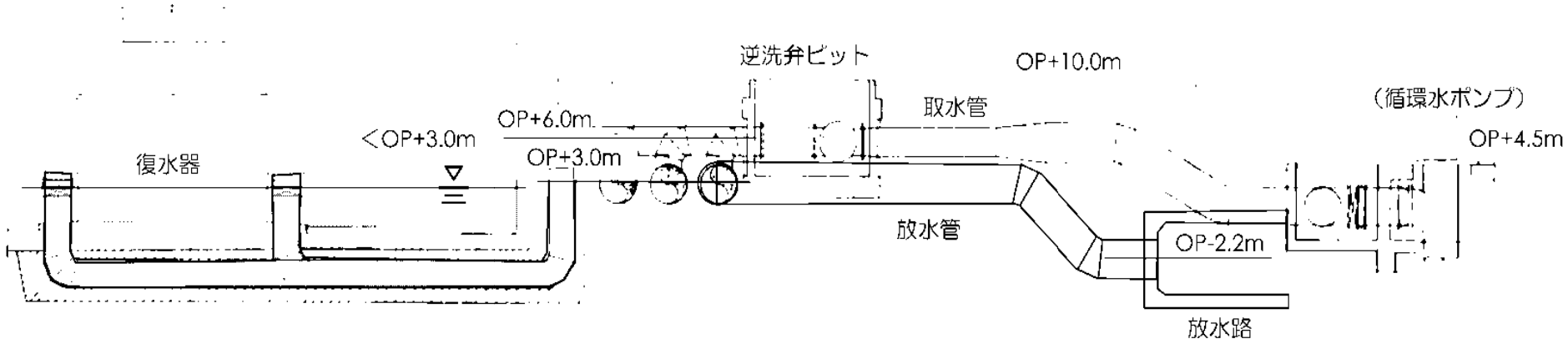
- 立坑脇の窪地の土壌を測定したが、放水路の濃度を上昇させるような高濃度では無く、溜まり水をろ過しても放射性物質濃度の変化はなかった。
- 1,2号機タービン建屋の屋根上の雨水及び１号機タービン建屋屋根から地上に出てきた雨水のサンプリングを実施したが、セシウム137濃度が420～10,000Bq/L程度と溜まり水の濃度上昇に比べて低濃度であった。
- 海側4m盤からの流れ込みについて再確認したが、降雨時にも流れ込む量はわずかであった。また、4m盤の地下水観測孔に、放水路のようにセシウム濃度のみが高い観測孔は無い。

引き続き、流入経路、土壌の測定、地表面の線量率測定等の調査を継続して汚染源の特定に努めるとともに、溜まり水の浄化等の対策を進めていく。

【参考】放水管の状況

復水器から接続する配管は、逆洗弁ピット付近でO.P.+6m（中心）まで立ち上がっており、タービン建屋の水位より高く、復水器内の水位も低いことから、放水管からの流入は無いものと考えられる。

2号機循環水系ﾚﾍﾞﾙ関係図（1号機もレベルは同じ）



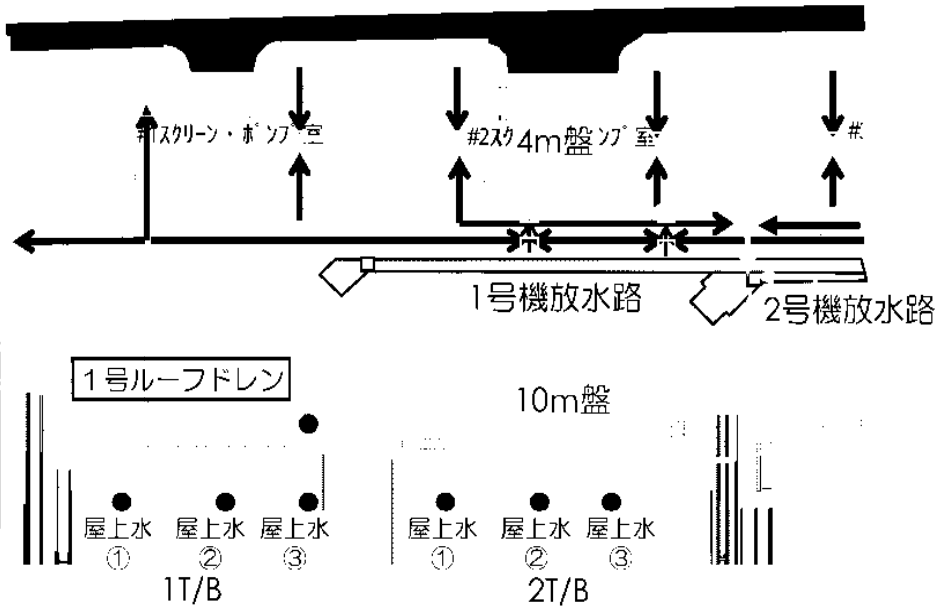
2- 2 .1号機放水路追加調査結果 (タービン建屋ルーフドレン水調査結果)

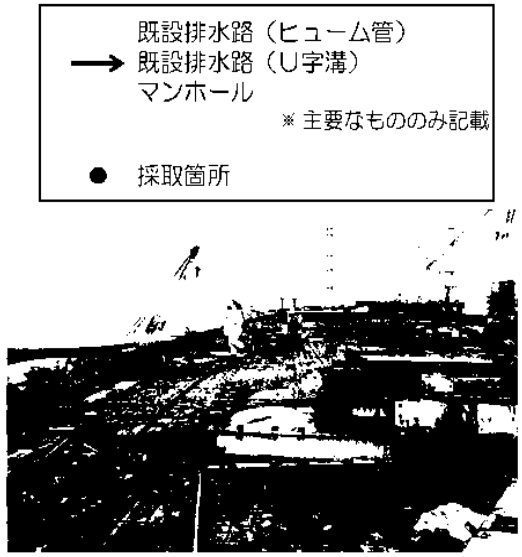
降雨時に、1,2号機タービン建屋屋上の雨水及び１号機ルーフドレン水を採取した。

屋上で採取した雨水のCs-137濃度は、1号機が980～2,700Bq/L、2号機が420～10,000Bq/Lの範囲で、これまでに放水路立坑に流入していた雨水と同程度の濃度であった。

日降水量
11/26 38mm
12/1　7.5mm

１号機タービン建屋屋上





２号機タービン建屋屋上

試料名	1号機T/B ルーフドレン水	1号機T/B 屋上水①	1号機T/B 屋上水②	1号機T/B 屋上水③
採取日	2014年11月26日	2014年11月26日	2014年11月26日	2014年11月26日
Cs-134	760	740	250	570
Cs-137	2600	2700	980	1900
全β	4500	6900	1400	2300

試料名	2号機T/B 屋上水①	2号機T/B 屋上水②	2号機T/B 屋上水③
採取日	2014年12月1日	2014年12月1日	2014年12月1日
Cs-134	120	3000	530
Cs-137	420	10000	1900
全β	500	29000	1700

2- 3 .1号機放水路追加調査結果 (4m盤からの流れ込み :排水路状況確認)

４m盤は津波により水没し、U字溝は土砂により埋没、ヒューム管にも土砂が流入したと想定される（立坑観察状況から、通水機能は喪失せず）

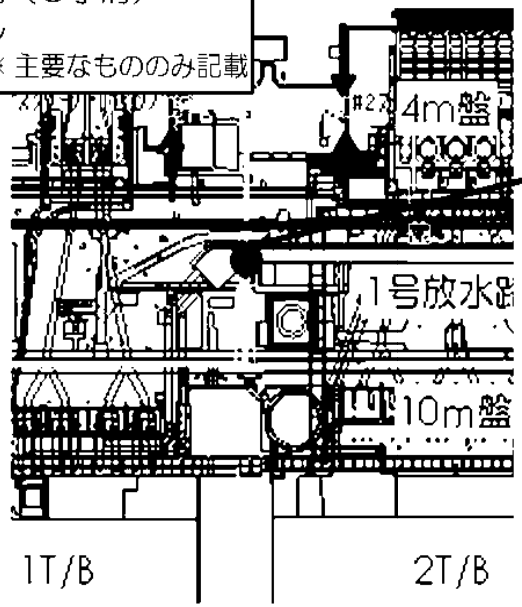
現在はその上面に砕石盛立、道路山側はフェーシング実施済

→放水路立坑への雨水流入は、かなり抑制されている

降雨翌日に１号機放水路上流側立坑で４m盤から接続するヒューム管出口を観察。

フェーシング前の降雨時においては、多量の流入を確認しており、比べものにならないわずかな流入量。

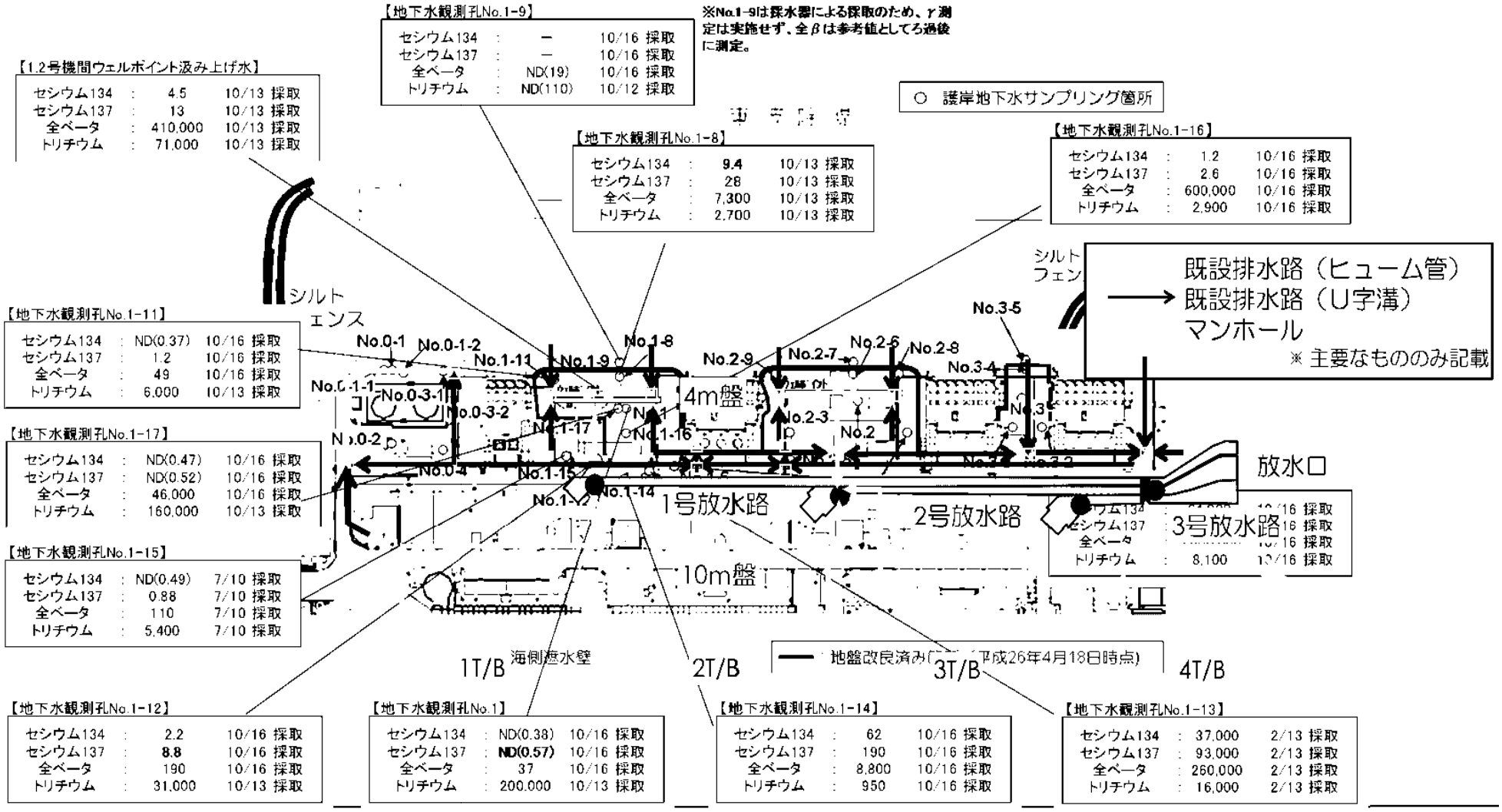
既設排水路（ヒューム管）
既設排水路（U字溝）
マンホール
※ 主要なもののみ記載



降雨翌日の4m盤からの雨水排水流入状況
ヒューム管（φ500mm）から僅かな流入を確認
（撮影日：11/27，11/26の累計降雨量：38mm）
※ フェーシング前の降雨時においては、多量の流入を確認している（状況写真無）

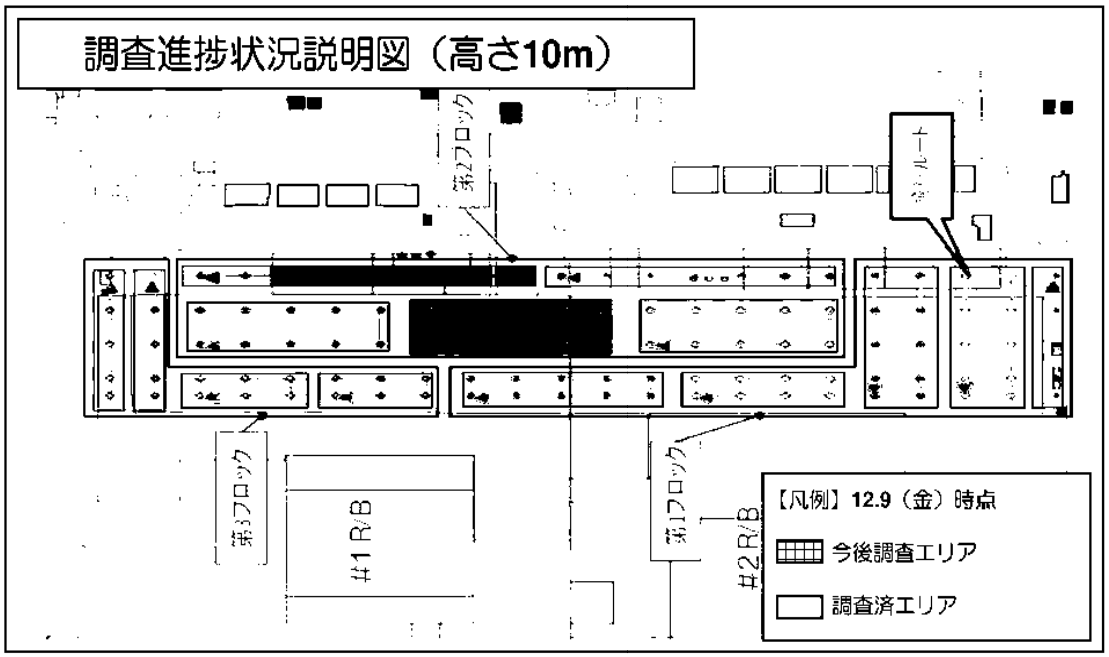
2- 4 .1号機放水路追加調査結果 (4m盤からの流れ込み 地下水の状況)

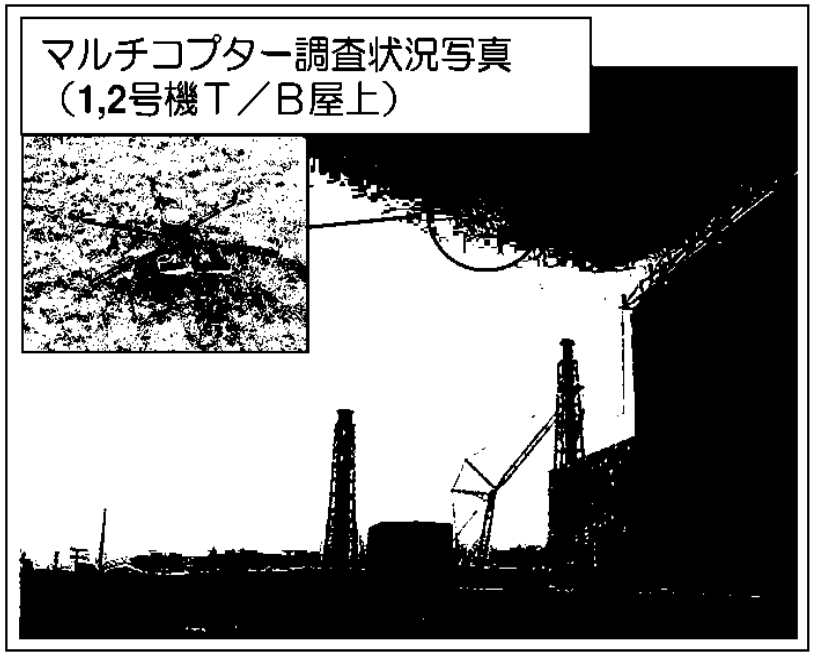
10月の台風によりNo.1-6のセシウム濃度が上昇した際の、1,2号機取水口間護岸部の地下水濃度を確認したが、セシウム濃度だけが高い地下水は見あたらない。フェーシングにより、放水路への流れ込みの量がわずかであること、及び核種組成が異なることから、4m盤からの流れ込みが放水路の濃度上昇の原因である可能性は低いものと考えられる。



2-５.マルチコプターによる1~ 4号T/ B屋根線量調査

平成26年12月9日よりマルチコプターによる線量調査を実施中。
12月中に1,2号機Ｔ／Ｂ建屋屋上を調査完了予定
１月以降3,4号機Ｔ／Ｂ建屋屋上を調査実施予定





項　目	H26年度					
	9	10	11	12	1	2
マルチコプターによる調査	▼9/16着手 準備（作業計画、飛行訓練、ヤード調整）			▼1/26 安全事前評価 試験飛行 1,2号T/B屋上	3,4号T/B屋上 線量解析	▼2/20完了 報告書作成

3- 1 .1号機放水路濃度上昇の外部への影響と対策について

放水路の開口部である放水口は、堆積した土砂により閉塞しており、さらに放水口出口は海側遮水壁の内側であり埋立も終了していることから、溜まり水が直接外洋に流出することは無い。

また、降雨後を中心に、放水口を閉塞している土砂を通じて溜まり水がわずかずつ流れ出ているものと考えられるが、土砂等の間を通過する際にセシウムの一部は吸着されているものと考えられる。

放水路下流側立坑の溜まり水のセシウム137濃度は、一時的に6,200Bq/Lまで上昇したものの、現在は低下。

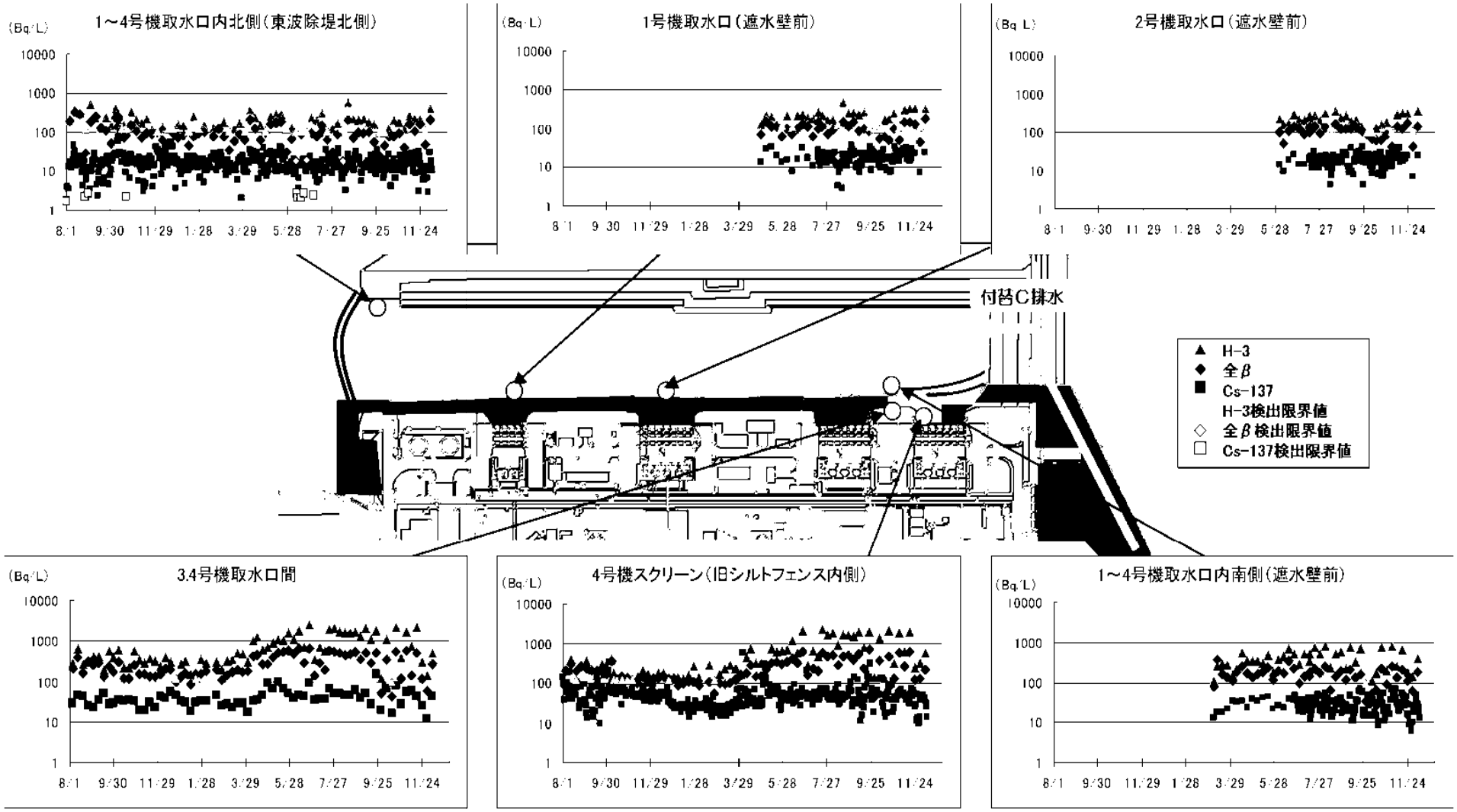
港湾内外の海水中のセシウム濃度には、特に影響は見られていないことから、外部への影響は無いものと考えられる。

今後、モバイル処理装置による浄化を行うが、それまでの間、上流側立坑にセシウム吸着材を設置して溜まり水の浄化を図る。

また、さらなる影響低減のため、放水口部分にはセシウムを吸着するゼオライトを投入する計画。

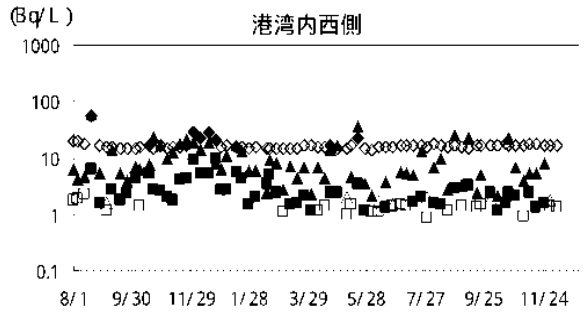
3- 2 .1～4号機取水口付近の海水サンプリング結果

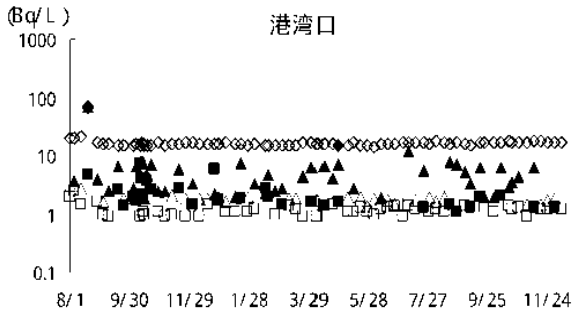
1～4号機取水口付近の海水のセシウム濃度は、最も高濃度である4号機スクリーンでも100Bq/Lを下回ってきており、概ね横ばい状態。

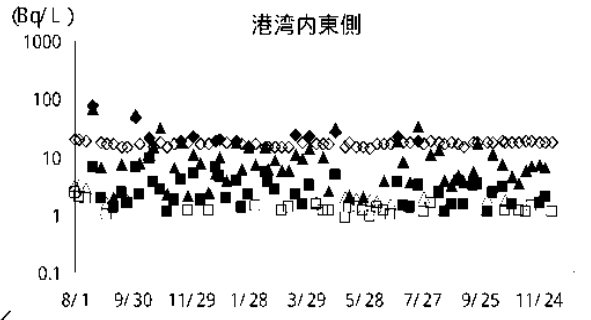


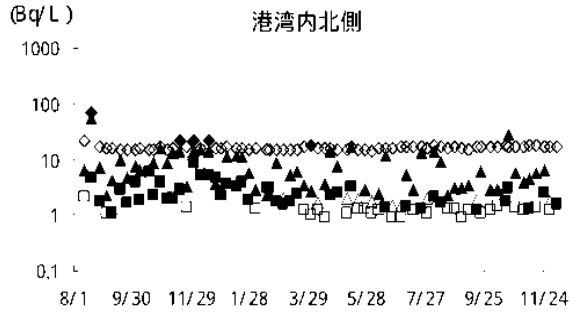
3-３.港湾内の海水サンプリング結果

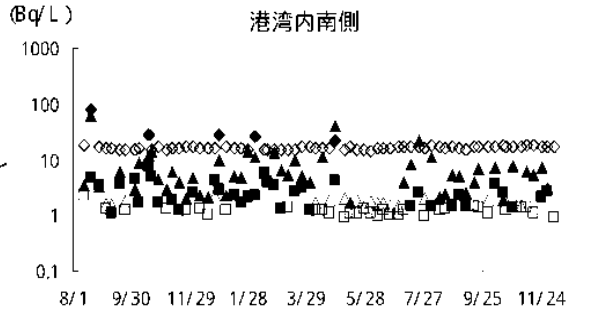
概ね横ばい傾向であるが、昨年の同時期に比べれば全体に低減傾向。

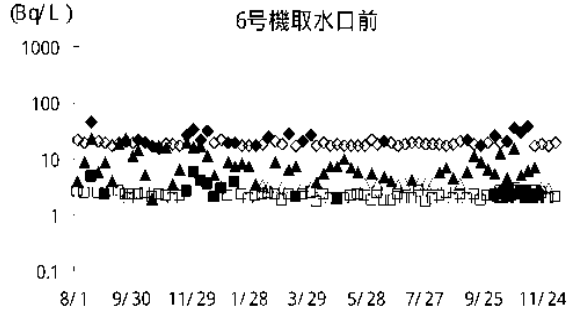


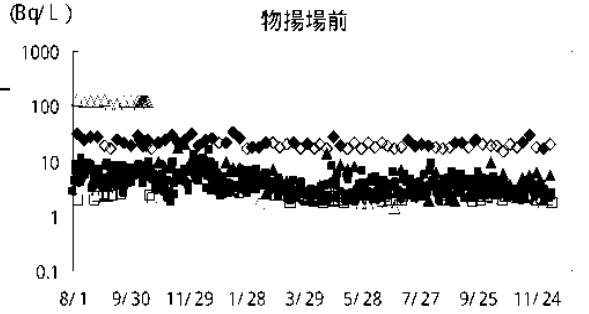


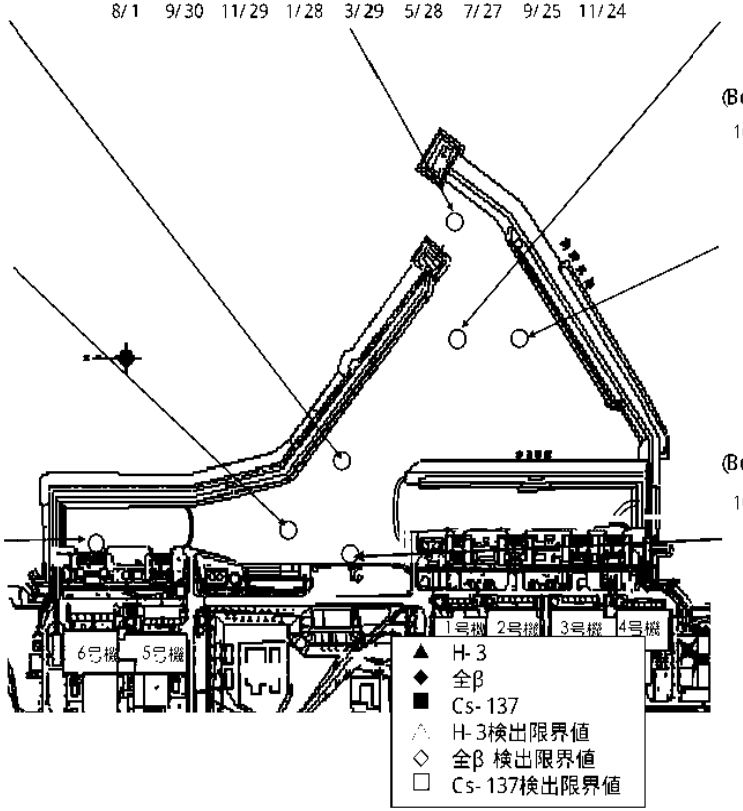






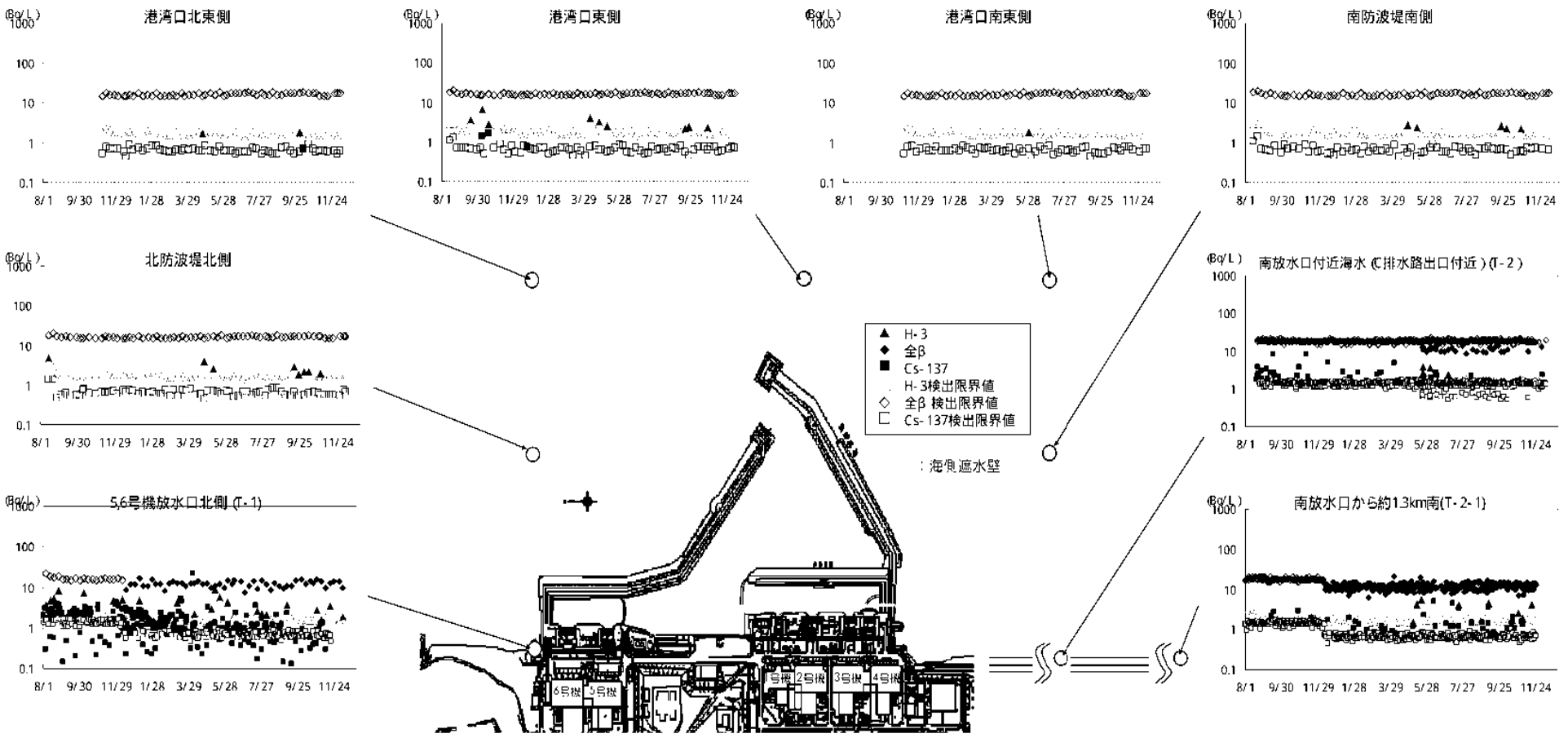






3-4.港湾外(周辺)の海水サンプリング結果

港湾外の各採取点も、全体に横ばい状態で、濃度上昇などの特別な傾向は見られない。



注：昨年10月以降の南北放水口付近の全β放射能の検出は、検出下限値の変更によるものである。

3-５.1号機放水路上流側立坑へのセシウム吸着材の投入

１号機放水路上流側立坑のセシウム濃度上昇の対策として、モバイル浄化装置稼働までの当面の対策として、上流側立坑に繊維状セシウム吸着材約10kgを設置した。

最初に設置した吸着材の一部を2週間後にサンプリングして分析した結果、Cs-137濃度は3.6E+07Bq/kgであった。昨年海水で試験した際には、設置後13日時点では想定される吸着性能の20%程度の吸着量であり、その後も数ヶ月間吸着量が増えていることから、今回設置した吸着材もさらにセシウムの吸着が継続するものと考えられる。

引き続き、毎月1回吸着材の一部を採取し、吸着量の評価を行う。

10,000Bq/Lの溜まり水100m^{3}の濃度を1/10にするために必要な吸着材量の試算結果は以下の通り。

水の移動：無し（密閉状態　ビーカー試験と同じ状態を仮定）

分配係数Kd（=(C_0-C)/C×V/m (L/kg)）：1×10^5（日立GE試験結果）

C_0（初期Cs濃度）：10,000Bq/L

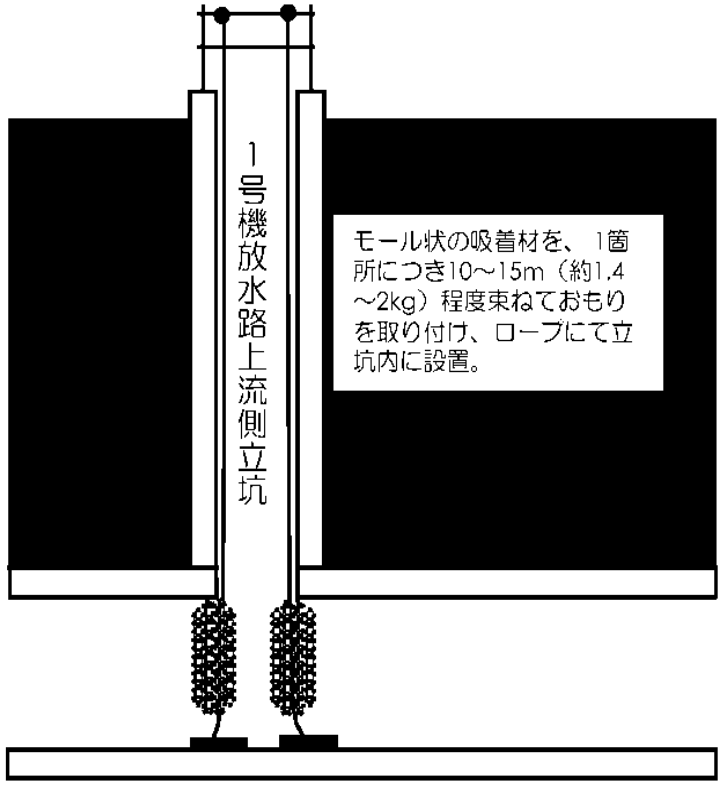
C：浄化後のCs濃度：1,000Bq/L

V：浄化する水の量：100m^3＝100,000(L)

m：吸着材量(Kg)

m＝(10,000-1,000)/1,000× 100,000(L)／ 1×10^5＝9kg

セシウム吸着材



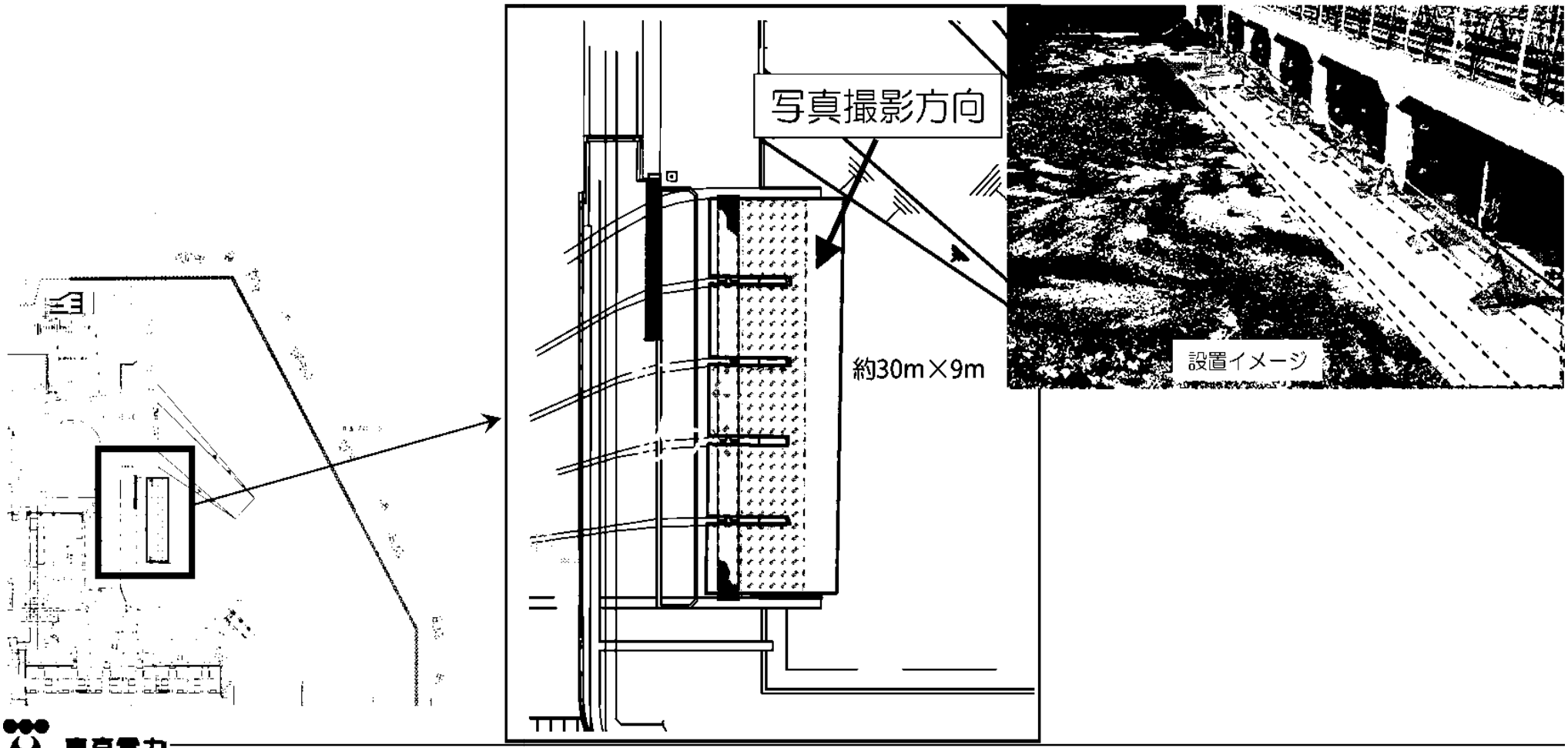
設置イメージ図

3-6.1~ 3号機放水口への放射性物質吸着材投入(1/2)

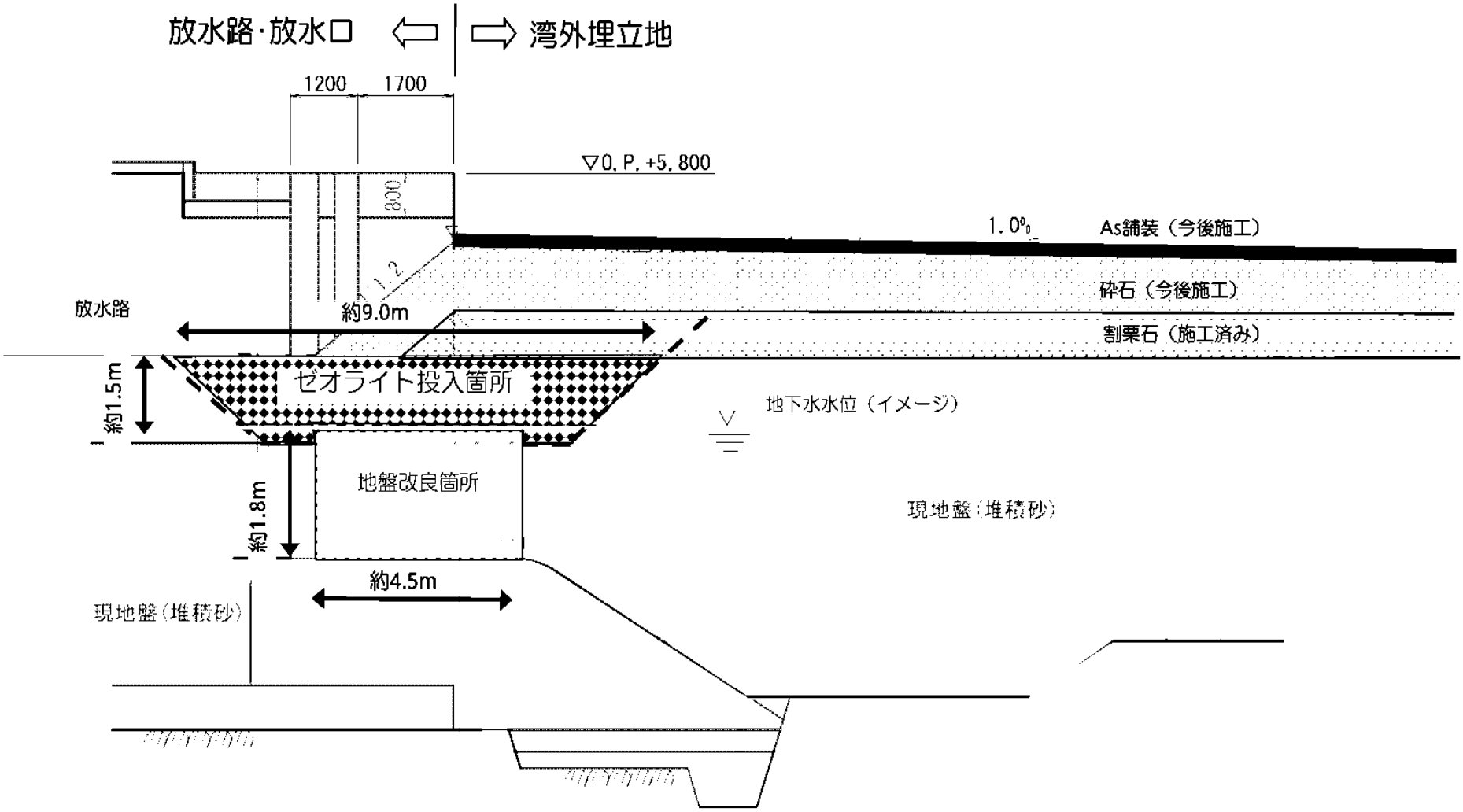
Csを吸着するゼオライトを放水口に設置し、放水路溜まり水中の放射性物質流出を抑制する計画。

施工箇所平面図

ゼオライト投入箇所
地盤改良箇所



3-７.1~ 3号機放水口への放射性物質吸着材投入(2/2)



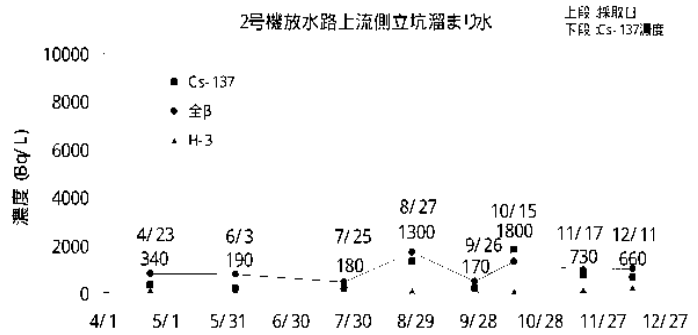
※対策工の寸法は現場状況により変更となる場合がある

２号機放水口付近断面図（イメージ図）

4．2号機放水路調査結果

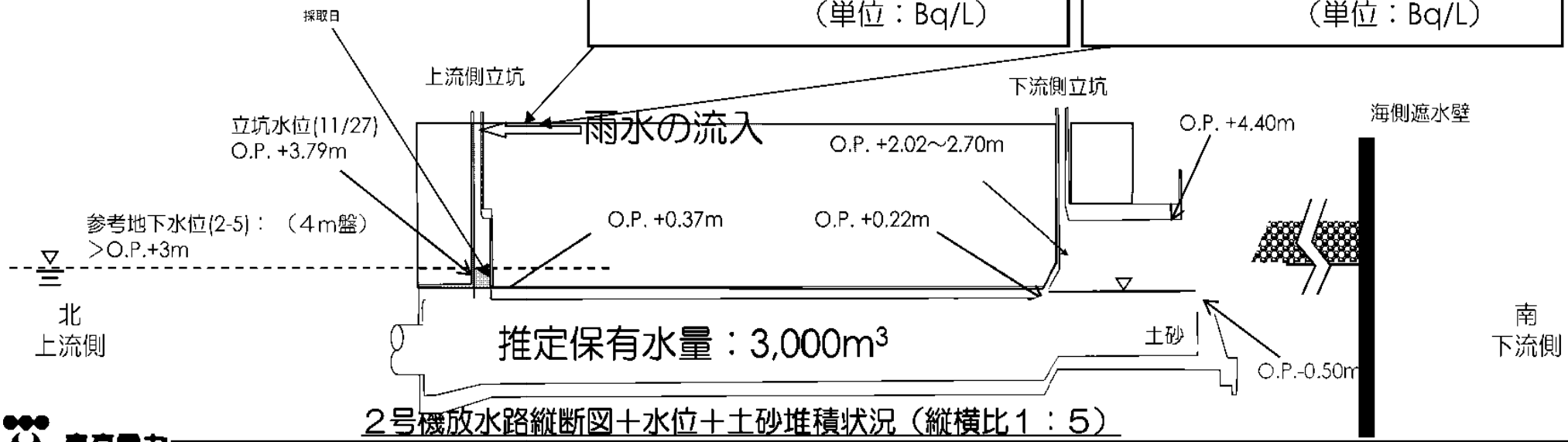
2号機放水路上流側立坑の溜まり水は、当初よりセシウム137濃度が340Bq/Lと低かったが、8/26の降雨後や台風後の10/15には濃度が一時的に上昇。12/11には660Bq/Lに低下。

3号機タービン建屋周辺からの流入水のセシウム濃度が高く、降雨時に一時的に濃度が上昇するものの、拡散や希釈、沈降等により濃度が低下しているものと考えられる。



2号機上流側立坑西側流入水（2号T/Bﾙｰﾌﾄﾞﾚﾝ・T/B東側地表）			
調査日：	6/12	8/26	
Cs134：	140		サンプリングできず
Cs137：	400		
全β ：	770		
H3 ：	13		
（単位：Bq/L）			

2号機上流側立坑南側流入水（3号T/Bﾙｰﾌﾄﾞﾚﾝ・T/B東側地表）		
調査日：	6/12	8/26
Cs134：	3,800	3,100
Cs137：	11,000	9,400
全β ：	18,000	17,000
H3 ：	65	41
（単位：Bq/L）		

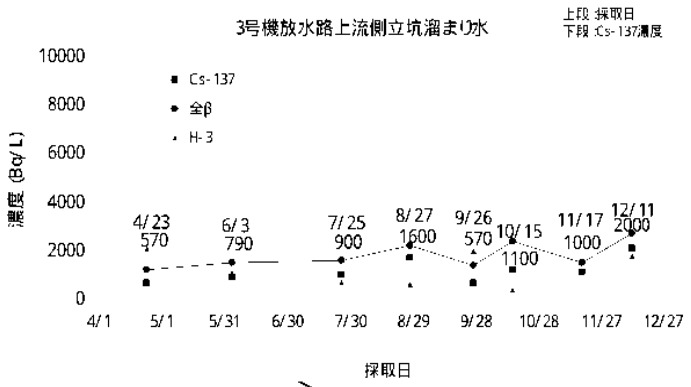


2号機放水路縦断図＋水位＋土砂堆積状況（縦横比１：５）

5．3号機放水路調査結果

3号機放水路上流側は、2号機放水路と同様、当初よりセシウム137濃度が570Bq/Lと低かったが、 8/26の降雨後や台風後の10/15には濃度が一時的に上昇。 1,000～2,000Bq/L程度で推移。

2号機同様、放水路への流入水濃度は溜まり水より高く、降雨時の流入により一時的にセシウム濃度が上昇するものの、拡散や希釈、沈降等により濃度が低下しているものと考えられる。



3号機上流側立坑流入水
（3号S/Bﾙｰﾌﾄﾞﾚﾝ・T/B東側地表）

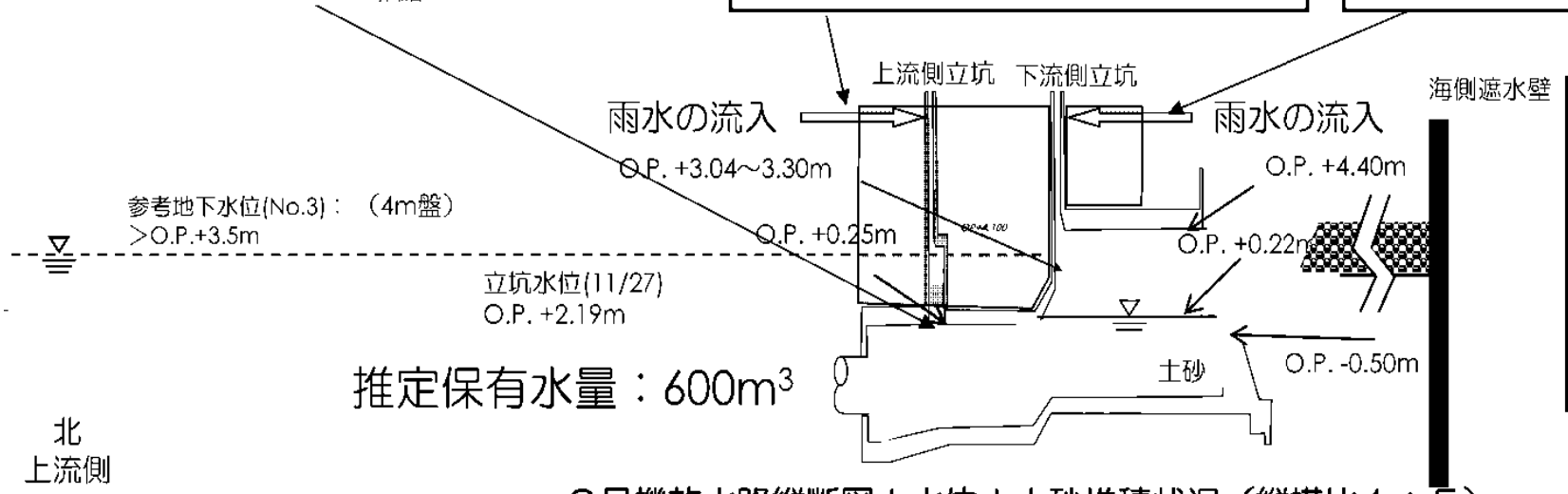
	6/12	8/26
調査日：		
Cs134：	1,400	サンプリングできず
Cs137：	4,100	
全β ：	4,800	
H3 ：	ND(9.4)	

（単位：Bq/L）

3号機下流側立坑流入水
（4号T/B建屋周辺雨水）

	6/12	8/26
調査日：		
Cs134：	1,000	サンプリングできず
Cs137：	2,800	
全β ：	3,900	
H3 ：	13	

（単位：Bq/L）



4号機ﾙｰﾌﾄﾞﾚﾝ水

調査日：	6/12
Cs134：	570
Cs137：	1,600
全β ：	2,500
H3 ：	ND(9.4)

（単位：Bq/L）

3号機放水路縦断図＋水位＋土砂堆積状況（縦横比１：５）

6.放水路溜まり水の今後の対応について

1．モニタリングの継続

1号機放水路の溜まり水については、上流側立坑のセシウム137濃度が1万Bq/Lを下回るまで2回／週のモニタリングを継続する。

2,3号機放水路の溜まり水については、1回／月のモニタリングを継続する。

2．溜まり水の浄化

モバイル処理装置による浄化について、準備を進める。

モバイル処理装置が稼働するまでの間、1号機放水路上流側立坑にセシウム吸着材を投入する。

外部への影響を更に抑制するため、放水口部にセシウムを吸着するゼオライトを投入する。

3．タービン建屋周辺の調査、除染等について

1号機については、降雨時の流れ込み水の再調査、立抗周辺の地表面線量率調査など、引き続き流入源調査を行う。

10m盤全体の汚染源特定のため、タービン建屋屋根面、1～4号機周辺および海側の線量調査を開始した。

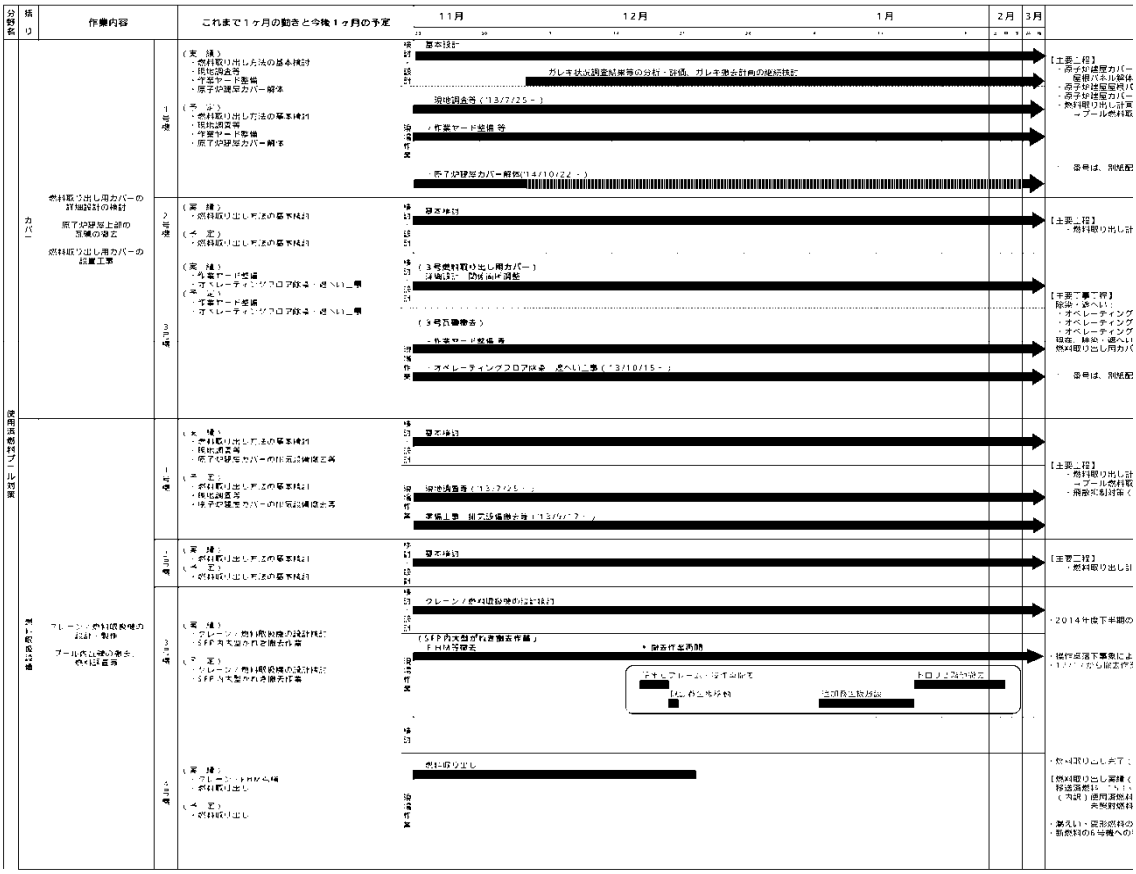
タービン建屋周辺のガレキ撤去を12月までの予定で実施中。

タービン建屋東側エリアの排水整備は除染の進展に伴い計画予定。

7.今後の予定

項　目	11	12	1	2	3	備　考
タービン建屋海側ガレキ等撤去						
タービン屋根面線量調査		1，2号機	3，4号機			調査結果を踏まえて対策実施
		線量解析、結果とりまとめ				
地上面（4m盤、10m盤）線量調査		1号機放水路上流側立坑周辺をまず実施				調査結果を踏まえて対策実施
モバイル処理装置による浄化処理		繊維状セシウム吸着剤による浄化				
			設計・調達、工事			
			許認可			
					浄化開始	
1～3号機放水口へのゼオライトの設置						前倒し検討中
モニタリング						処理終了まで継続実施

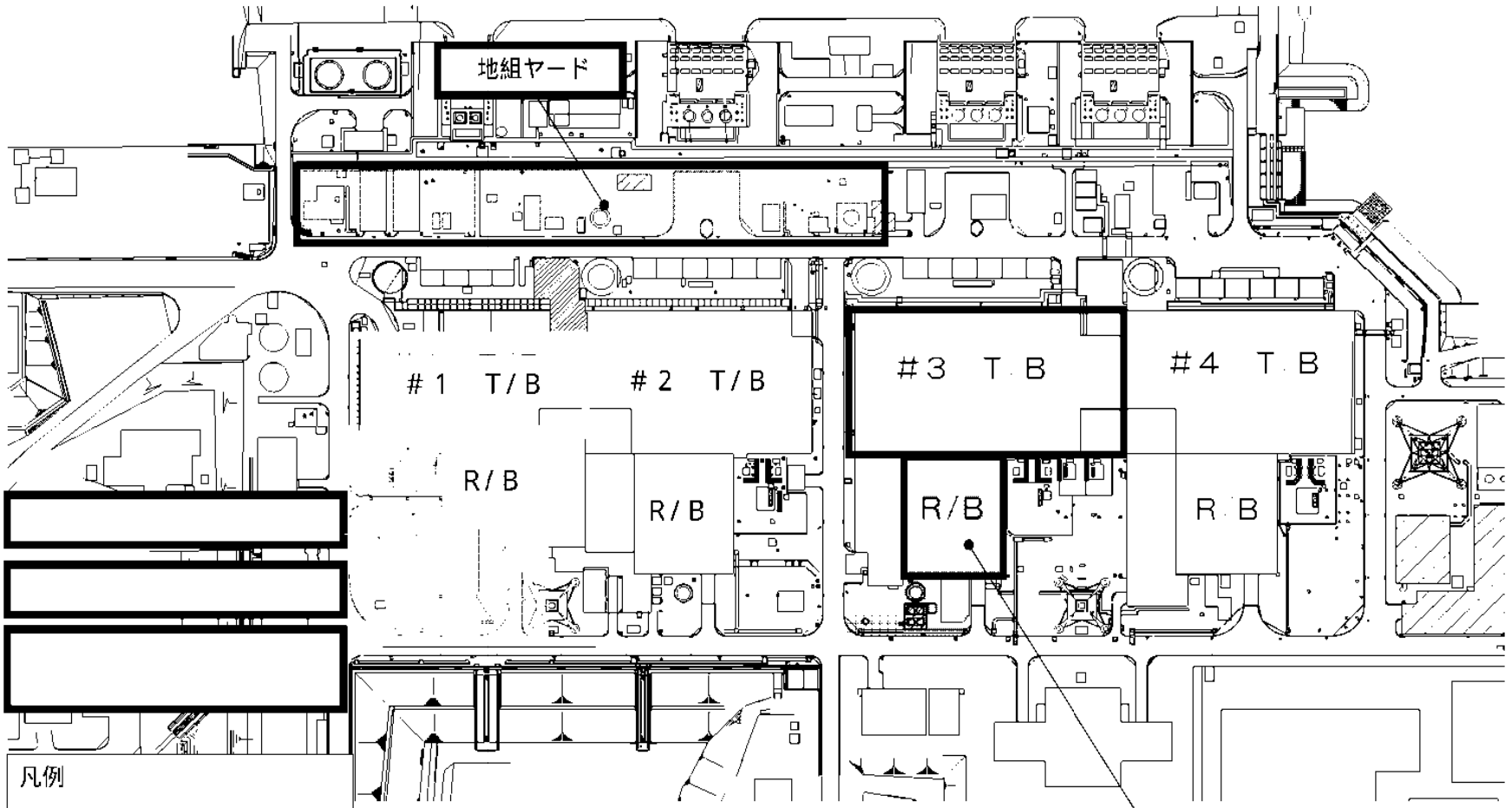
使用済燃料プール対策　スケジュール



使用済燃料プール対策　スケジュール

東京電力株式会社
使用済燃料プール対策
2014年12月25日

1，3号機 原子炉建屋上部瓦礫撤去工事 燃料取り出し用カバー工事 他 作業エリア配置図



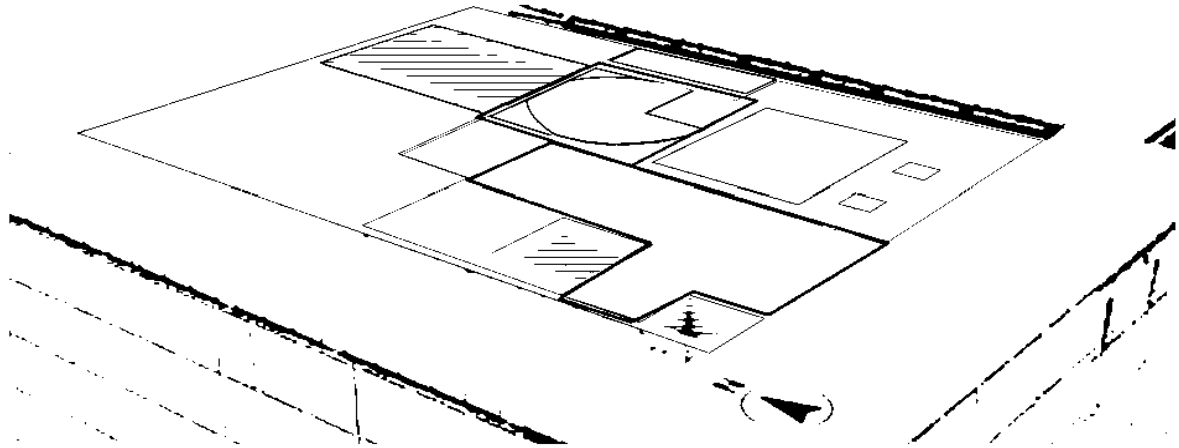
備考 R/B :原子炉建屋 T/B :タービン建屋 Rw/B :廃棄物処理建屋

東京電力株式会社
使用済燃料プール対策
2014年12月25日

【３号機原子炉建屋上部除染・遮へい工事】

■１１月２７日（木）～１２月２４日（水）主な作業実績
・Ｒ／Ｂ上部除染(ガレキ集積、ガレキ吸引、床表層切削)
・ＳＦＰ内瓦礫撤去
・追加飛散防止剤散布
・作業ヤード整備

□作業進捗イメージ図



【凡例】
除染対象外　ガレキ集積　ガレキ吸引　床表層切削　遮へい材設置
SFP内ガレキ撤去　追加飛散防止剤散布
※除染・遮へい対策手順：ガレキ集積→ガレキ吸引→床表層切削→遮へい材設置

■１２月２５日（木）～１月２８日（水）主な作業予定
・Ｒ／Ｂ上部除染(ガレキ集積、ガレキ吸引、床表層切削)
・ＳＦＰ内瓦礫撤去
・追加飛散防止剤散布
・作業ヤード整備

■備考
・Ｒ／Ｂ：原子炉建屋
・ＳＦＰ：使用済燃料貯蔵プール
・追加飛散防止剤散布：オペレーティングフロア全面への散布は既に実施済であるため、当該月の作業進捗に合わせた追加散布（作業前、作業後）エリアのみを記載

以　上

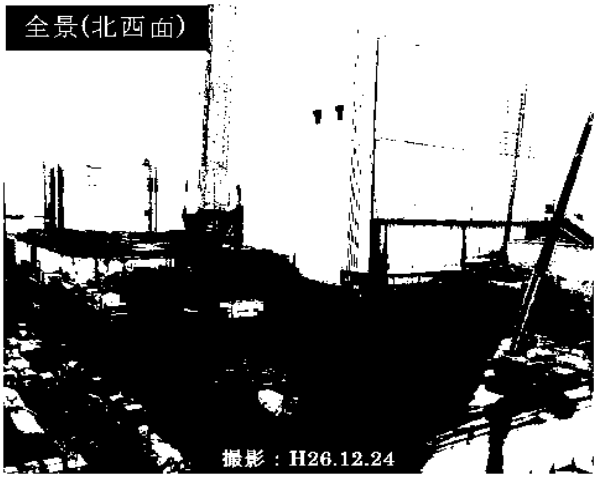
東京電力株式会社
使用済燃料プール対策
2014年12月25日

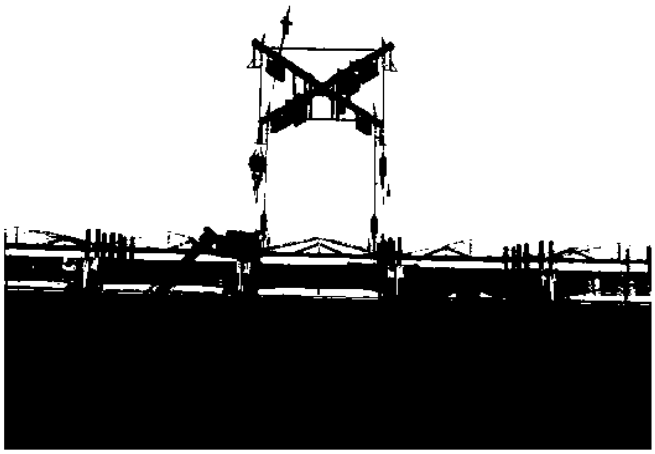
【１号機原子炉建屋カバー解体工事】

■１１月２７日（木）～１２月２４日（水）主な作業実績
・ガレキ調査
・温度分布調査　（ウェル上）
・ダストサンプリング（ウェル上）
・屋根パネル戻し（北３・南３）

□今月

作業進捗





屋根パネル戻し（南３）（１２月４日実施）

■１２月２５日（木）～１月２８日（水）主な作業予定
・資機材整備

■備考

以　上

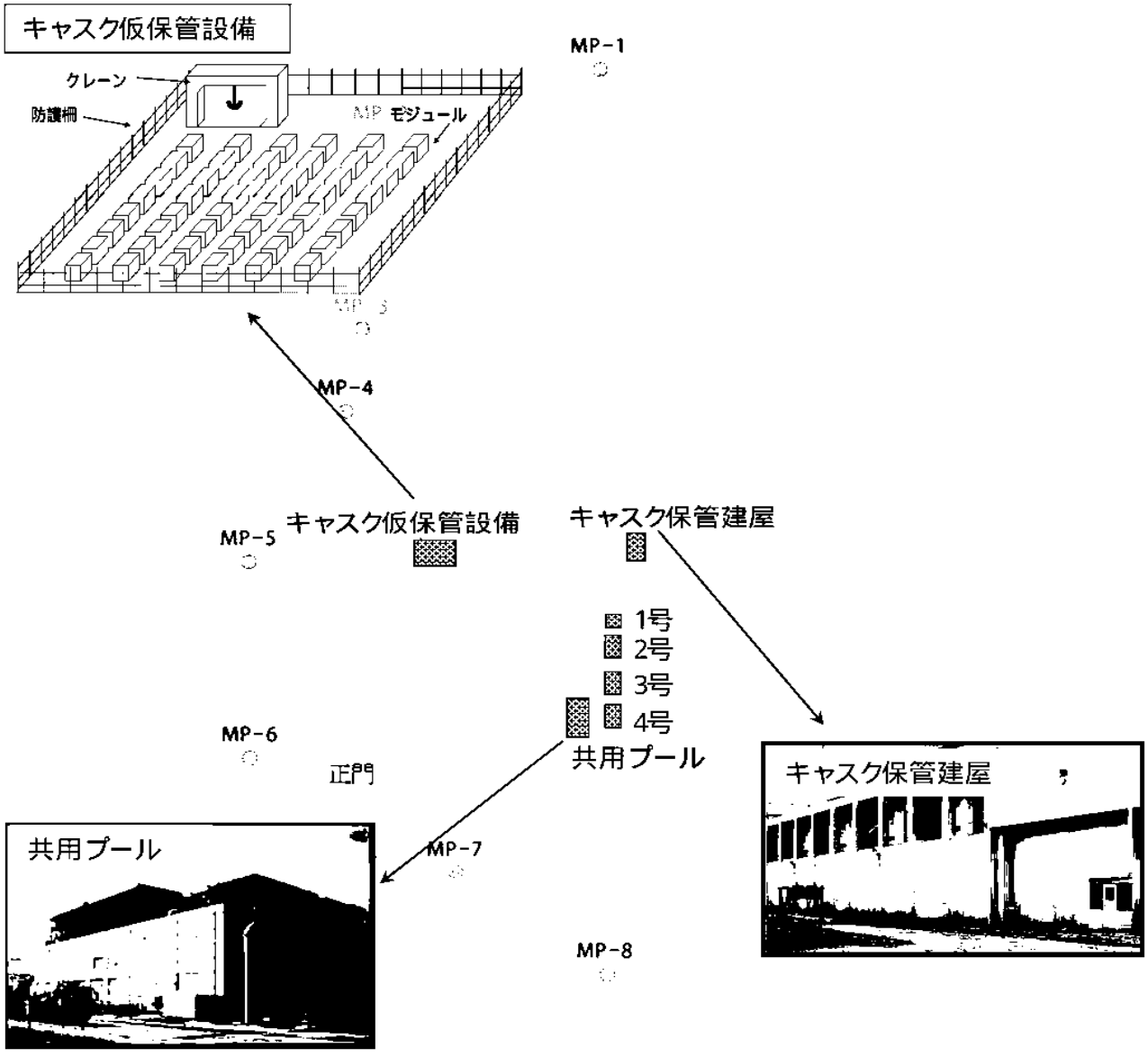
東京電力株式会社
2014年12月25日

使用済燃料の保管状況（H26.12.22作業終了時点）

保管場所	保管体数（体）			取出し率	（参考）	
	新燃料	使用済燃料	合計		H23.3.11時点	キャスク基数
1号機	100	292	392	0.0%	392	-
2号機	28	587	615	0.0%	615	-
3号機	52	514	566	0.0%	566	-
4号機	0	0	0	100.0%	1535	-
キャスク保管建屋	0	0	0	100.0%	408	0
合計	180	1393	1573	55.3%	3516	

保管場所	保管体数（体）			保管率	（参考）	
	新燃料	使用済燃料	合計		保管容量	キャスク基数
キャスク仮保管設備	0	1412	1412	48.2%	2930	28（容量：50）
共用プール	24	6702	6726	98.9%	6799	-

・共用プールラック取換工事実施により保管容量6840体から6799体に変更
・4号機の新燃料の一部（180体）は6号機使用済燃料プールへ輸送



福島第一原子力発電所1号機建屋カバー解体に向けた飛散防止剤散布と調査結果について

平成26年12月25日

東京電力株式会社

東京電力 TEPCO

目　次

1.はじめに

2.オペレーティングフロアの空気中の放射性物質濃度について

3.ガレキ調査

4.原子炉建屋上部の線量率測定

5.原子炉上部の放射性物質濃度調査

6.赤外線サーモグラフィ調査

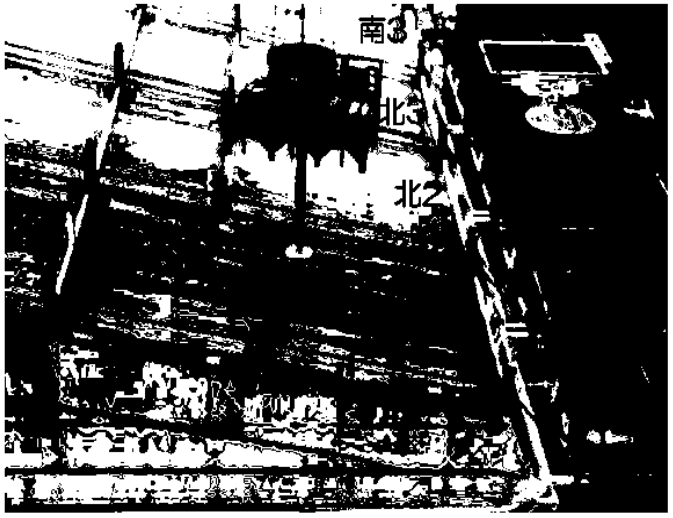
7.まとめ

1. はじめに

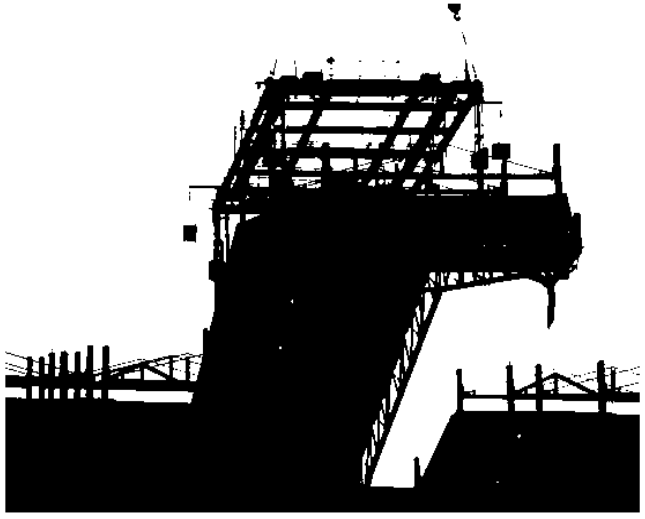
■建屋カバー解体を着実に進めるため，飛散防止剤散布，屋根パネル取り外し（計6枚ある屋根パネルのうち中央部分の2枚の取り外し），各種調査，屋根パネル戻しを実施した。

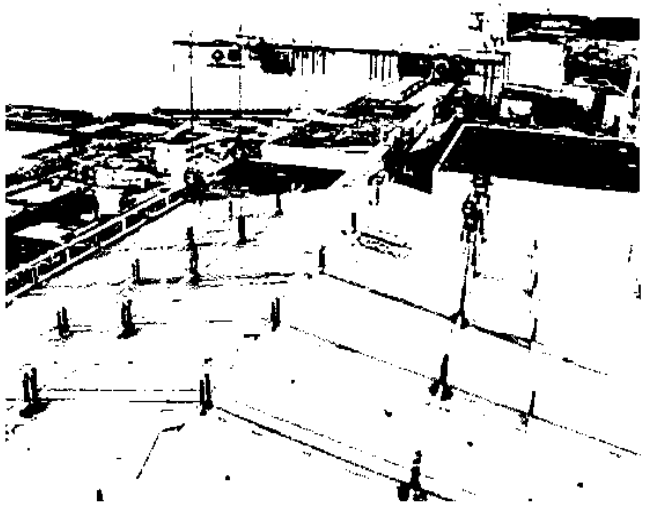
■工程（実績）
- 10/22～10/29：飛散防止剤散布
- 10/31　：1枚目屋根パネル取り外し
- 11/10　：2枚目屋根パネル取り外し
- 11/20　：原子炉上部の放射性物質濃度調査
- 11/21～12/3　：ガレキ調査，線量測定
- 11/29　：赤外線サーモグラフィ調査
- 12/4　：屋根パネル戻し

【状況写真】



飛散防止剤散布状況（10/22～10/29）


屋根パネル取り外し状況（10/31）


屋根パネル戻し状況（12/4）

2-1. オペレーティングフロアの空気中の放射性物質濃度について（結果）

■オペレーティングフロアの10/17（作業着手前）～12/5（屋根戻し完了翌日）までの「空気中の放射性物質濃度と風速の推移」をP5以降に示す

■各作業における空気中の放射性物質濃度
- オペレーティングフロアダスト濃度設定値※（5.0×10^{-3}Bq/cm^3）に比べ低い値で推移した。
- 屋根パネル取り外し～屋根パネル戻しまでの間でオペレーティングフロアダスト濃度設定値を超えることはなかった。
- 今回実施した全ての作業においてオペレーティングフロア空気中の放射性物質濃度の上昇はなかった。

項　目	測定対象期間	オペレーティングフロア上の空気中の放射性物質濃度	備　考
作業着手前（穴あけ、飛散防止剤散布前）	10/17～10/22	2.1×10^{-6}Bq/cm^3～7.2×10^{-5}Bq/cm^3	
屋根パネルを穿孔した飛散防止剤散布	10/22～10/29	1.4×10^{-6}Bq/cm^3～4.4×10^{-5}Bq/cm^3	
屋根パネル取り外し(南3)	10/30～10/31	2.0×10^{-6}Bq/cm^3～3.5×10^{-5}Bq/cm^3	屋根取り外し:10/31
屋根パネル取り外し(北3)	11/ 1 ～11/10	2.0×10^{-6}Bq/cm^3～3.2×10^{-5}Bq/cm^3	屋根取り外し:11/10
屋根パネル2枚取り外し以降	11/11～12/4	6.3×10^{-7}Bq/cm^3～2.7×10^{-5}Bq/cm^3	屋根戻し:12/4
屋根パネル戻し完了以降	12/5	4.9×10^{-6}Bq/cm^3～2.0×10^{-5}Bq/cm^3	

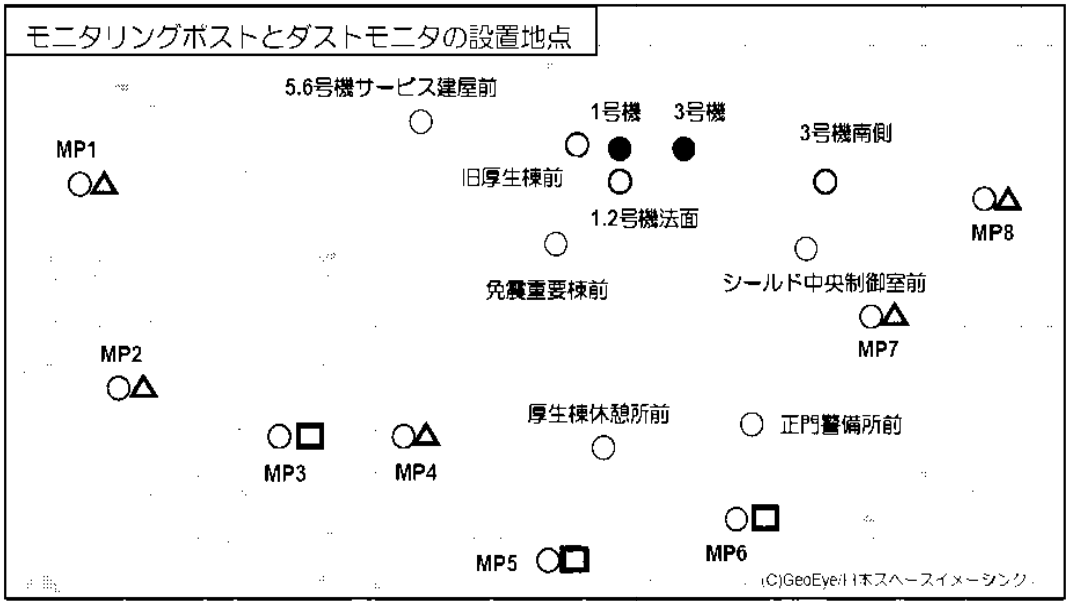
※ 敷地境界モニタリングポスト近傍のダストモニタ警報値より設定した公衆被ばくに影響を与えないように設定した値

2-2. オペレーティングフロアの空気中の放射性物質濃度について（結果）

■空気中の放射性物質濃度と風速の関係

・屋根パネル取り外し後の強風時においてもオペレーティングフロア空気中の放射性物質濃度に上昇はなかった。また，構内各種ダストモニタ・モニタリングポストについても上昇や有意な変動がなく推移した。

項目	日時	空気中の放射性物質濃度 (Bq/cm3)	風速(m/s)	備考
オペレーティングフロア空気中の放射性物質濃度が最大時	H26/10/24 7:49	4.4×10^{-5}	0.9	-
最大風速(10分間平均)時	H26/11/3 8:20	4.9×10^{-6}	10.2	最大風速時における瞬間最大風速 20.0m/s



【凡例】

敷地境界のモニタリングポスト　：○（有意な変動：＋２μSv/h以上の変動）

１号機原子炉建屋のダストモニタ：●（設定値：5×10^{-3}Bq/cm3）

３号機原子炉建屋のダストモニタ：●（設定値：5×10^{-3}Bq/cm3）

建屋周辺のダストモニタ　：○（設定値：1×10^{-4}Bq/cm3）

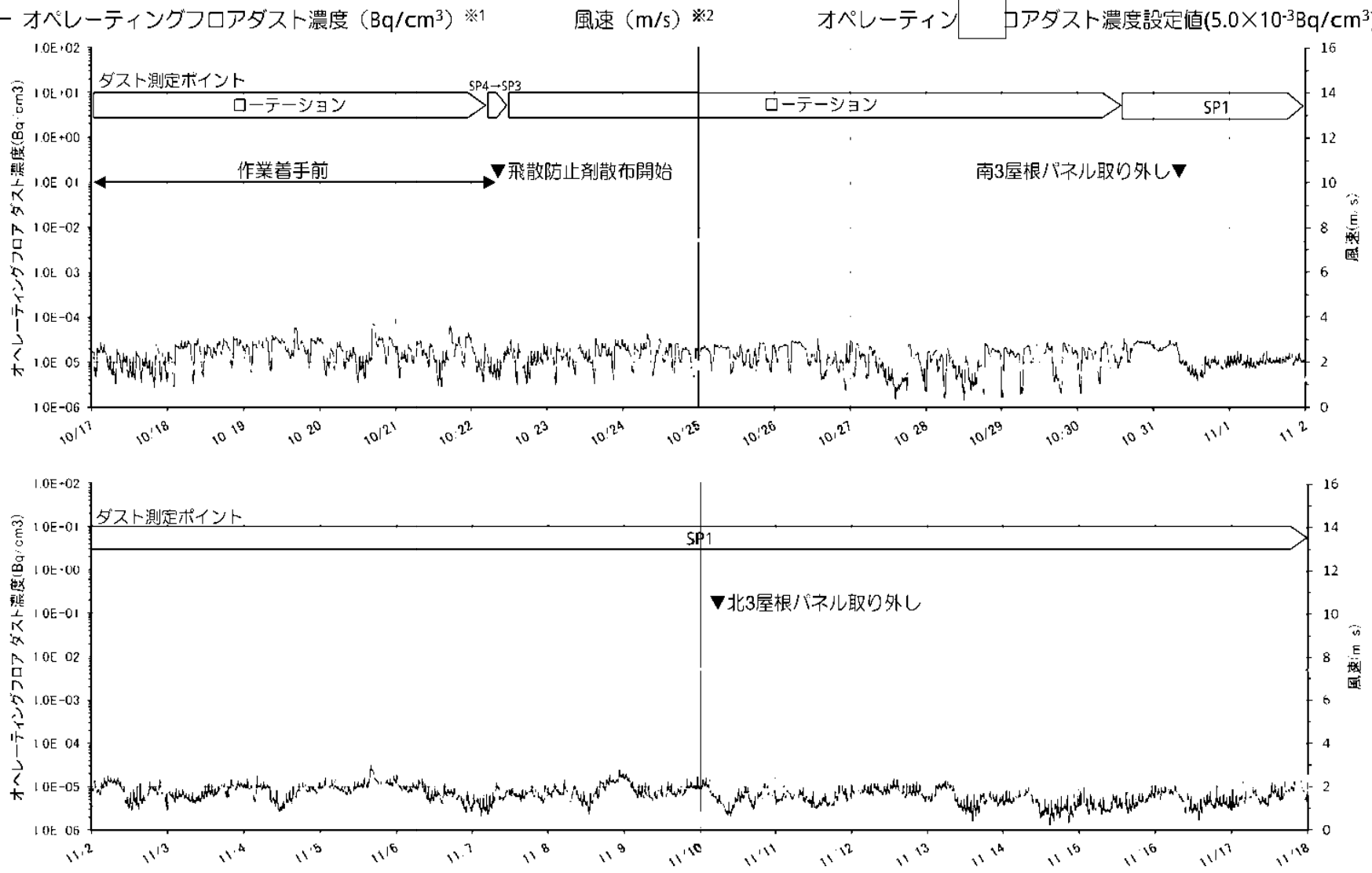
構内のダストモニタ　：○（設定値：1×10^{-4}Bq/cm3）

敷地境界付近のダストモニタ　：△（設定値：1×10^{-5}Bq/cm3）

敷地境界付近のダストサンプラ　：□

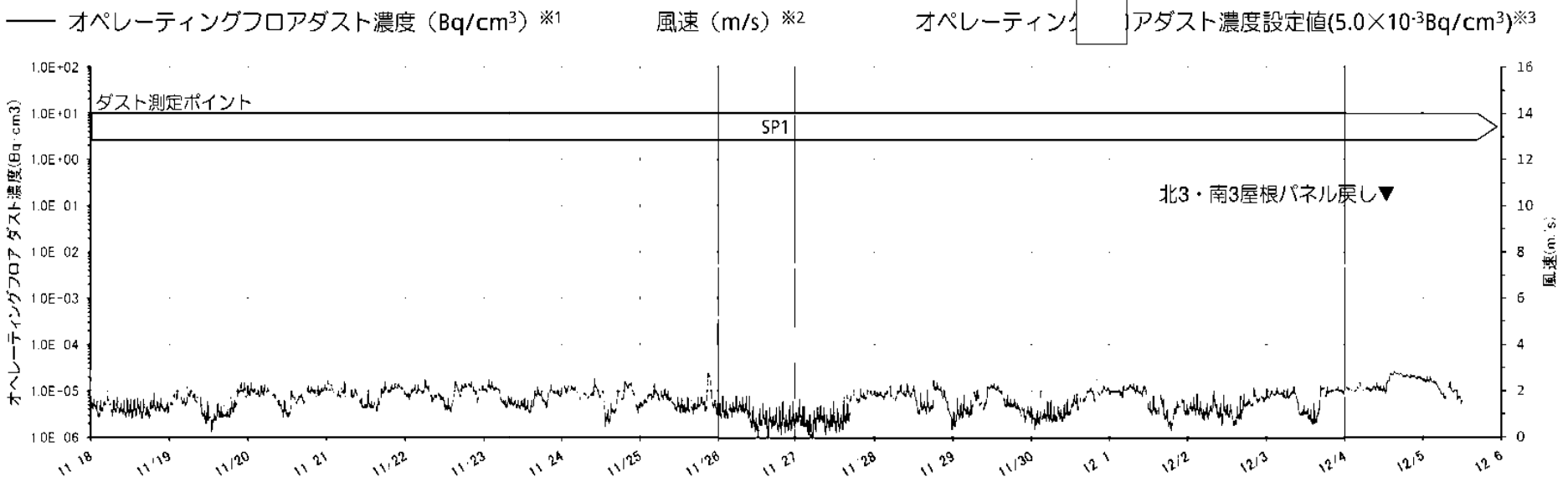
2-3. オペレーティングフロアの空気中の放射性物質濃度について

オペレーティングフロアの空気中の放射性物質濃度推移と風速の推移

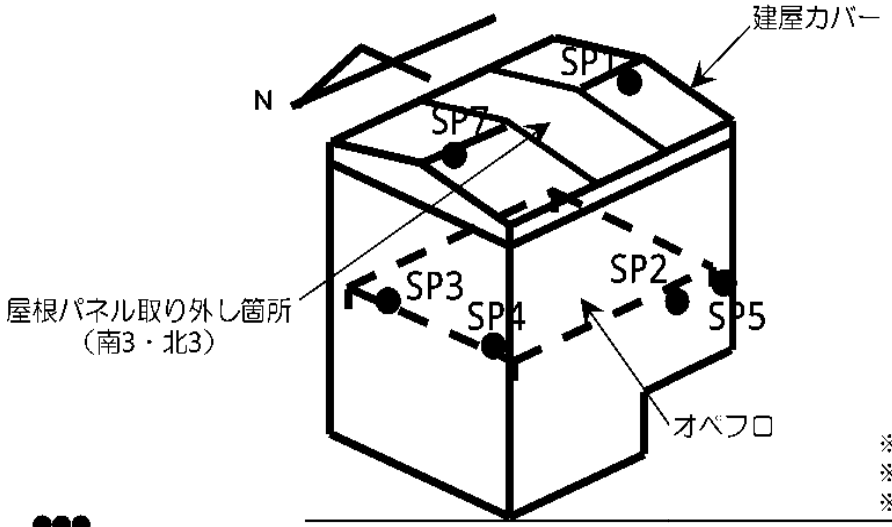


※1オペレーティングフロアダスト濃度0～20分値については有効値ではないため削除
※2福島第一原子力発電所構内露場にて観測した値(10分間の平均風速)
※3 敷地境界モニタリングポスト近傍のダストモニタ警報値より設定した公衆被ばくに影響を与えないように設定した値

2-4. オペレーティングフロアの空気中の放射性物質濃度について



1号機建屋カバー内ダストモニタのサンプリング箇所



	サンプリング箇所	オペフロ面からの高さ
SP1	使用済燃料プール天井部	＋約19m
SP2	原子炉建屋オペフロ面開口部	+約0.5m
SP3	カバー北東コーナー	+約0.5m
SP4	カバー北西コーナー	+約0.5m
SP5	カバー南西コーナー	+約0.5m
SP7	カバー排気系フィルター入口	+約23m

※1オペレーティングフロアダスト濃度0～20分値については有効値ではないため削除
※2福島第一原子力発電所構内露場にて観測した値(10分間の平均風速)
※3 敷地境界モニタリングポスト近傍のダストモニタ警報値より設定した公衆被ばくに影響を与えないように設定した値

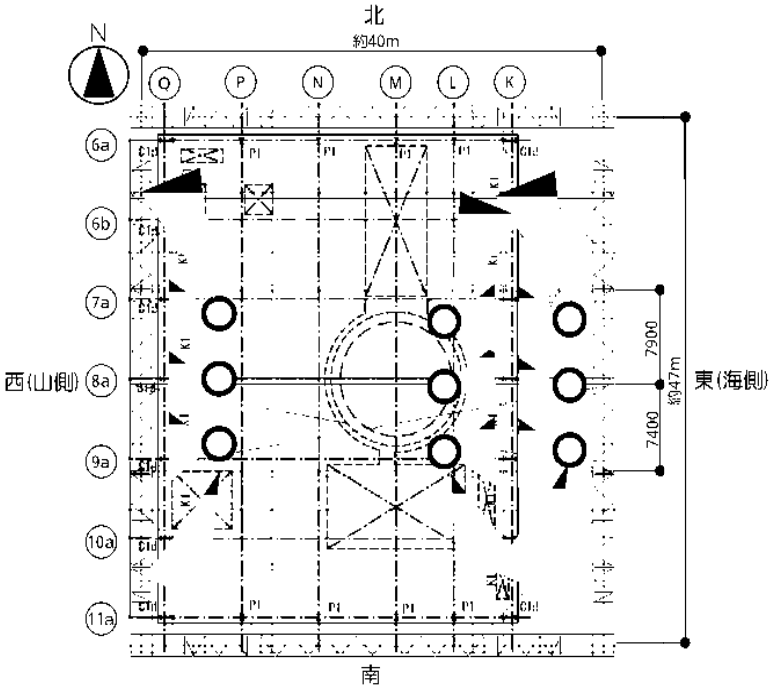
3-1．ガレキ調査（調査概要）

目的：ガレキ撤去方法を検討するためのデータ収集

項目：天井クレーンや燃料取扱機（FHM）の状況，使用済燃料プール（SFP）周りのガレキ状況，線量率測定

方法：1．カメラを原子炉建屋上部(ガレキ上部)へクレーンにて吊り下げ，撮影
2．崩落した屋根の裏側は，線量計付きのカメラを東面から挿入して，撮影

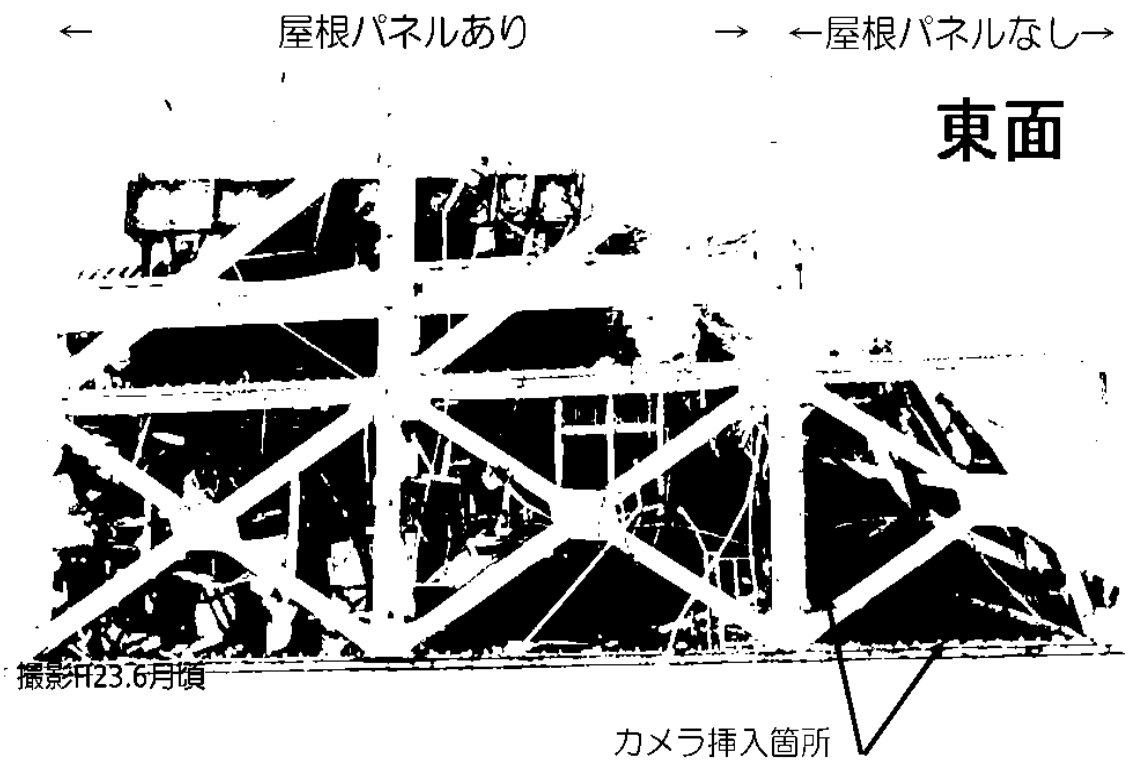
［原子炉建屋上部調査箇所］



○ カメラ吊り下げ位置

撮影方向

［崩落した屋根の裏側の調査箇所］



3-2. ガレキ調査 （結果）

[原子炉建屋上部]

オペレーティングフロア上には，崩落した屋根が散乱している様子が確認された。また、先行して撤去するガレキを確認した。

[原子炉建屋上部の既存鉄骨]

大部分の柱，梁，接合部のボルトに損傷はみられなかったが，一部，接合部のボルト欠落，ブレースの損傷を確認した。今後，今回の調査結果をふまえ，散水設備設置の詳細方法立案を進める。

[崩落した屋根の裏側]

①使用済燃料プール（ＳＦＰ）

ＳＦＰ及びＳＦＰ内燃料に損傷を与えるような，燃料取扱設備（ＦＨＭ，天井クレーン）の落下及び鉄骨材が水面から突き出ている様子は確認されなかった。今後，建屋カバー解体後にさらに調査を行う。

②燃料取扱設備

天井クレーンの一部がＦＨＭ上に乗りかかるように落下しており，ＦＨＭで支えられている。

ＦＨＭについては天井クレーンとの接触部及び下部付近に一部変形等が確認されているが，落下している様子は確認されなかった。

今回の調査は，東面の一部からであったが，今後の建屋カバー解体後に残りの東面，南面及び西面からの調査を行い，安全な撤去方法を検討する。

3-3. ガレキ調査（結果）

③使用済燃料プール(ＳＦＰ)周辺

ＳＦＰ付近にはガレキが散乱しており，その中に東側の新燃料貯蔵庫のコンクリートハッチを確認した。なお，当該貯蔵庫内には，新燃料は保管されていない。

④原子炉ウェル付近

原子炉上部に設置してある，原子炉ウェルカバーの一部が浮き上がっていることが確認された。

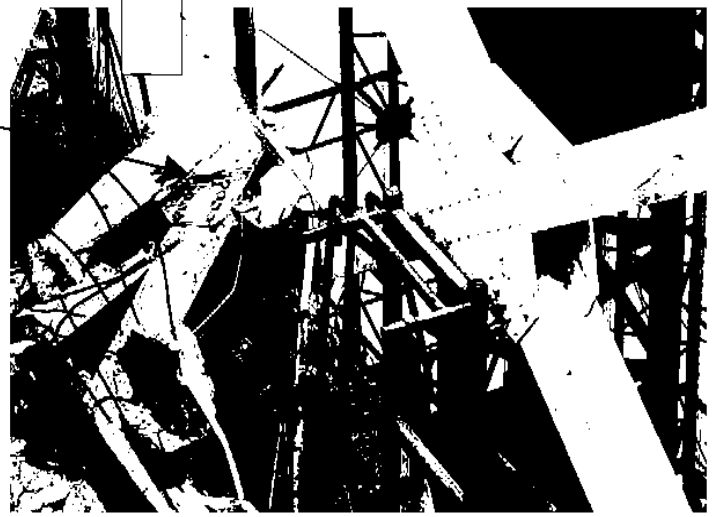
なお，当該ウェルカバー以外については崩落した瓦礫に覆われている状態であるため確認が出来なかったため，建屋カバー解体後の瓦礫撤去にあわせ，慎重に調査する。

3-4. ガレキ調査 （調査写真） [原子炉建屋上部

写真①(オペフロ北西部)

既存階段室

屋根鉄骨



写真③（オペフロ北東側）

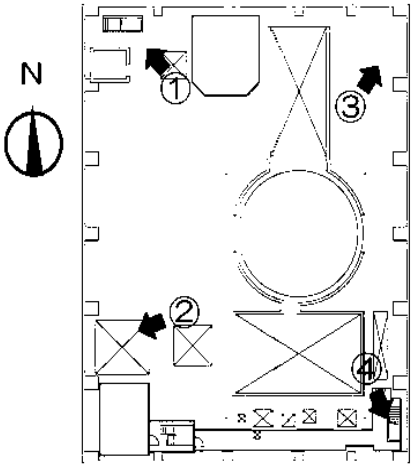


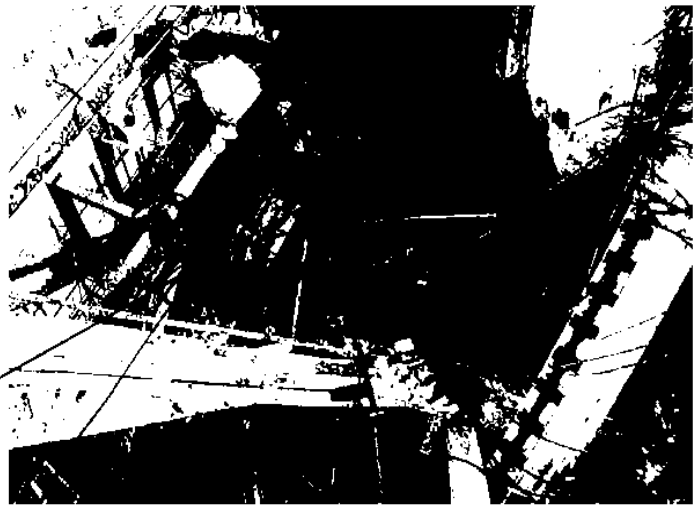
図１：撮影箇所
（オペフロレベル；OP+38.9m）

写真②(オペフロ南西側)

鉄筋

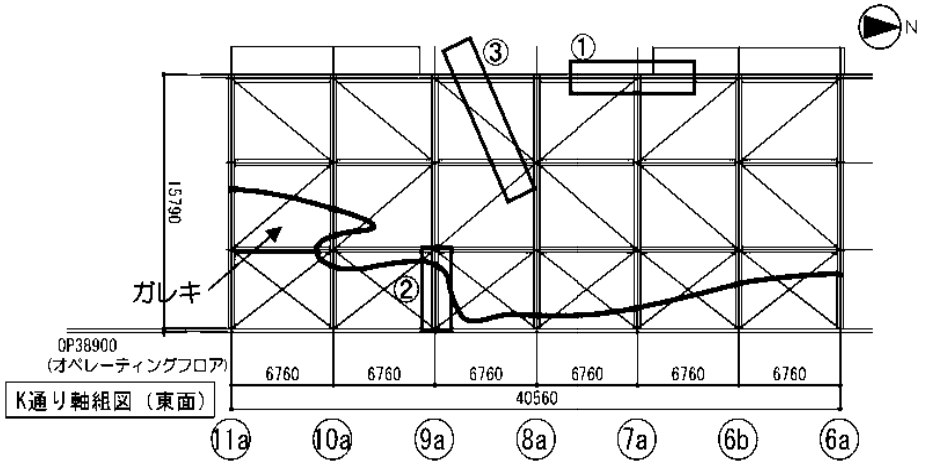
屋根

屋根

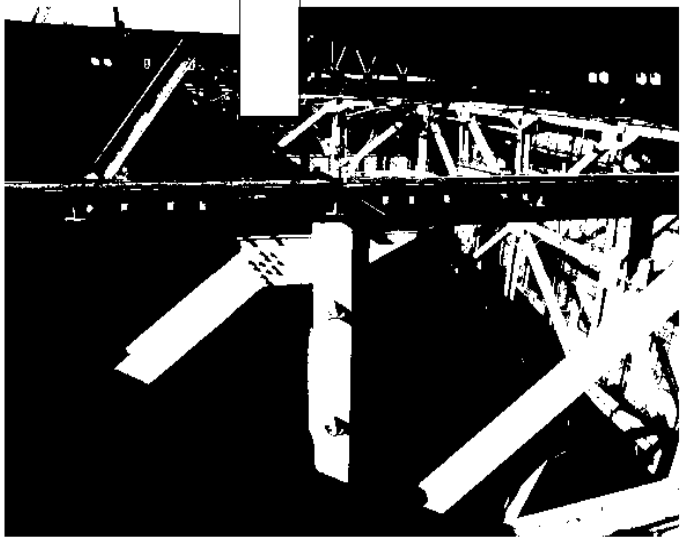


写真④(オペフロ南東側)

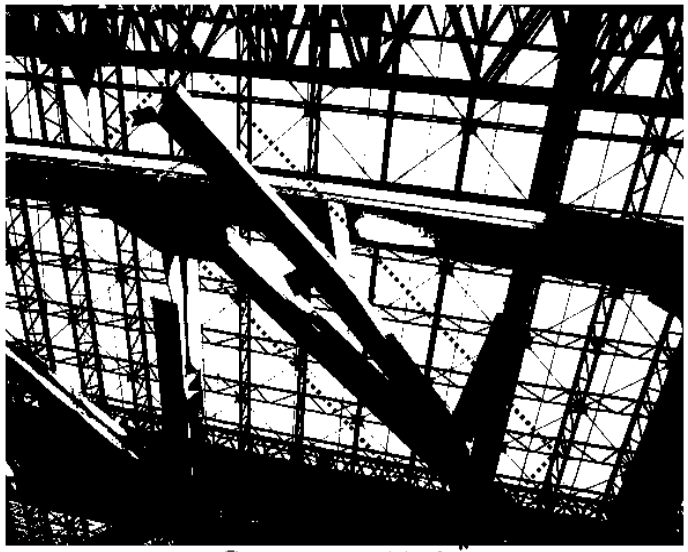
3-5. ガレキ調査 （調査写真） [原子炉建屋上部の既存鉄骨]



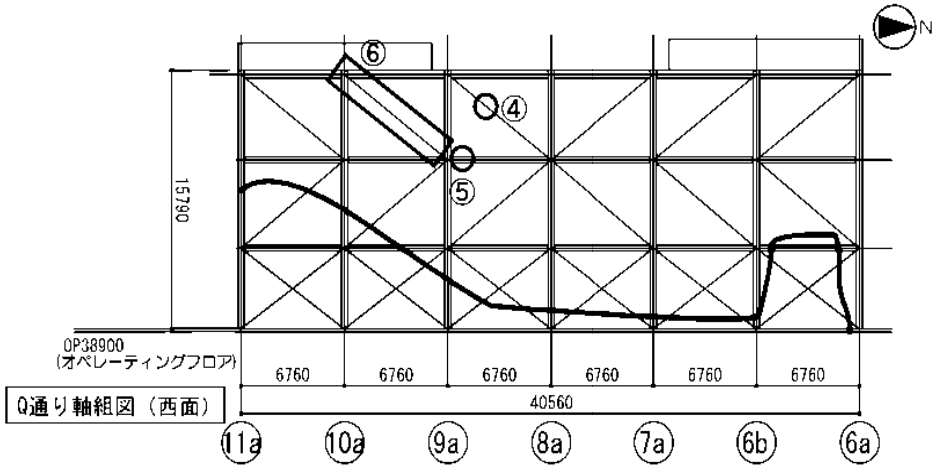
K通り軸組図（東面）


① 7a柱上部梁
健全

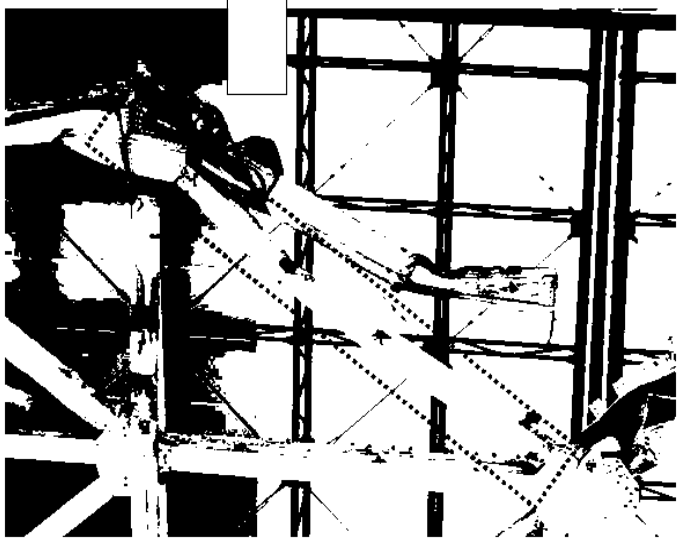
② 9a通り柱脚
健全

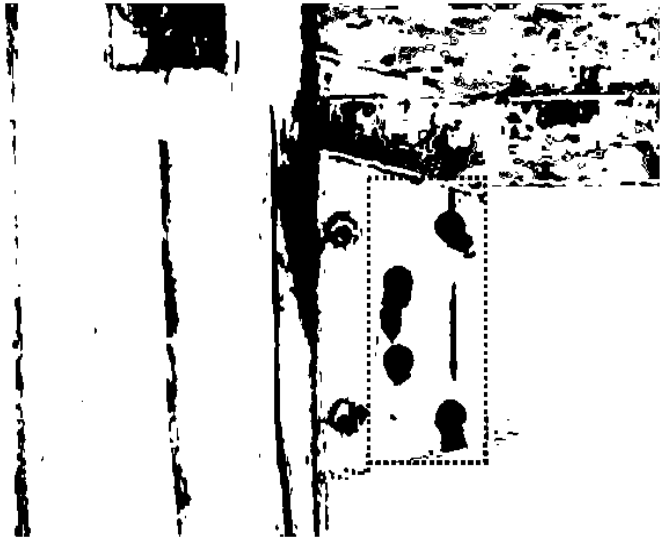

③ 7a通り付近
鉄骨損傷

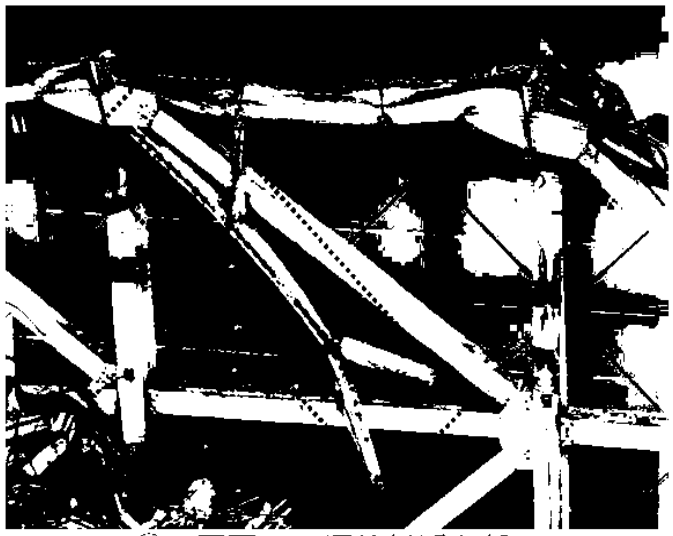
3-6. ガレキ調査 （調査写真） [原子炉建屋上部の既存鉄骨]



Q通り軸組図（西面）


④　9a-8a通り間上部
鉄骨損傷


⑤　9a通り柱梁接合部
ボルト欠落


⑥　西面10a通り付近上部
鉄骨損傷

3-7. ガレキ調査（調査写真） [崩落した屋根の裏側]

写真①

写真③

写真②

燃料取扱機

ガレキ

原子炉ウェルカバー

燃料取扱機(下部部分)

使用済燃料プール水面

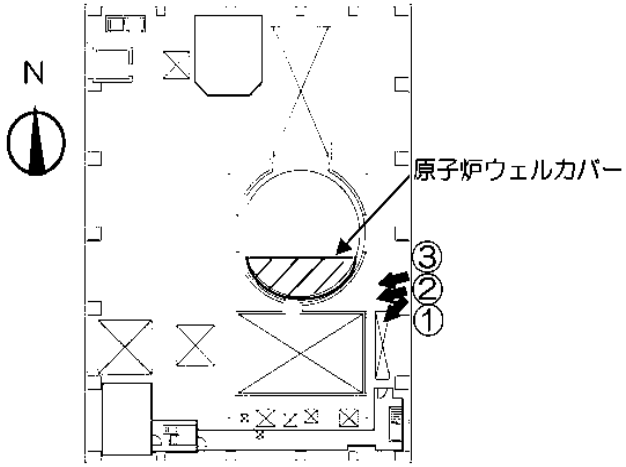
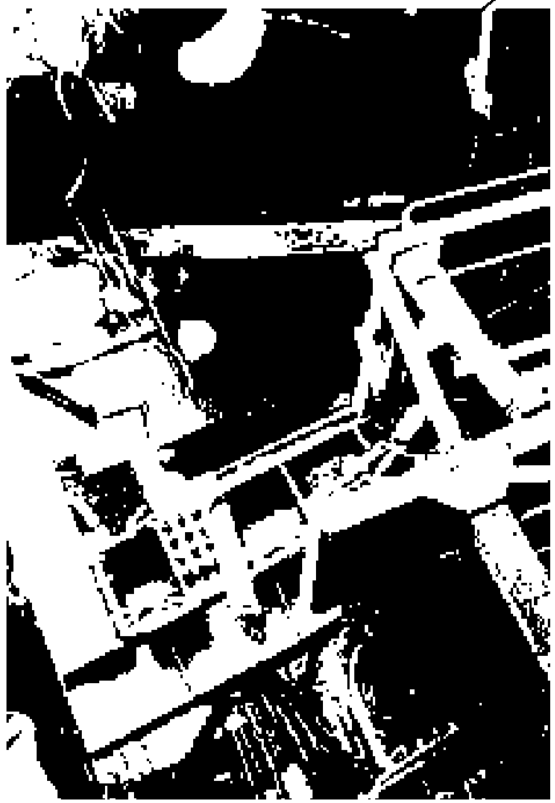


図１：撮影箇所

3-8. ガレキ調査 （調査写真）[崩落した屋根の裏側]



写真④

写真⑤

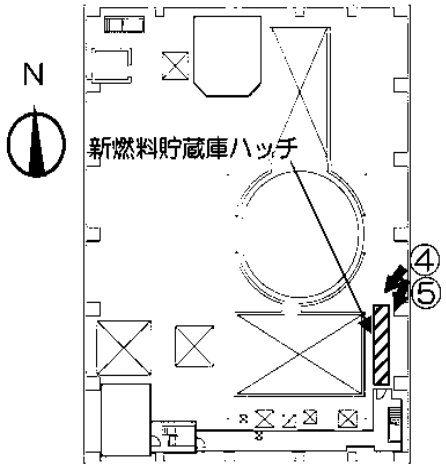
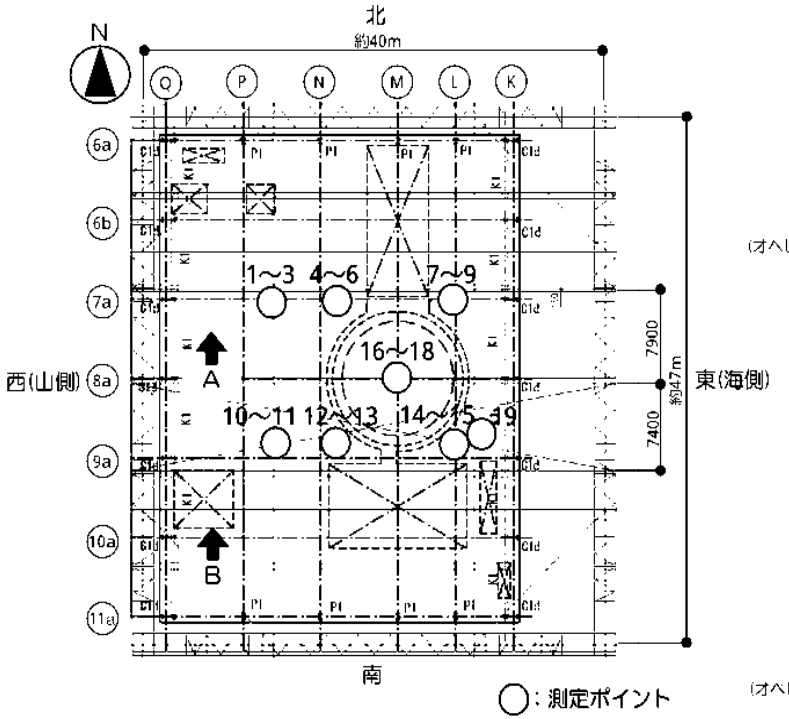


図１：撮影箇所

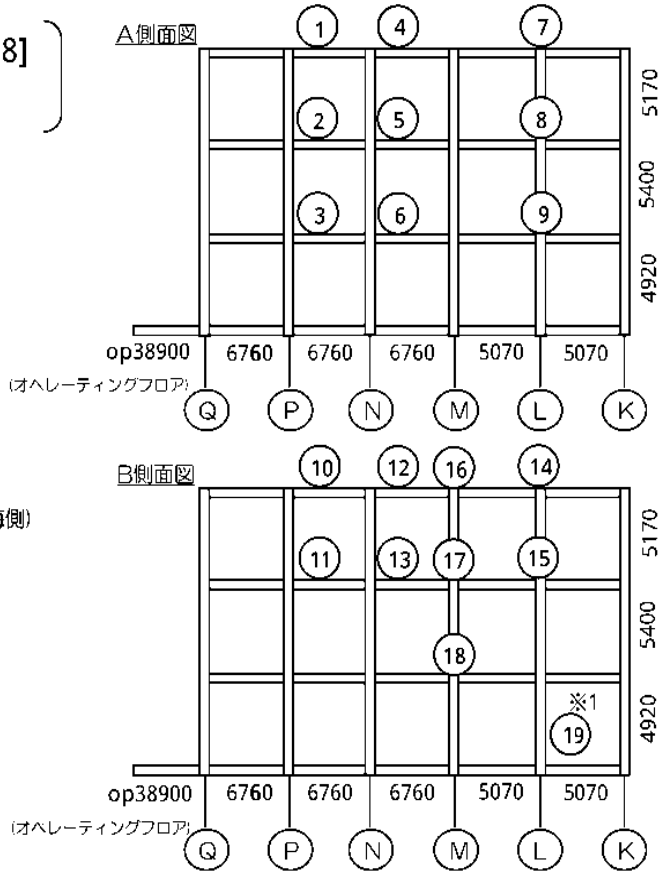
4. 原子炉建屋上部の線量率測定（調査概要と結果）

目　的：オペレーティングフロアの線量率の確認
測定日：H26/11/24,H26/12/01
結　果：今回の線量率測定はガレキ上部の測定が主で約8～77mSv/hであったが，今後ガレキ撤去後の線量率の上昇を加味して，ガレキ撤去計画の検討を進める。

測定器：電離箱式サーベイメータ[測定ポイント1～18]
　　パンケーキ型GM検出器 [測定ポイント19]



1号機原子炉建屋　平面図



1号機原子炉建屋　側面図

線量率測定結果

測定ポイント	線量率(mSv/h)
①	10
②	11
③	8
④	13
⑤	19
⑥	21
⑦	16
⑧	28
⑨	58
⑩	9
⑪	9
⑫	13
⑬	14
⑭	20
⑮	27
⑯	21
⑰	32
⑱	66
⑲	77

※1測定ポイント19は崩落した屋根の裏側調査時に実施

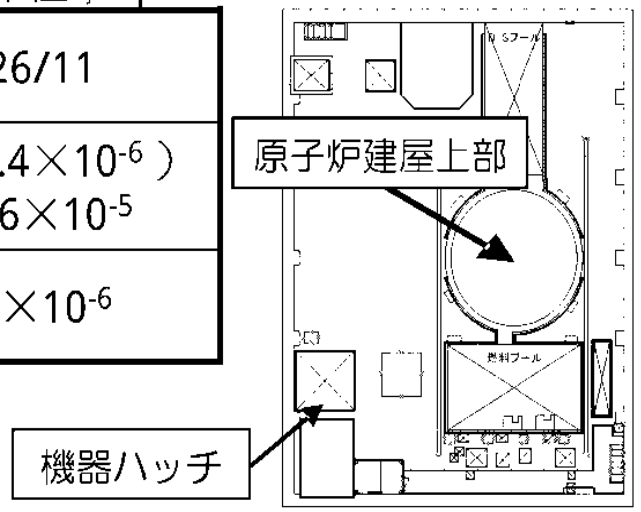
5. 原子炉上部の放射性物質濃度調査（調査概要・結果）

目　　的：原子炉建屋上部の放射性物質濃度を測定する。
測 定 日：H26/11/20
測定方法：放射性物質濃度測定器を原子炉建屋上部へクレーンにて吊り下げて，所定の位置にて一定時間計測する。
結　　果：・空気中の放射性物質濃度を下表に示す。
・H23/10に比べ約1/100に低下しており，現時点のオペレーティングフロア空気中の放射性物質濃度計測値と同等レベルであった。
→「原子炉の安定冷却の継続による放射性物質発生量自体の減少」が考えられる。

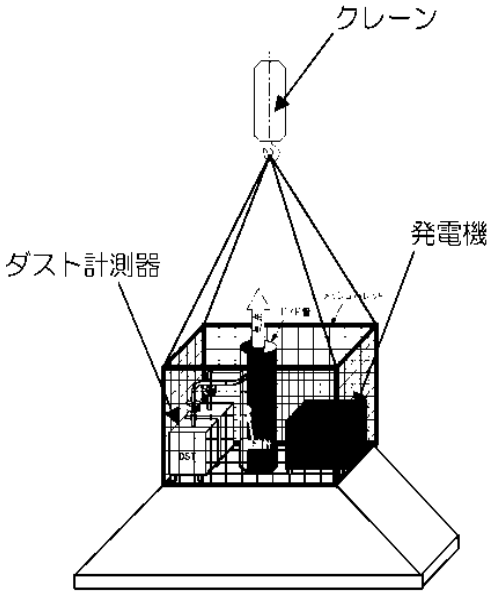
単位 ;Bq/cm^3

測定場所	H23/10※1	H26/11
原子炉上部	9.9×10^{-4}	ND（3.4×10^{-6}）～1.6×10^{-5}
機器ハッチ※2	2.6×10^{-4}	2.4×10^{-6}

表の数値は，Cs-134.137の合計値



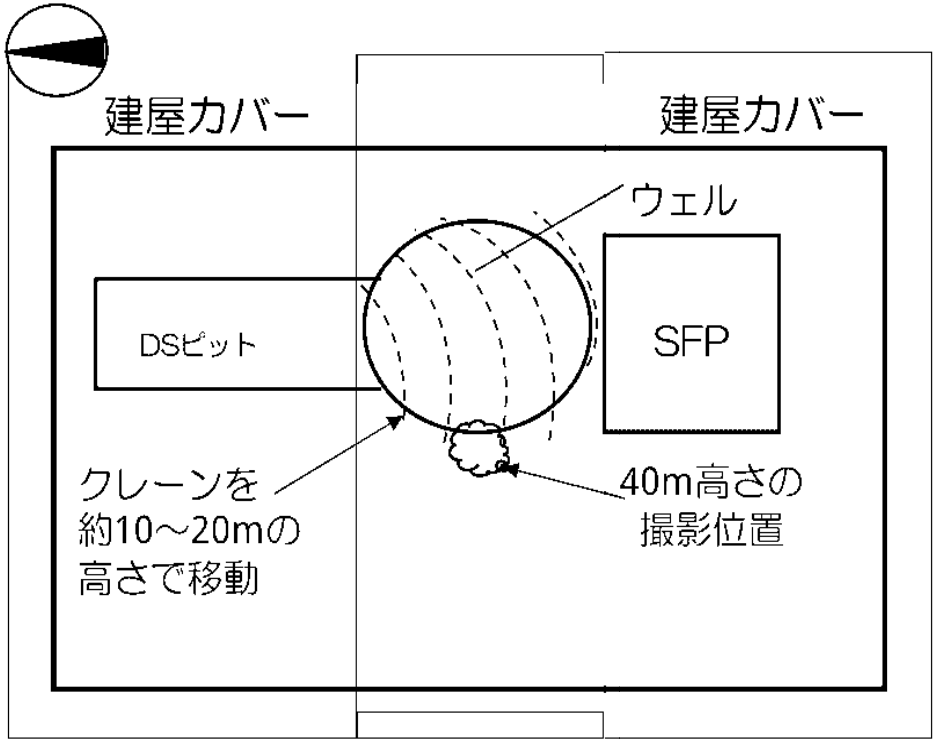
放射性物質濃度調査位置
（H26/11/20）



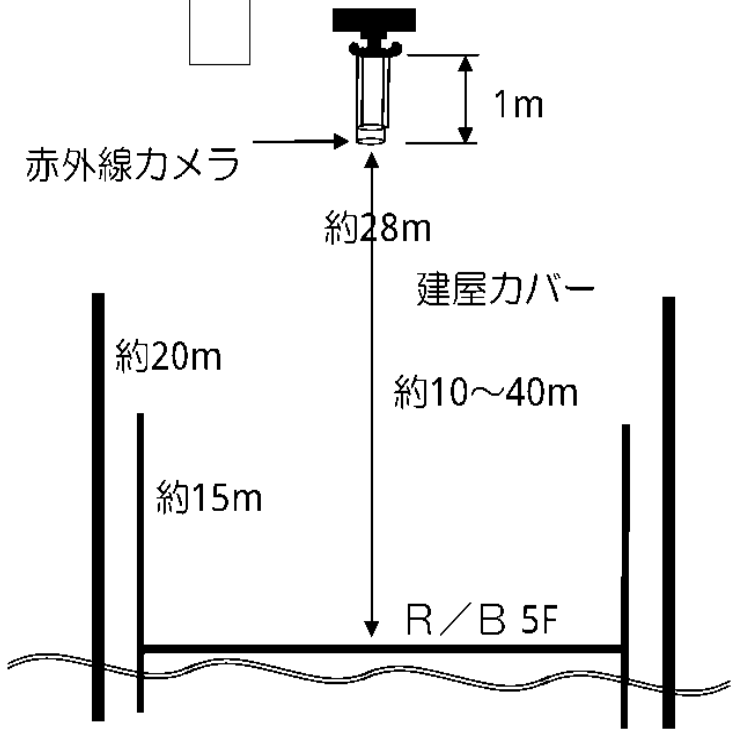
ダスト測定装置概要図

※1建屋カバー設置前
※2機器ハッチ付近の可搬型サンプラーにて採取

6-1. 赤外線サーモグラフィ測定（調査概要）



原子炉建屋5階 平面イメージ



原子炉建屋 断面イメージ

目　　的：原子炉建屋ウェル上部ガレキ表層部に熱源がなく有意な吹き上げがないことを確認する
測定日時：H26/11/29　8:05～8:51
気象状況：気温12℃，湿度97.9%（8:30時点）
測定高さ：原子炉建屋オペレーティングフロア上　約10～40m
測定方法：連続自動撮影状態にした，赤外線カメラ１台を原子炉建屋上部へクレーンにて吊り下げて，撮影位置へ移動し，測定高さを変えながら撮影。
（オペレーティングフロア上にガレキがあるため適宜測定高さを変えて撮影）
撮影後，赤外線カメラを回収し，データ確認を実施。

6-2. 赤外線サーモグラフィ測定（結果）

【測定結果について】

原子炉ウェル上部付近で，測定可能な範囲で温度分布を確認した結果，外気温（12℃）と同等程度（約8～13℃）であり、ガレキ表層部に熱源は確認されなかったことから，有意な吹き上げが生じている状況ではないことを確認した。

３号機では，ＰＣＶヘッドにて熱せられた雨水の水蒸気が，オペフロウエルカバーの隙間より放出される（湯気発生の推定メカニズム）際に，蒸気と接触しているオペフロ表層部を熱して周囲より温度が高い部分が発生していたが，今回の１号機では，そのような状況も確認されなかった。

【参　考】

◎赤外線サーモグラフィには以下のような特性がある。

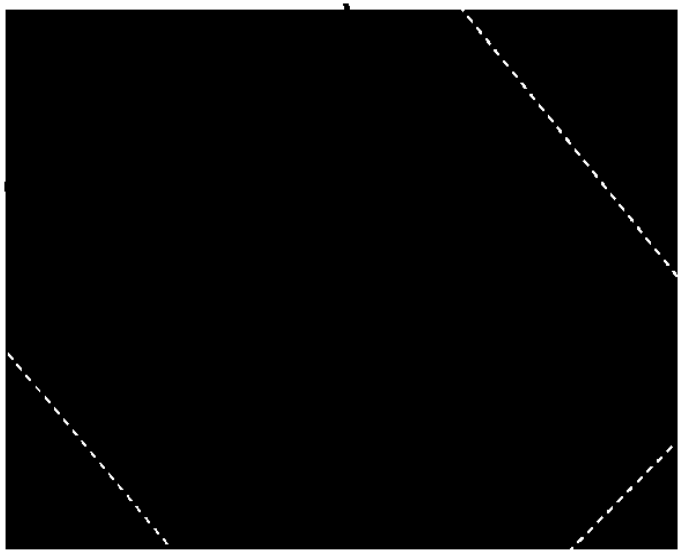
・蒸気については濃密度でなければ蒸気自体の温度は表示されない

・構造物については表面温度を計測する（内部温度は測定不可）

・同一温度の物でも、その放射率・反射率の違いにより測定値に違いがでる

6-3. 赤外線サーモグラフィ測定（調査画像）

測定高さ：[illegible]m画像



測定高さ：20m画像

7.まとめ

【空気中の放射性物質濃度測定】
・屋根パネル2枚取り外した後，ダストの状況を傾向監視した結果，屋根パネル取り外し前と変わらずダスト濃度が上昇しないことを確認した。

【ガレキ調査】
・今回の調査では，バルーン調査等これまでの調査と比較して，より詳細な確認ができた。
・原子炉建屋上部については，先行して撤去するガレキを確認した。今後，ガレキ撤去計画を検討する。
・崩落した屋根の裏側については、ＳＦＰ及びＳＦＰ内燃料に損傷を与えるような，燃料取扱設備の落下及び鉄骨材が水面から突き出ている様子は確認されなかった。今後，建屋カバー解体後にさらに調査を行う。

【原子炉建屋上部の線量率測定】
・今回の線量率測定はガレキ上部の測定が主で約8～77mSv/hであったが，今後ガレキ撤去後の線量率の上昇を加味して，ガレキ撤去計画の検討を進める。

【赤外線サーモグラフィ測定】
・外気温（12℃）と同等程度　（約8～13℃）であり、ガレキ表層部に熱源は確認されなかったことから，有意な吹き上げが生じている状況ではないことを確認した。

■ダスト飛散や使用済燃料プール内燃料に直ちに損傷を与えるような事象は確認されなかった。来春以降，再度屋根パネルを取り外し，慎重に建屋カバー解体を進めていく予定。

■ガレキ調査にて確認された先行撤去するガレキについて撤去計画を検討する。

３号機使用済燃料プール内大型瓦礫撤去作業の進捗状況について

平成２６年１２月25日
東京電力株式会社

東京電力
TEPCO

３号機大型瓦礫撤去作業の進捗状況について

- ３号機使用済燃料プールからの燃料取り出しに向け、使用済燃料プール内の大型瓦礫撤去を開始(2013.12.17)。
- ３月中にＦＨＭに干渉している鉄筋・デッキプレート等の撤去をほぼ完了。FHM撤去作業に着手。
- 8月末に操作卓落下事象により作業を中断。
- 12月17日に作業再開。
- これまでの撤去瓦礫量は累計で鉄筋322本、デッキプレート55枚、屋根トラス材6本、走行式補助ホイスト1基，張出しフレーム1枚，操作卓1基

使用済燃料プール内大型瓦礫撤去順序

落下防止対策（ライニング養生）

↓

ＦＨＭに干渉していない瓦礫の撤去（①～②）

↓

ＦＨＭに干渉している瓦礫の撤去（③ ～⑦）

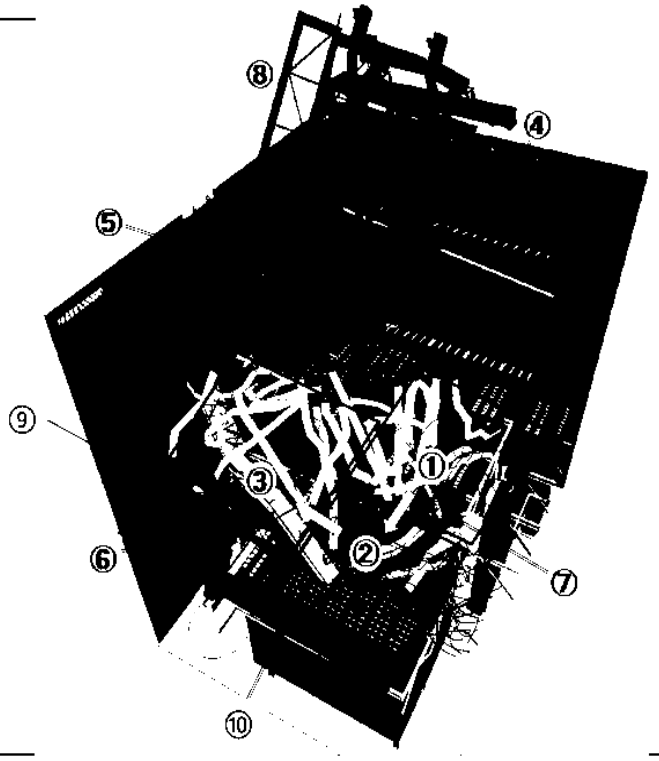
↓

現在実施中

ＦＨＭ他残存瓦礫の撤去（⑧，⑨，⑩）

操作卓落下事象を受け，今後の瓦礫撤去作業中に，ラック養生板追加敷設を行う。

＜使用済燃料プール内瓦礫撤去作業状況＞



追加養生板敷設と瓦礫撤去時の運用方針

＜養生板敷設＞

●撤去前に撤去対象物の移動ルートにある燃料ラック上を原則養生する。・・・Ⓐ

●大型瓦礫着床の干渉等により養生板が追加設置できない場合は，養生板設置前に着床瓦礫を撤去する。

●養生板が追加設置できない範囲を撤去対象物が移動する場合は，以下の「撤去時の運用」にて対処する。

「撤去時の運用」

＜FHMブリッジ以外＞

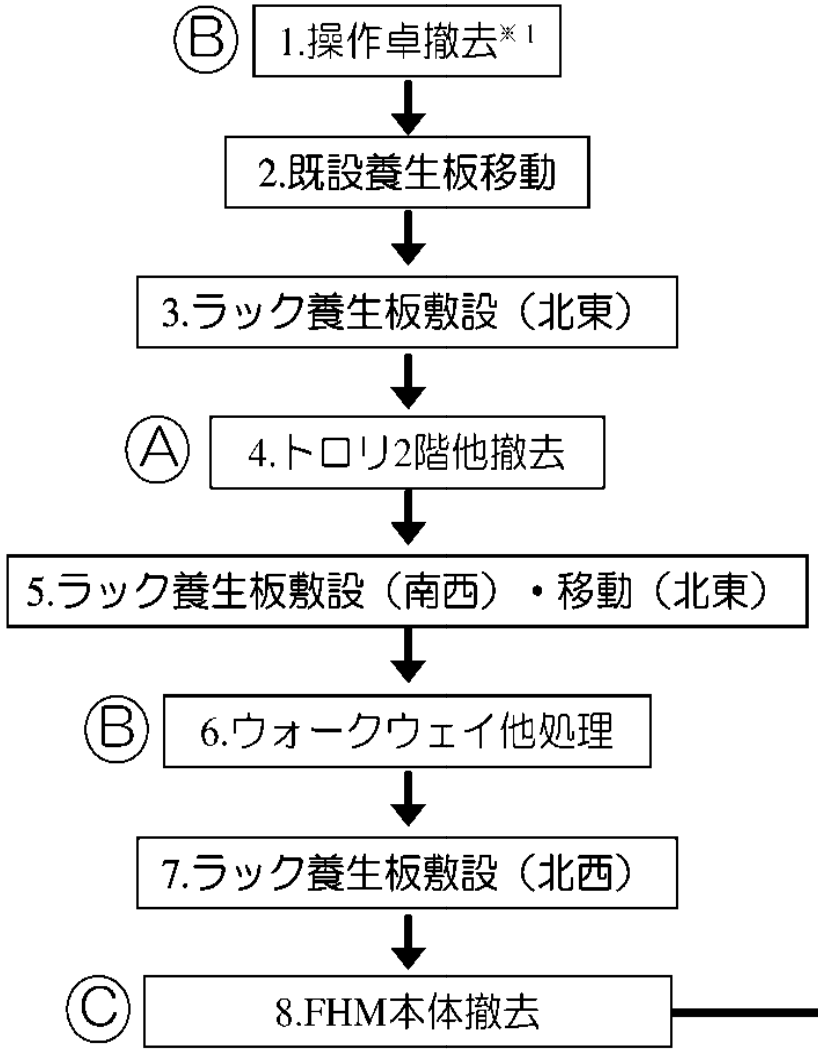
・大型瓦礫の撤去時は吊上げ高さを管理し燃料ラックとの距離を抑えることで万が一の落下時の衝撃を低減する。・・・Ⓑ

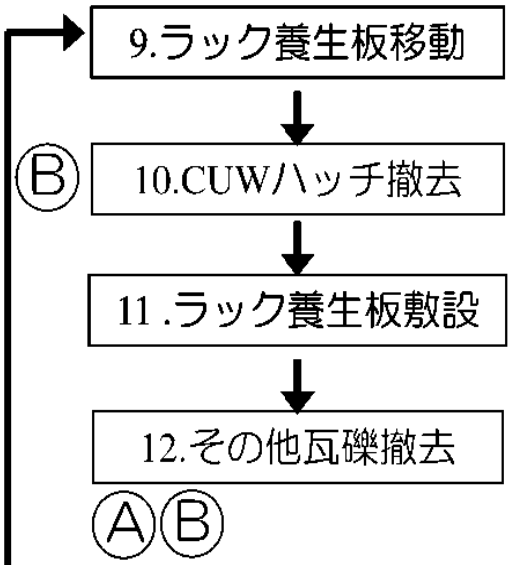
・燃料未装荷のエリア上で撤去する。

＜FHMブリッジ＞

・専用治具を用いて確実に把持し撤去を行う。・・・Ⓒ

今後のラック養生板設置及び瓦礫撤去手順案（概略）





A：撤去前に追加養生材敷設
- トロリ２階，その他瓦礫

B：吊上げ高さを管理
- 操作卓，ウォークウェイ，CUWハッチ※2，その他瓦礫

C：専用治具を用いた撤去
- ＦＨＭ本体

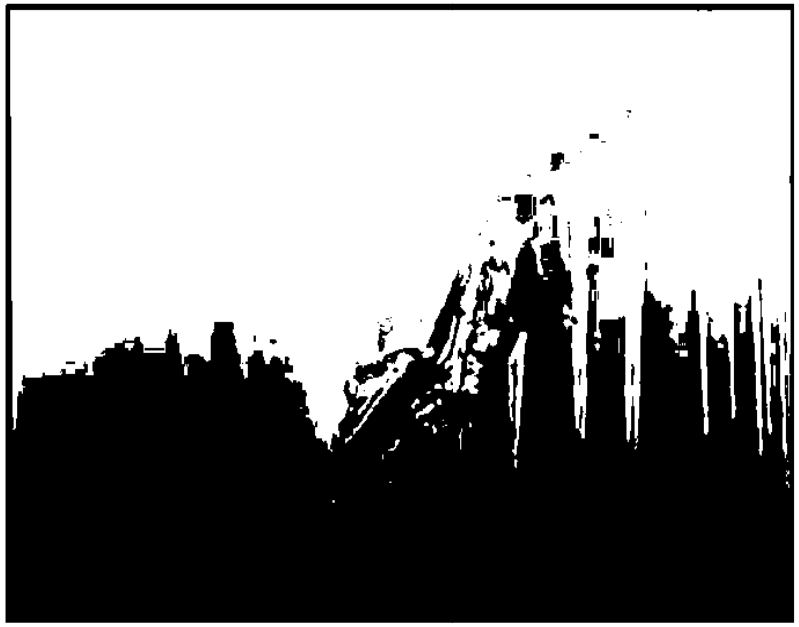
※1：撤去しないとラック養生板が敷設できないため，先行して撤去を行う。
※2：専用治具を用いて撤去を行う。

張出しフレーム撤去状況（H26.12.17）

水中で掴んだ様子

気中に吊り上げた様子

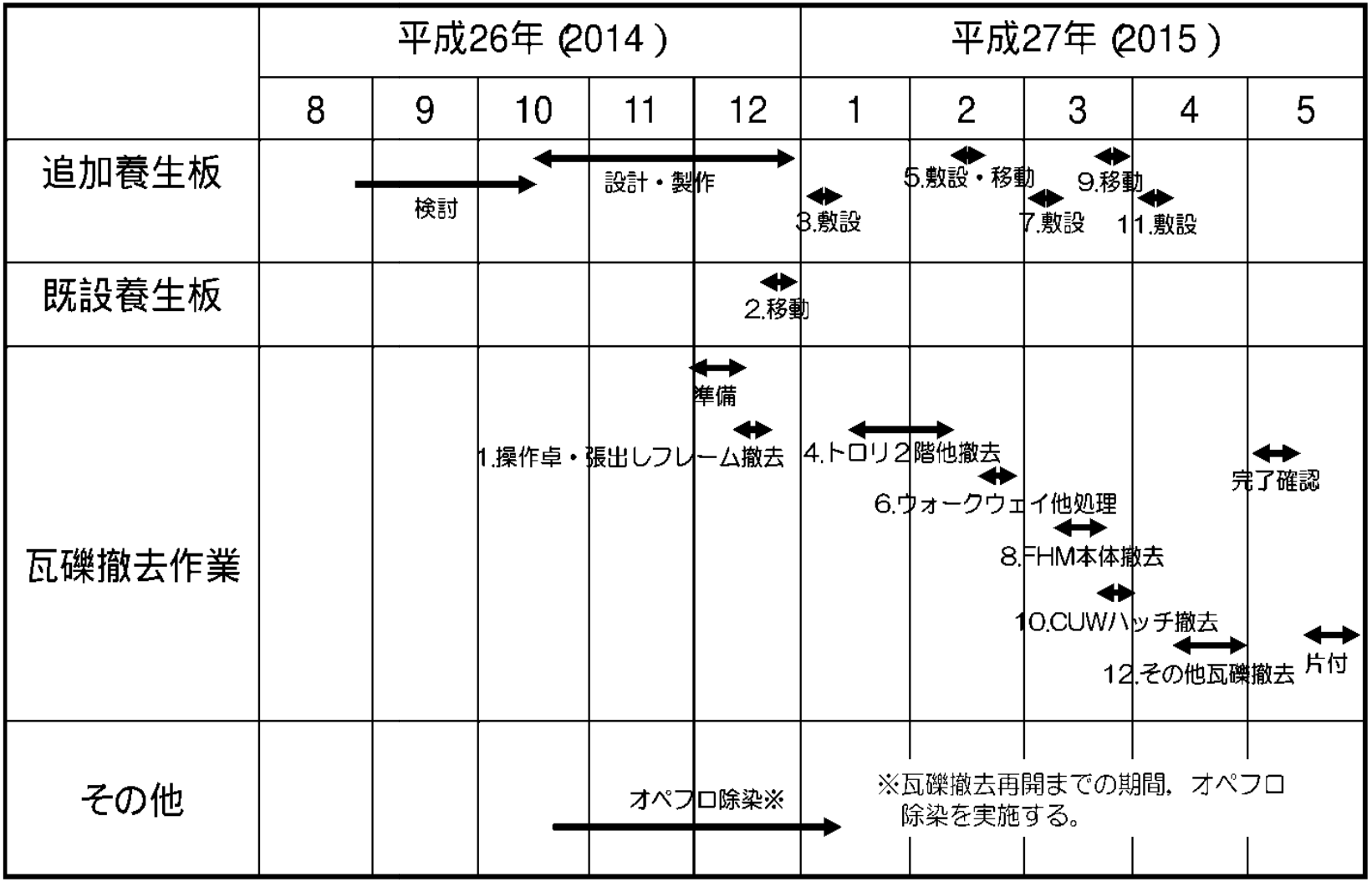
操作卓撤去状況（H26.12.19）



水中で掴んだ様子

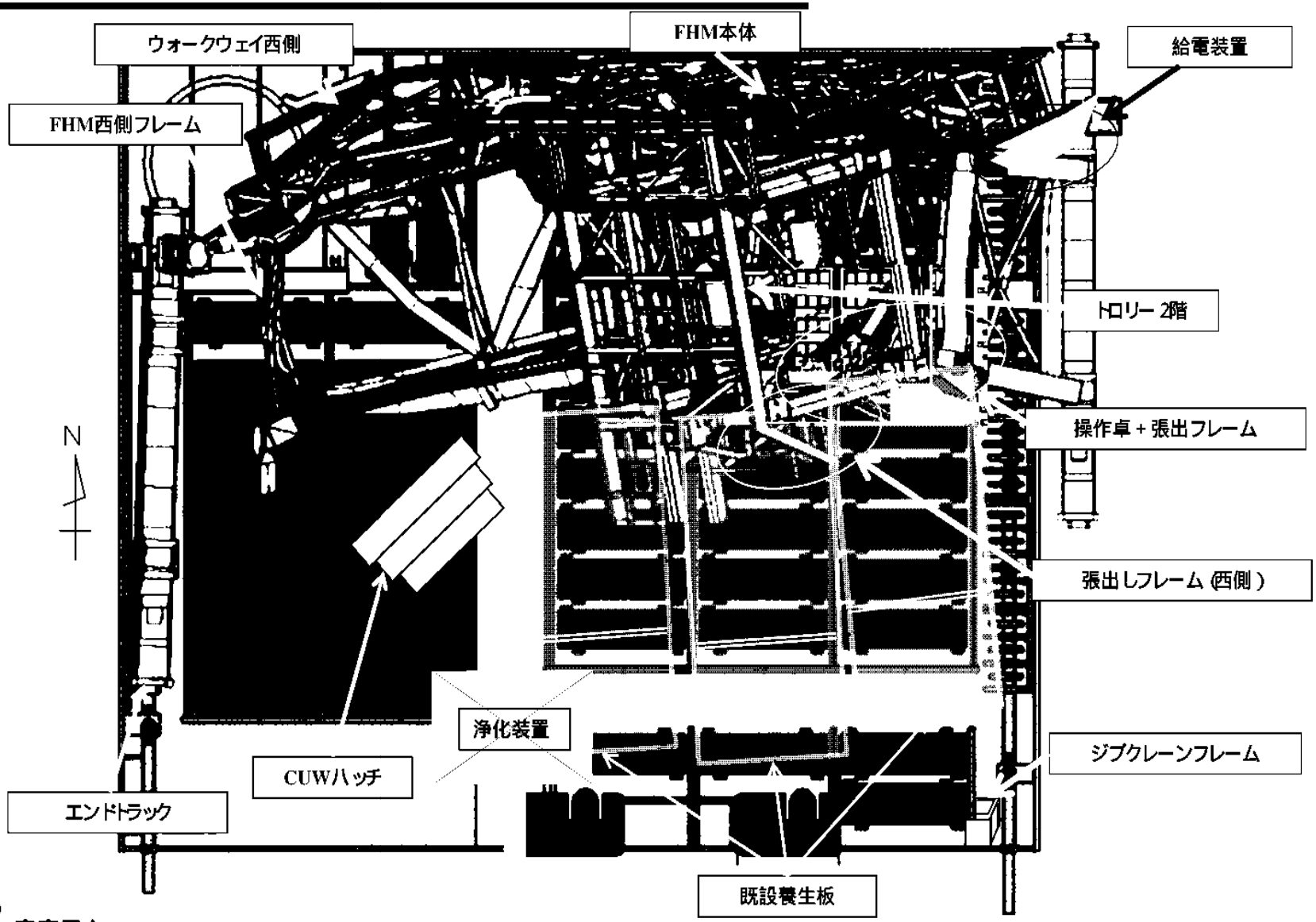
気中に吊り上げた様子

工程（案）



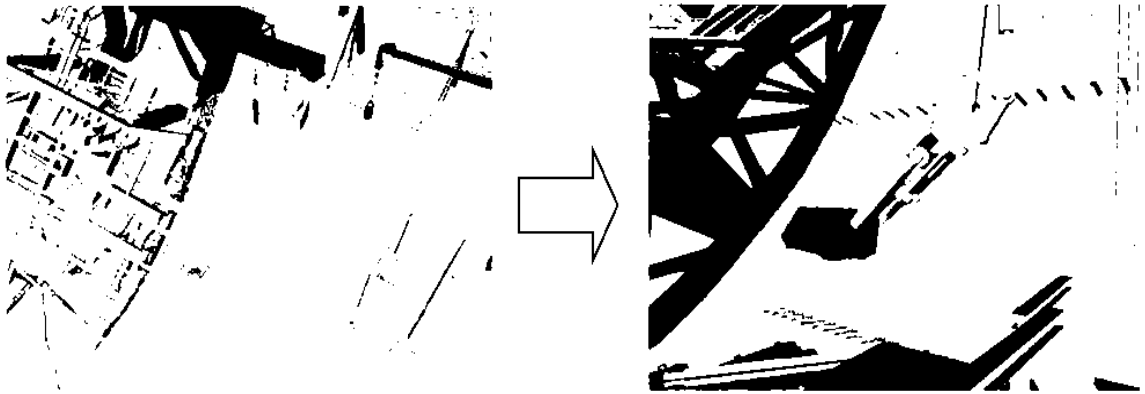
今後，瓦礫撤去を進めて行く上で，瓦礫に応じた新撤去治具等を新規製作する場合は，工程に影響を及ぼす可能性がある。

現状の瓦礫と既設養生板の配置



撤去案(1/2)

吊り上げ高さ管理による撤去例（操作卓）Ⓑ 追加養生材が設置出来ない例



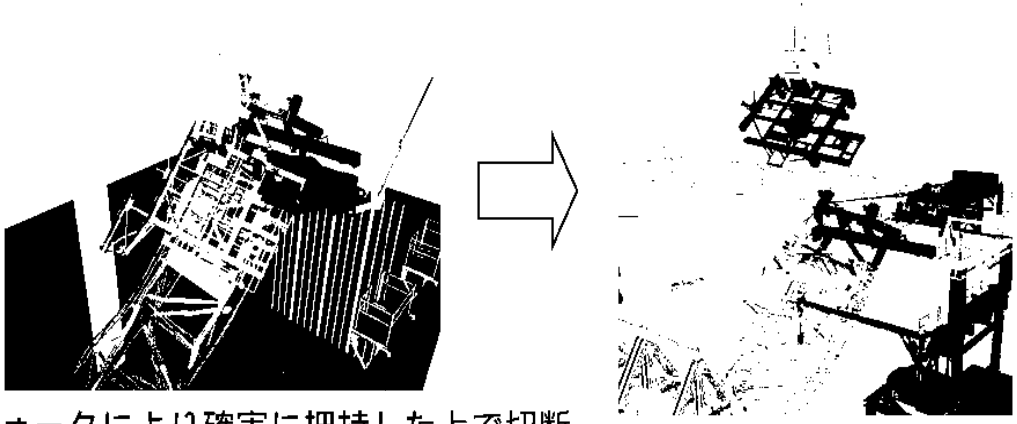
鋼材用カッター機にて把持し，吊り上げ高さ管理し，万が一の落下時の衝突を低減

吊上げ，プール外搬出，その後，養生材を設置

手順（案）
- 鋼材用カッターにて操作卓を把持
- 操作卓撤去

使用取扱具
- C/C1台
- 鋼材用カッター

撤去前に追加養生材敷設の例（トロリ２階）Ⓐ



フォークにより確実に把持した上で切断

吊上げ，撤去

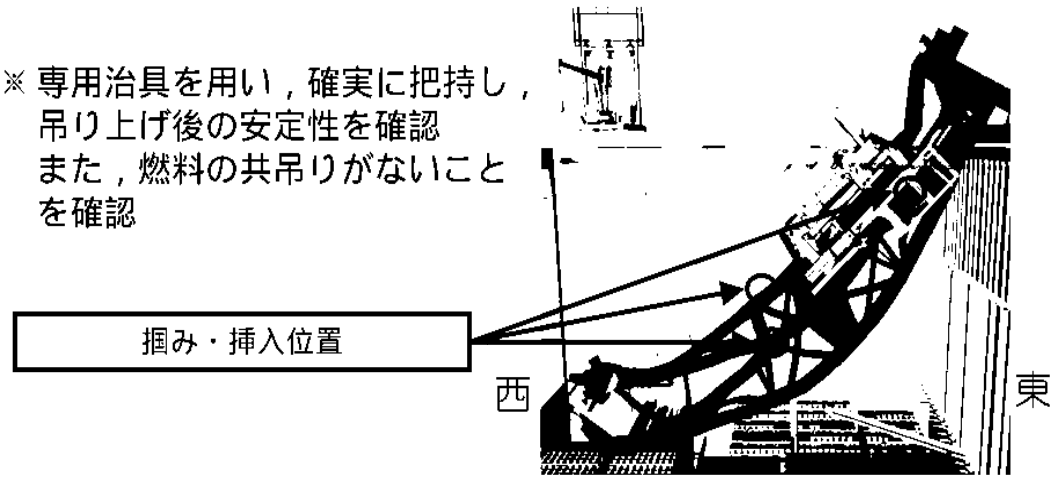
手順（案）
- フォークにより撤去対象物を確実に把持
- 鋼材用カッター，ケーブル用カッターによるフレーム変形，切断
- フォークにて吊り上げ・撤去

使用取扱具
- C/C2台
- 鋼材用カッター
- ケーブル用カッター
- フォーク

撤去案(2/2)

専用治具を用いた撤去例（ＦＨＭ本体）Ⓒ

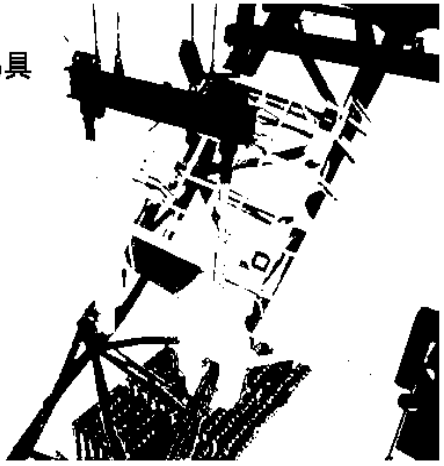
※ 専用治具を用い，確実に把持し，吊り上げ後の安定性を確認
また，燃料の共吊りがないことを確認



手順（案）
・FHM西側をFHM西側吊具にて把持
・FHM東側をFHM東側吊具にて把持
・FHM西側吊具，FHM東側吊具の順序にて交互に吊上げ，ヤードに吊り降ろす

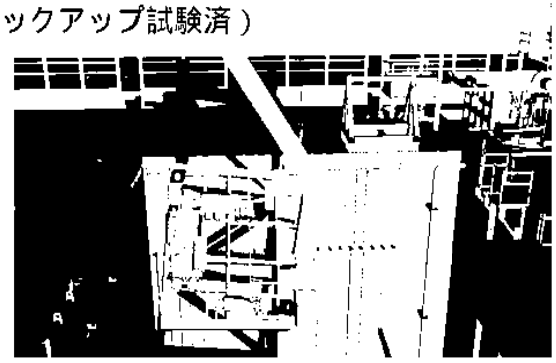
使用取扱具
・C／C2台
・中型カッター機
・FHM西側吊具
・FHM東側吊具

西側吊具



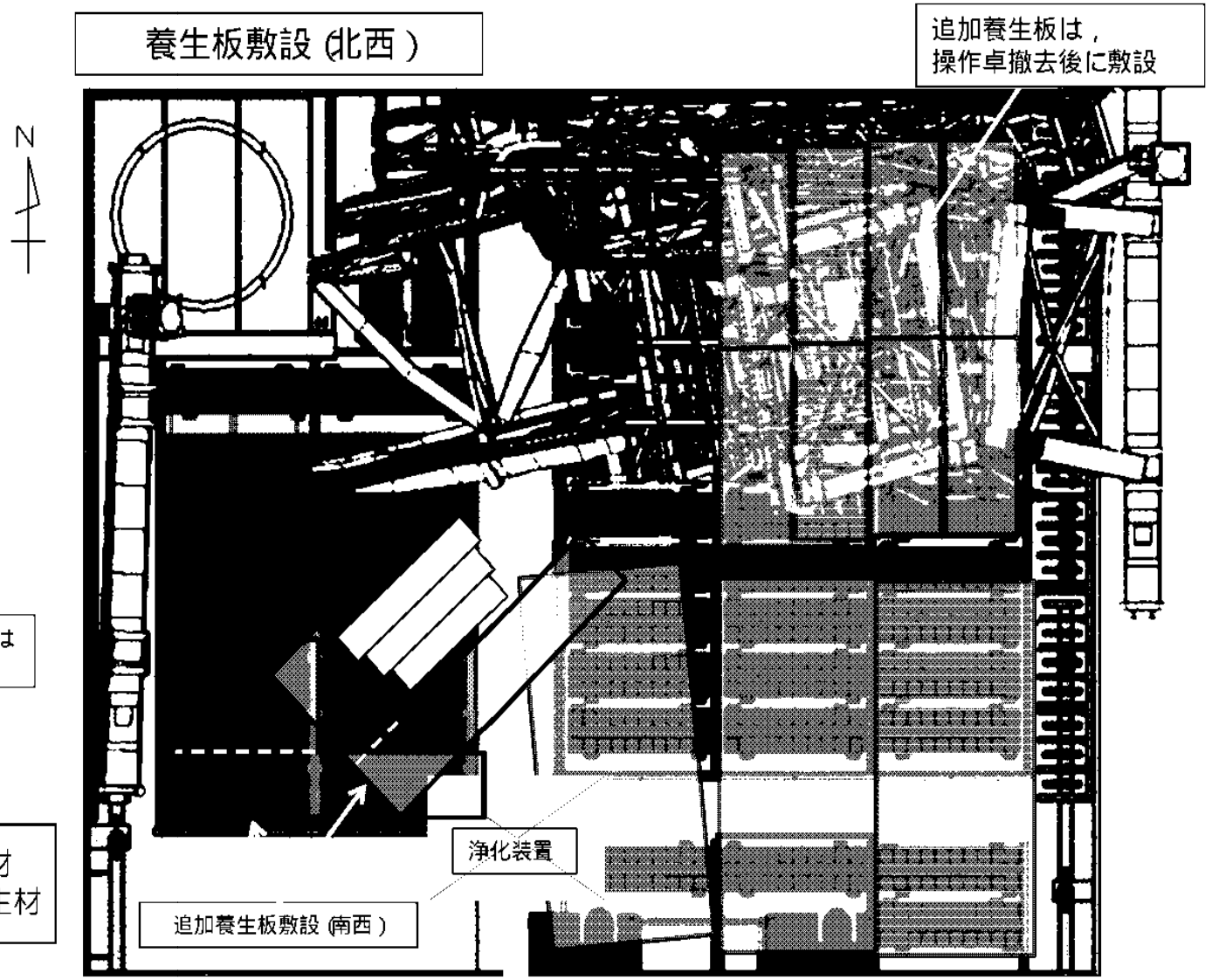
ＦＨＭ西側をＦＨＭ西側吊具にて把持

東側吊具
（モックアップ試験済）

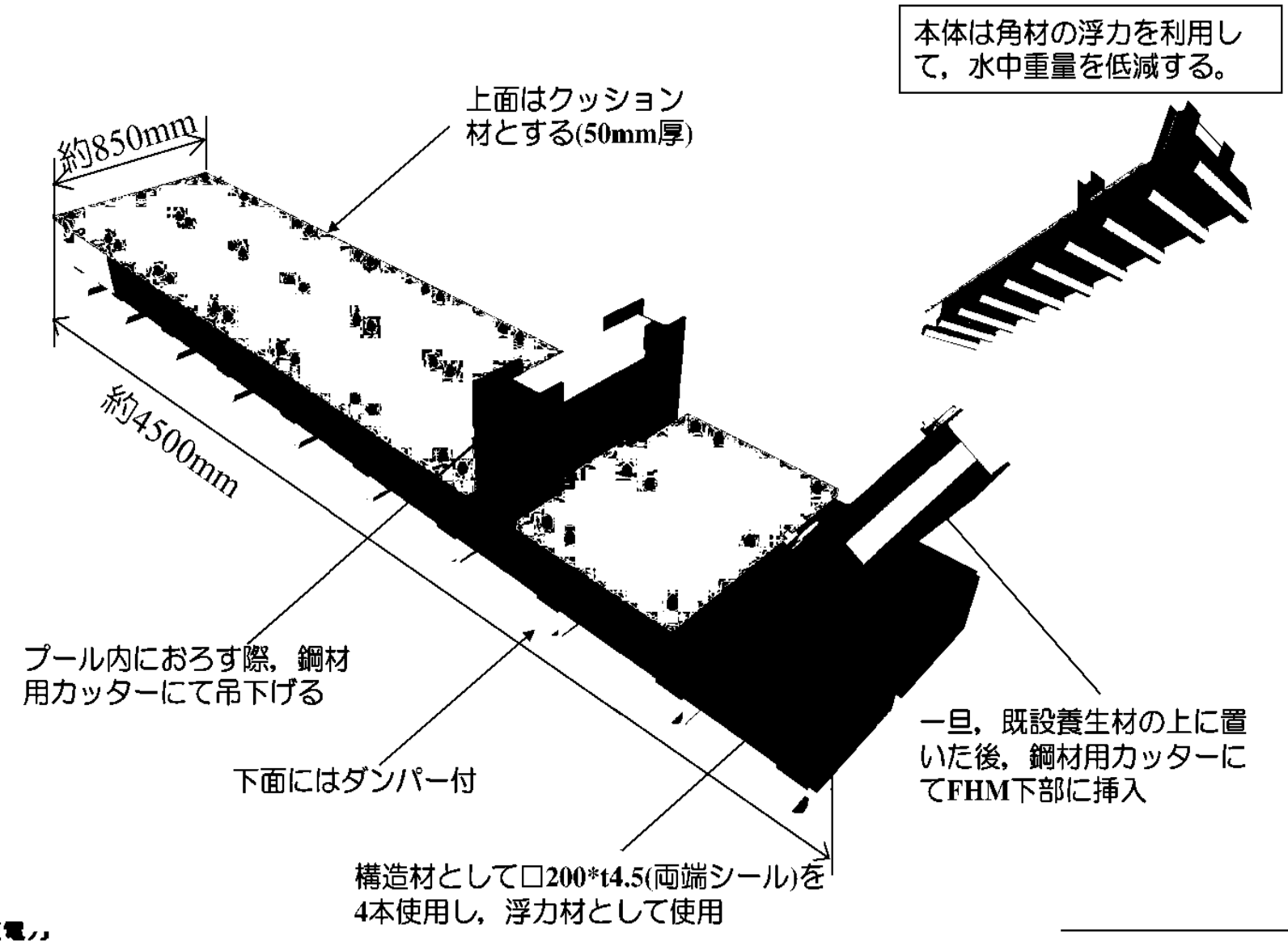


ＦＨＭ東側をＦＨＭ東側吊具を挿入し，吊上げ，撤去

ＦＨＭ本体撤去前養生板敷設予定図



（参考資料）ラック養生板について（概略例）

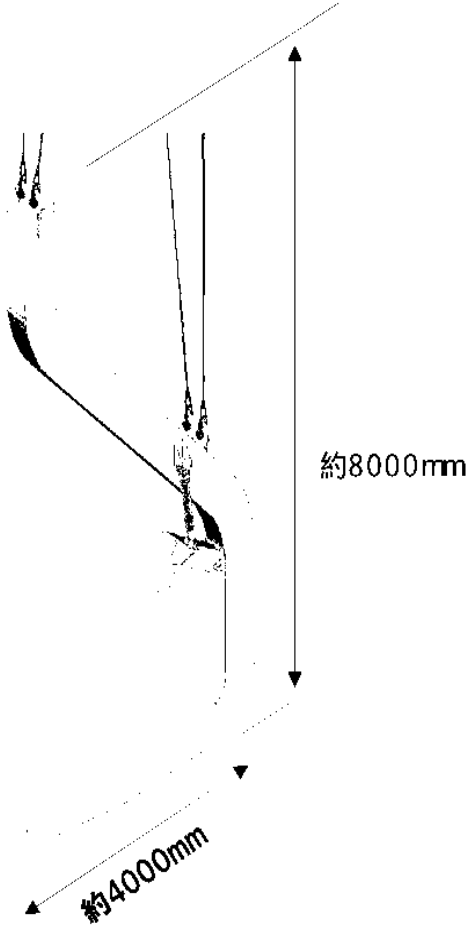


（参考資料）瓦礫取扱具

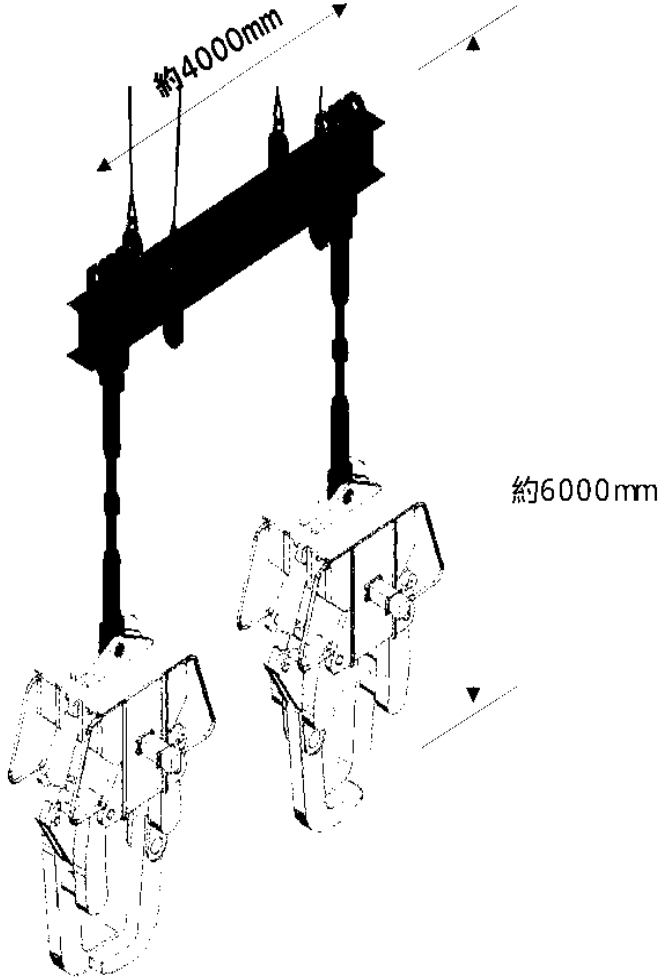
鋼材用カッター	ケーブル用カッター	フォーク
鋼材を切断、または把持して撤去する場合に使用。刃の根本部分で旋回・曲げ動作が可能。FHM構成部材へのアクセスが大型カッターに比べ容易。	鋼材用カッターに取付けて使用。ケーブル、細い鋼材の切断に使用。	水中・気中の瓦礫（鋼材、コンクリート等）を把持して撤去する場合に使用。

（参考資料）ＦＨＭ吊具

- ＦＨＭブリッジ一括撤去吊具　概略図



FHM東側吊具　外形図



FHM西側吊具　外形図

福島第一における４号機使用済燃料プール からの燃料取り出しについて

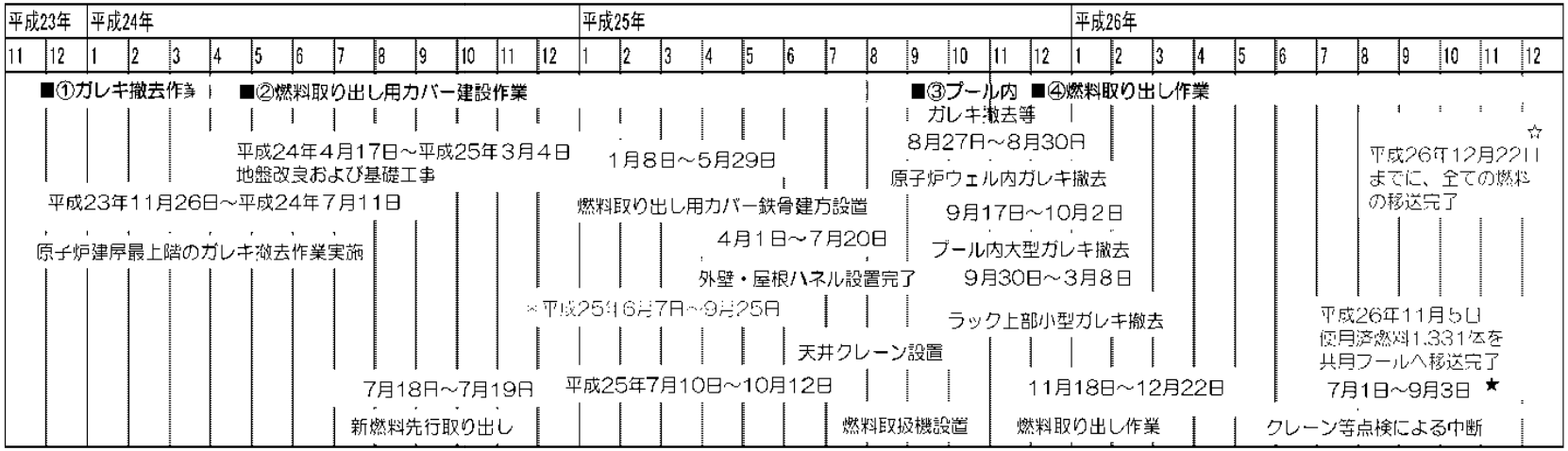
平成26年12月25日

東京電力株式会社

東京電力
TEPCO

無断複製・転載禁止　東京電力株式会社

1．４号機使用済燃料プールからの燃料取り出しの時系列と主な作業内容



＊訂正：天井クレーンの設置が「平成25年7月10日～10月12日」となっていましたが、正しくは、平成25年6月7日～9月25日となりますので、お詫びして訂正させて頂きます。（平成27年1月5日）

使用済燃料プール内貯蔵体数（震災時）

号機	使用済燃料プール（体数）			
	保管容量	使用済燃料	新燃料	合計
1号機	900	292	100	392
2号機	1240	587	28	615
3号機	1220	514	52	566
4号機	1590	1331	204	1535
1～4号機計	4950	2724	384	3108
5号機	1590	1374	168	1542
6号機	1770	1456	248	1704
共用ﾌﾟｰﾙ	6840	6375	-	6375

4号機　燃料取り出し実績

平成24年7月18日～平成24年7月19日
新燃料2体　→　共用プール

平成25年11月18日～平成26年11月5 日
新燃料22体　→　共用プール
使用済燃料1331体　→　共用プール

平成26年11月15日～平成26年12月22日
新燃料180体　→　6号機

共用プール　燃料搬出実績

平成25年6月27日～平成26年3月6日
使用済燃料1004体　→　キャスク仮保管設備

2. まとめ

- 震災時、４号機使用済燃料プールに保管されていた1,535体の燃料を取り出すため、様々な工事・準備、必要な許認可取得等を行い、 2013年11月、燃料取り出しの準備が完了。
  - 原子炉建屋上部のガレキ撤去（2011/9/21～2012/12）
  - カバー／クレーン等の設置（2012/4/17～2013/11/12）
  - 使用済燃料プール内のガレキ撤去（2013/8/27～2014/3）
  - 許認可取得（2012/12/7～2013/11/12）
  - 作業手順書の整備、作業員の教育・訓練
  - 共用プールの空き容量確保（共用プールの復旧、キャスク仮保管設備の設置、乾式キャスクによる使用済燃料移送）、構内道路整備　等

- 2013年11月18日、燃料取り出し作業を開始し、安全かつ着実に作業を進め、目標通り2014年12月22日、全ての燃料取り出しが完了。
  - 使用済燃料の移送に先立ち、新燃料22体の取り出しを行い、作業手順の最終確認を実施
  - 震災前から存在する２体の漏えい燃料、１体の変形燃料についても、その状態に応じた方法により移送を実施
  - 遮へい体設置、作業改善等により作業エリアの雰囲気線量、作業者被ばくの低減対策に取り組み、開始当初の１／３という目標を達成

【参考１－１】オペレーティングフロア上部のガレキ等の撤去

①ガレキ撤去前
（撮影日：平成23年９月22日）

②撤去作業中の様子
（撮影日：平成24年５月28日）

③撤去作業終了後
（撮影日：平成24年７月５日）

■オペフロ上部のガレキ撤去作業 ： 平成23年11月26日～平成24年７月11日

●燃料を取り出すために、水素爆発で破損したオペレーティングフロア上のガレキを撤去
●震災時、定検中であったため、オペレーティングフロア上に残置された圧力容器上蓋等を撤去

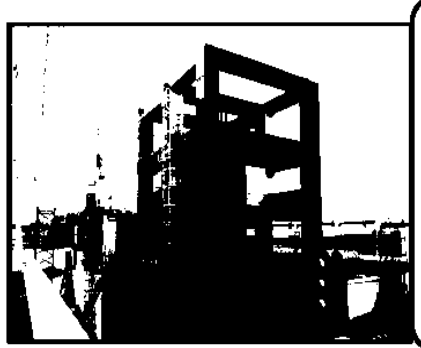
⑤圧力容器上蓋の撤去
（撮影日：平成24年９月13日）

④格納容器上蓋の撤去
（撮影日：平成24年８月10日）

【参考１－２】燃料取り出し用カバー・燃料取出設備の設置

①鉄骨建方着工前
（撮影日：平成24年12月18日）

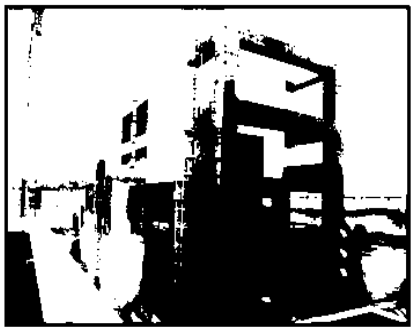
②第一節　鉄骨建方完了
（撮影日：平成25年１月14日）



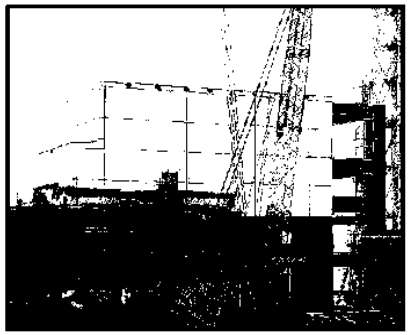
③原子炉建屋上部を除く鉄骨建方完了
（撮影日：平成25年４月10日）

■地盤改良・基礎工事
平成24年４月17日～平成25年３月４日
■鉄骨建方設置
平成25年１月８日～平成25年５月29日
■外壁・屋根パネル設置
平成25年４月１日～平成25年７月20日
■天井クレーン設置
平成25年６月７日～平成25年９月25日
■燃料取扱機設置
平成25年７月10日～平成25年10月12日

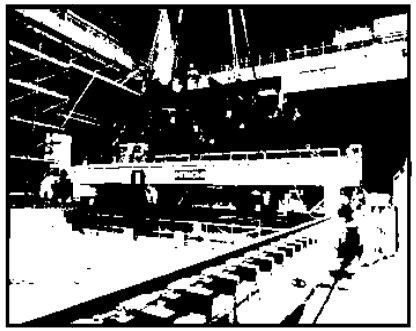
●燃料取り出し作業環境を整えるために燃料取り出し用カバーを設置
●カバー内部には、既存の燃料取出設備と同等の安全機能（落下防止策等）、構造強度・耐震性を有する設備を設置



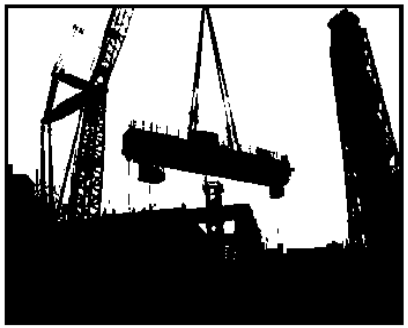
④鉄骨建方完了
（撮影日：平成25年５月29日）



⑦外壁・屋根パネル設置完了
（撮影日：平成25年７月20日）



⑥燃料取扱機　部材据付け
（撮影日：平成25年７月10日）



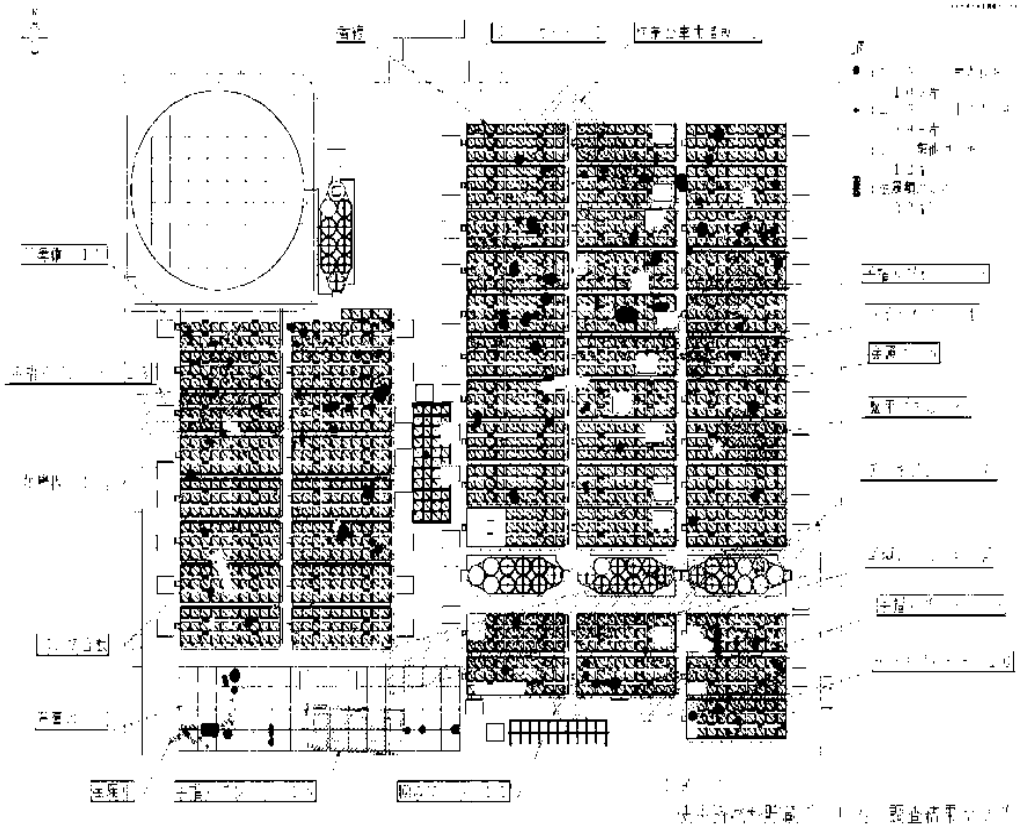
⑤クレーン部材吊り上げ
（撮影日：平成25年６月７日）

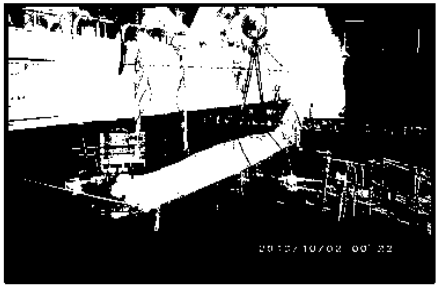
■外壁パネル等を含む大きさ
約69m（南北）×約31m（東西）
×約53m（地上高）
■鉄骨に使用した鋼材の量
約4,000t
※東京タワーで使用された鋼材と同程度

【参考１－３】使用済燃料プール内のガレキ撤去

●事前の水中調査に基づき、様々な大きさ・形状の治具を用いて、一つひとつ、ガレキを撤去することで、燃料取り出し時のリスクを軽減

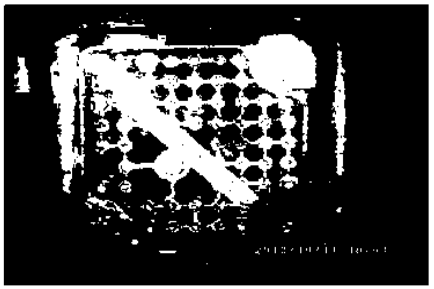
■使用済燃料プール内大型がれき撤去 ： 平成25年９月17日～平成25年10月２日
■使用済燃料プール内小型がれき撤去 ： 平成25年９月30日～平成26年３月８日





①大型ガレキの撤去
（撮影日：平成25年10月２日）

②燃料ラック上部ガレキ吸引作業
（撮影日：平成25年10月11日）



③吸引作業後
（撮影日：平成25年10月11日）

【参考１－４】燃料取り出し作業

■燃料取り出し開始
平成25年11月18日
■使用済燃料1,331体の
取り出し完了
平成26年11月５日
■全ての燃料1,535体の
取り出し完了
平成26年12月22日

①キャスクを使用済燃料プールへ移動
（撮影日：平成25年11月18日）

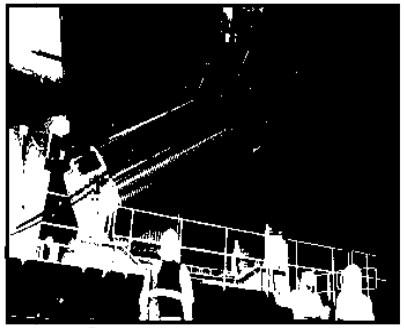
②燃料を掴みラックから引き上げ
（撮影日：平成25年11月20日）

③燃料取り出し作業
（撮影日：平成25年11月18日）

④キャスクへの装填
（撮影日：平成25年11月26日）

●燃料とラックの隙間に小さなガレキが入り込んでいる可能性があるため、水中カメラなどで確認しながら慎重に作業を実施

⑤キャスクの吊り降ろし
（撮影日：平成25年11月21日）

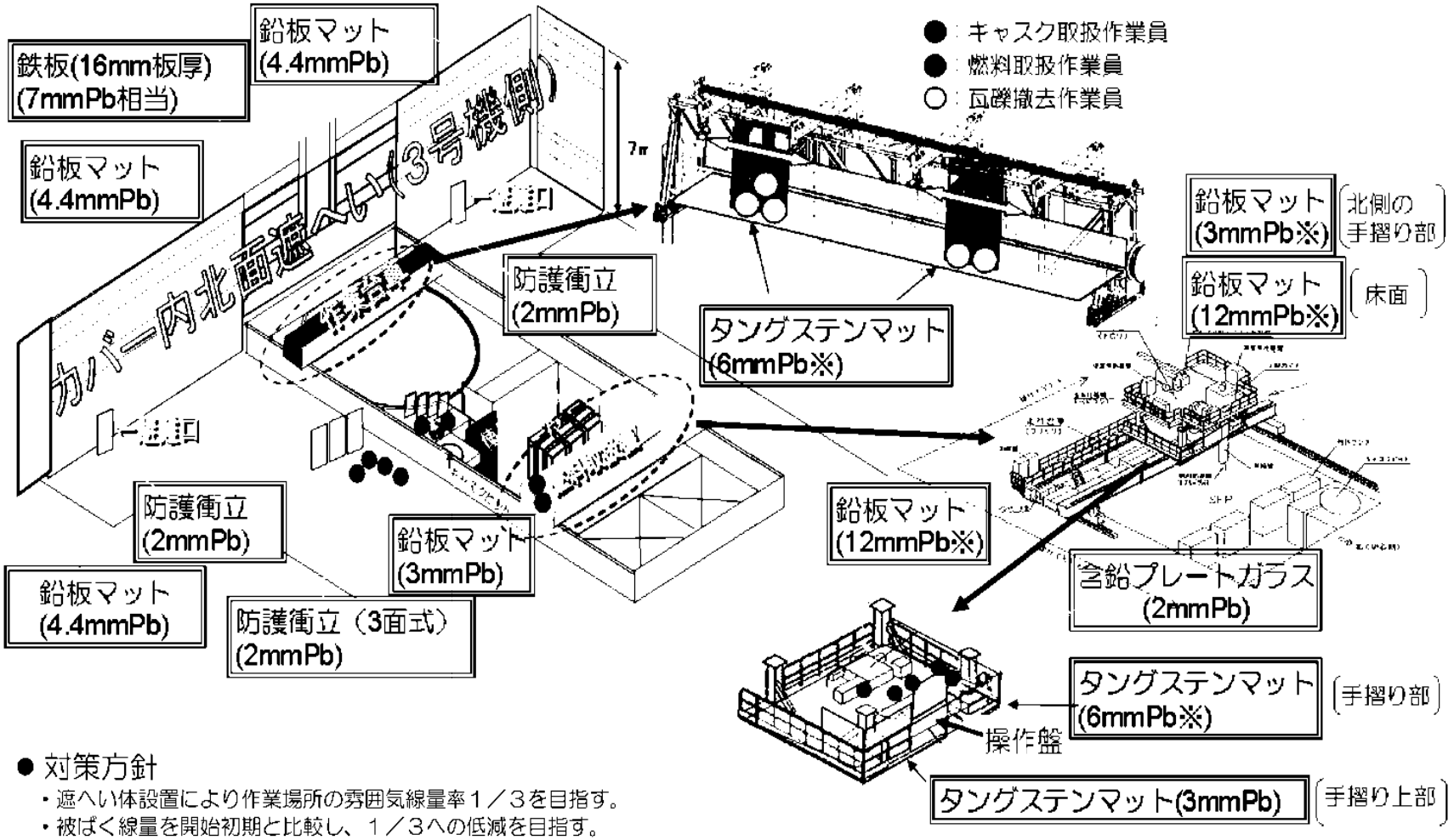


⑥トレーラーへの積み込み
（撮影日：平成25年11月21日）

⑦共用プールへの燃料格納
（撮影日：平成25年11月22日）

※写真の一部については、核物質防護などに関わる機微情報を含むことから修正しております。

【参考２－１】４号機オペレーティングフロアの遮へい対策



● 対策方針
- 遮へい体設置により作業場所の雰囲気線量率１／３を目指す。
- 被ばく線量を開始初期と比較し、１／３への低減を目指す。

● 実施事項
- オペレーティングフロア上の線量率測定を行い、線源の推定と効果的な遮へい設置箇所の検討を行い、遮へい体を順次設置。
- 燃料取り出し作業を分析し、被ばく線量の多い作業を改善。

（※設置状況により，上図の通り遮へい体を設置できない箇所について，重量等を考慮し，可能な限り厚い遮へい体を設置）

【参考２－２】４号機被ばく線量低減対策の実施結果

■被ばく線量低減対策の実施結果

➢ 2014年4月24日　廃炉・汚染水対策チーム会合　事務局会議（第５回）

	燃料取り出し開始初期	現在
燃料取扱機運転作業※1,2	約0.093 [mSv/人･班]	約0.032 [mSv/人･班]（約66%減）
キャスク取扱作業※1,3	約0.26 [mSv/人・基]	約0.09 [mSv/人･基]（約65%減）

⇩

➢ ６１基目まで（NFT-22BでのSF輸送終了時）の値

	燃料取り出し開始初期	現在
燃料取扱機運転作業※1,2	約0.093 [mSv/人･班]	約0.026 [mSv/人･班]（約72%減）
キャスク取扱作業※1,3	約0.26 [mSv/人・基]	約0.07 [mSv/人･基]（約73%減）

※1：構内移動に伴う被ばく線量の推定値（燃料取扱機運転作業：約0.005mSv，キャスク取扱作業：約0.017～約0.023mSv）を除いた値

※2：燃料取扱機運転作業を1班当たり2時間実施した際の平均被ばく線量

※3：キャスク取扱作業を1基分実施した際の平均被ばく線量

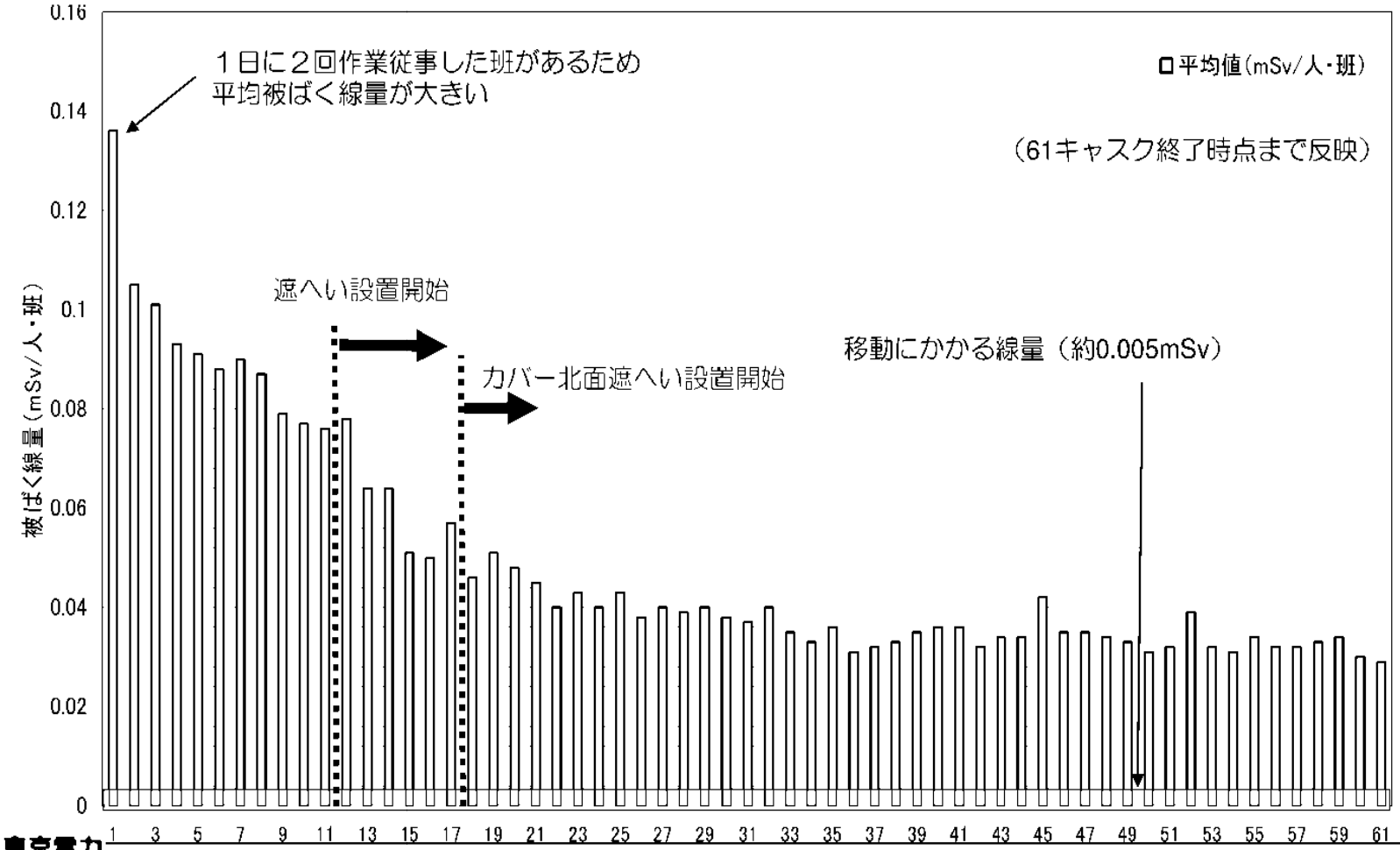
【参考２－３】燃料取扱機運転作業の被ばく線量（基数毎）

■燃料取扱機の１班・１作業員あたりの平均被ばく線量（約２時間作業の作業員一人あたりの平均被ばく線量）

・燃料取出し開始初期の平均被ばく線量（2～5キャスク目の平均）：約0.098mSv/人・班

・至近の平均被ばく線量（59～61キャスク目の平均）　　：約0.031mSv/人・班

■移動にかかる被ばく線量の推定値約0.005mSvを考慮すると，燃料取扱機運転作業の４号機における被ばく線量は，約0.093mSv/人・班→約0.026 mSv/人・班に低減。（約72%低減）



【参考２－４】キャスク取扱作業の被ばく線量（基数毎）

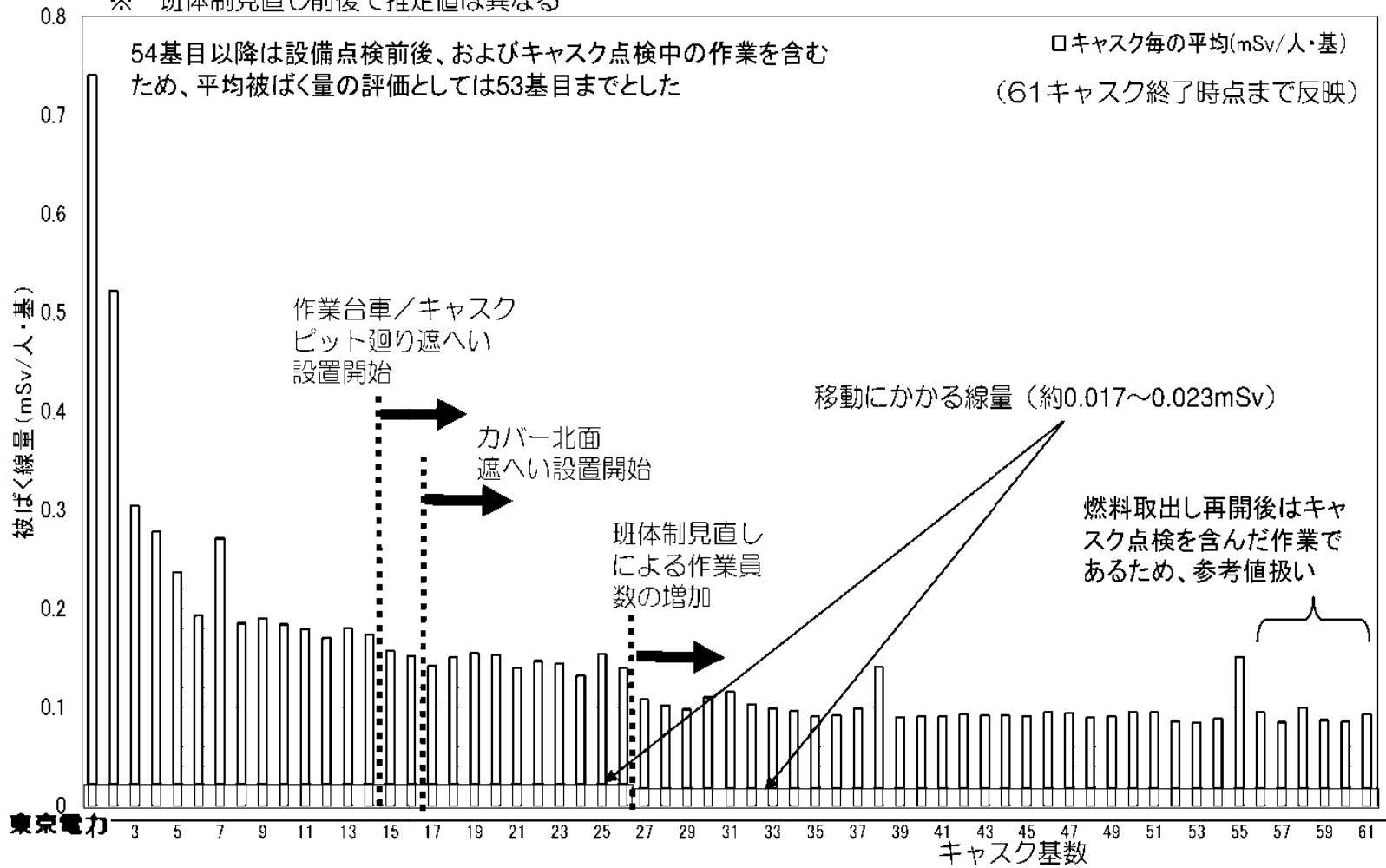
■キャスク１基・１作業員あたりの平均被ばく線量

・燃料取り出し開始初期の平均被ばく線量（3～5キャスク目の平均）：約0.28mSv/人・基

・至近の平均被ばく線量（51～53キャスク目の平均）：約0.09mSv/人・基

■移動にかかる被ばく線量の推定値約0.017mSv※～約0.023mSv※を考慮すると，キャスク取扱作業における４号機及び共用プールでの被ばく線量は，約0.26mSv/人・基→約0.07mSv/人・基に低減。（約73%低減）

※　班体制見直し前後で推定値は異なる

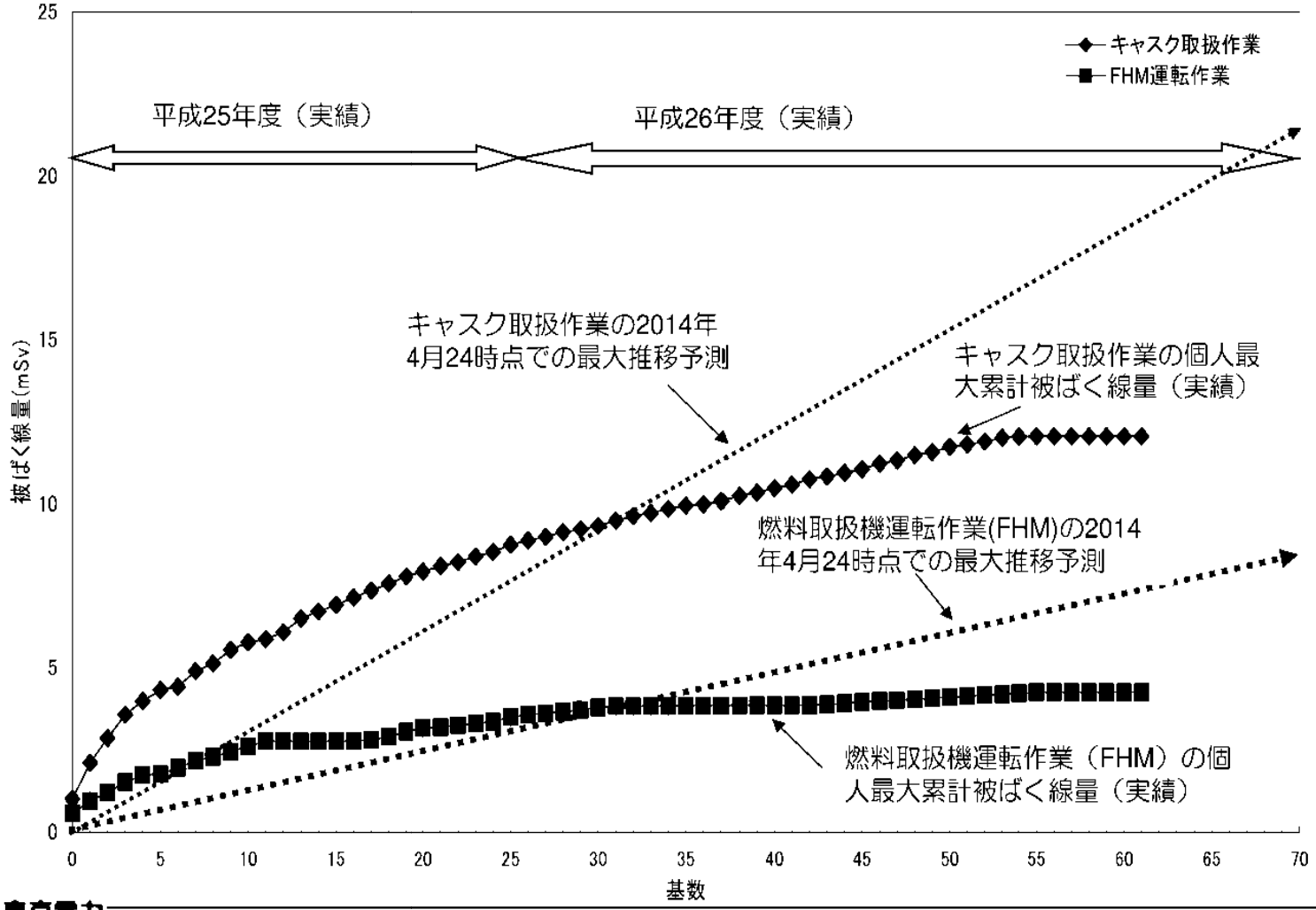


【参考２－５】６１基目までの個人最大累積線量の実績

○燃料取出し作業の個人最大累積線量は予測値（2014年4月24時点の予測値※、グラフ点線）を下回り推移。

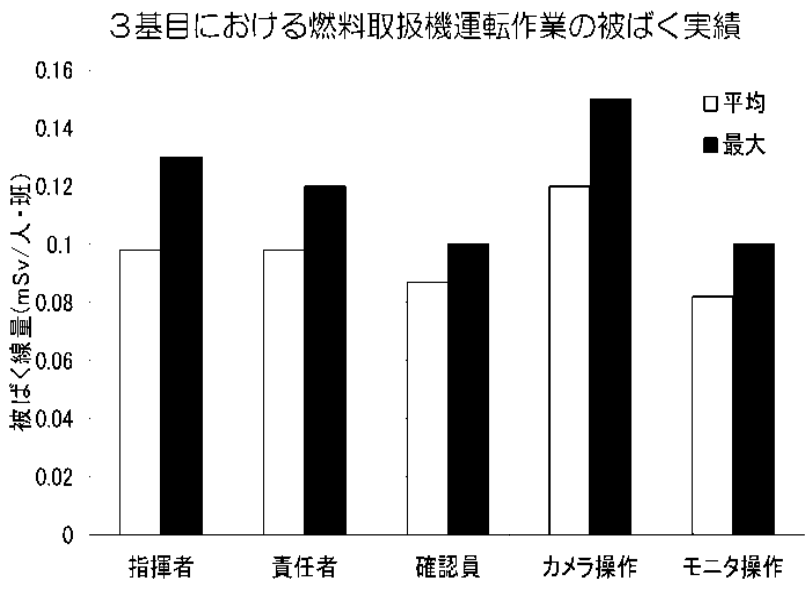
- 燃料取扱機運転作業実績：4.26mSv　（準備作業日分最大0.57mSv含む）
- キャスク取扱作業実績　：12.06mSv　（準備作業日分最大1.01mSv含む）

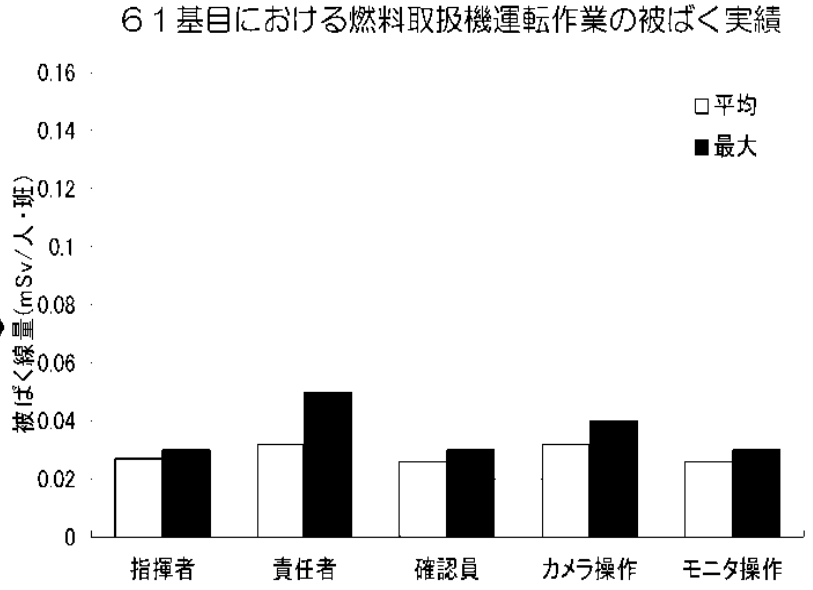
※2014年4月24日廃炉・汚染水対策チーム会合　第5回事務局会議



【参考２－６】燃料取扱機運転作業の燃料取り出し開始初期との線量の比較

- 燃料取り出し開始初期である３基目と使用済燃料取り出し後半の６１基目を比較。
  - ➢被ばく線量の最大値，平均値とも大きく低減。
  - ➢各作業役割（指揮者，責任者，確認員，カメラ操作，モニタ操作）全て，大きく低減。



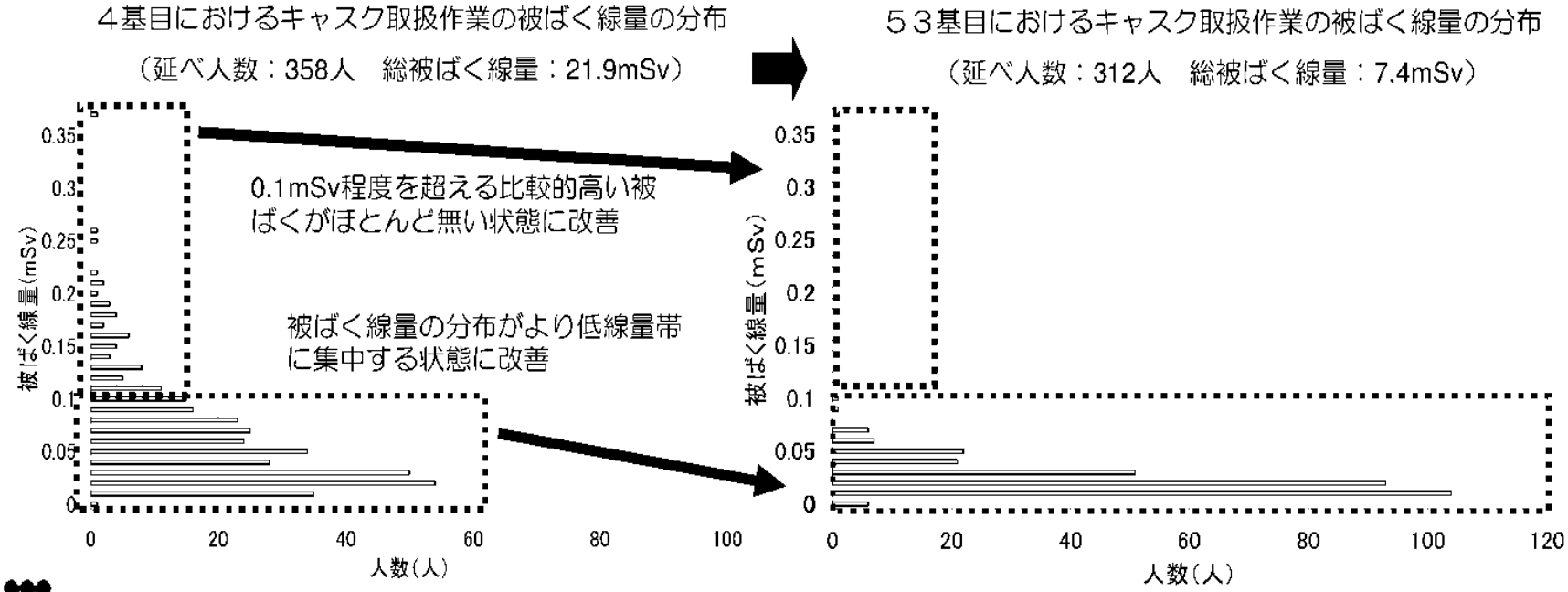


【参考２－７】キャスク取扱作業の燃料取り出し開始初期との線量の比較

- 燃料取り出し開始初期である４基目※と至近の５３基目※の被ばく線量の分布を比較。0.1mSv程度を超える比較的高い被ばくがほとんど無い状態に改善されているとともに，全体的に分布がより低線量側にシフトしている。

※前後のキャスクを含むため，実質２キャスク分の作業期間

- 燃料取り出し開始初期において高線量であった作業は以下と推定。
  - ４号機キャスクピット周りの作業：遮へい対策，タングステンジャケットの装着等により改善
  - 共用プールでのキャスク内部水排水時の瓦礫回収作業：フィルターの遮へい，カメラ監視等により改善
  - 建屋外の作業：作業習熟の効果等により被ばく低減と推定



１号機原子炉建屋カバー解体工事
屋根パネル戻し完了について

平成26年12月25日

東京電力株式会社

東京電力 TEPCO

＜ 参 考 資 料 ＞
平成26年12月4日
東京電力株式会社

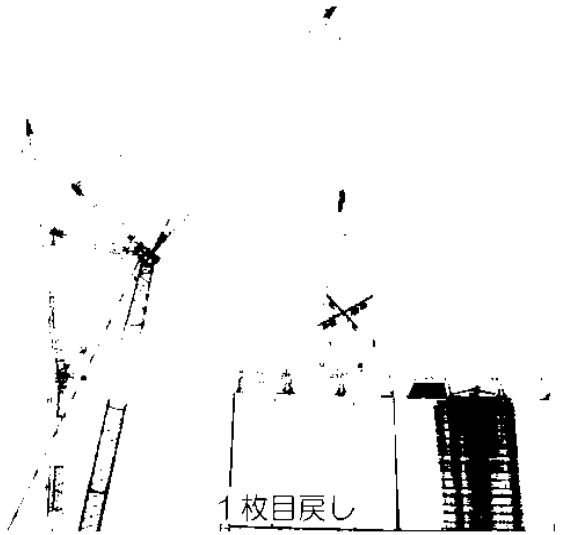
福島第一原子力発電所 1号機原子炉建屋カバー解体工事
屋根パネル戻し完了について

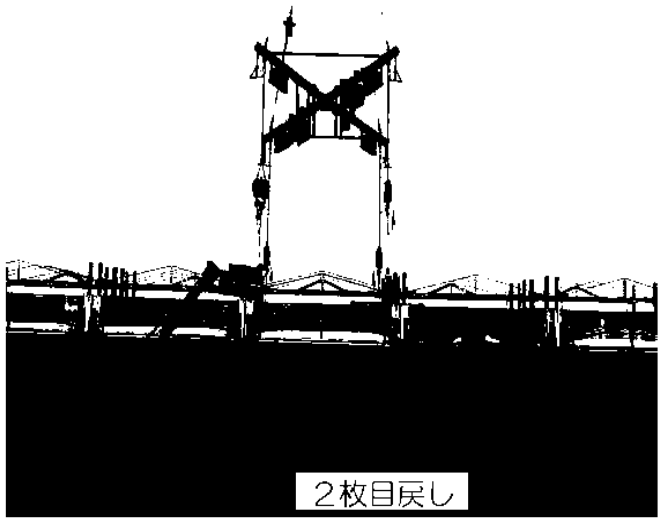
10月22日に着手した建屋カバー解体に向けた飛散防止剤散布と調査が完了し、本日、取り外した2枚の屋根パネルの戻しが完了しました。

本期間中、空気中の放射性物質濃度を監視しているダストモニタや敷地境界に設置してあるモニタリングポストに有意な変動はありませんでした。

＜概要＞
■作業日
平成26年12月4日
■作業時間
（1枚目）
7時25分：吊り上げ開始
8時31分：戻し完了
（2枚目）
11時45分：吊り上げ開始
12時09分：戻し完了

屋根パネル戻し状況





撮影者：東京電力株式会社
撮影日：平成26年12月4日

１号機原子炉建屋カバー解体工事建屋カバー
南２屋根パネルの拡大した孔の塞ぎ方について

平成26年12月25日

東京電力株式会社

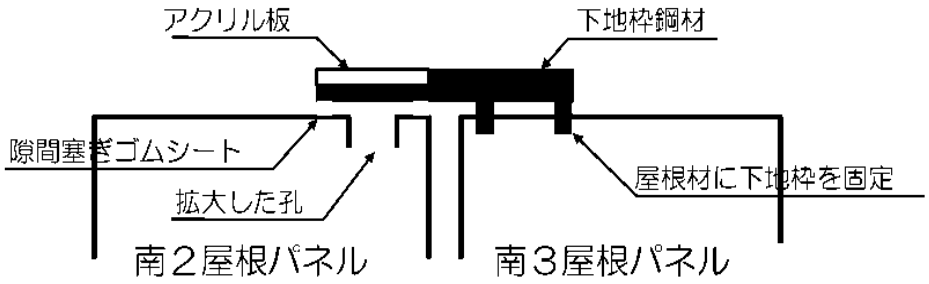
東京電力
TEPCO

＜ 参 考 資 料 ＞
平成26年12月4日
東京電力株式会社

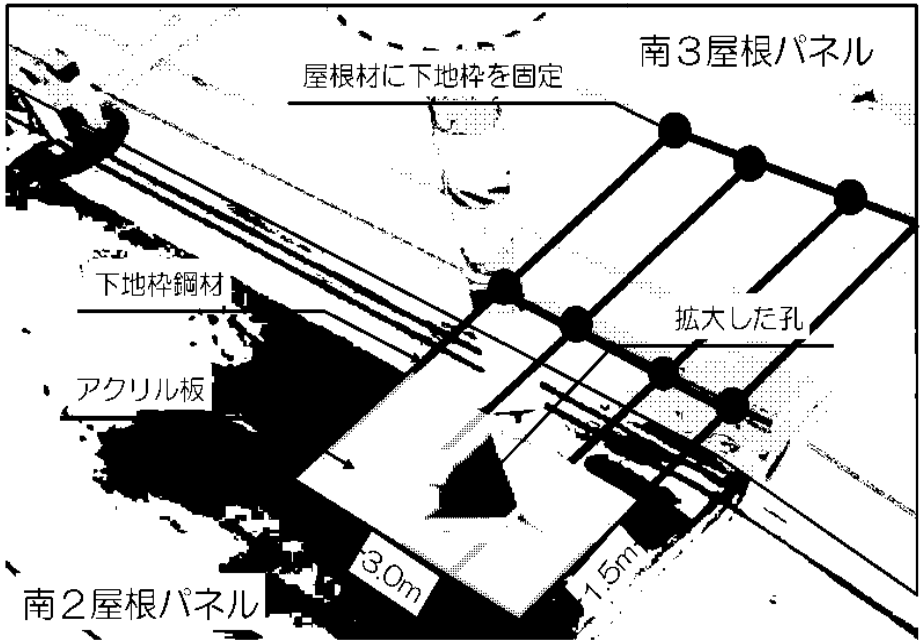
福島第一原子力発電所１号機原子炉建屋カバー解体工事
建屋カバー南２屋根パネルの拡大した孔の塞ぎ方について

■拡大した孔が位置する南２屋根パネルは、南３屋根パネルに隣接します。

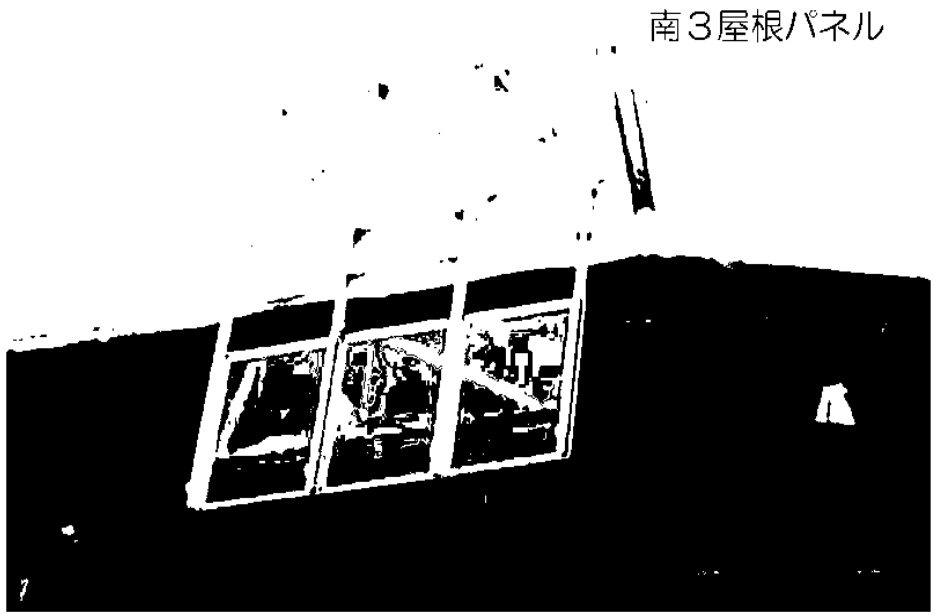
■南３屋根パネルに、南２屋根パネルの拡大した孔を覆うはね出し部材を取り付け、南３屋根パネル戻しにより、南２屋根パネルの拡大した孔を上面から覆いました。



概念図（断面図）



概念図（平面）



はね出し部材取り付け状況

１Ｆ-４使用済燃料プールから共用プールに輸送された漏えい燃料の調査について

２０１４年１２月２５日

東京電力株式会社

東京電力 TEPCO

概要

概　要

福島第一原子力発電所 4号機の使用済燃料プールから共用プールに移送した漏えい燃料 (2体)※ について、移送後の状態を確認するため、水中カメラによる外観点検およびファイバースコープによる漏えい燃料棒の調査を実施。今後、結果が取りまとまり次第結果を報告する。

※ 当該燃料 2体は漏えいが確認された後、平成22年2月から3月にかけて、超音波による調査を行い、漏えい燃料棒を特定。また、ファイバースコープによる観察の結果、被覆管に割れや孔は確認されていない。

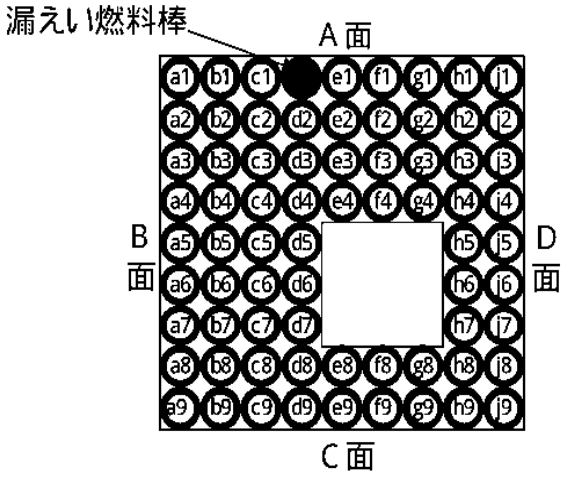
現場作業実施期間 (予定)

平成26年12月17日 ~ 12月18日 (実施済)

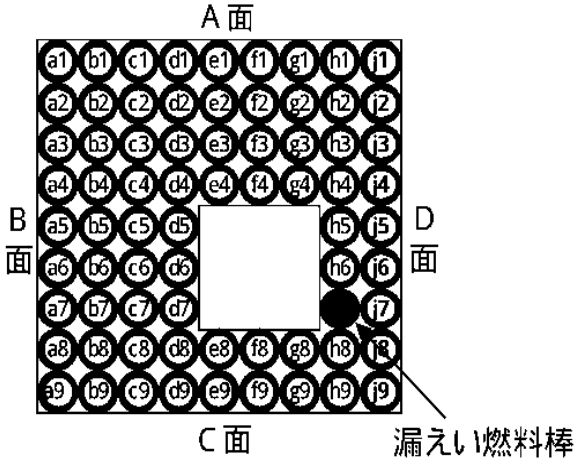
実施内容

① 漏えい燃料 2体に対して、水中テレビカメラによる外観点検を実施

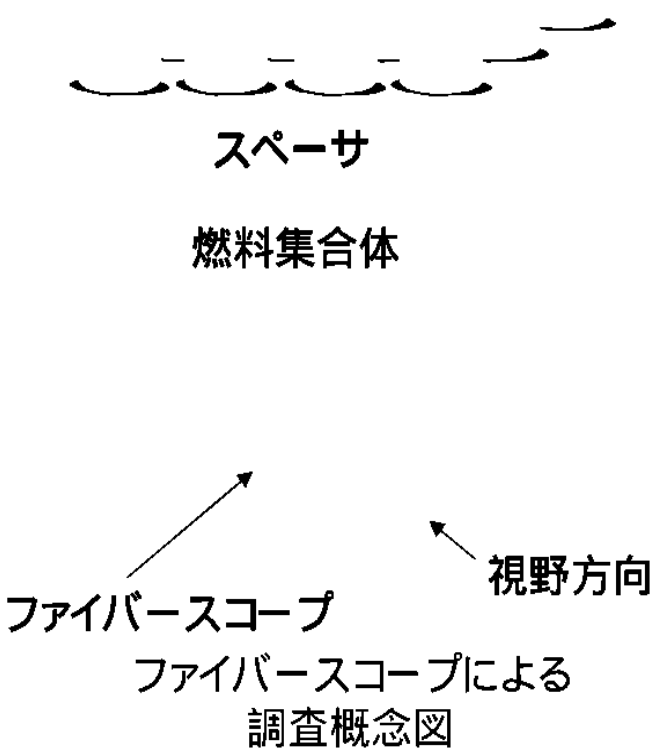
② 震災前の調査により特定されている漏えい燃料棒は、ファイバースコープによる被覆管の詳細観察を実施



燃料集合体断面 (F4UN4)



燃料集合体断面 (F4UN22)



ファイバースコープによる調査概念図

1F-4使用済燃料プールから共用プールに輸送された使用済燃料の調査結果について

2014年12月25日

東京電力株式会社

東京電力 TEPCO

IRID

概要

概要

「平成25年度発電用原子炉等廃炉・安全技術基盤整備事業（使用済燃料プールから取り出した燃料集合体他の長期健全性評価」の一環として、1F4SFPから取り出した使用済燃料に対する調査を実施。

現場作業実施期間

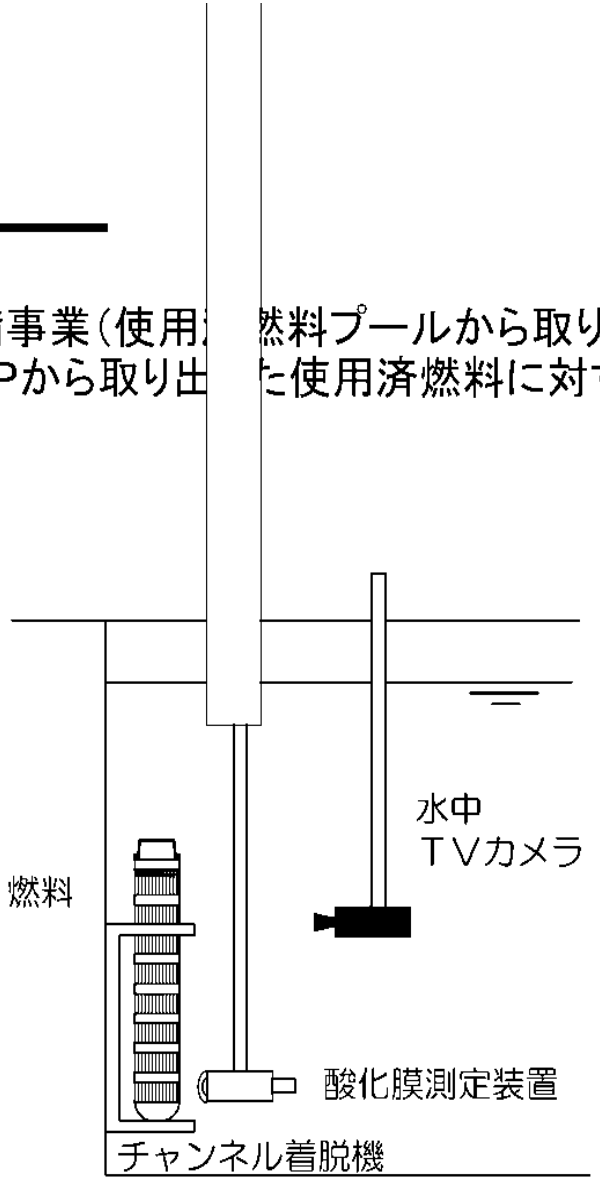
平成26年11月18日～11月25日（実施済）

実施内容

① 燃焼度、燃料タイプ等を勘案し選定した5体の燃料に対して、水中テレビカメラによる外観点検を実施

② 外観点検を実施する5体の燃料について、腐食の影響を確認するため被覆管の酸化膜の厚さを測定

③ 外観点検を実施する燃料のうち2体について、燃料上部のロックナット部の一部を一時的に取り外し、ロックナット内側等の外観観察を実施



作業イメージ図

調査結果(1)

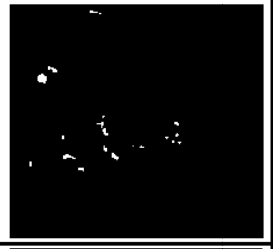
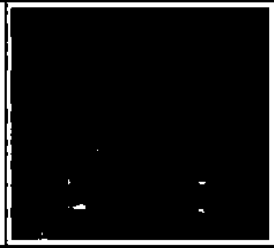
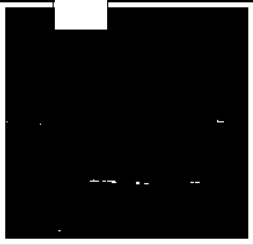
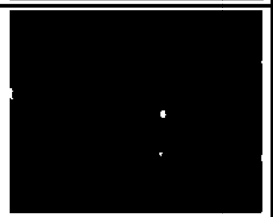
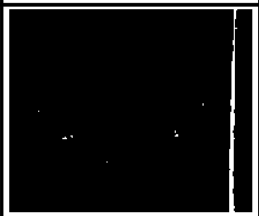
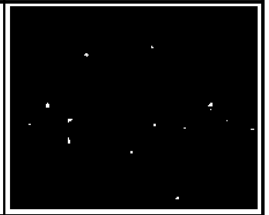
調査の結果、燃料に影響を及ぼす異常は確認されていない。

外観点検の結果、燃料の大きな腐食、変形は確認されていない

なお、コンクリートガレキの影響と想定される白色化が上部・下部で顕著に見受けられる。

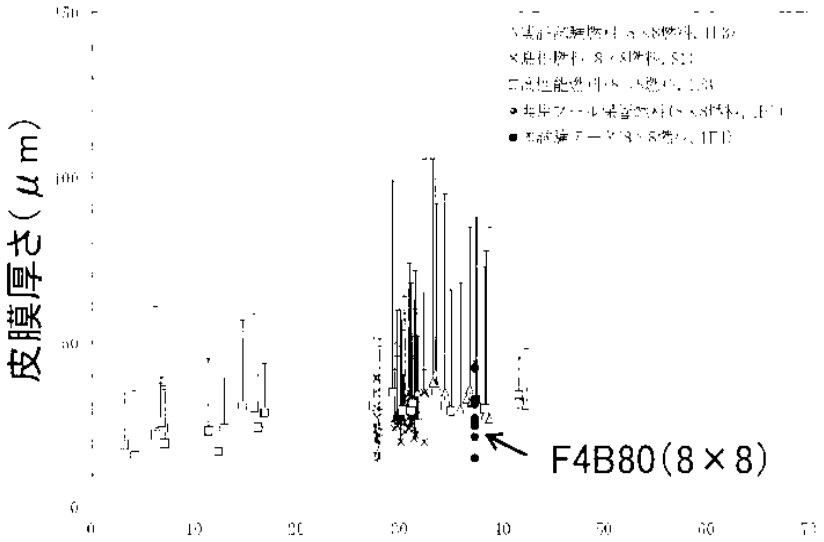
酸化膜厚さ測定の結果、異常な酸化膜厚さの増大は確認されていない。

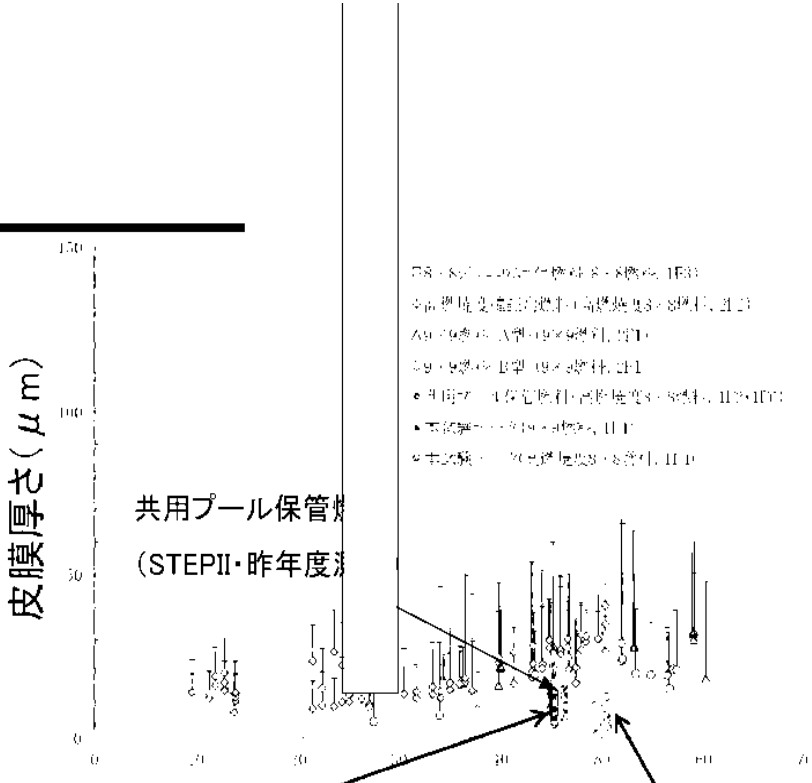
ロックナットの内側に顕著な腐食は確認されていない。

	F4B80(8×8) 砂状がれき:有 小片がれき:有	F4R36(STEPⅡ) 砂状がれき:有 小片がれき:有	F4VN117(STEPⅢ-B) 砂状がれき:有 小片がれき:ー	F4V(STEPⅢ-B) がれき:有 がれき:ー	F4UN32(STEPⅢ-B) 砂状がれき:有 小片がれき:有
上部 タイプレート部					
スペーサ部					
下部 タイプレート部					

外観点検映像

調査結果(2)





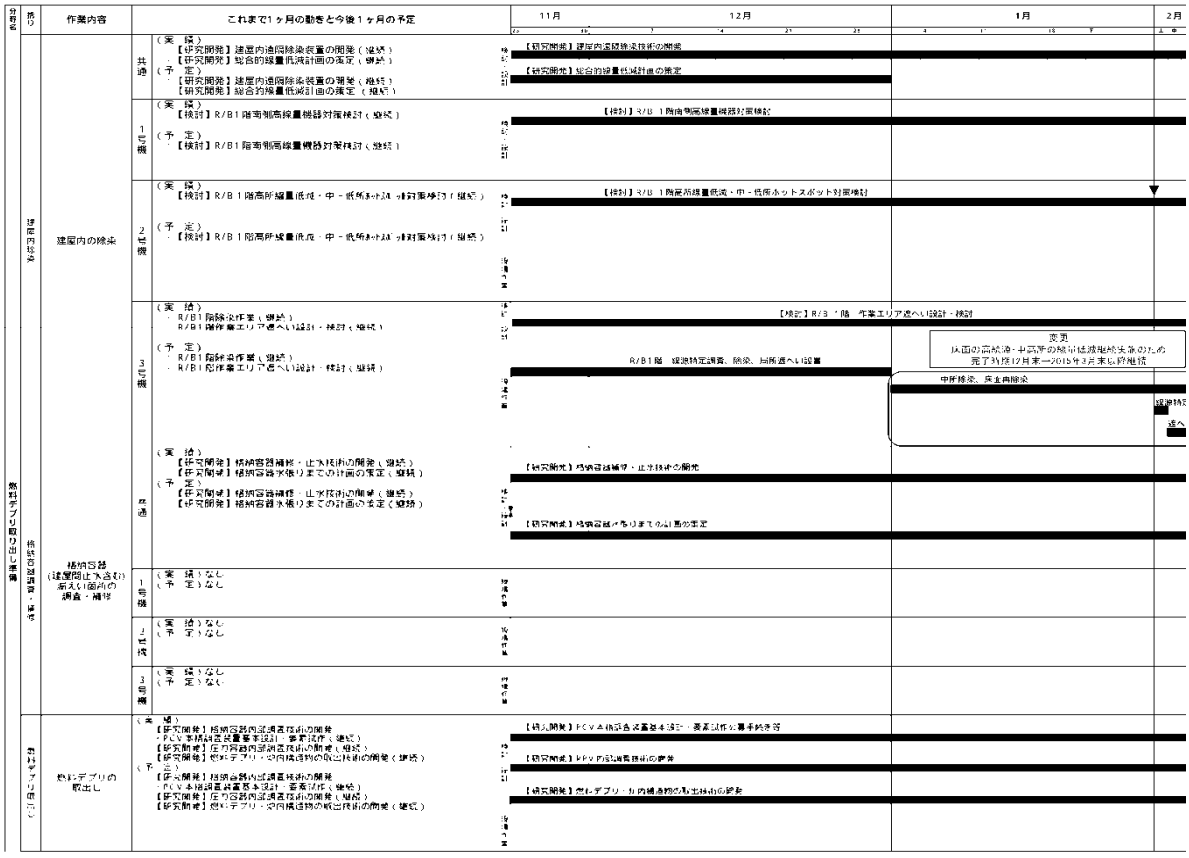
酸化膜厚さ測定結果

F4UN32
F4VN21
F4VN117
(STEPⅢ-B)

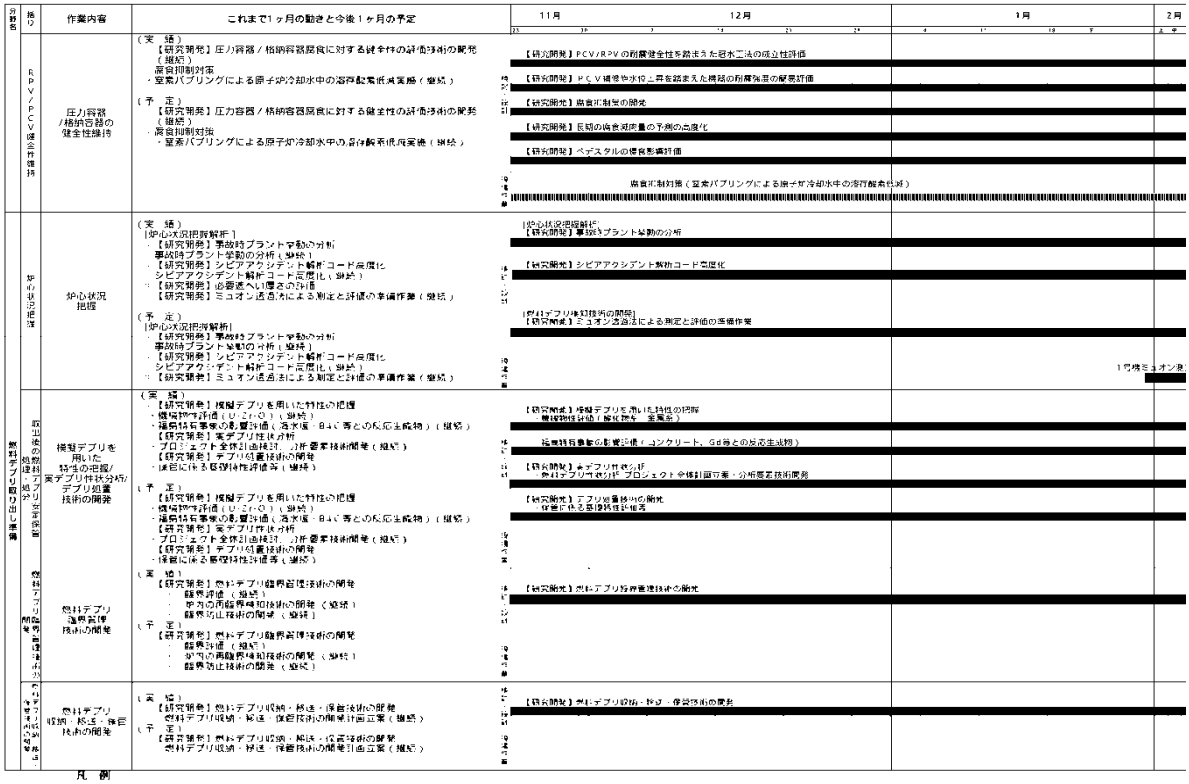
F4VN21 (STEPⅢ-B) がれき:有	 ロックナットねじ部表面
F4UN32 (STEPⅢ-B) がれき:有	 ロックナットねじ部表面

ロックナット観察映像

燃料デブリ取り出し準備　スケジュール



燃料デブリ取り出し準備　スケジュール



凡　例

- ：検討実施・設計実施・準備作業
- ：状況変化により、再度検討・再設計等が発生する場合
- ：現場作業予定
- ：天候状況及び他工事調整により、工期が左右され完了日が確定な場合
- ：機器の運転確認のみで、現場作業（工事）がない場合
- ：2014年9月以降も作業や検討が継続する場合は、矢印で記載
- ：工程調整中のもの

１～３号機原子炉建屋線量低減
進捗状況と計画

2014年12月25日

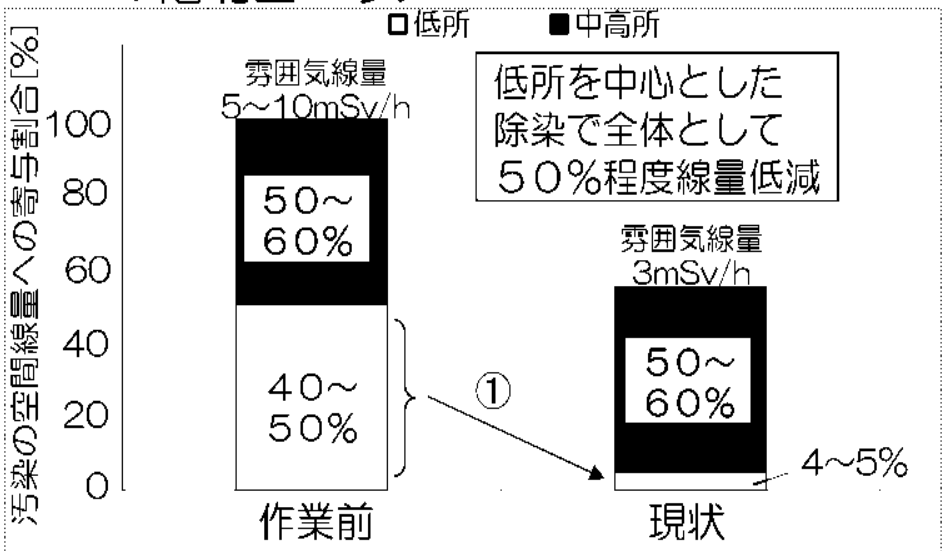
東京電力株式会社

東京電力
TEPCO

1-1. 原子炉建屋内除染　総括　１号機

１号機

１階北西エリア



除染前の空間線量を100%とした場合の推移

線量低減実績

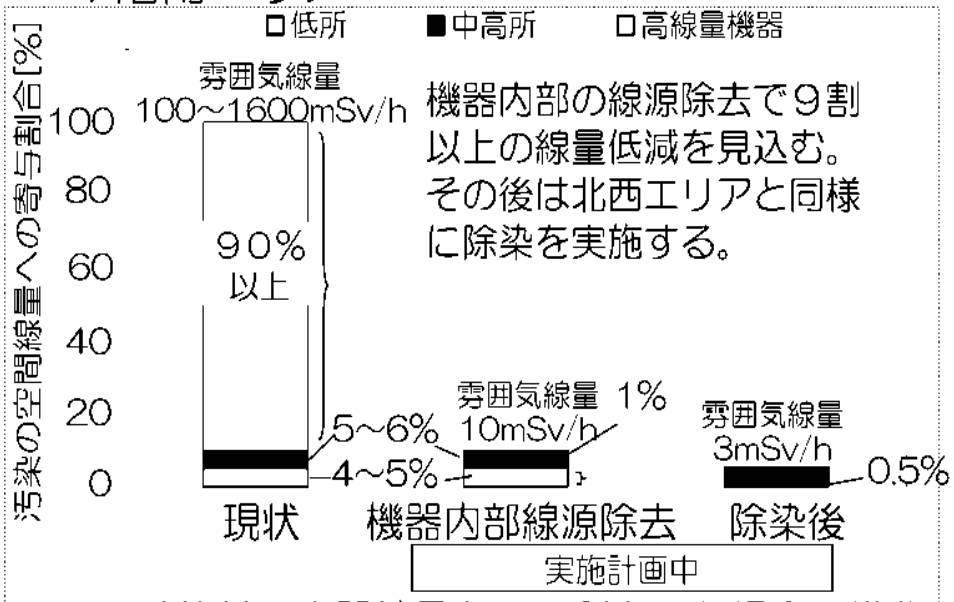
・実施済作業

-ガレキ撤去

-低所除染，高線量箇所遮へい(①)

・線量低減後の空間線量率が平均３ｍＳｖ／ｈまで低減。目標達成。

１階南エリア



除染前の空間線量を100%とした場合の推移

線量低減実績

・実施済作業

-線源調査：配管・機器内部の線量寄与が大きいことを確認（約９割以上）

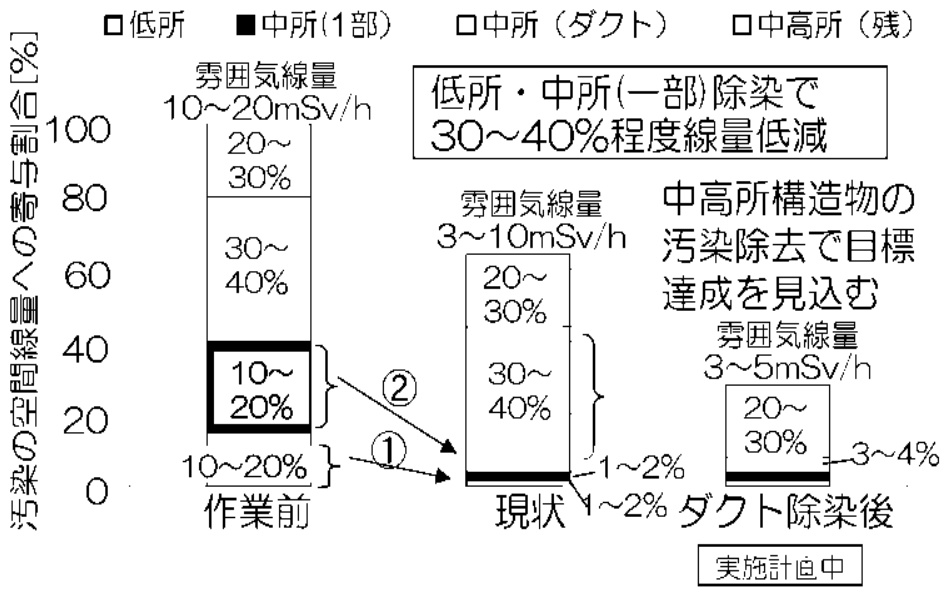
今後の実施内容（2015年度完了）

・配管・機器の内部の線源除去工法を2014年度内に定め、2015年度内に作業実施。(　)

・中低所除染(　)

1-2. 原子炉建屋内除染　総括　2・3号機

2号機1階

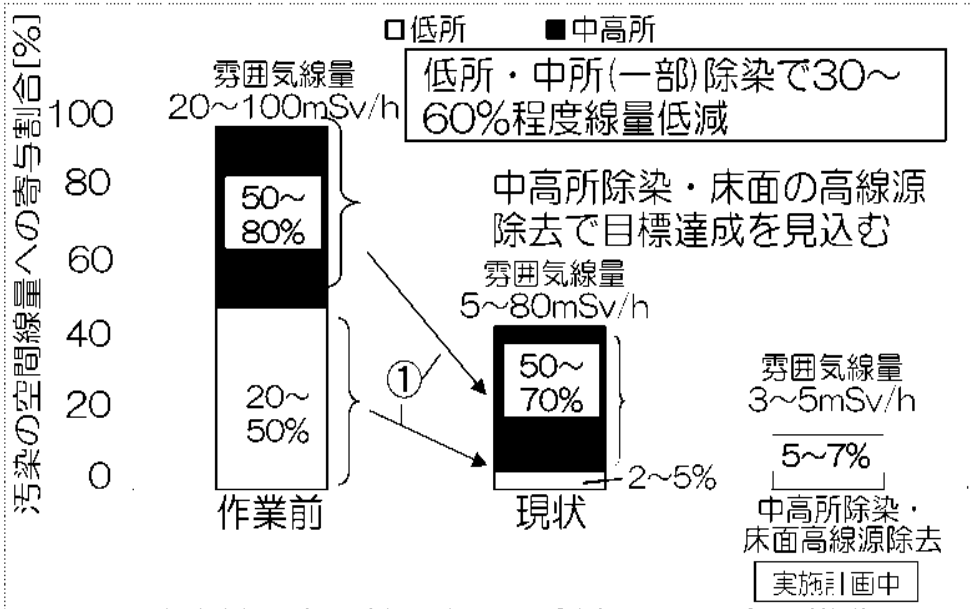


除染前の空間線量を100%とした場合の推移

線量低減実績
- 実施済作業
  - -低所除染(①)
  - -線源調査：主たる線量寄与は中高所構造物であることを確認
  - -中所除染（盤上面等のふき取り）(②)
- 雰囲気線量は3~10mSv/hまで低減。

今後の実施内容（2015年度上期完了）
- 中高所構造物のうち，線量寄与が高い空調ダクト・ケーブルトレイ等の汚染除去工法を検討・実施する。（ ）

3号機1階



除染前の空間線量を100%とした場合の推移

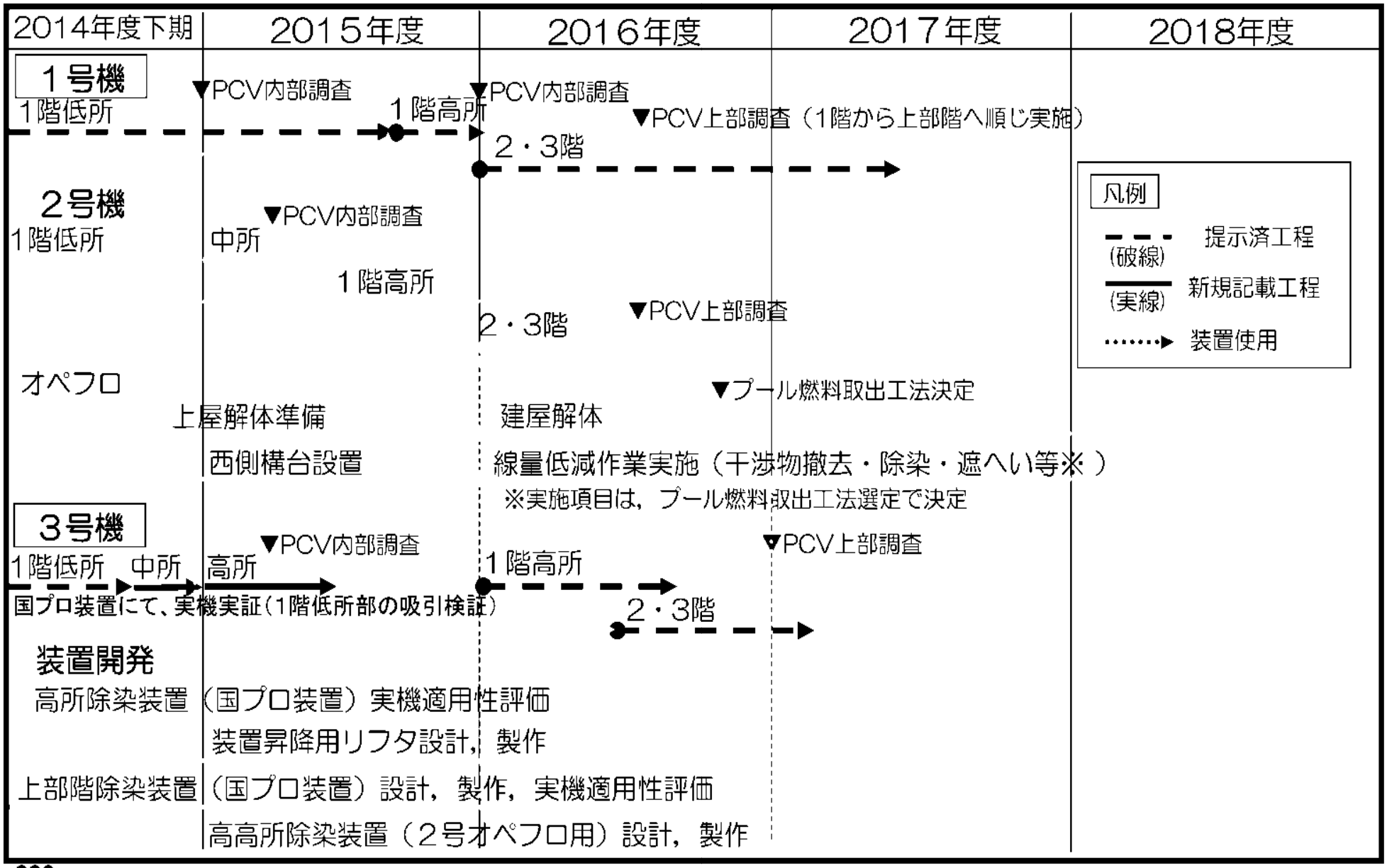
線量低減実績
- 実施済作業
  - -ガレキ撤去
  - -低所・中所(一部)除染，吸引（国プロ装置）除染(①)
- 北西・南東エリアの雰囲気線量は5~20mSv/h。
- 北東・南西エリアは床面除染が難航。雰囲気線量は20~80mSv/h。

今後の実施内容（2015年度上期完了）
- 北東・南西エリアの床面高線源除去（ ）
- 中所除染装置による中所除染(2015年1月~)（ ）
- 高所除染装置による高所除染（2015年4月予定の実機検証完了後）（ ）

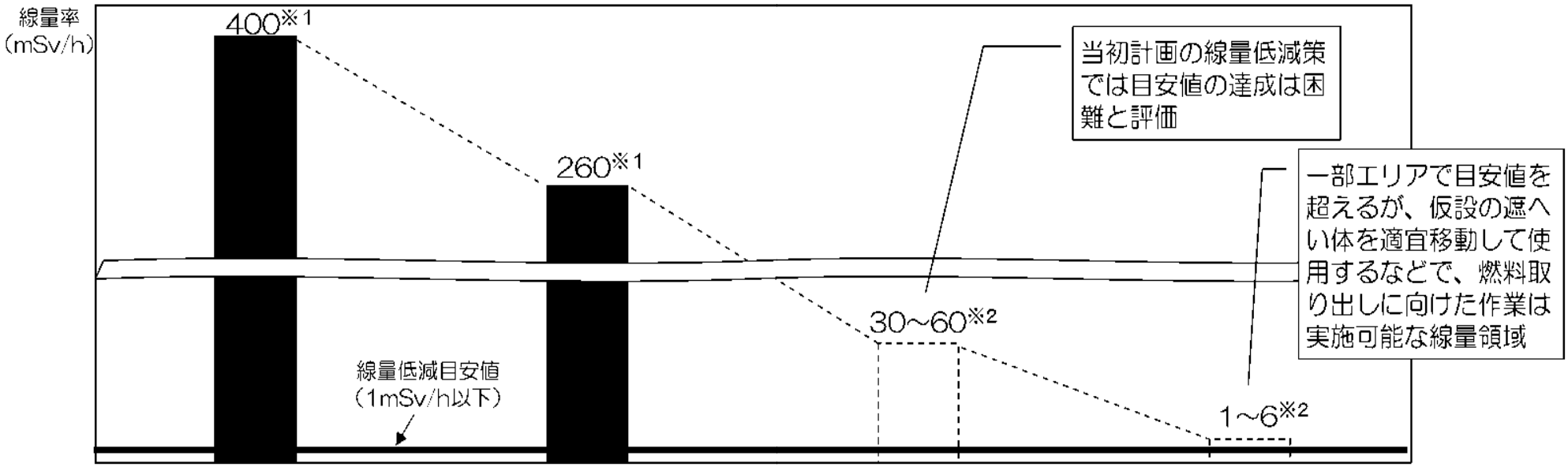
2. 原子炉建屋線量低減計画

1～3号機原子炉建屋上部階は線量低減方針を策定中

※2019年度までに線量低減完了目標



3. 3号機オペフロ線量低減実績および今後の見通し



※1　代表点としてシールドプラグ中央の空間線量率（オペフロ＋5m高さ）を示す
※2　除染・遮へい完了後の線量率寄与が大きい場所の評価値を示す

＜線量低減効果が計画と相違している原因＞

- オペフロに堆積していたガレキを撤去したところ、一部の床スラブに極めて大きな損傷があることが判明したため、実施予定であった吸引、床切削等の除染作業が十分に実施できなかった
- 爆発の影響で床スラブに微細なクラック等が生じ、床表面の浸透汚染が文献等の知見より深く達していた可能性があり、十分な除染効果が得られなかったと想定される

＜今後の実施内容＞

- 当初計画していた除染・遮へい作業の実施後でも線量の寄与が大きいエリアを中心に追加の線量低減策を実施する
- 追加策を実施しても線量低減の目安値を超過する場合は、仮設の遮へい体を適宜移動して使用するなどにより、作業員の被ばく低減を図る
- 空間線量率の高い場所での作業を減らすため、機器レイアウト等の見直しを検討中

4．3号機オペフロ　除染・遮へい作業の実施状況

除染効果実績

A工区

・集積によって、初期の約80%まで低減。

・集積に加えて、切削＋吸引によって、初期の約20%に低減。

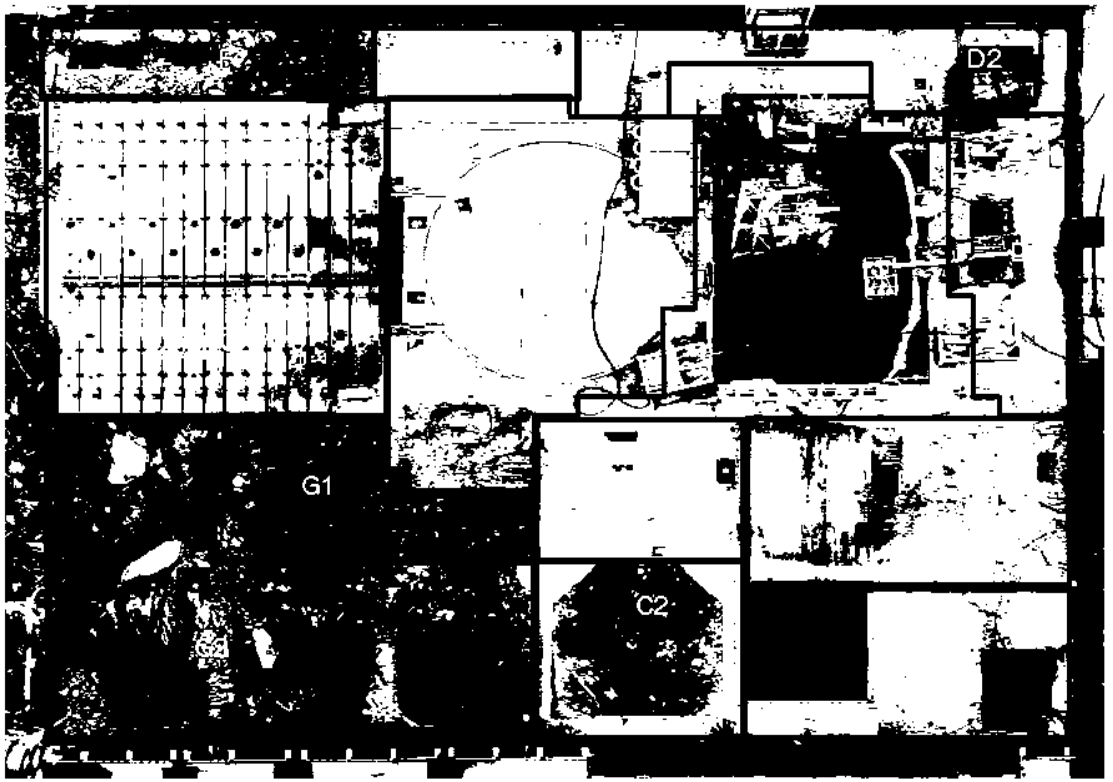
C－1工区

・集積＋高圧水はつり＋吸引によって、初期の約40%に低減。

※コリメータ測定値(床上50cm)から汚染密度へ換算した値の割合

計画時に想定していた除染効果（床面表層切削による除染効果1/100）とは大きく乖離している状況。

【各工区の配置】



【除染・遮へい対策の進捗状況】

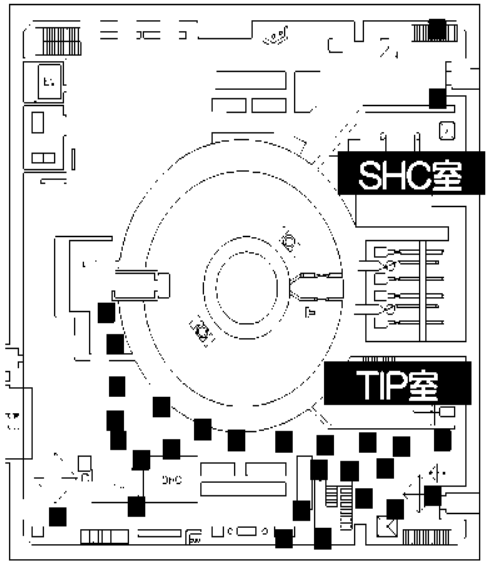
＊1)：スキマサージ周辺除く
＊2)：スキマサージ周辺、ウェルクレーンフックBOX内除く

除染・遮へい対策	A工区	B1工区 躯体健全部	B1工区 躯体損傷部	B2工区	C1工区	C2工区	D1～4工区	E工区	F工区	G1～2工区
小がれきの集積	○＊1)	○	△	○	○	別途計画中	○	－	－	追加遮へい体設置を計画
小がれきの吸引	○ ＊2)	△	△	△	○		×	○	－	
切削	○ ＊1) スキャブラ	△ 高圧はつり	△ 高圧水洗浄	○ 高圧水はつり	○ 高圧水はつり		×	－	－	
遮へい体設置	×	×	×	×	×	×	×	○	×	

凡例　○：実施済み　△：部分的に実施済み　×：未実施　－：計画なし

参考　1-1．１号機原子炉建屋１階　線量低減進捗状況

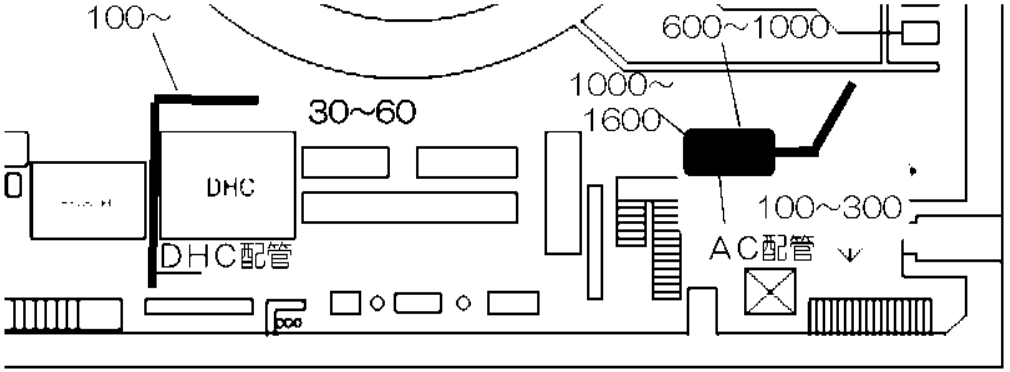
現状空間線量（２０１４年１２月）



マップ線量凡例
：＜3mSv/h
：＜5mSv/h
：＜7mSv/h
：＜１０mSv/h
■：＞１０mSv/h
：＞２０mSv/h
■：＞５０mSv/h

線源寄与特定状況

南側エリアは，高線量AC配管（1600mSv/h）とDHC配管（100mSv/h）の配管内包線源が寄与。



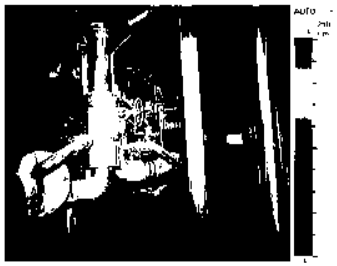
凡例　100mSv/h未満　600~1000mSv/h
100~600mSv/h　1000mSv/h以上
赤字　雰囲気線量率

線量低減実施内容

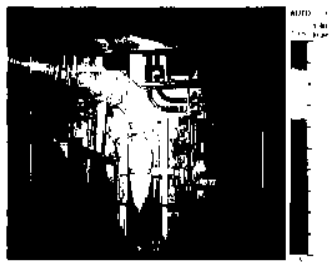
①ガレキ撤去（遠隔装置）
②ケーブル整線・機材撤去（人手）
③除染（吸引・拭取）（人手）
④ホットスポット遮へい（HCU）（人手）

線量低減評価

線量低減後の空間線量が平均3mSv/hまで低減し線量低減前と比較し50%程度の低下。（北西エリアの空間線量のうち低所以下の寄与である20~50%を削減）
南側エリアは高線量AC・DHC配管が線量寄与が大きな割合を占めている。



DHC配管汚染状況
表面50cm線量：
約300~500mSv/h
（γ線強度より推定）



AC配管汚染状況
表面50cm線量：
約1000~1200mSv/h
（γ線強度より推定）

参考　1-2．１号機原子炉建屋１階　線量低減課題

現状課題

南側エリアに寄与しているAC配管・DHC配管の線量低減工法確立が課題。

未調査箇所

SHP室：アクセス扉前に大型遮へい体が設置されているためアクセスが困難。RCW配管が線源となり室内が高線量と推測。

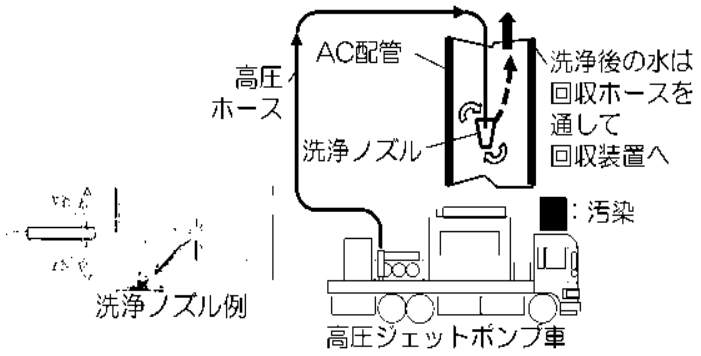
TIP室：南側エリアが高線量につき，アクセス扉に寄付が困難な状況。

※未調査小部屋に関しては，調査アクセスルートを検討し２０１５年上期までに実施計画。

現状課題に対する検討内容

AC配管洗浄検討内容

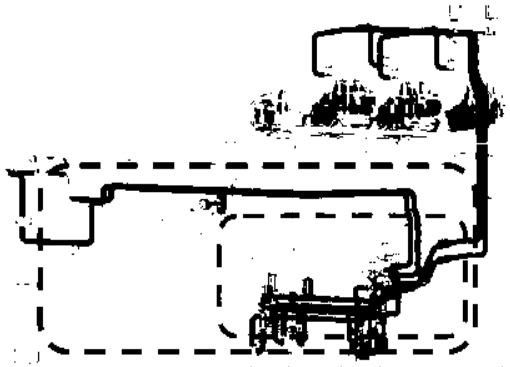
残留水素の可能性のある配管への穿孔工法，及び，AC配管内部に固着したCs線源の除去工法の検討。



配管洗浄のイメージ図

DHC配管洗浄検討内容

配管内部に残留している汚染水の抜き取り，フラッシング工法の検討。

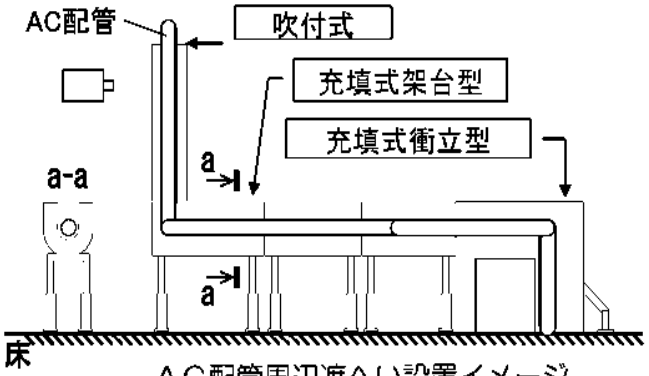


γカメラで高線量を確認した範囲

対策が必要な範囲（１階）

配管遮へい設計，製作

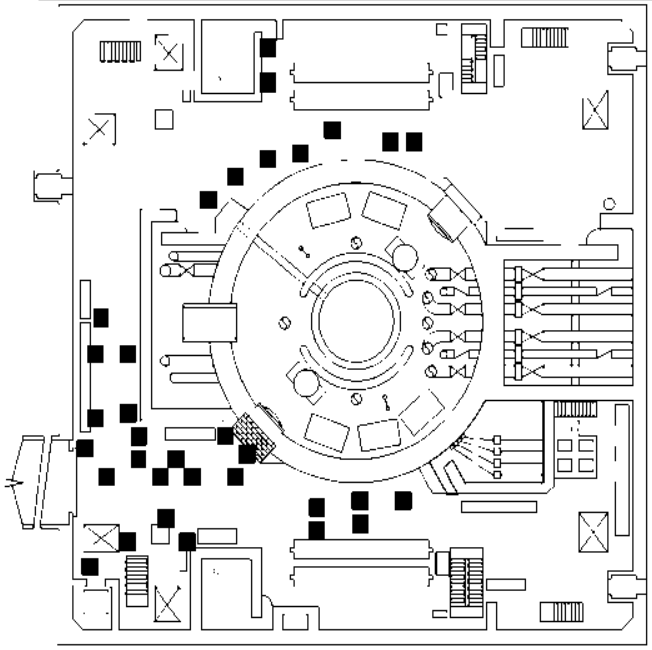
配管洗浄のバックアッププランとして遮へいを計画。床耐荷重（1.22ｔ／m²）に対応する最適な遮へい設計を検討。



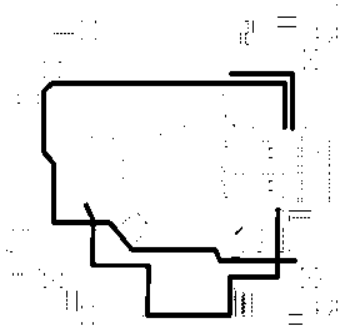
ＡＣ配管周辺遮へい設置イメージ

参考　2-1．２号機原子炉建屋1階 線量低減進捗状況

現状空間線量（2014年10月）



線源寄与特定状況



中・高所部にあるダクトが20mSv/h程度あり，空間線量（床上1500㎜）に1～3mSv/h程度寄与している。
ダクト内除染，撤去を計画中。

線量低減実施内容

①資機材撤去（人手）
②中・低所（床上～4m）除染（遠隔装置・人手）
③床面除染（遠隔装置）
④残部除染（汎用機器・人手）
⑤特定線源遮へい（ペネ・HCU）（人手）
⑥遮へい設計，現場実証（人手）
※現場実証により遮へい体内線量が3mSv/h程度まで低減できることを確認。至近後作業の作業環境確保の見通しを得た。

フレーム製作型遮へい体

足場囲い型遮へい体

線量低減評価

線量低減後の空間線量として北側が5～7mSv/h，南側が8～10mSv/hと線量低減前に比べて50%低減。（空間線量のうち低所以下の寄与である10～20%以上を削減）
残りの線量寄与は，線量低減できていない中・高所部構造物（ダクト・ケーブルトレイ等）からである。

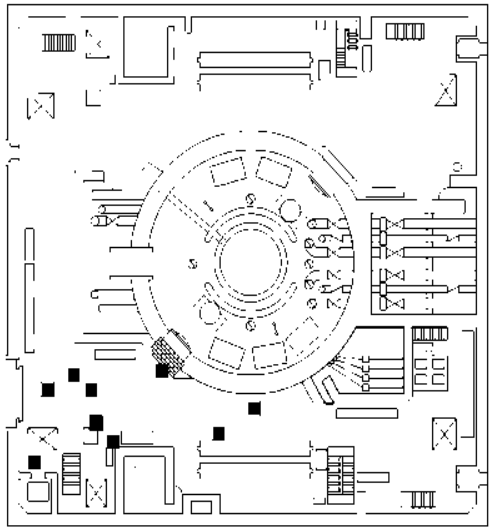
参考　2-2.　2号機原子炉建屋1階 線量低減課題

現状課題

更なる線量低減として、線源寄与が特定されている中・高所部構造物への対応が必要。

現状課題に対する対応

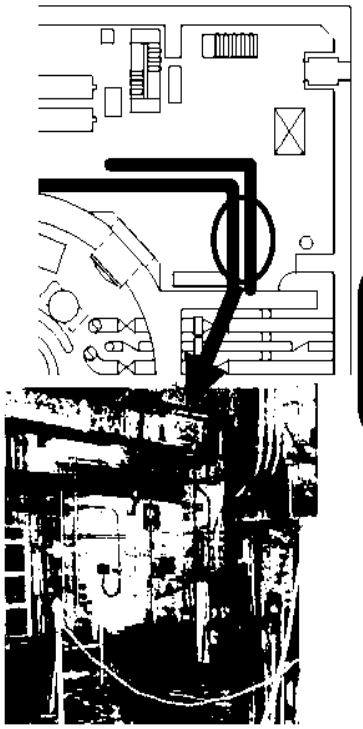
ダクト対応後の空間線量試算



マップ線量凡例
- ：＜3mSv/h
- ：＜5mSv/h
- ：＜7mSv/h
- ■：＜10mSv/h
- ■：＜15mSv/h

1～3mSv/h程度の線量低減が図れる試算，
北西・北東・南東エリアは3mSv/hの空間線量になる。
南西エリアはハッチ開口上部の線量寄与が残る。今後の課題として対応検討中。

調査結果と検討内容



ダクト内部汚染形態は，汚染蒸気の乾燥固着である。

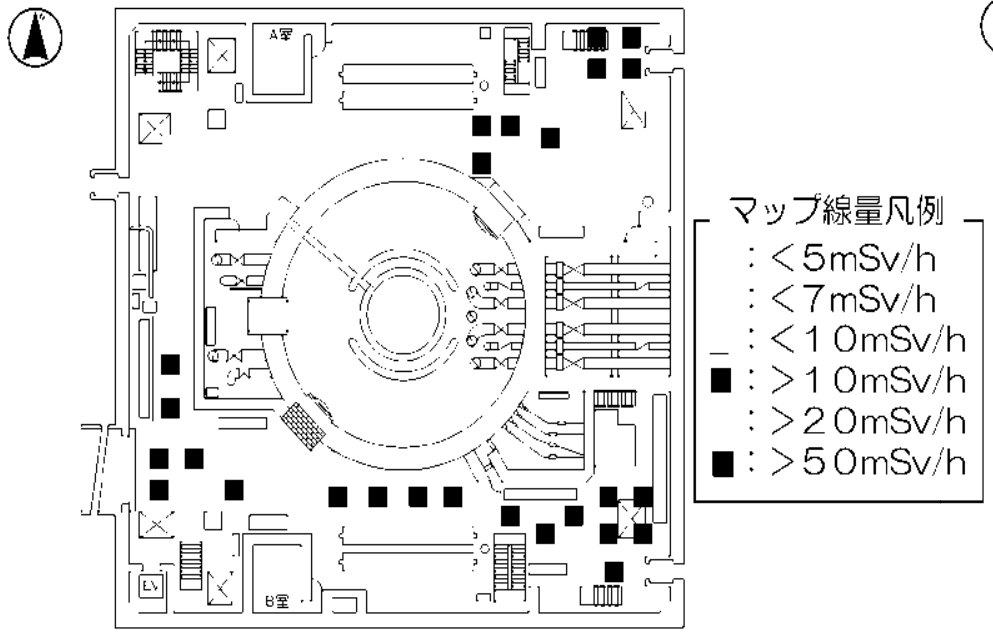
汚染蒸気の乾燥固着に対する最適なダクト内部除染工法を検討中。
併せてダクト撤去工法を検討中。

※短時間の有人作業によるダクト撤去計画の環境整備として先行でダクト内部除染を計画。

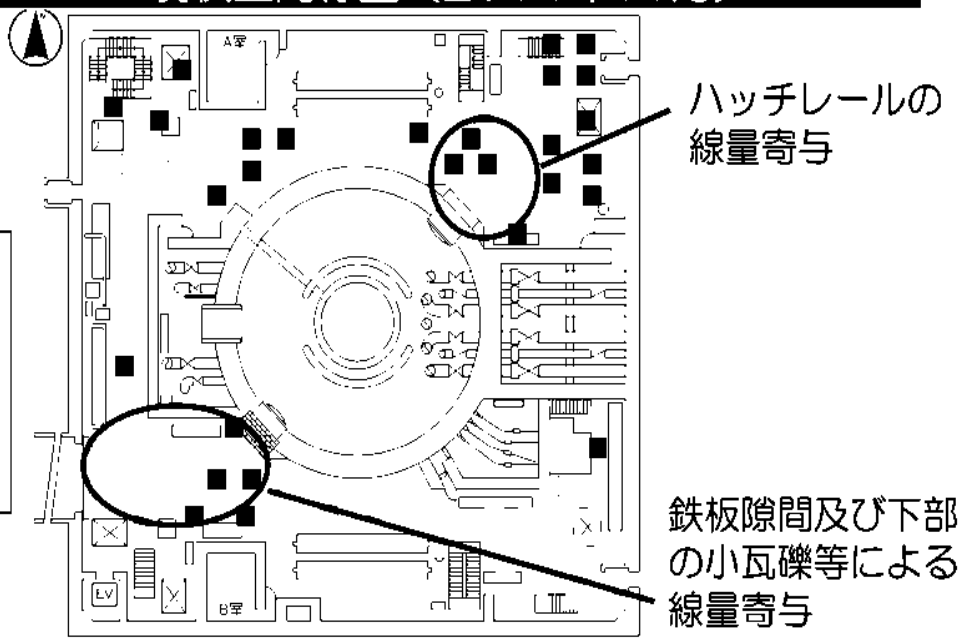
参考　3-1．３号機原子炉建屋1階 線量低減進捗状況

空間線量推移

ガレキ撤去前空間線量



現状空間線量（2014年11月）



線量低減実施内容

①ガレキ撤去（遠隔装置）
②小瓦礫撤去，粉塵回収（継続中）（遠隔装置）
　※国プロ装置の吸引装置も使用。
③中・低所（床上～4m）除染（継続中）（遠隔装置）
④床面除染（継続中）（遠隔装置）

線量低減評価

継続中であるが線量低減後の空間線量として北西・南東エリアで平均10mSv/hと線量低減前と比較し約60%程度低減している。残りの線量寄与は，線量低減できていない中・高所部構造物及びHCU等のホットスポットからの寄与であると推測。（空間線量のうち低所以下の寄与である20～40%以上を削減）
北東・南西エリアは床面線源除去が難行しており線量低減前と比較し30%程度の低減である。

参考　3-2.　3号機原子炉建屋1階 線量低減課題

線源寄与特定状況

北東エリア：ハッチレール溝部

ハッチレール溝の高線量堆積物が空間線量に寄与と推測。溝部堆積物の除去を継続。

南東エリア：鉄板敷設エリア

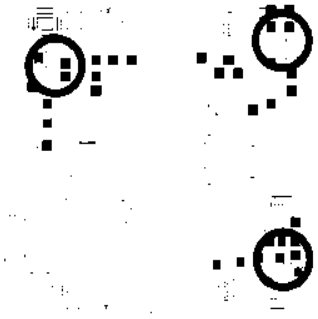
鉄板隙間及び下部に堆積している小瓦礫が空間線量に寄与と推測。鉄板撤去，小がれき回収，床面除染を計画中。

現状課題

- 中・高所構造物の線源除去が課題。
- エリア全体の線量が高いため後作業が可能な作業エリア遮へい設計が課題。
- 北東エリアのハッチレール溝部の堆積物の除去効果によっては遮へい設置が必要。
- 北東エリアの重要設備（プラント維持管理設備）の安全確保と線量低減作業の両立が課題。
- 屋上階の汚染した雨水が１階に流入し再除染が必要。

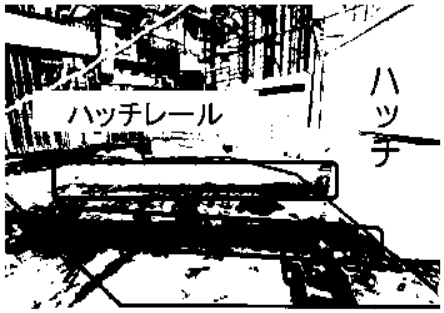
現状課題対応

線量測定

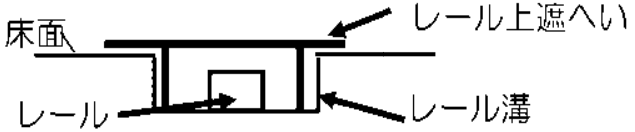


左図3箇所をコリメート付線量系により線量寄与の方向性を確認。遮へい設計のインプット情報取得。

ハッチレール上遮へい

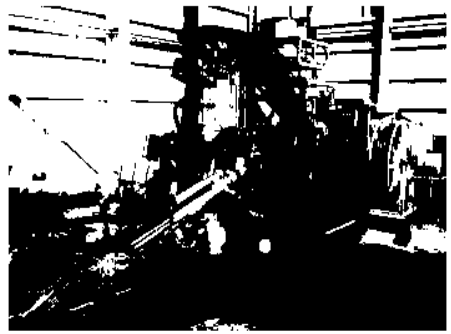


遠隔設置可能な遮へいを検討中。



レール上遮へいイメージ

中所除染装置導入



中所除染装置（リバイ）を導入し中所（～４ｍ）の壁・機器の追加除染を計画。

参考　4. 原子炉建屋上部階線量低減の課題

H２５年度国プロ調査（上部階線源特定調査）から下記事項の課題が判明している。２０１６年４月からの線量低減実施に向けて２０１５年上期までに課題対応を検討。

		課　　題	検討内容
１号機	エリア アクセスルート	水素爆発により機材等がエリアに散乱。 RCW配管・熱交換器内部が高線量の可能性があり機器に対する個別対応が必要。	機材撤去技術の検討。 機器内部除染，撤去技術の検討。
３号機	エリア アクセスルート	水素爆発により瓦礫等がエリアに散乱。 アクセスルートのガレキ干渉により遠隔装置の調査が実施できず線源が特定されていない。 ３階へアクセス階段が崩落。	瓦礫撤去技術の検討。 アクセスルート検討，線源特定調査を計画。 ３階へのアクセスルート検討。
共通	エリア アクセスルート	線源が上部のため除染では線量低減が見込めないリスク有り。	線量低減可否の判断は国プロ開発装置の除染性能結果をもって判断。 PCV上部調査は調査内容を確認し局所遮へいで対応を検討。 PCV補修は更なる装置の遠隔化を検討。
	小部屋	調査未実施であり線量低減の策定が不可。	２０１５年上期から調査計画

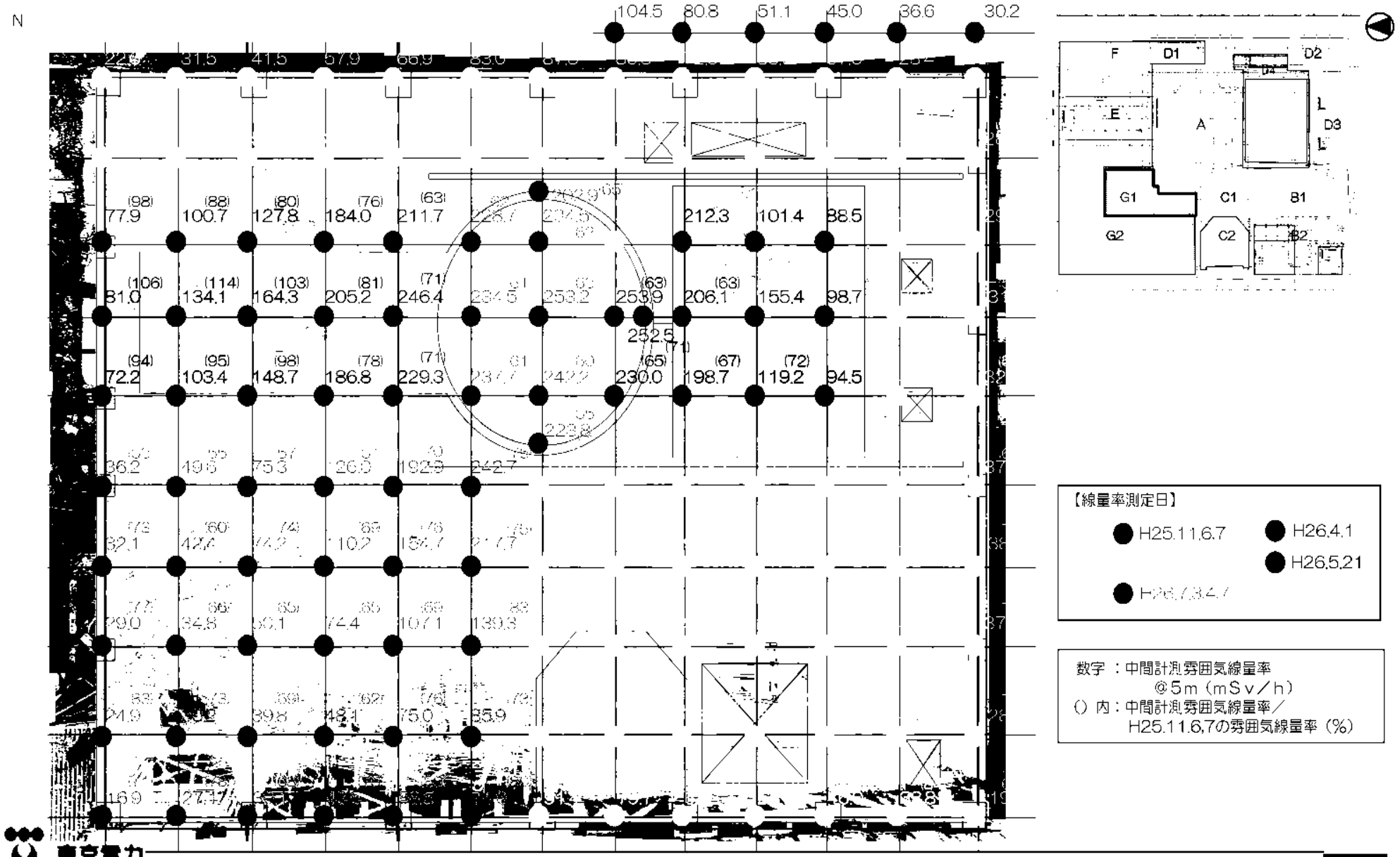
１号機２階 南西位置での線源特定調査結果

２号機３階 南西位置での線源特定調査結果
全域が汚染されている

３号機２・３階 南西エリアの瓦礫状況

参考5．3号機オペフロ空間線量（オペフロから5m高さ）の推移

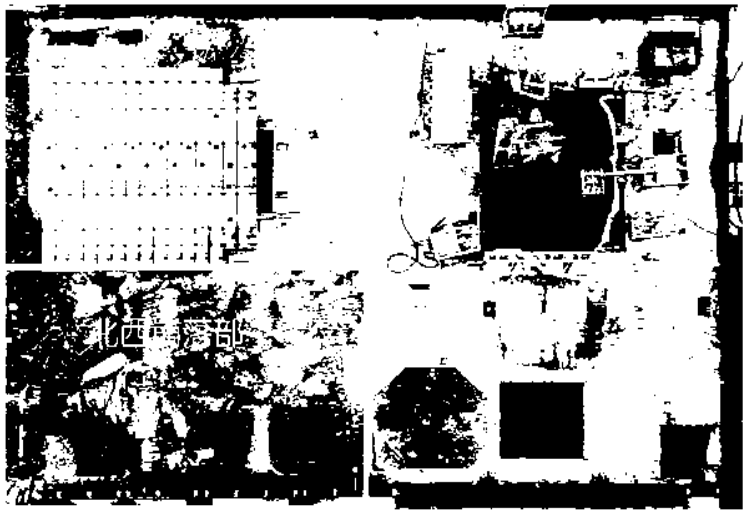
除染作業の中間計測結果



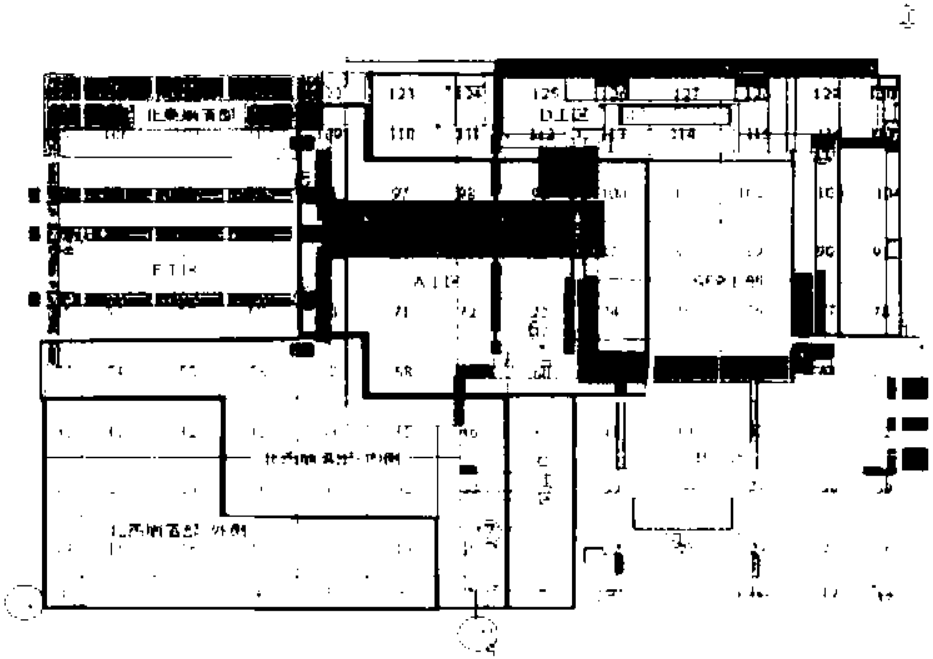
参考6．線量低減対策（除染及び遮へい）の追加実施内容について

除染の追加対策
　線量寄与が大きい工区は、主にB,C工区であり、当該工区を中心に追加除染を実施

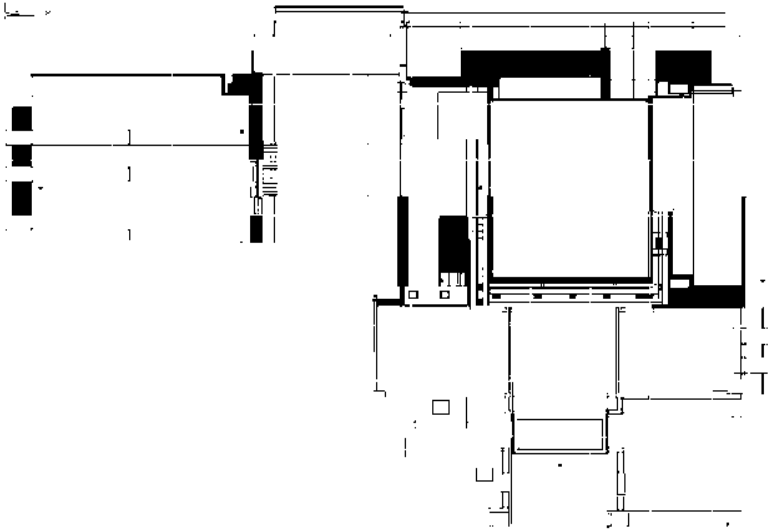
遮へいの追加対策
　北西崩落部遮へい体と当初計画遮へいの隙間を補完する遮へい体を設置(下図参照)



【番号：評価点位置】



【評価を考慮した追加遮へい】



当初計画の遮へい：灰
補完遮へい　　：青（1/10）,緑(1/100)
北西崩落部遮へい：黄（1/90）

参考7.　３号機オペフロ有人エリアでの線量率評価

評価①

当初計画の除染と遮へい体設置後のオペフロ有人作業エリア線量率を求めるために評価を実施。

評価②

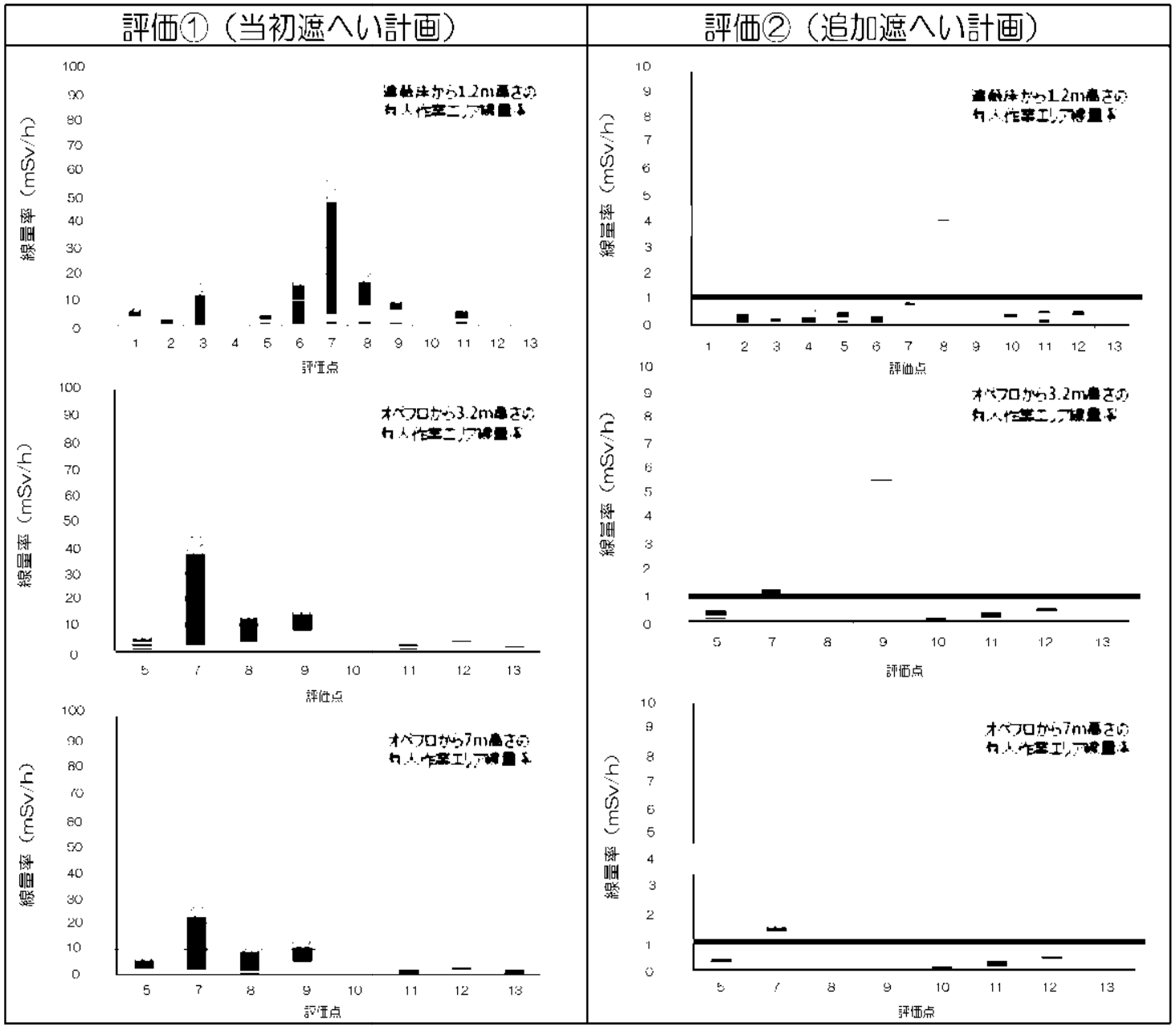
当初計画の除染と遮へい体設置に加えて、北西崩落部遮へい体と当初計画遮へいの隙間を補完する遮へい体を考慮した場合の評価を実施。

課題

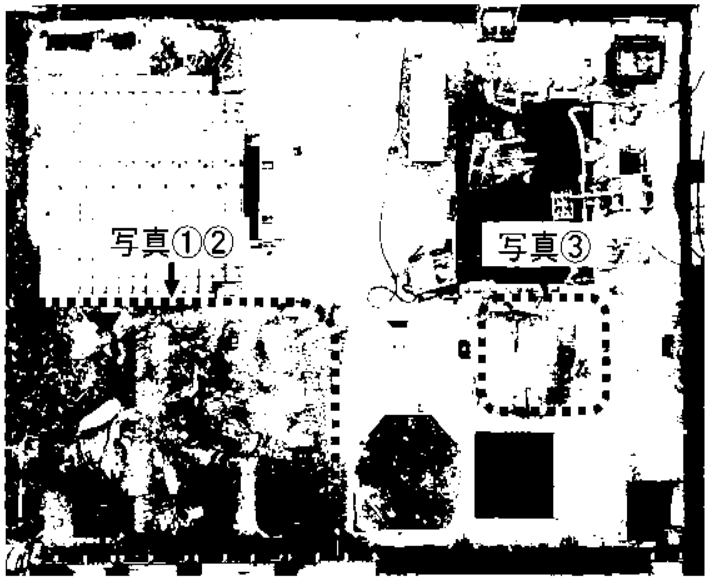
追加遮へいを実施しても一部エリアで目安値1mSv/hを超過する

対策

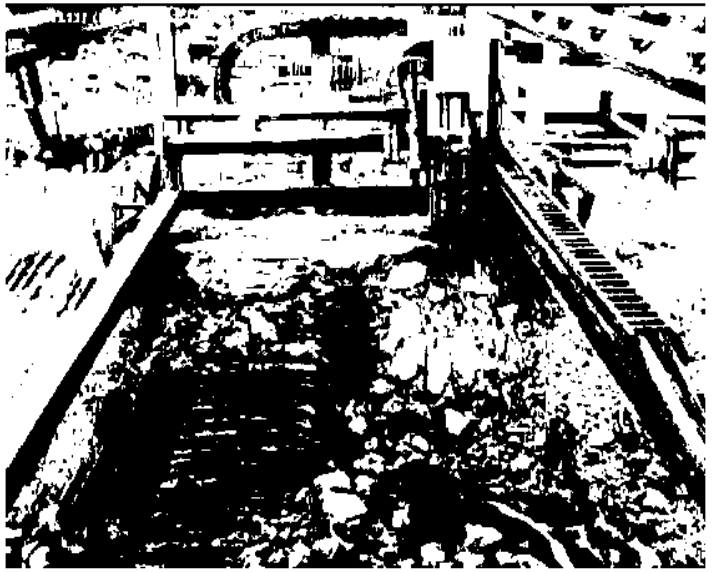
主にB,C工区を追加除染するが、１mSv/hを超過する場合は、仮設の遮へい体を適宜移動して使用するなどにより、作業員の被ばく低減を行う



参考8．大きな損傷を受けた3号機オペフロの床スラブ状況



現状（H26/5時点）



写真③コンクリート表層の損傷

写真①R/B北側状況

写真②北西崩落部拡大写真

原子炉内燃料デブリ検知技術の開発
進捗報告

2014年12月25日

東京電力株式会社

東京電力
TEPCO

IRID

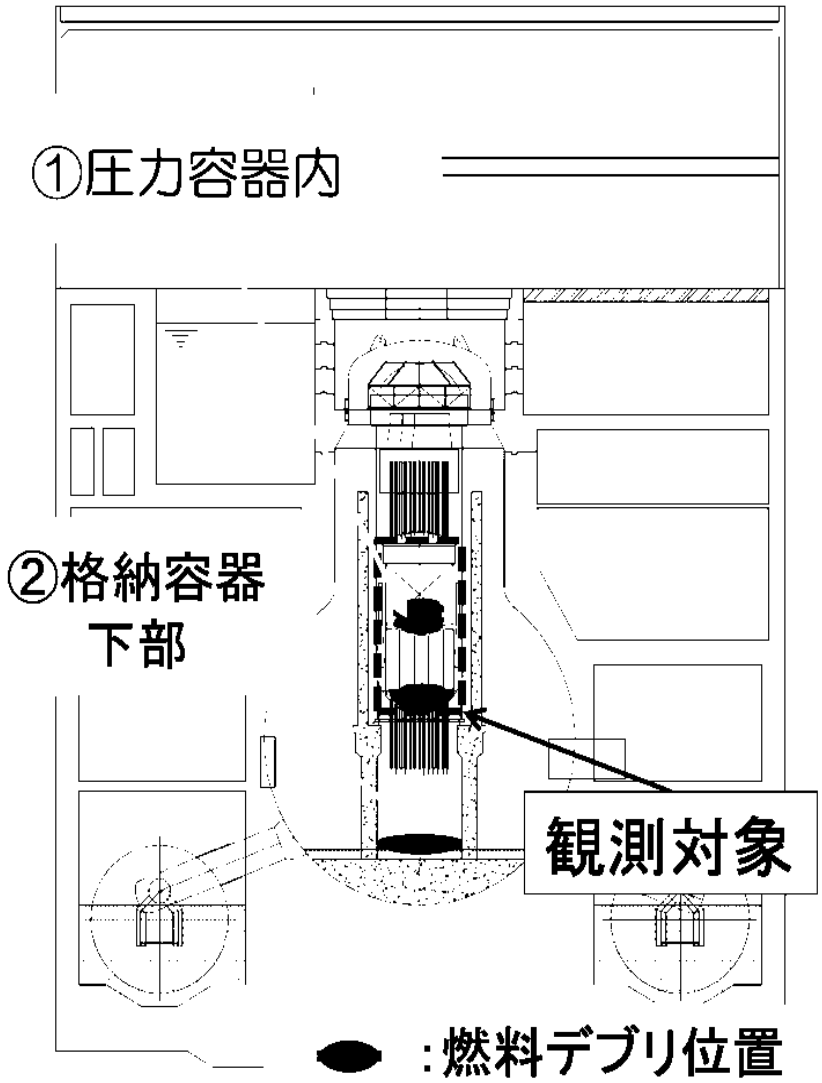
本資料の内容においては、技術研究組合国際廃炉研究開発機構（IRID）の成果を活用しております。

1.全体計画 - 目的

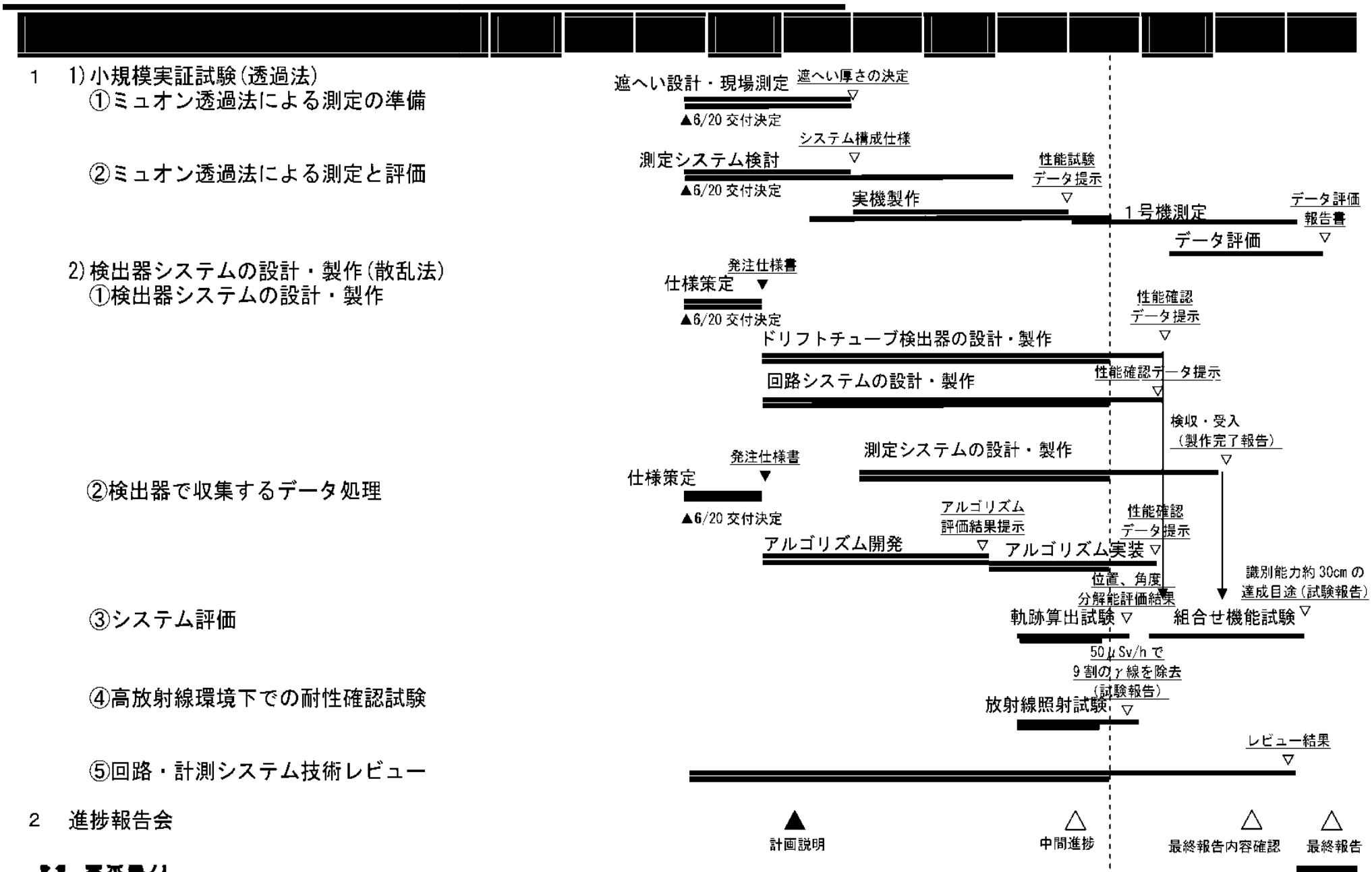
●圧力容器内(①)と格納容器下部(②)
　の燃料デブリの位置、量の把握が重要
◆燃料集合体の損傷状態
◆狭隘部への溶融燃料の流れ込み有無
◆燃料デブリの密度等の詳細分布

圧力容器内部は
高放射線場で
アクセス困難

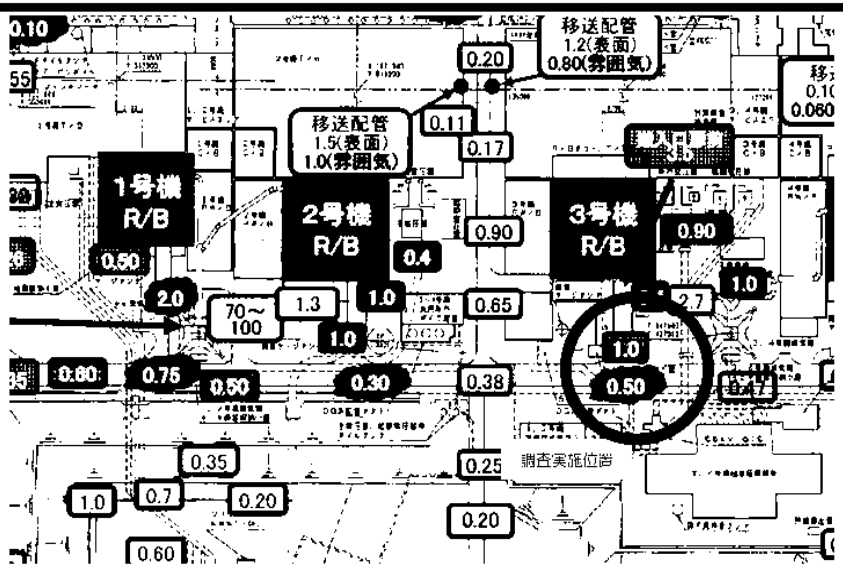
**ミュオンによる透視技術で
早期に燃料デブリ分布を
廃炉技術開発に提供**



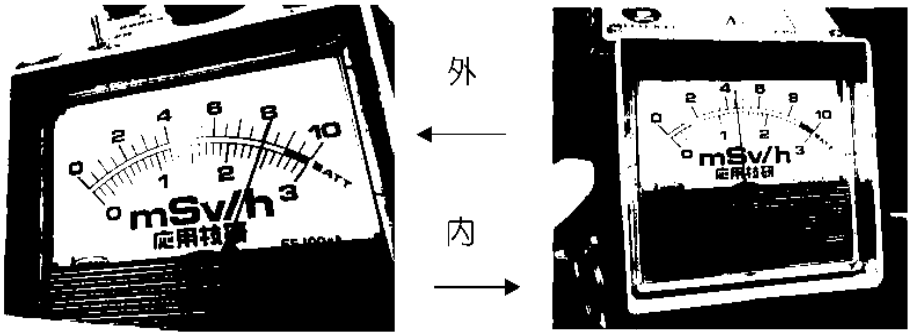
2．H26年度実施計画


1 1)小規模実証試験(透過法)
①ミュオン透過法による測定の準備
②ミュオン透過法による測定と評価
2)検出器システムの設計・製作(散乱法)
①検出器システムの設計・製作
②検出器で収集するデータ処理
③システム評価
④高放射線環境下での耐性確認試験
⑤回路・計測システム技術レビュー
2 進捗報告会
遮へい設計・現場測定
遮へい厚さの決定
▲6/20 交付決定
システム構成仕様
測定システム検討
性能試験
データ提示
▲6/20 交付決定
実機製作
1号機測定
データ評価
報告書
データ評価
発注仕様書
仕様策定
▲6/20 交付決定
性能確認
データ提示
ドリフトチューブ検出器の設計・製作
回路システムの設計・製作
性能確認データ提示
検収・受入
(製作完了報告)
測定システムの設計・製作
発注仕様書
仕様策定
▲6/20 交付決定
アルゴリズム
評価結果提示
性能確認
データ提示
アルゴリズム開発
アルゴリズム実装
位置、角度
分解能評価結果
識別能力約 30cm の
達成目途(試験報告)
軌跡算出試験
組合せ機能試験
50μSv/h で
9割のγ線を除去
(試験報告)
放射線照射試験
レビュー結果
▲ 計画説明
△ 中間進捗
△ 最終報告内容確認
△ 最終報告

3．透過法：小規模実証試験（成果）

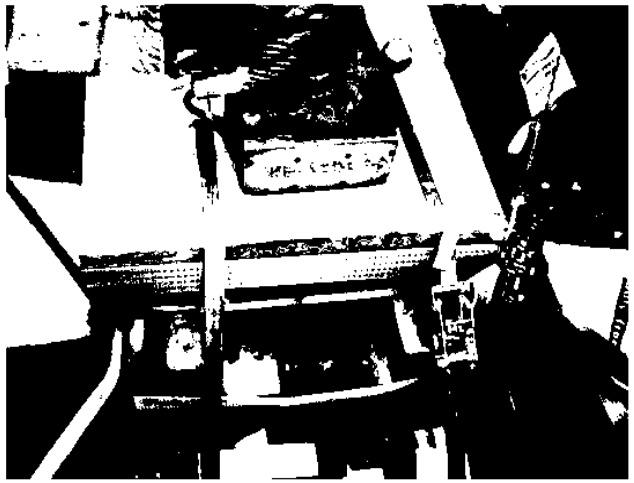


・現場での作業風景



・遮へい能力の検証のため、設置場所での線量（0.4mSv/h程度）より高い、3号機原子炉建屋前で試験を実施

・実施場所の線量は0.8mSv/h程度であったものの、コンテナ内では0.45mSv/h程度に低下

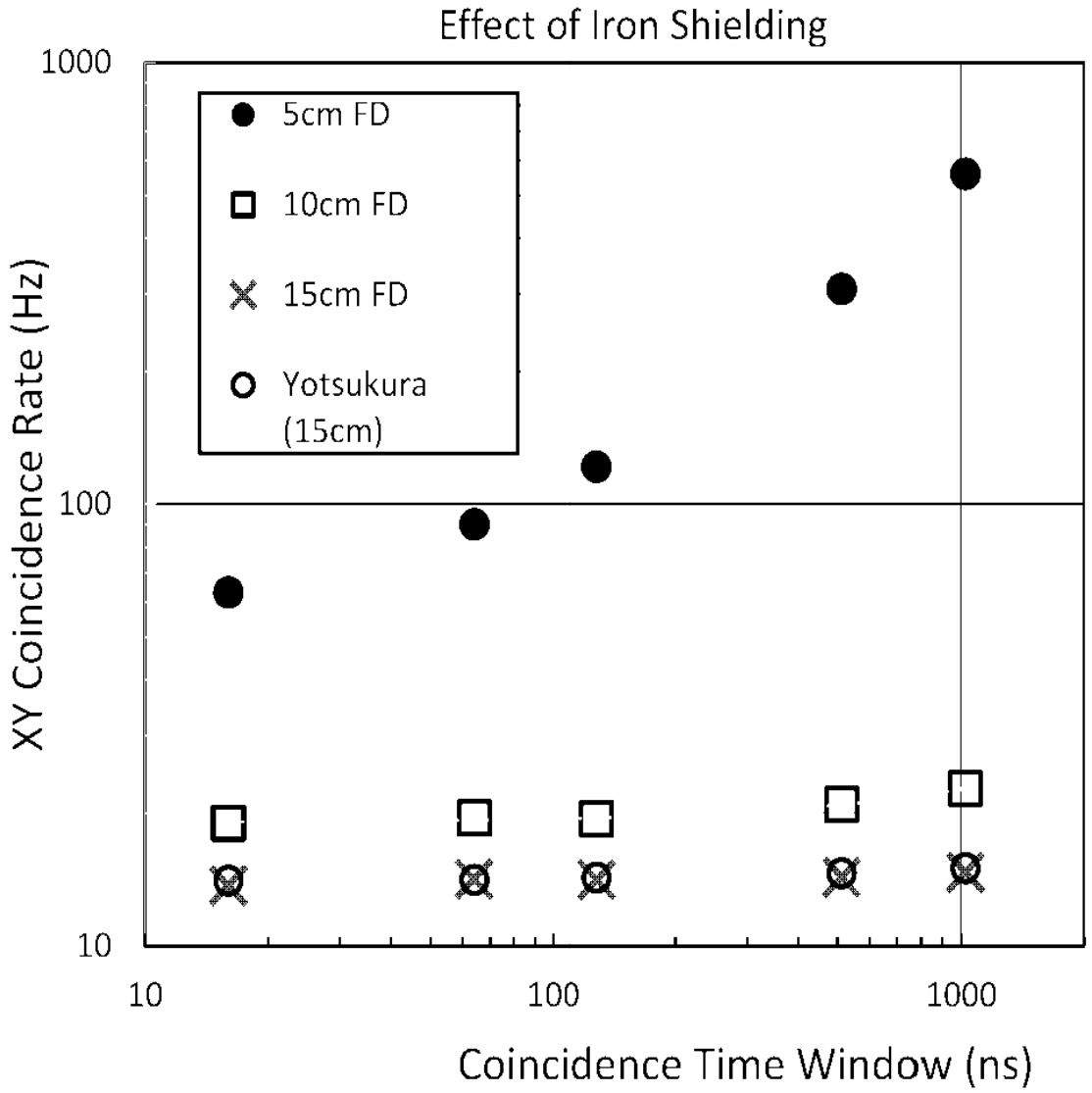


遮へい無

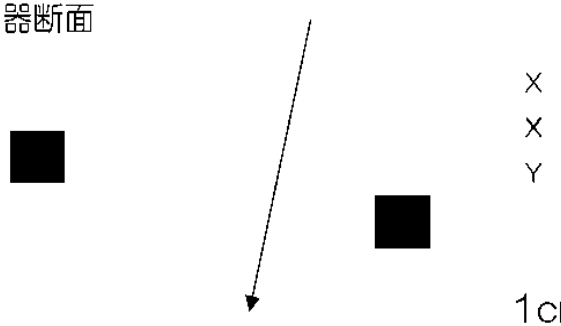
遮へい有

・コンテナ内に設置した、10cm厚の線量計用の遮へい内部の線量は数μSv/hに低下

4．透過法 :小規模実証試験 (成果)



検出器断面



X(20本)とY(10本)のXY同時計数レートは、
　通過ミュー粒子の数
　検出器のノイズ
　放射線バックグラウンド
に依存する。
(2)(3)は、偶然事象のため、同時性を判断する時間幅（Time Window）に比例して増加

⇩

(2)(3)は遮へい厚さに依存

⇩

放射線が少ない場所(いわき四倉)での測定から増加分として(3)を推定可

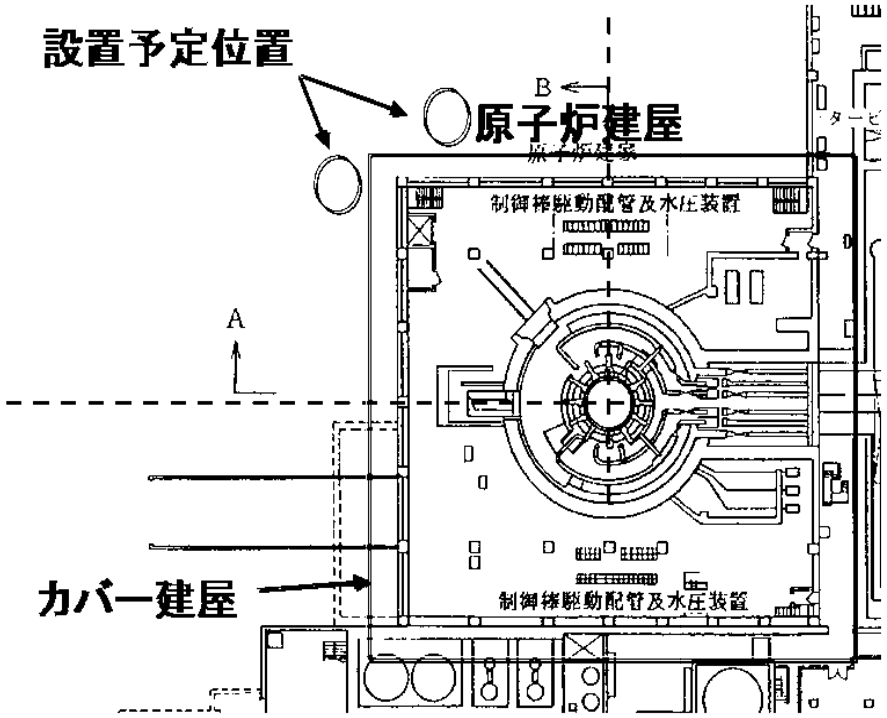
10,15cmでは放射線バックグラウンドの影響をほとんど受けないことを確認

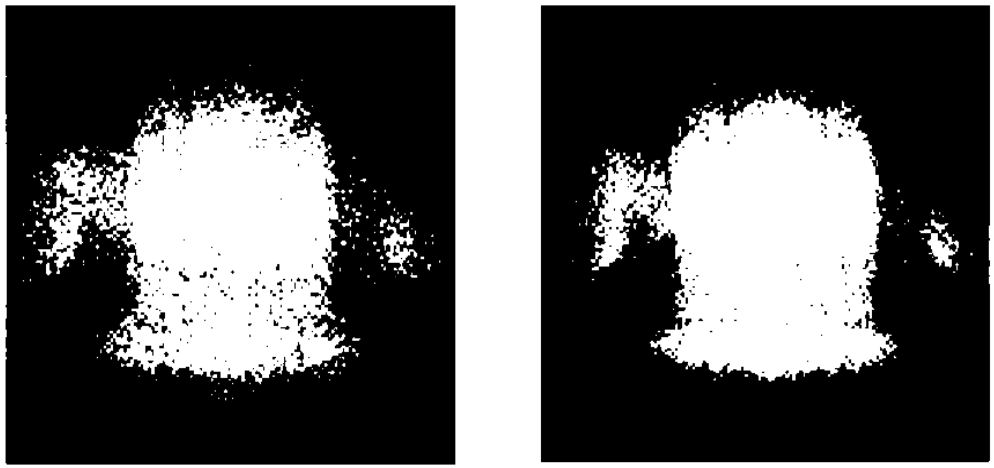
5 .透過法 :設置位置及び測定結果のイメージ

■検出器は、原子炉建屋の北側及び
北西コーナに設置予定（1月下旬以降）

■測定開始は最速で2月初旬頃

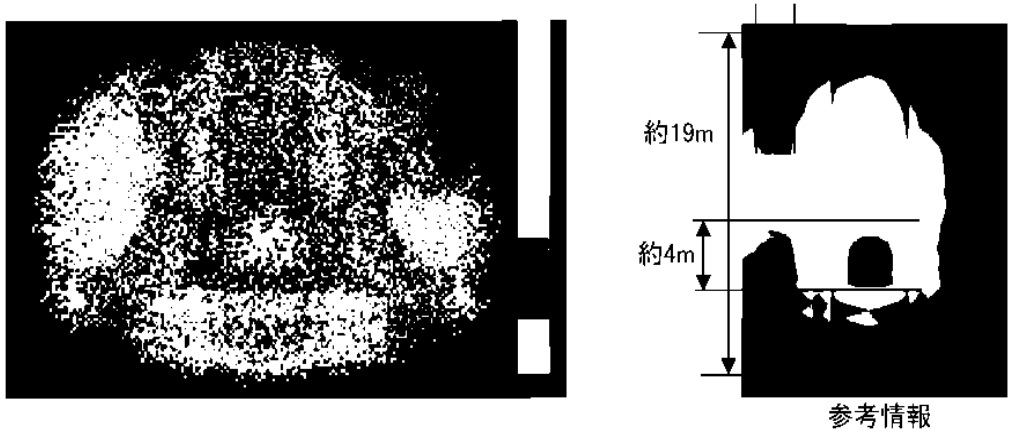
■建屋前検出器は10cm厚鉄板で遮蔽





30日　　90日

シミュレーションによる予備評価



参考情報

高密度領域の抽出結果（30日）

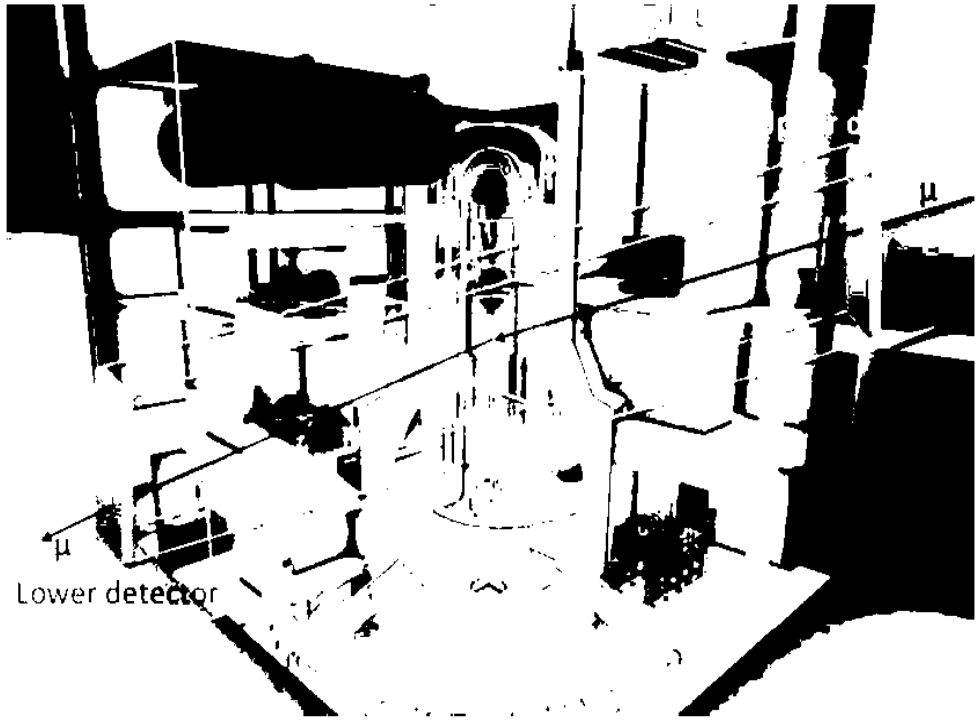
RPV・PCVの形状が既知のため、燃料有無を検知可能

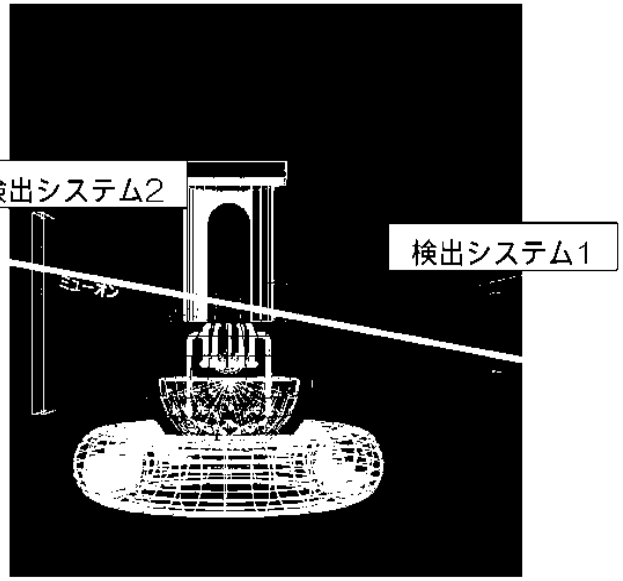
6 .散乱法 :設置位置と測定方法のイメージ

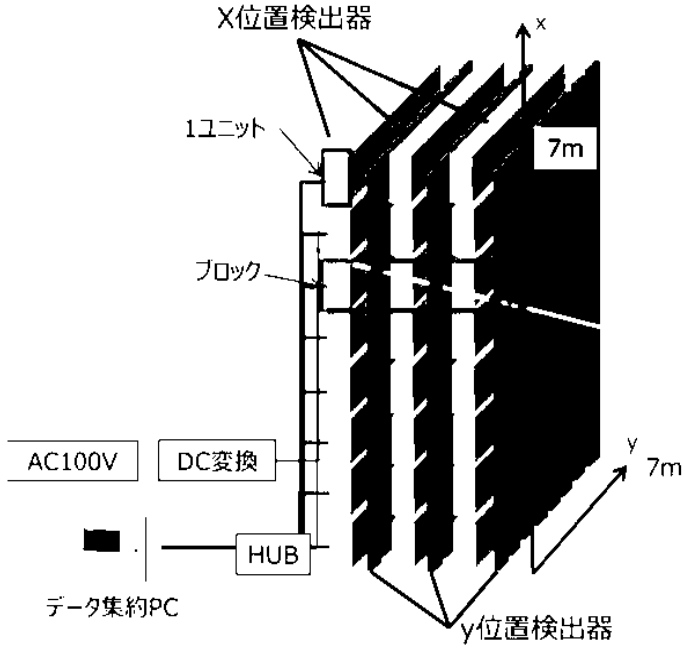
■検出器は、建屋前とタービン建屋2F（オペフロ）
■遮蔽体とアルゴリズムによるバックグランド除去

■建屋前検出器は8cm厚鉄板で遮蔽
■タービン建屋2Fは線量が低いため、遮蔽体なし

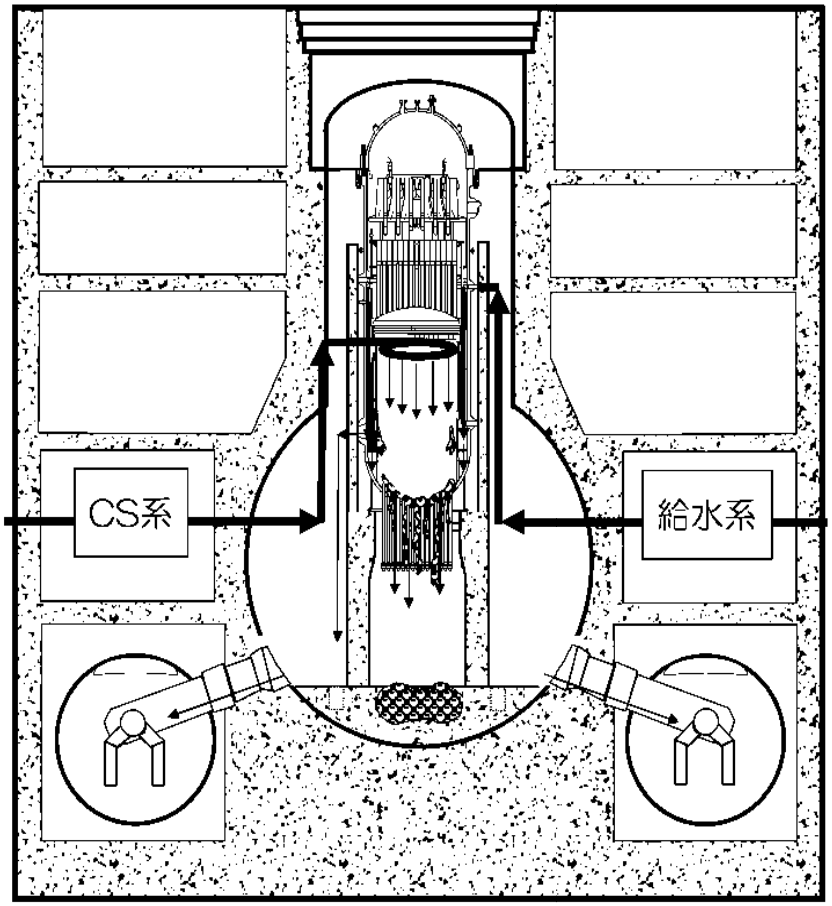
■現場作業との関係から、測定開始は10月頃（見込み）



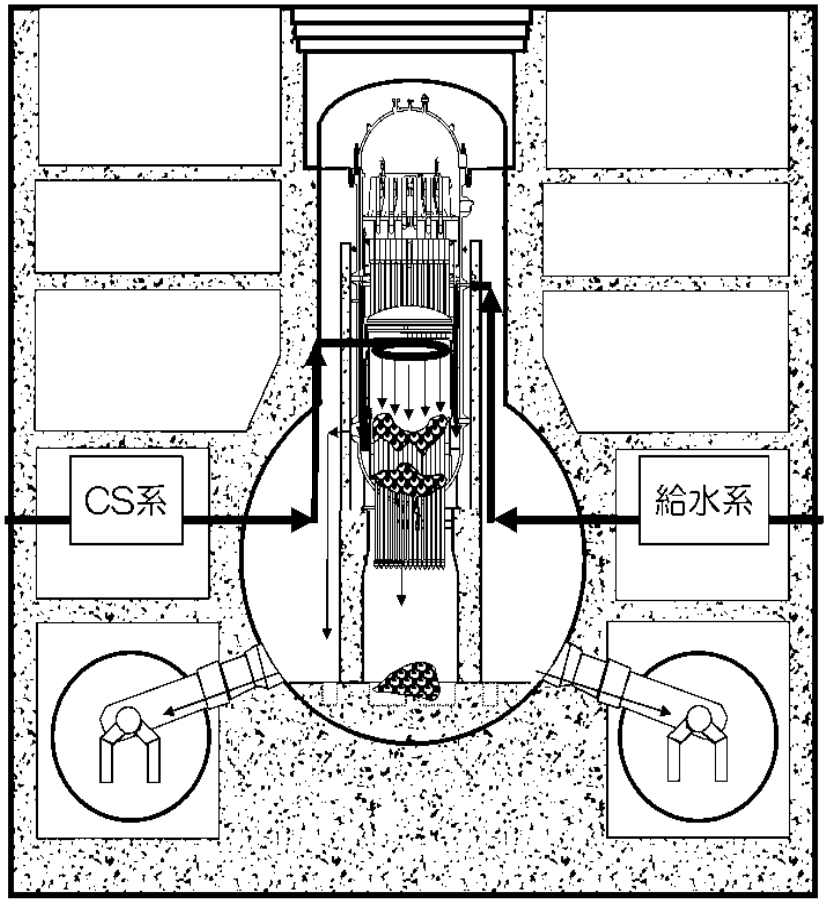




(参考) 測定対象号機の炉心・格納容器状態の推定図



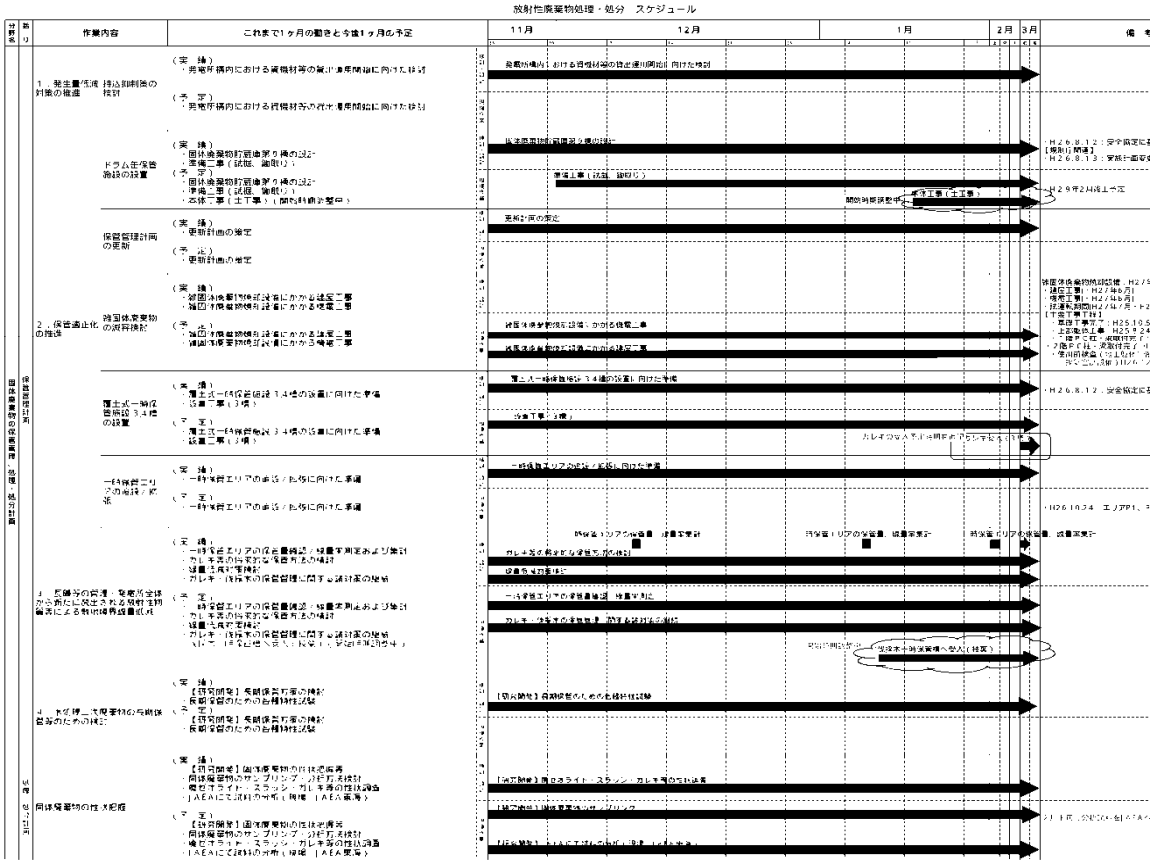
1号機



2号機

■燃料がほとんど残っていないと推定されている1号機に透過法を適用
■炉心部にも燃料が残っている可能性がある2号機に散乱法を適用

放射性廃棄物処理・処分　スケジュール



東京電力株式会社
放射性廃棄物処理・処分
2014年12月25日

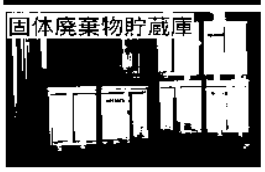
ガレキ・伐採木の管理状況（2014.11.30時点）

保管場所	エリア境界空間線量率（mSv/h）	種類	保管方法	保管量※1		前回報告比※2（2014.10.31）		変動※3理由	エリア占有率
固体廃棄物貯蔵庫	0.03	ガレキ	容器	5,100	m³	+100	m³	①②	43%
A：敷地北側	0.45	ガレキ	仮設保管設備	2,900	m³	+100	m³	③	41%
C：敷地北側	0.01未満	ガレキ	屋外集積	48,800	m³	+4,400	m³	②③⑤	86%
D：敷地北側	0.01	ガレキ	シート養生	2,600	m³	0	m³	－	88%
E：敷地北側	0.02	ガレキ	シート養生	4,200	m³	0	m³	－	27%
F：敷地北側	0.01	ガレキ	容器	600	m³	0	m³	－	99%
			屋外集積	2,000	m³	+1,600	m³	③	27%
J：敷地南側	0.03	ガレキ	屋外集積	4,700	m³	0	m³	－	98%
L：敷地北側	0.01未満	ガレキ	覆土式一時保管施設	8,000	m³	0	m³	－	100%
O：敷地南西側	0.03	ガレキ	屋外集積	26,200	m³	+2,200	m³	②③⑤	95%
Q：敷地西側	0.12	ガレキ	容器	5,700	m³	0	m³	－	93%
U：敷地南側	0.01未満	ガレキ	屋外集積	700	m³	0	m³	－	100%
W：敷地西側	0.03	ガレキ	シート養生	20,300	m³	+100	m³	④	69%
合計（ガレキ）				131,900	m³	+8,600	m³	－	74%
G：敷地北側	0.01未満	伐採木	伐採木一時保管槽	7,300	m³	0	m³	－	27%
H：敷地北側	0.01	伐採木	屋外集積	14,300	m³	+100	m³	④	81%
I：敷地北側	0.02	伐採木	屋外集積	10,500	m³	0	m³	－	100%
M：敷地西側	0.01未満	伐採木	屋外集積	37,600	m³	0	m³	－	83%
T：敷地南側	0.01	伐採木	伐採木一時保管槽	10,100	m³	0	m³	－	44%
V：敷地南側	-	伐採木	屋外集積	0	m³	0	m³	－	0%
合計（伐採木）				79,700	m³	+100	m³	－	58%

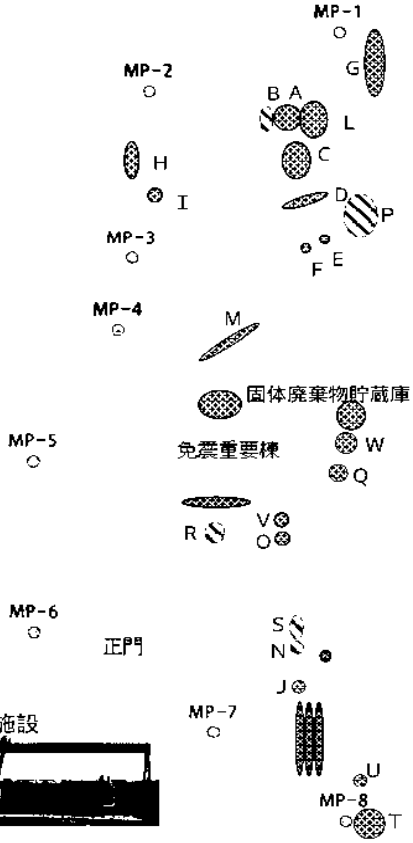
※1　端数処理で100m³未満を四捨五入しているため、合計値が合わないことがある。
※2　100m³未満を端数処理しており、微増・微減とは100m³未満の増減を示す。
※3　主な変動理由：①3号建屋瓦礫撤去関連工事　②凍土遮水壁設置関連工事　③1－4号建屋周辺瓦礫撤去関連工事
④タンク設置関連工事　⑤多核種除去設備増設関連工事　⑥焼却対象物の集約作業　等

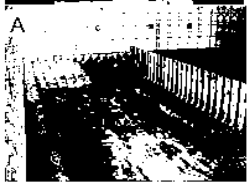
水処理二次廃棄物の管理状況（2014.12.23時点）

保管場所	種類		保管量		前回からの増減（2014.11.25）		保管量/保管容量
使用済セシウム吸着塔保管施設	セシウム吸着装置使用済ベッセル		540	本	+22	本	43%
	第二セシウム吸着装置使用済ベッセル		120	本	+4	本	
	多核種除去設備等保管容器	既設	592	基	+52	基	
		増設	140	基	+64	基	
	多核種除去設備処理カラム	既設	3	塔	0	塔	
	高性能多核種除去設備使用済ベッセル	高性能	1	本	+1	本	
	モバイル式処理装置等使用済ベッセル及びフィルタ類		37	本	+6	本	
廃スラッジ貯蔵施設	廃スラッジ		597	m³	0	m³	85%



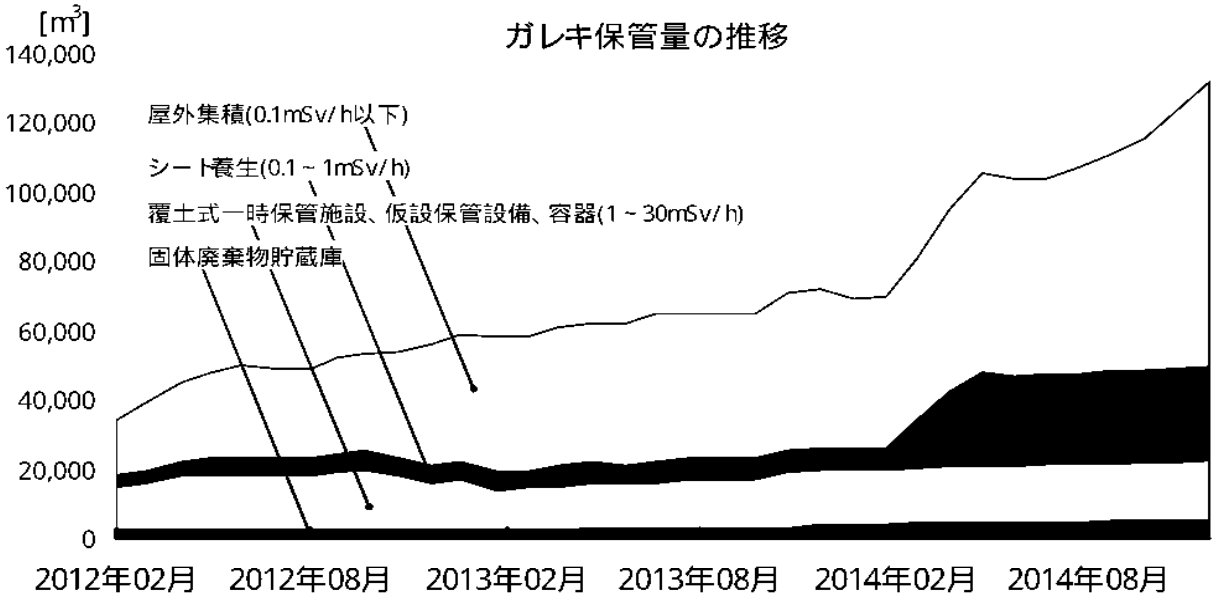
使用済セシウム吸着塔保管施設



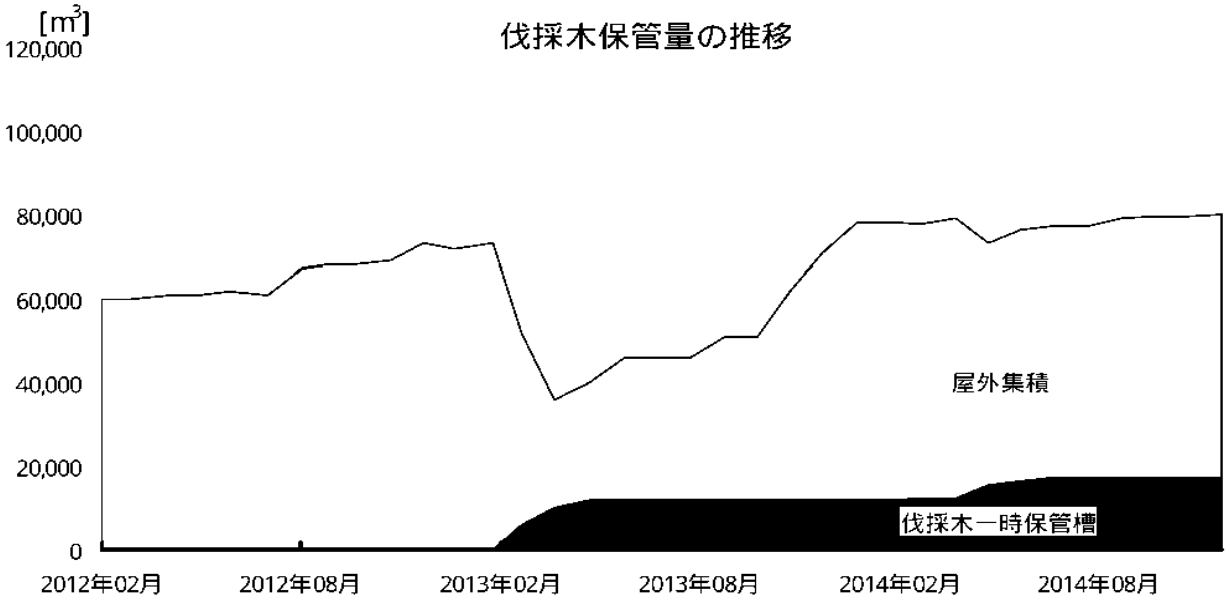


⊗瓦礫保管エリア
⊗伐採木保管エリア
瓦礫保管エリア（予定地）
伐採木保管エリア（予定地）
⊗セシウム吸着塔保管エリア
スラッジ保管エリア
スラッジ保管エリア（運用前）

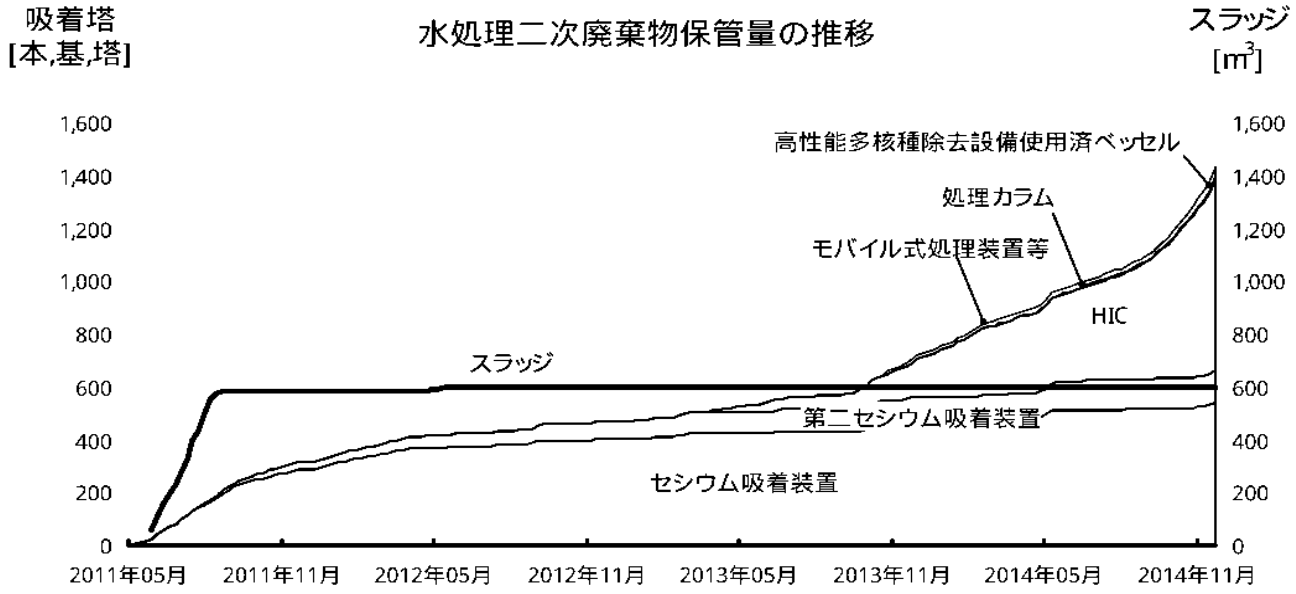
ガレキ保管量の推移



伐採木保管量の推移



水処理二次廃棄物保管量の推移



ガレキ・伐採木・水処理二次廃棄物の保管におけるトピックス（H26年12月25日）

分類		保管量（m^3）	保管容量（m^3）	占有率（%）	トピックス
		H26年11月30日時点（H26年10月31日報告からの増減）			
ガレキ	屋外集積 （0.1mSv/h未満）	82,400 （+8,200）	97,200	85	・主なガレキは、工事で発生した廃材。 ・エリアP1運用開始（H26年10月24日）
	シート養生 （0.1～1mSv/h）	27,100 （+100）	48,300	56	・主なガレキは、工事で発生した廃材、建屋内に設置していた撤去機器、水処理で使用したホース類及び廃車両。 ・今後発生量の増加が見込まれるため、廃棄物発生量の抑制や既保管物の減容処理を進めていく。 ・エリアP2運用開始（H26年10月24日）
	覆土式一時保管施設、仮設保管設備、容器 （1～30mSv/h）	17,200 （+100）	21,900	79	・主なガレキは、原子炉建屋上部等で撤去されたガレキ。 ・1号機ガレキ撤去に向けて、覆土式一時保管施設3,4槽設置（8,000m^3）の安全協定に基づく事前了解（H26年8月12日）。 ・エリアE2運用開始（H26年10月24日） ・覆土式一時保管施設3槽設置工事開始（H26年11月10日）
	固体廃棄物貯蔵庫	5,100 （+100）	12,000	43	・主なガレキは、原子炉建屋上部等で撤去された高線量ガレキ。 ・第9棟設置（ドラム缶 約11万本）に向けて安全協定に基づく事前了解（H26年8月12日）。 ・第9棟設置に伴う実施計画変更認可申請（H26年8月13日）
伐採木	屋外集積 （幹・根・枝・葉）	62,400 （+100）	88,200	71	・主にエリアP1造成により伐採した幹・根を受入。 その他工事により発生した幹・根を随時受入中。
	一時保管槽 （枝・葉）	17,400	50,100	35	・当面受入を計画していた枝葉については、チップ化した後、エリアTの伐採木一時保管槽へ受入完了。

※ 保管量、保管容量については端数処理で100m^3未満を四捨五入

分類		保管量	保管容量	占有率（%）	トピックス
		H26年12月23日時点（H26年11月25日報告からの増減）			
水処理二次廃棄物	使用済ベッセル （セシウム吸着装置使用済ベッセル、第二セシウム吸着装置使用済ベッセル、多核種除去設備等の保管容器及び処理カラム、高性能多核種除去設備使用済ベッセル、モバイル式処理装置等使用済ベッセル及びフィルタ類）	1,433本 （+149）	3,317本 （+768）	43	・多核種除去設備の高性能容器を保管する使用済吸着塔一時保管施設第三施設（容量3,456本/18ブロック）について実施計画変更認可（H26年11月20日） 使用前検査が終了し使用承認を得た範囲（768本/4ブロック）を運用開始(H26年12月9日) ※ 192本/ブロック
	スラッジ	597 m^3	700 m^3	85	除染装置の運転計画は無く新たに廃棄物が増える見込みは無い。 準備が整い次第、除染装置の廃止について実施計画の変更申請を行う。

特定原子力施設監視・評価検討会
（第30回）
資料1

海水配管トレンチ建屋接続部 止水工事の進捗について

平成２６年１２月２６日

東京電力株式会社

東京電力
TEPCO

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４．６　４号機海水配管トレンチ　間詰め方法
４．７　４号機海水配管トレンチ　トンネル充填施工手順（案）

５．　トレンチ閉塞の工程

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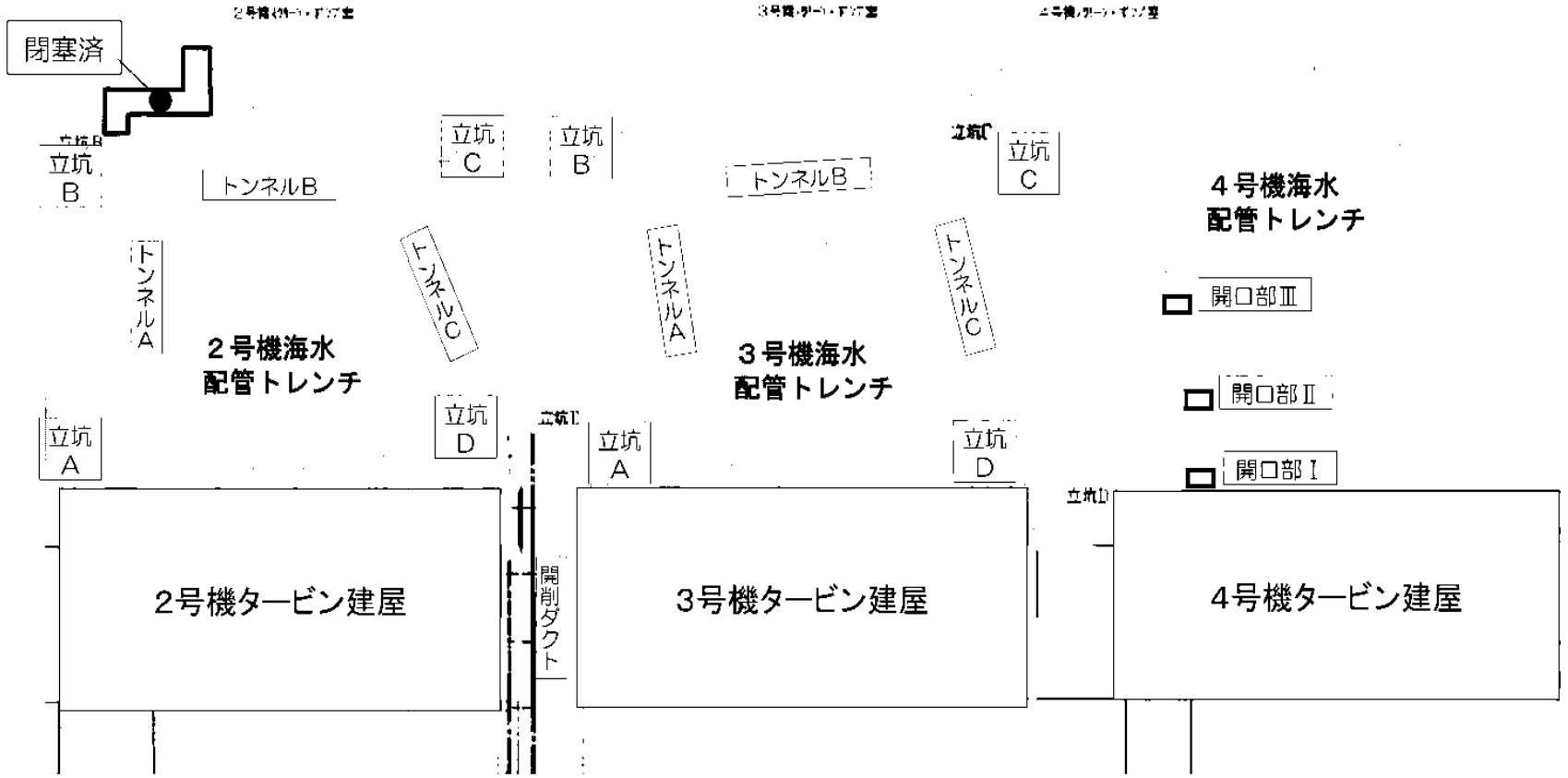
1. 海水配管トレンチ止水・閉塞工事の進捗状況

■位置図



■進捗状況（平成26年12月26日現在）

2号機	3号機	4号機
12/18 トンネル部閉塞充填完了 12/24 揚水試験実施	12/15 揚水試験完了、充填準備中	12/19 揚水試験実施、開口部調査中

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2．1　2号機海水配管トレンチ　充填・閉塞の施工手順

充填孔・ポンプ設置孔の削孔、水位計の設置

※一部の孔の削孔はトンネルA天井部充填までに実施

トンネルA、B、C一般部充填　※トンネルの中・下部を一般部とする

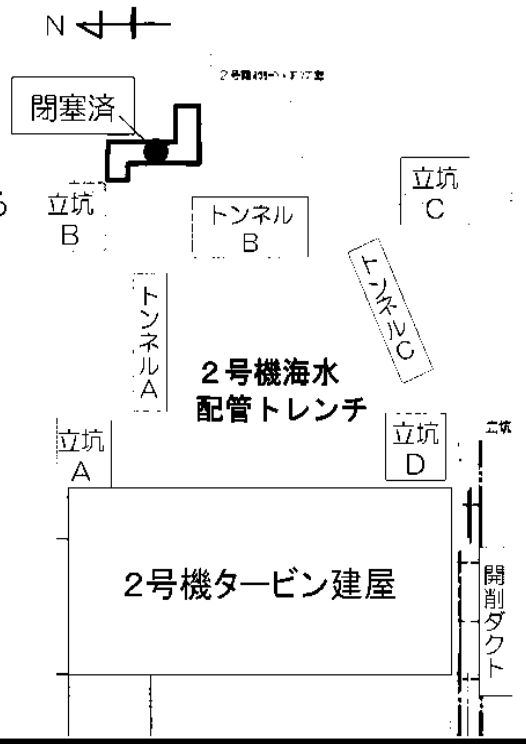
数回にわけて水抜きと充填を繰り返し

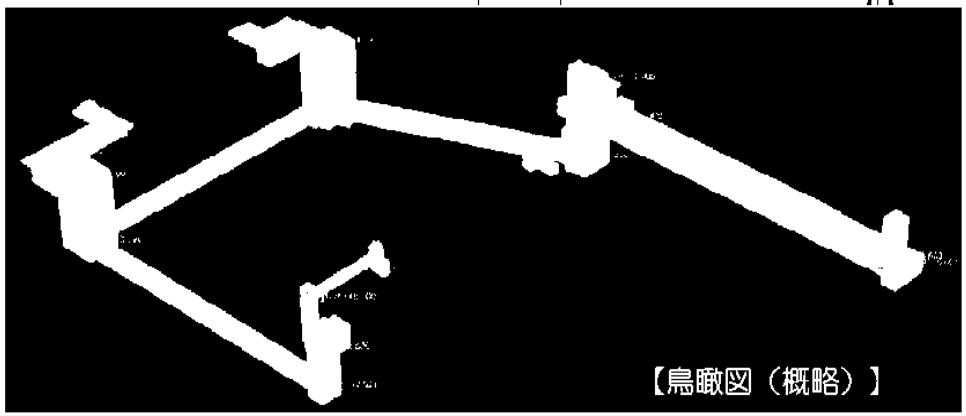
トンネルA、B、C天井部充填　12/18完了

揚水試験による充填状況の確認　12/24実施

立坑A、D、開削ダクトの閉塞

立坑B、Cの閉塞




【鳥瞰図（概略）】

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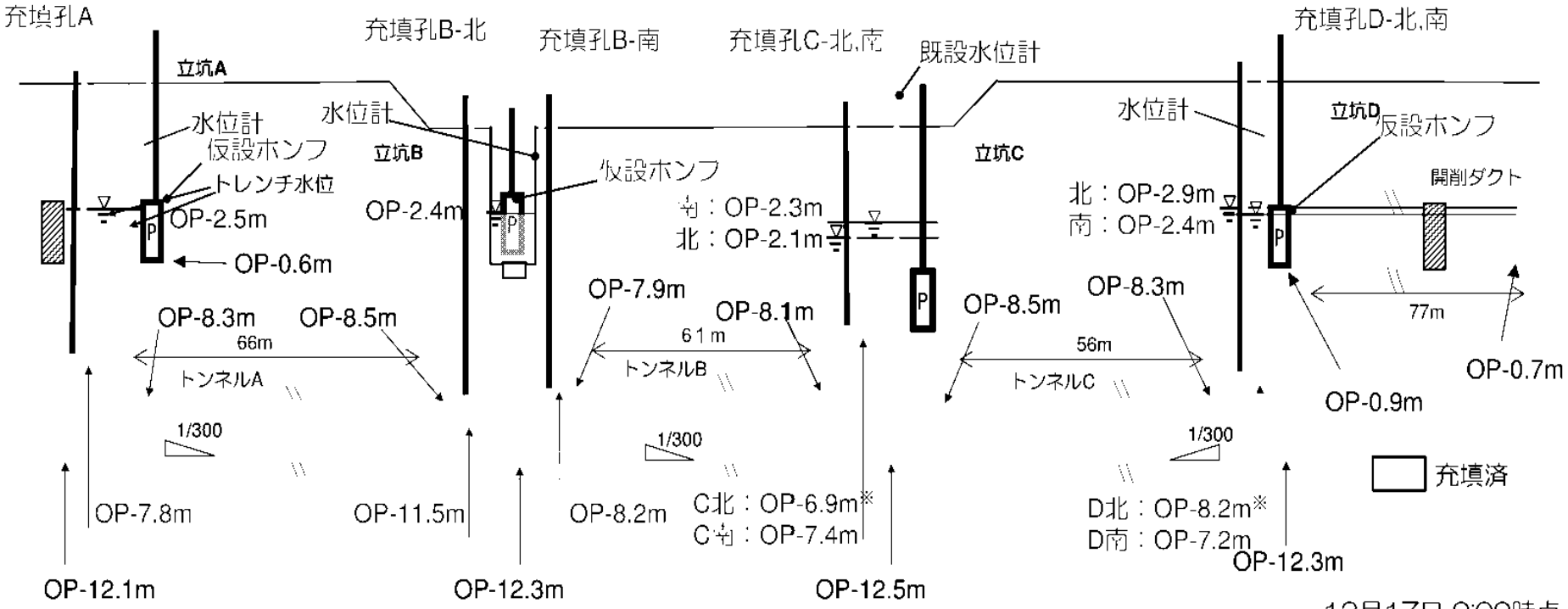
2．2　2号機海水配管トレンチ　トンネル充填の状況

11/25からトンネル部の充填を開始し、12/18に充填完了。充填量の累計は、2,510m^3。
立坑A,C,Dの観測孔から、トンネル頂部以上の高さに閉塞材料が充填されていることを確認。
砕石のある立坑Bの観測孔においては、閉塞材料のトンネル頂部の高さまでの到達は確認できないものの、打設量などから、接続するトンネル部は充填されていると推定。



【2号機海水配管トレンチ概略断面展開図】

12月17日 0:00時点
12月19日 0:00時点

※C北とD北の打設高さが異なる理由：閉塞材料打設時は、D北側の水位が高く、閉塞材料と水による上載荷重がC北とD北でバランスしていたため。

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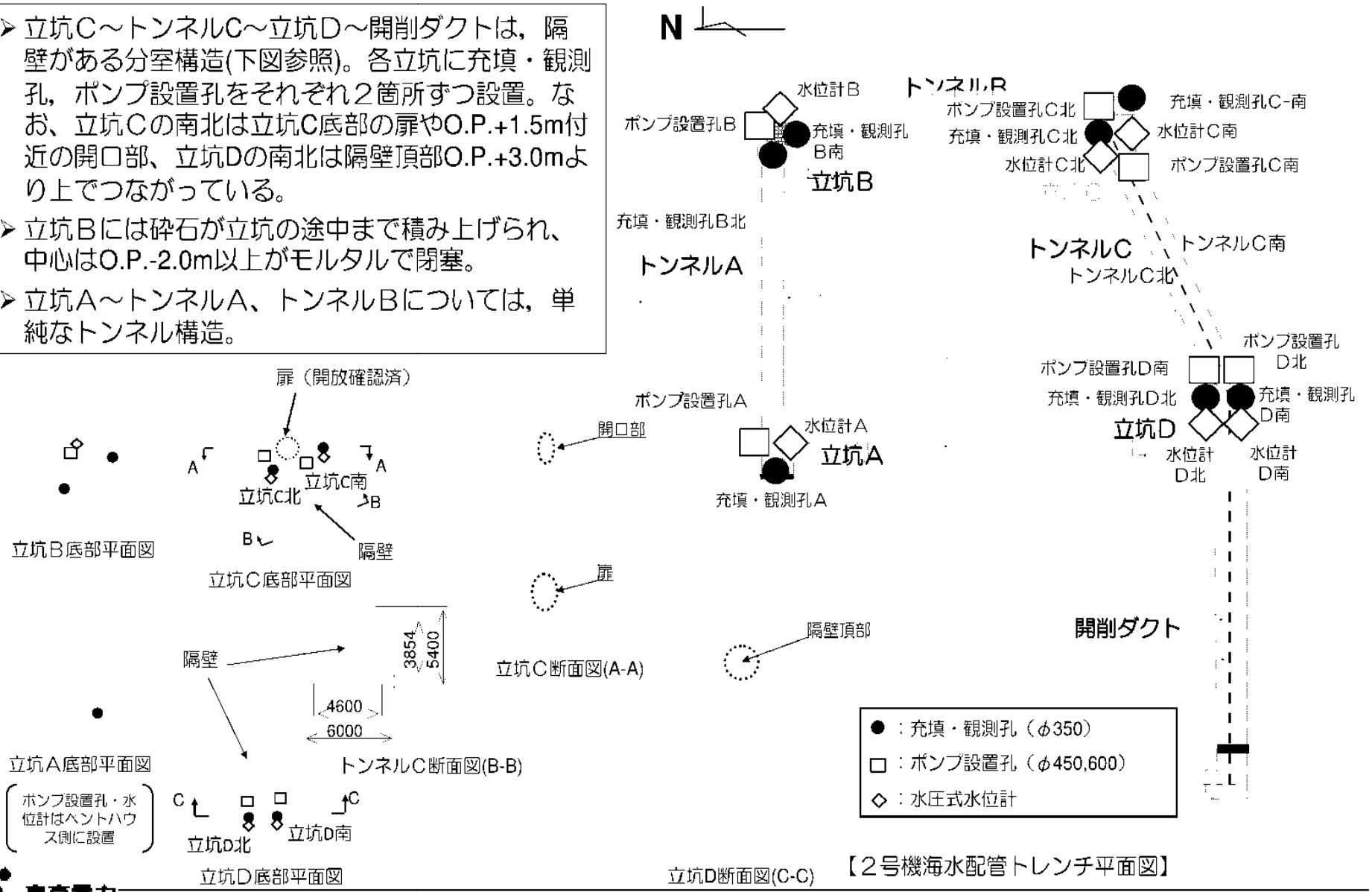
【参考】 2号機海水配管トレンチ ポンプ・水位計等の位置

- 立坑C～トンネルC～立坑D～開削ダクトは，隔壁がある分室構造(下図参照)。各立坑に充填・観測孔，ポンプ設置孔をそれぞれ２箇所ずつ設置。なお、立坑Cの南北は立坑C底部の扉やO.P.+1.5m付近の開口部、立坑Dの南北は隔壁頂部O.P.+3.0mより上でつながっている。
- 立坑Bには砕石が立坑の途中まで積み上げられ、中心はO.P.-2.0m以上がモルタルで閉塞。
- 立坑A～トンネルA、トンネルBについては，単純なトンネル構造。



【２号機海水配管トレンチ平面図】

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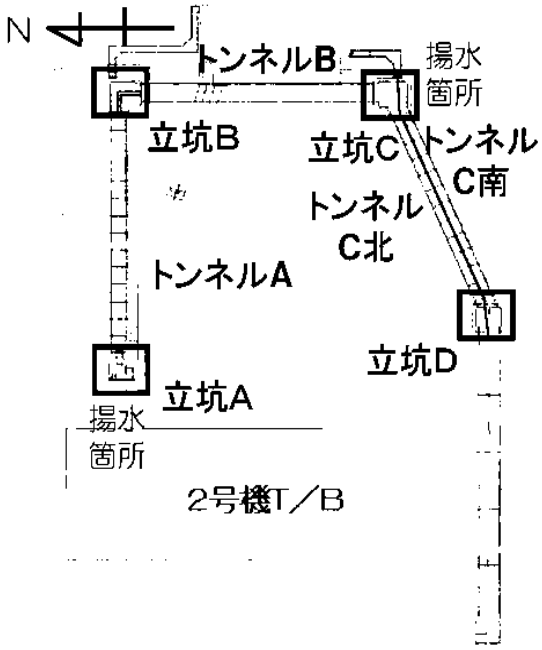
2．3　2号機海水配管トレンチ トンネル充填後の揚水試験

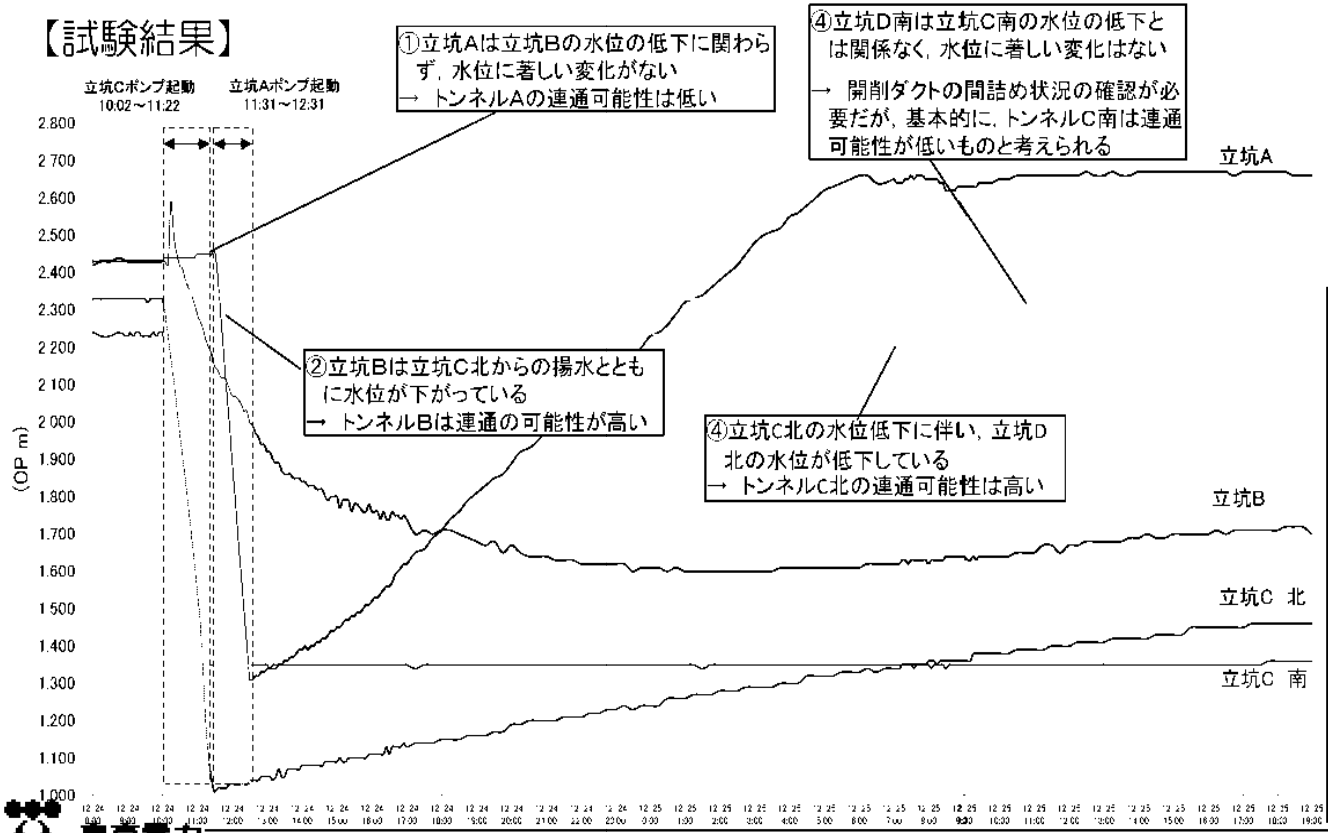
12/24に立坑C北および立坑Aから揚水し，各立坑の水位変化を観察

【試験概要】

日時	揚水箇所	揚水量
12/24 10:02～11:22	立坑C北	約60m^3
12/24 11:31～12:31	立坑A	約30m^3



【試験結果】



立坑C，Aにおける，揚水に伴う水位低下は，ほぼ予測どおりの結果となった。

現状，水位状況から考察される連通状況は下記の通り。

①トンネルA：連通可能性は低い
②トンネルB：連通可能性が高い
③トンネルC北：連通可能性が高い
④トンネルC南：連通可能性が低い
→ 但し，連通量はごくわずか

（今回の測定結果から概算：約20L/h～約400L/h）

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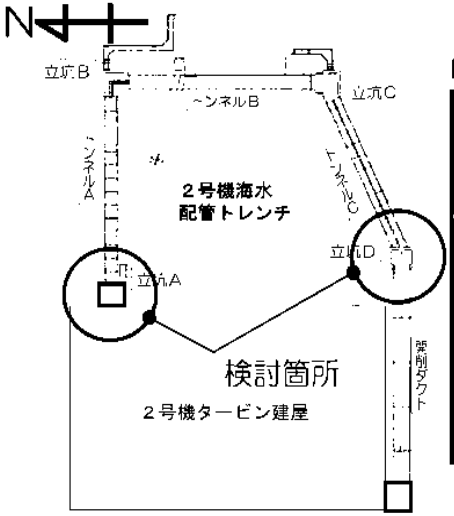
2．4　2号海水配管トレンチ　立坑閉塞材料について① 要求品質

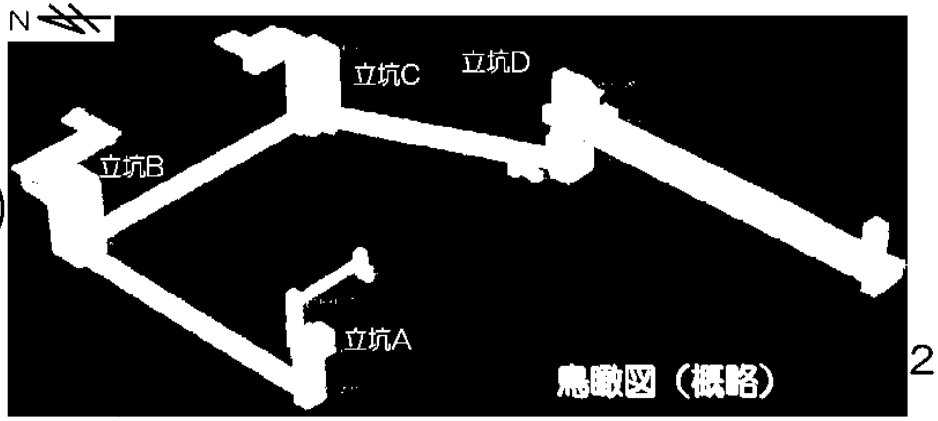
トンネル部分についてはわずかな連通が残る結果となった。立坑の閉塞によって、連通による漏えいリスクを低減させる.

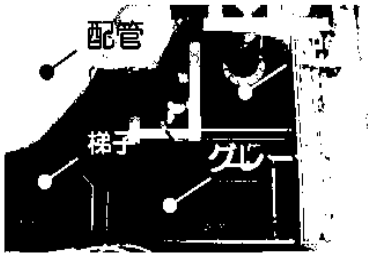
立坑閉塞の要求品質

立坑内部には配管、ケーブルトレイ、グレーチング等の支障物が存在する。立坑閉塞材料の要求品質は以下の通り。

- 支障物周りに密実に充填され、鉛直方向に連続する水みちを残さないこと。（充填性）
- 立坑内の水平方向５m程度流動すること（流動性）
- 水中で材料が分離しないこと。（水中不分離性）







２号立坑Ａの内部状況（震災前）

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2．4　2号海水配管トレンチ　立坑閉塞材料について② 材料の選定

■立坑閉塞材料は、要求品質（充填性、流動性、水中不分離性）を満たし、かつ土木工事において、大断面空洞の充填実績が豊富なセメント系材料を基本として検討する。

■ただし、セメント系材料は硬化する際の水和熱によりひび割れが発生する可能性があり、水みちが残るリスクがある。

■立坑では、より高い充填性を要求するため、下記に挙げるような，よりひび割れを抑制できる材料と施工方法を選定する。

【ひび割れ（温度）抑制対策の例】

単位セメント量の低減	→ 骨材の使用（コンクリート）
セメントによる温度上昇の抑制	→ 打設回数の分割による水和熱量のコントロール
ひび割れ発生の抑制	→ 膨張材等を添加、骨材を使用（コンクリート）

⇒　上記の条件に合致する閉塞材料として**水中不分離性コンクリート**の適用性を検討する。

⇒　併せて、最適な膨張材等の添加量や、打設回数についても検討を行う。

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2．4　2号海水配管トレンチ　立坑閉塞材料について③ 検討工程

■水中不分離性コンクリートを立坑閉塞材料に適用するための確認試験および施工方法の検討を行い，1月末までに立坑閉塞の基本方針を決定する。

実施・確認項目	概　要	11月	12月	1月
方針・試験計画検討	方針検討，試験準備	方針検討・試験計画作成	試験ヤード・装置準備	
流動性・水中不分離性の確認	配合試験、圧縮強度 他		▼材料調達 ▼試験実施 ▼7d	▼28d
充填性の確認	支障物の隙間への充填性試験		▼材料調達	▼充填 ▼7d ▼充填状況確認
水みちの抑制の確認	膨張・収縮試験		▼材料調達 ▼供試体作成・計測 ▼7d	▼28d
	透水試験		▼材料調達 ▼供試体作成	▼透水試験
施工方法検討	打設回数の検討			
施工準備	施工方法の詳細検討，材料調達，施工準備			閉塞準備

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２．５　２号機海水配管トレンチ　トンネル部充填のまとめと今後の方針

- ２号機海水配管トレンチのトンネル部については、水有り充填を行った結果、ほぼ計画通りに天井部までの充填が完了。
- トンネル部の充填に伴い、約２，５００m^{3}の滞留水を除去完了。
- 揚水試験の結果、トンネル部分についてはわずかな連通が残る結果となった。
- この連通については、立坑の閉塞によって遮る計画とし、具体的な材料や施工方法について、現在検討を進めているところ。立坑の閉塞にあたっては、工事の進捗併せて、連通状況を確認しつつ進めていく。
- ３号機海水配管トレンチについても、早期にトンネル部の充填を行い、滞留水を除去することが汚染水漏洩リスクの低減につながることから、ポンプ設置等の必要な準備が完了次第、トンネル部の充填を実施する。
- なお、３号機海水配管トレンチのトンネル部の充填の実施にあたっては、２号機の経験を活かしていく。

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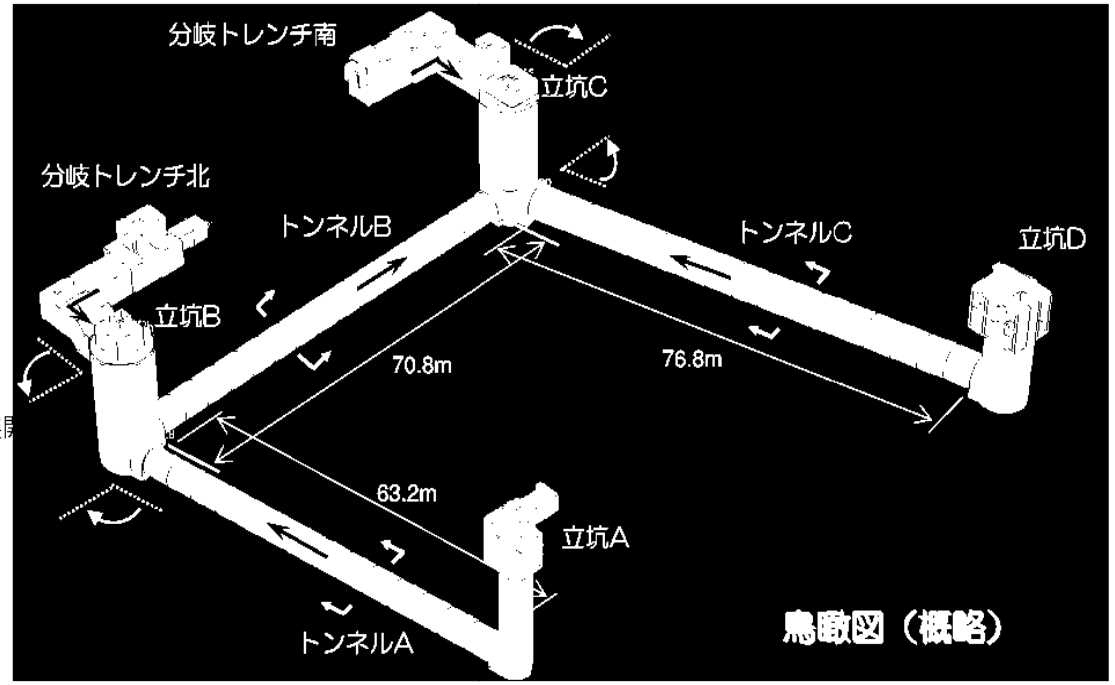
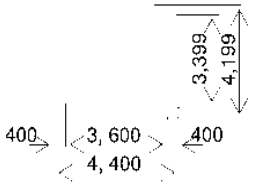
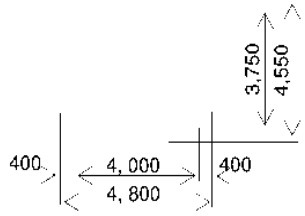
3．1　3号機海水配管トレンチの構造概要①



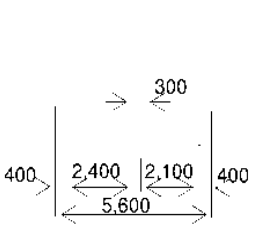
トンネルA 断面図



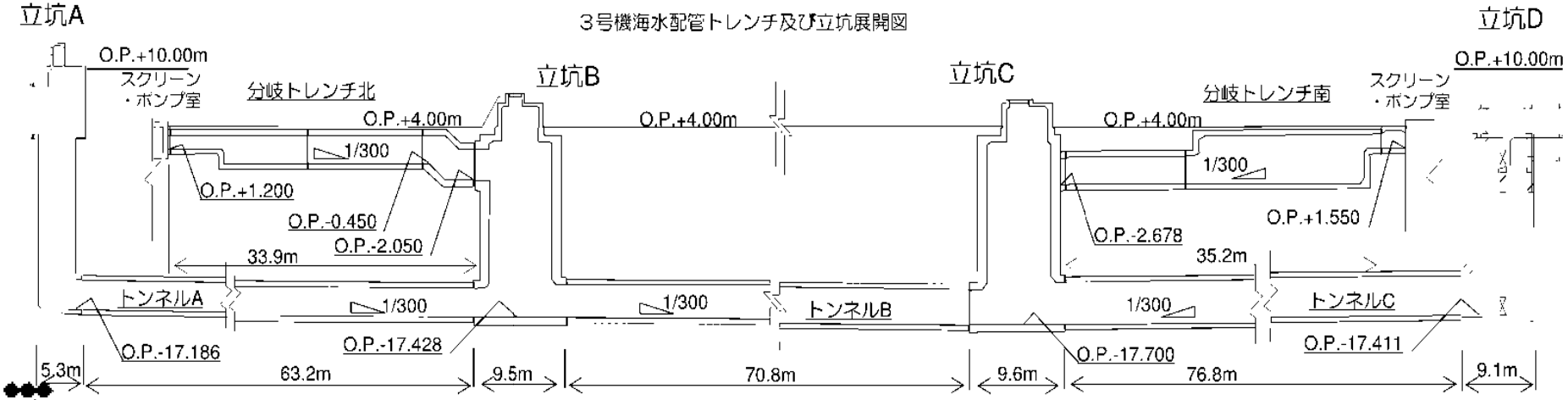
トンネルB 断面図



トンネルC 断面図



3号機海水配管トレンチ及び立坑展開図



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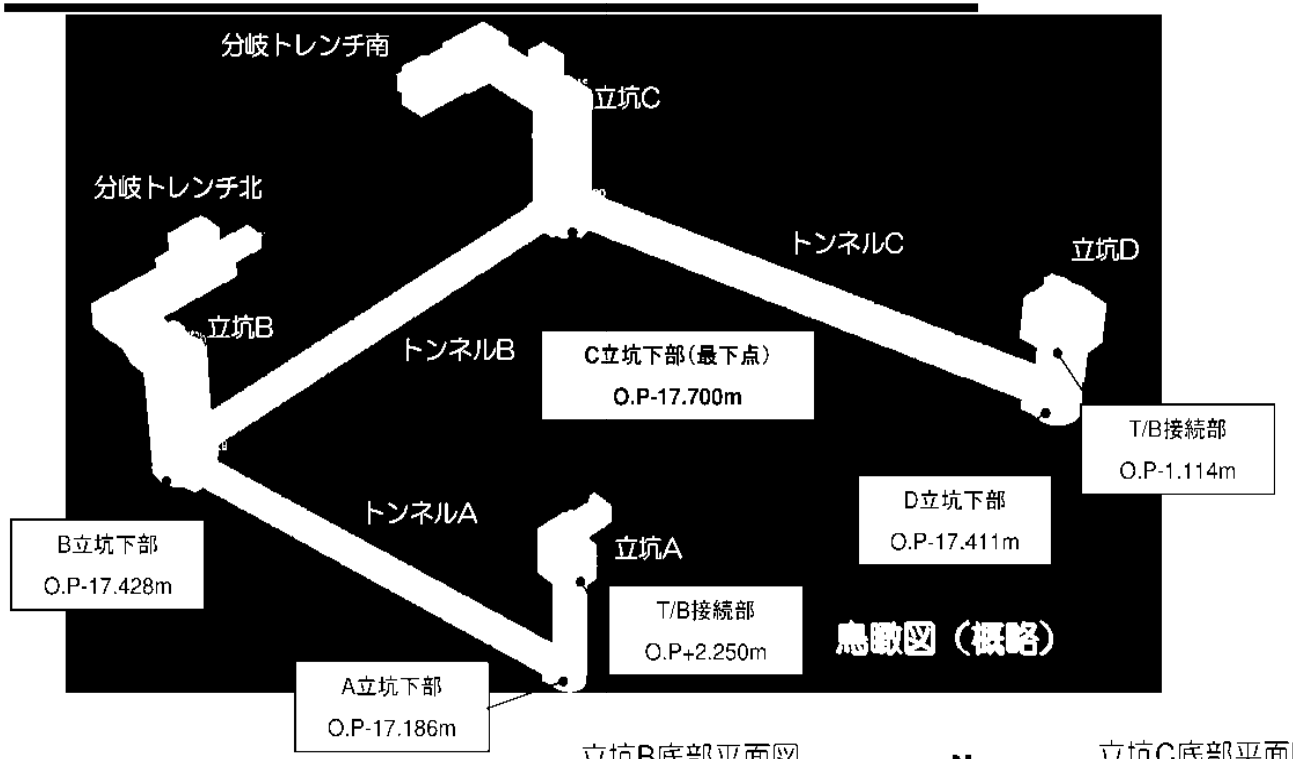
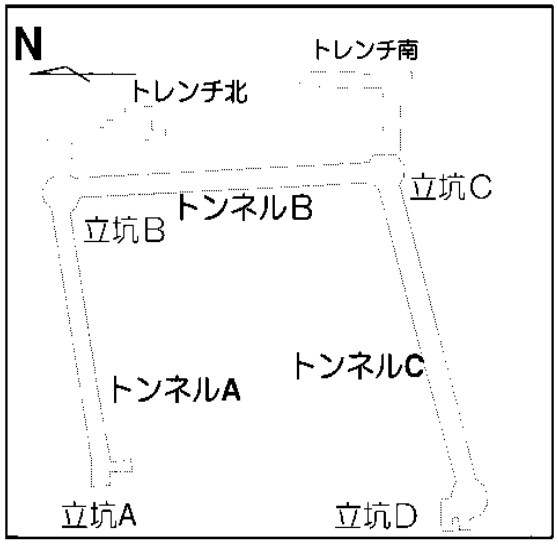
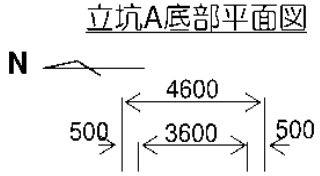
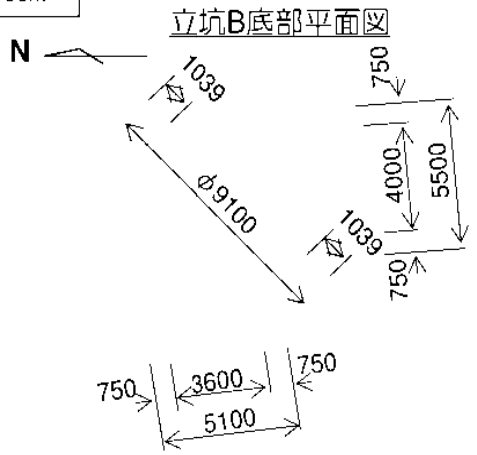
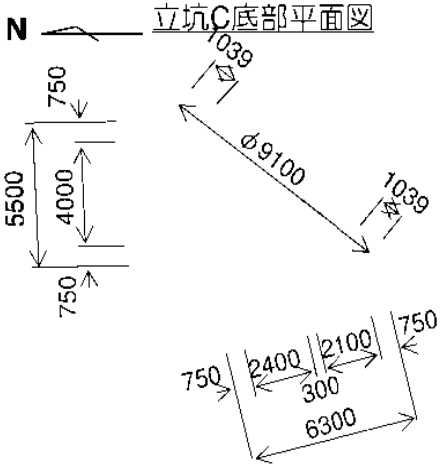
3．1　3号機海水配管トレンチの構造概要②

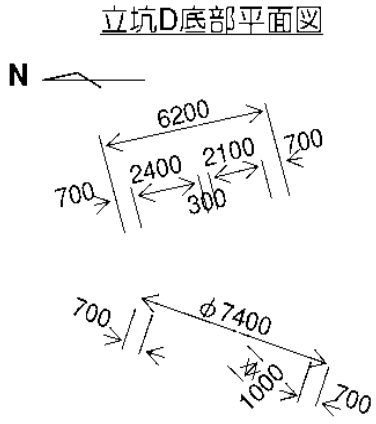












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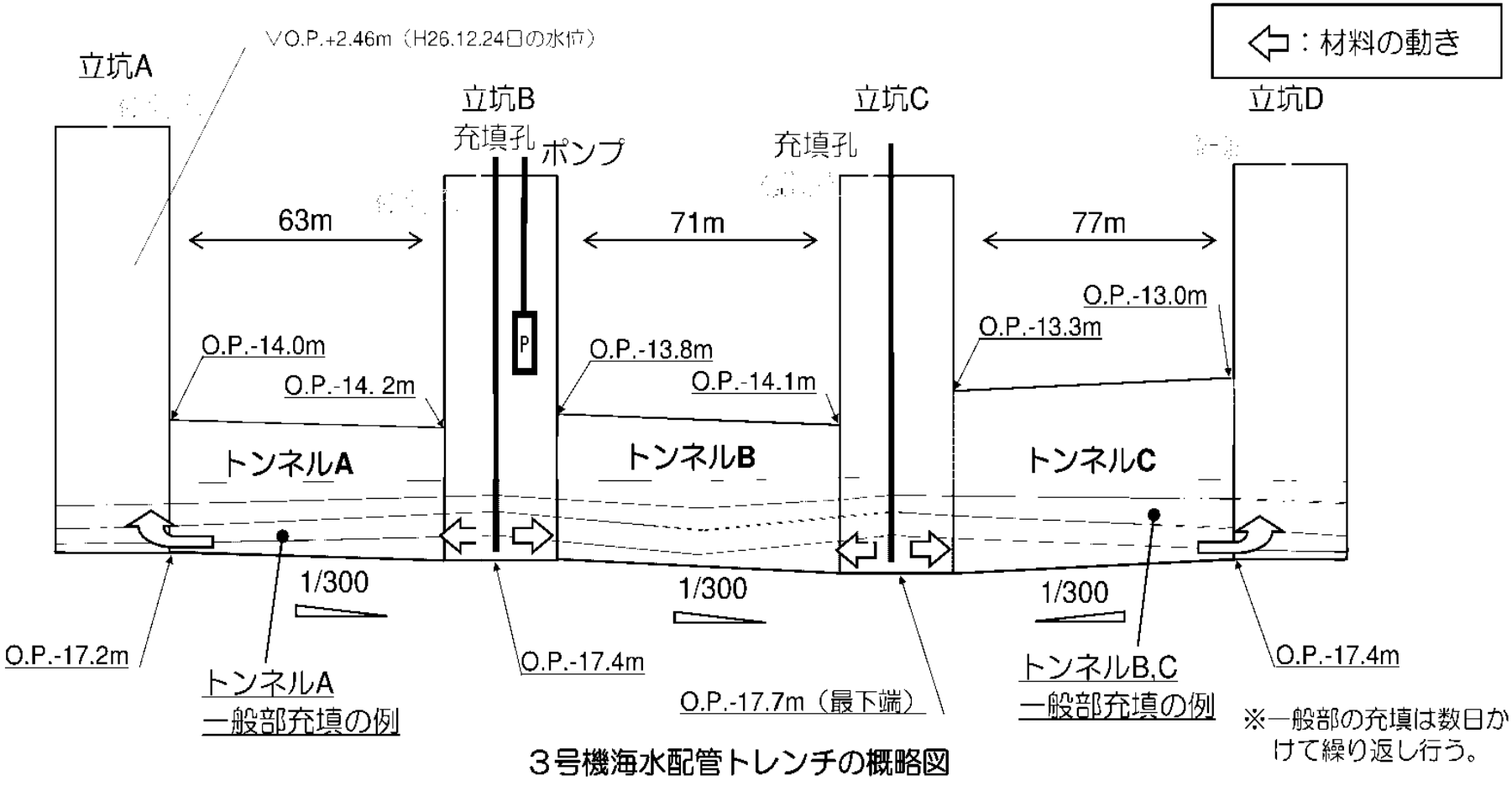
3．2　3号機海水配管トレンチの特徴と施工上の留意点(1)

- ２号機と同じく、自重で水平に広がる閉塞材料を使用。
  → 低い位置から徐々に閉塞材料を打ち上げることが合理的であり、トンネルB，Cは立坑Cから、トンネルA、Bは立坑Bから同時並行で充填する。



３号機海水配管トレンチの概略図

※なお、立坑B及び立坑Cには砂・沈殿物がそれぞれ約6cm, 7cm程度堆積していることを確認（12/23）。

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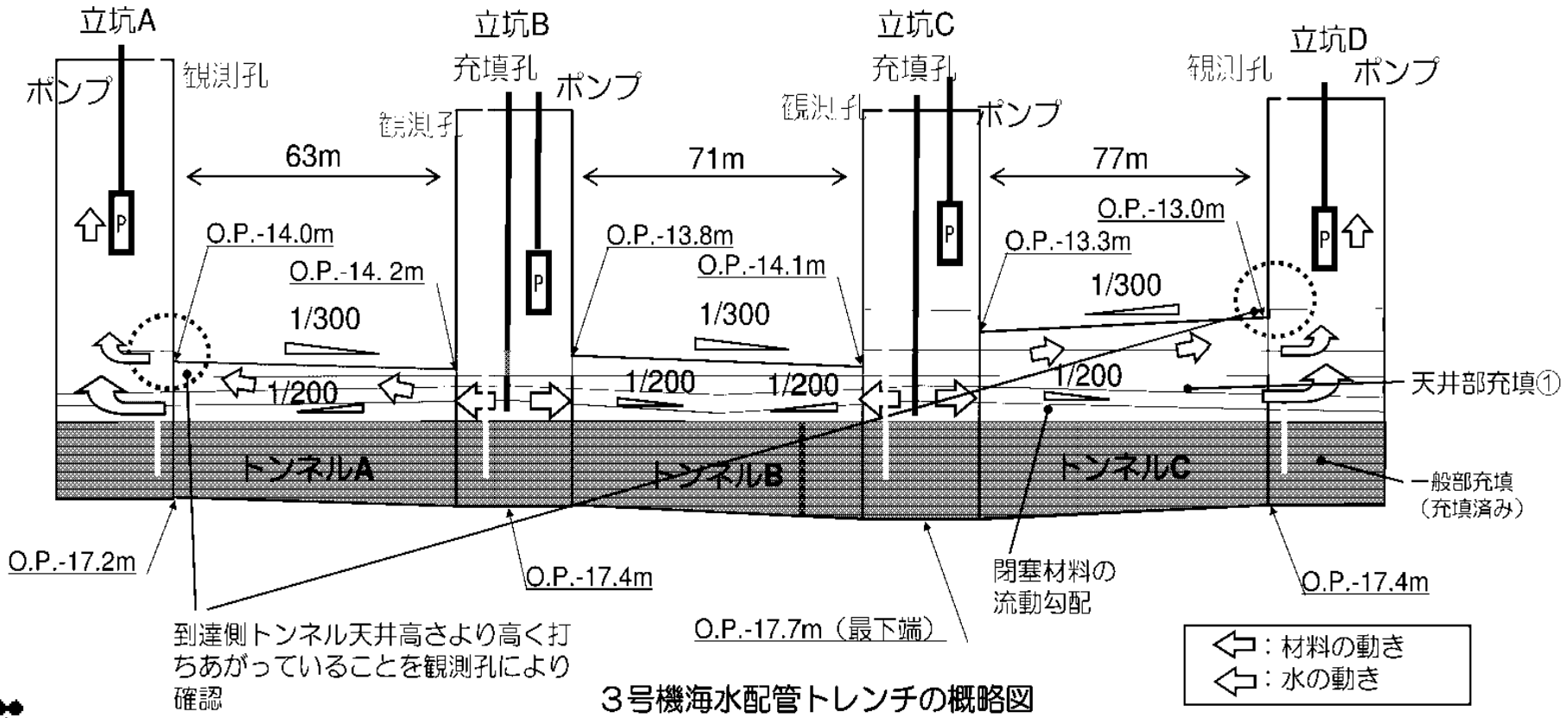
3．2　3号機海水配管トレンチの特徴と施工上の留意点(2)

- 各トンネルは径が異なり、それぞれ1/300の勾配がついている。
  →閉塞材料がトンネル頂部まで確実に充填されるように、到達側のトンネル天井高さより上まで確実に打設する。トンネルから押し出された水は，到達側立坑のポンプにて移送する。
- 到達側のトンネル天井高さより上まで確実に打設するにあたり、２号機の経験を踏まえ、到達側立坑の水を抜くなど、立坑水位のコントロールを行う。



３号機海水配管トレンチの概略図

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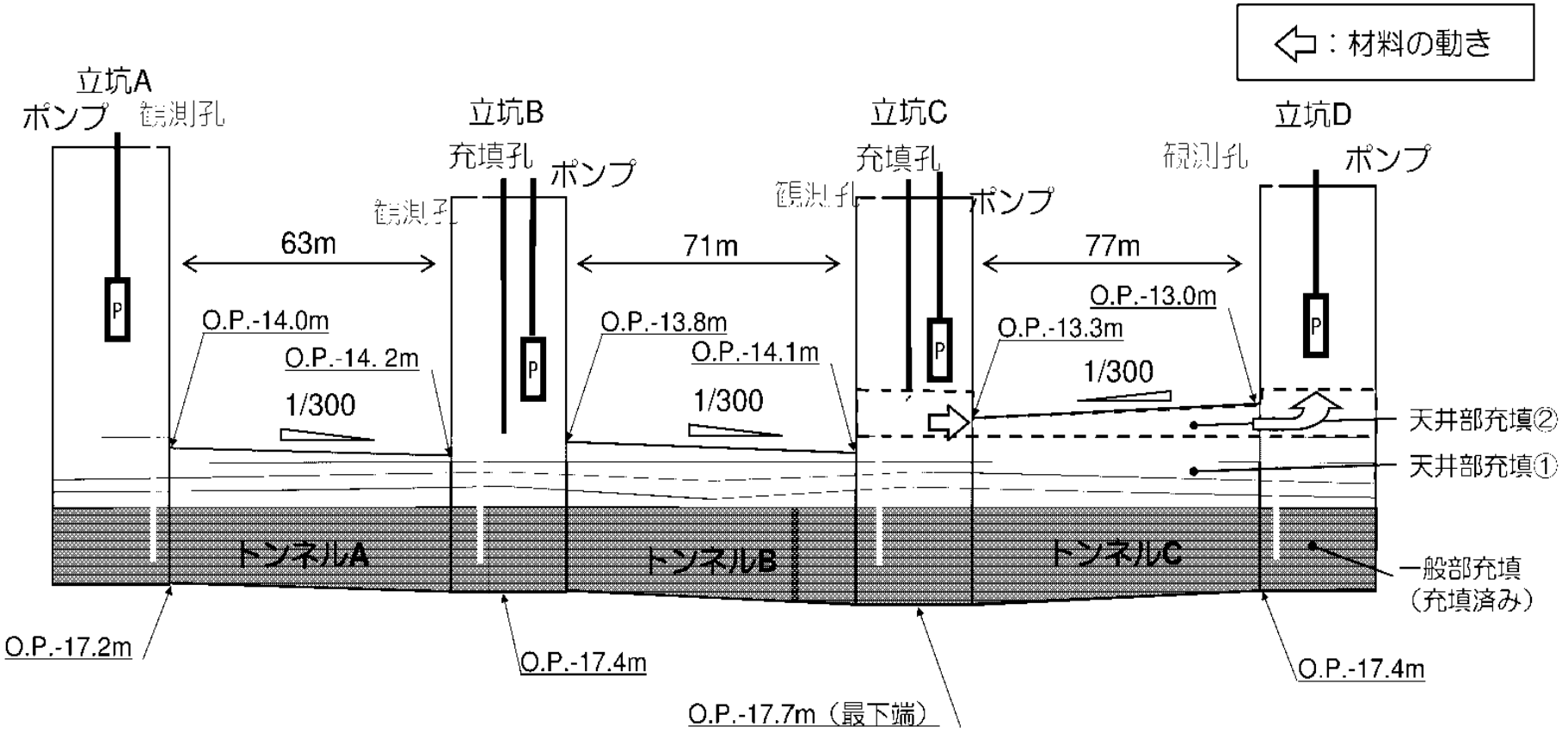
3．2　3号機海水配管トレンチの特徴と施工上の留意点(3)

- 立坑Cにおけるトンネル頂部の接続高さは，トンネルBでO.P.-14.1m、トンネルCでO.P.-13.3mで約80cmの差異がある。
  →トンネル天井部の充填は２回に分けて行うこととし，トンネルA，B天井部の充填実施後，トンネルCの天井部を充填する。



３号機海水配管トレンチの概略図

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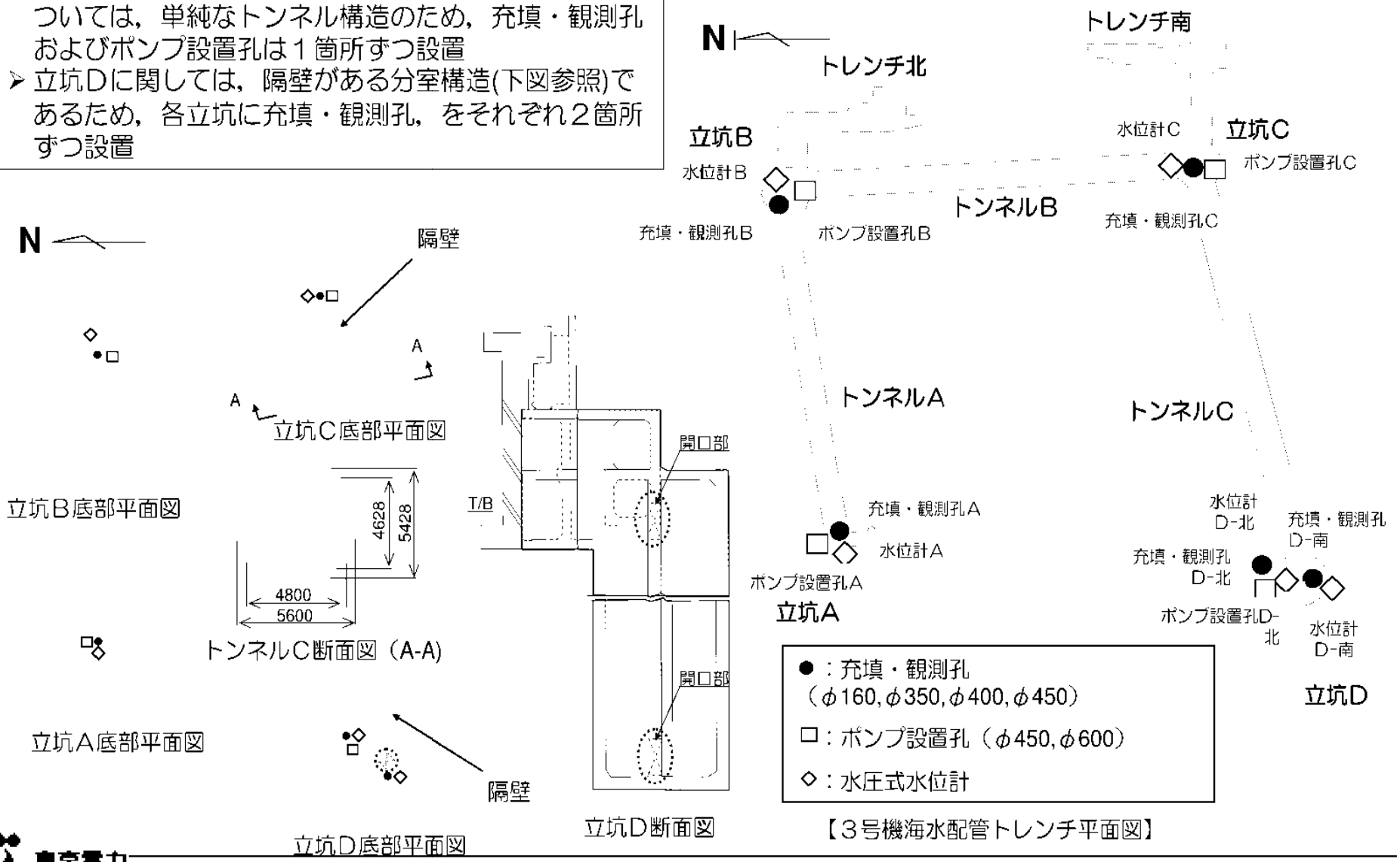
3．3　3号機海水配管トレンチ　充填手順(施工準備状況)

- 立坑A～トンネルA～立坑B～トンネルB～立坑Cについては，単純なトンネル構造のため，充填・観測孔およびポンプ設置孔は１箇所ずつ設置
- 立坑Dに関しては，隔壁がある分室構造(下図参照)であるため，各立坑に充填・観測孔，をそれぞれ２箇所ずつ設置



【３号機海水配管トレンチ平面図】

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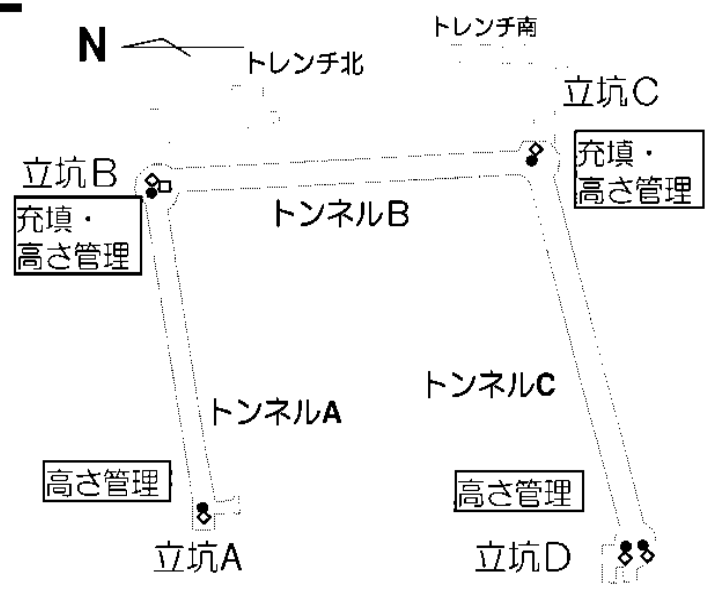
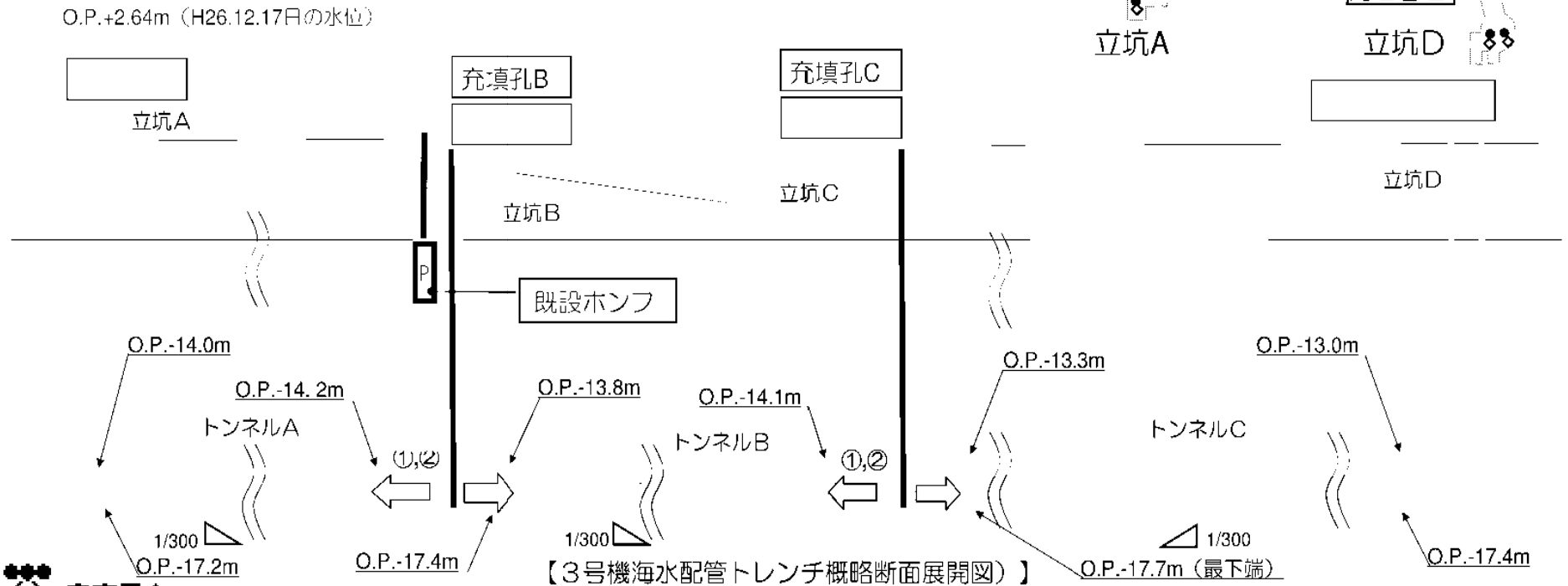
3．3　3号機海水配管トレンチ　充填手順（トンネルA、B、C一般部の充填）

①トンネルA,B,Cの一般部は，充填坑B及び充填孔Cに管の筒先を底版・既打設面から約10cm上に設置し、同時に閉塞材料を投入。
②以下、①を繰り返し、数日かけて天井手前までの充填を実施。
・充填中は、各観測管において充填高さを管理（水平に打ち上がっていることや、打設量と高さの関係を確認。）

※図に記載の充填孔･観測孔･ポンプは設置が完了しているもの。
※図中の各充填孔･観測孔･ポンプにおいて枠で囲まれているものは、本ステップにおいて使用するもの。





【3号機海水配管トレンチ概略断面展開図）】

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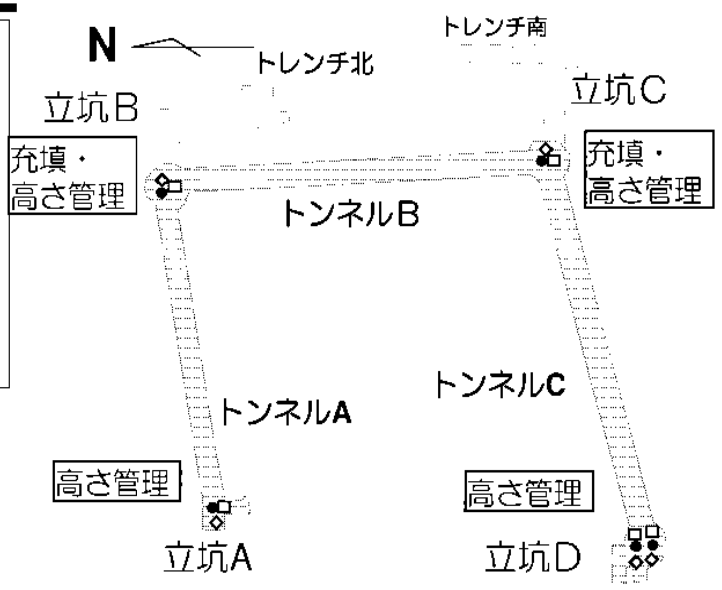
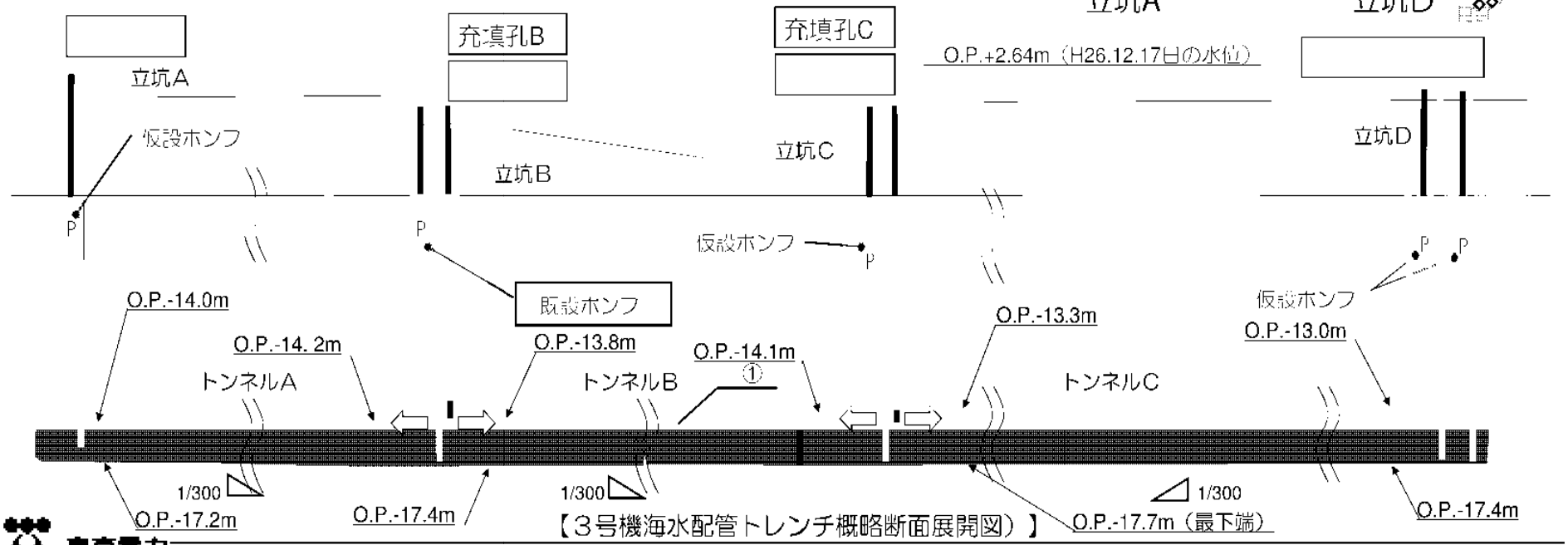
3．3　3号機海水配管トレンチ　充填手順(トンネル天井部の充填①)

①充填孔Bおよび充填孔Cに設置した投入管の筒先を既打設面から約10cm上に設置し、閉塞材料を投入（１日でトンネルA,Bの閉塞を完了）。
・充填中は、観測孔A,B,Cにおいて充填高さをO.P.-13.5mに設定して管理（トンネルA,Bの天井部における材料の到達状況を確認）。
・併せて，投入側および到達側の水位を同程度となるよう管理。



※図に記載の充填孔･観測孔･ポンプは設置が完了しているもの。
※図中の各充填孔･観測孔･ポンプにおいて枠で囲まれているものは、本ステップにおいて使用するもの

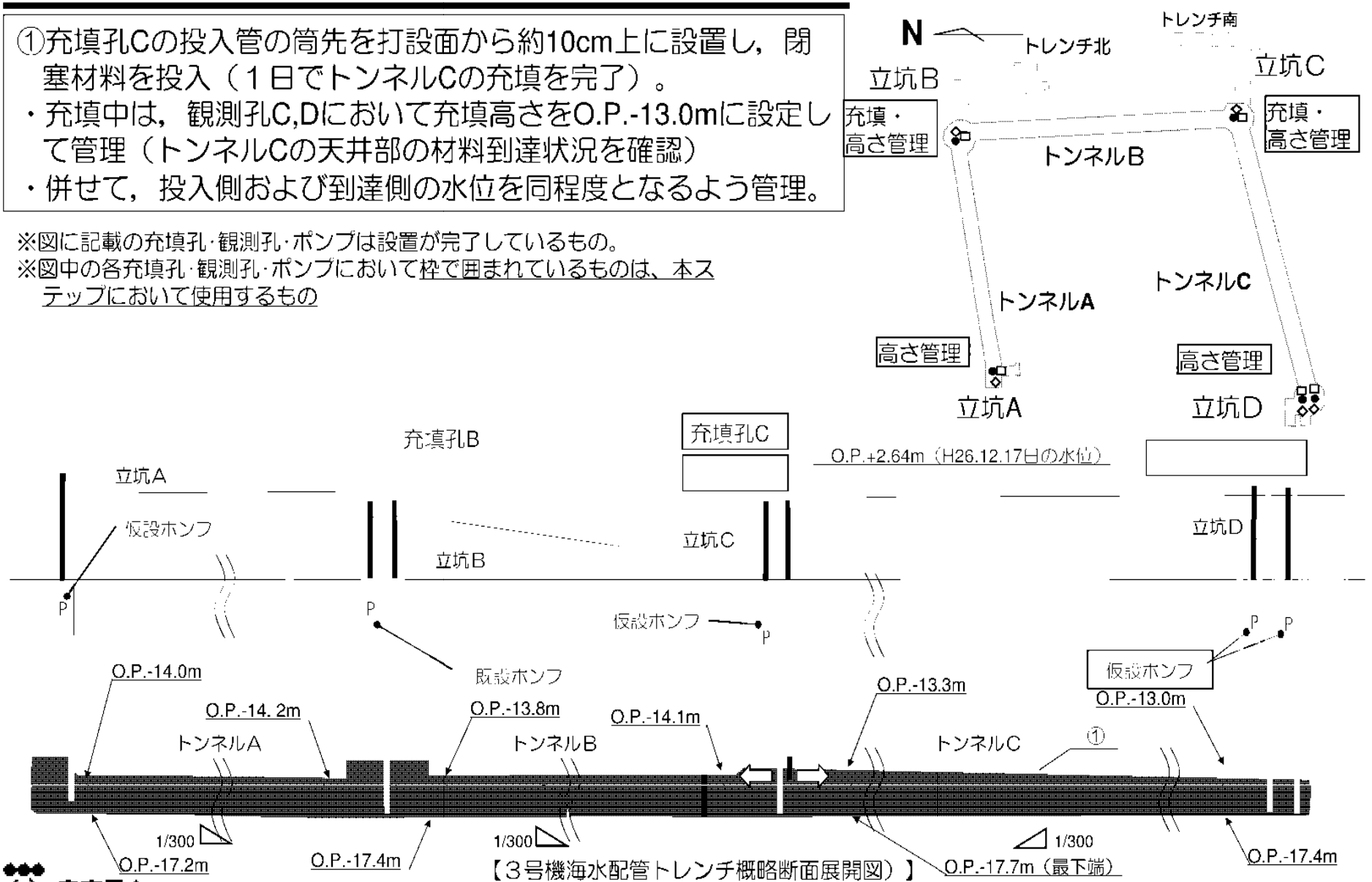


【３号機海水配管トレンチ概略断面展開図）】

3．3　3号機海水配管トレンチ　充填手順(トンネル天井部の充填②)

①充填孔Cの投入管の筒先を打設面から約10cm上に設置し，閉塞材料を投入（１日でトンネルCの充填を完了）。
・充填中は，観測孔C,Dにおいて充填高さをO.P.-13.0mに設定して管理（トンネルCの天井部の材料到達状況を確認）
・併せて，投入側および到達側の水位を同程度となるよう管理。

※図に記載の充填孔･観測孔･ポンプは設置が完了しているもの。
※図中の各充填孔･観測孔･ポンプにおいて枠で囲まれているものは、本ステップにおいて使用するもの



【３号機海水配管トレンチ概略断面展開図）】

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充填済み

【参考】 充填・閉塞工事の施工中の水位管理

- ２号トレンチトンネル部の充填と同じように適切に水位管理を行う。

- 運転上の制限であるO.P.+3.5mを超えないように下記の通りの施工サイクル及び水位管理を行う。
  - ①充填開始前までにトレンチの水位をO.P.+2.8m以下まで低下させる
  - ②充填中はトレンチ水位を監視（30分毎）し、O.P.+3.0mを超えた場合、トレンチ移送ポンプを起動させ、トレンチ水位の低下を図る
  - ③引き続き水位が上昇する場合、管理水位：O.P.+3.25mに達した場合は、即時、充填を中断する
  - ④打設終了後、次の日の打設開始前までにトレンチの水位を再びO.P.+2.8m以下に下げる

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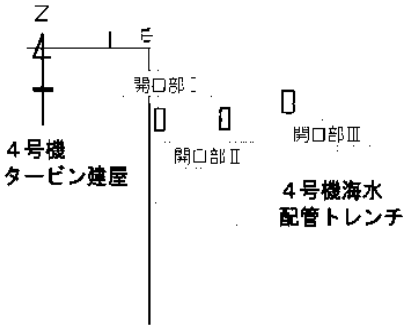
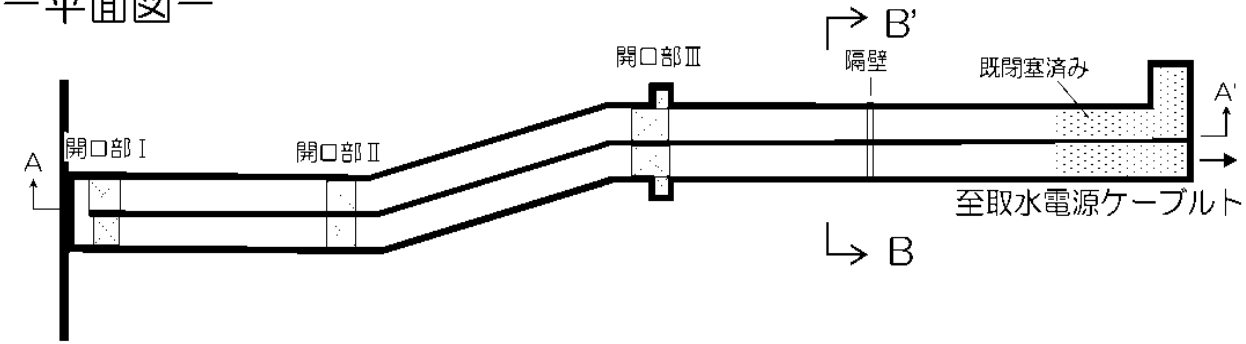
4．1　4号機海水配管トレンチ　構造と基本配置

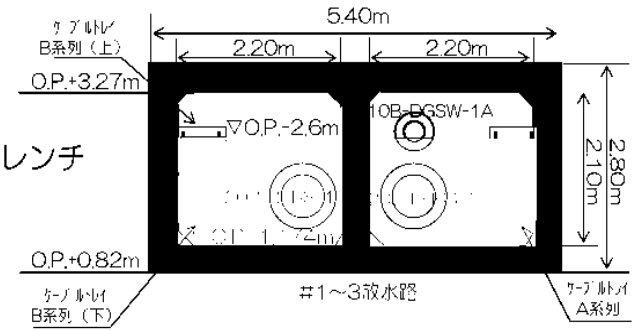
- ４号機海水配管トレンチの全長は約80m。トンネル部分は2.2m×2.1m×２連のボックスカルバート構造であり，開口部Ⅲの位置が最底部。
- 開口部Ⅰ・Ⅱ・Ⅲともに，２連ダクト部分より上はひとつの断面になっている（次スライド参照）。
- ＃１～３放水路を跨ぐ部分には，隔壁があり，東西で仕切られている。
- 隔壁より東側の箇所（取水電源ケーブルトレンチ部分含む）は既に一部閉塞済み。
- なお、トレンチ内の滞留水は約700m^{3}と推定。



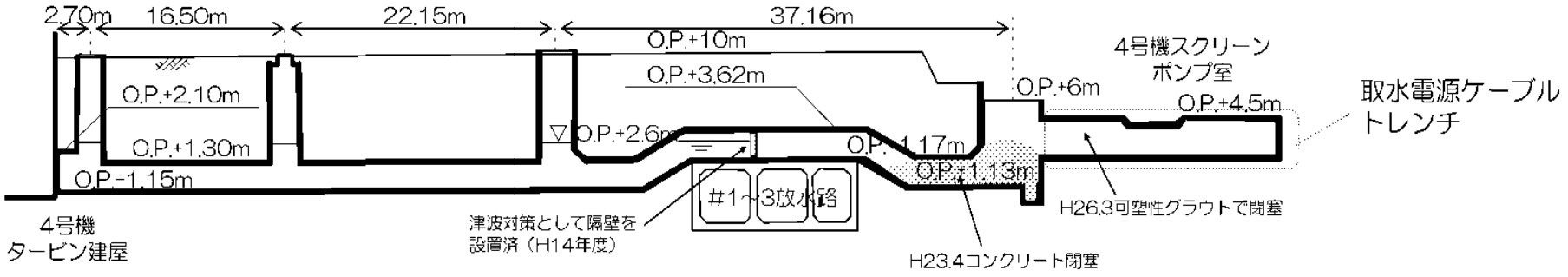
－平面図－



－B-B'断面図－



－A-A'断面図－



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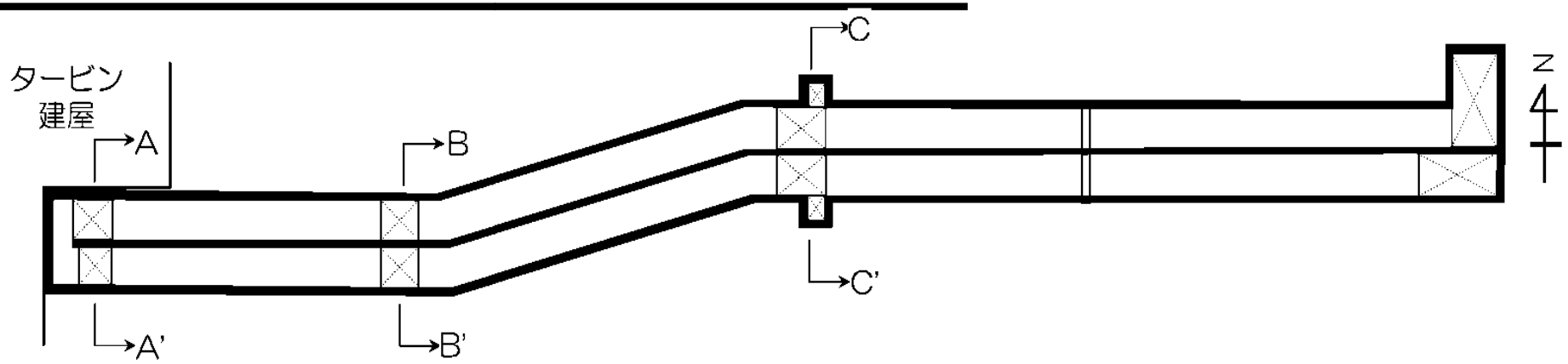
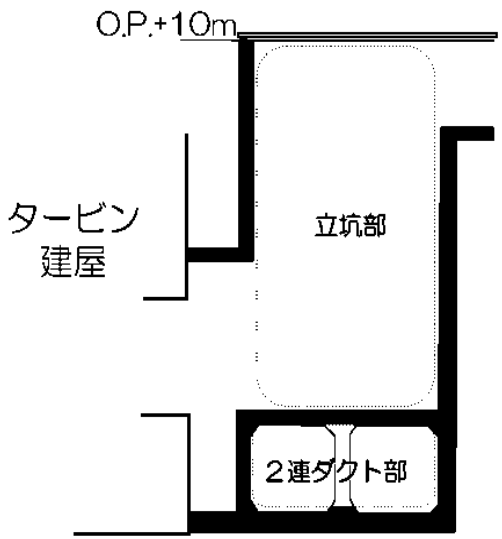
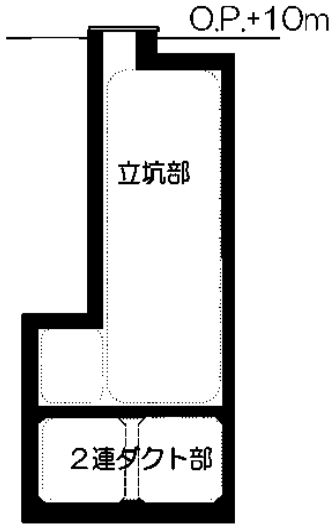
（参考）4号機海水配管トレンチ　各開口部の断面構造

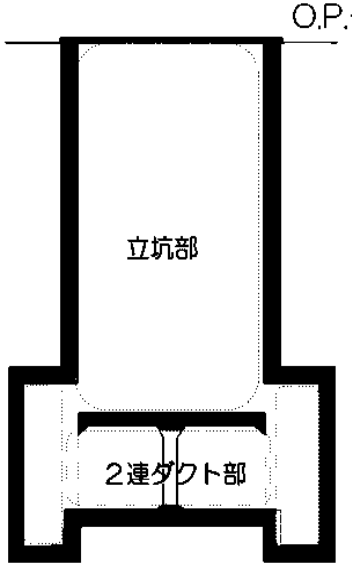




A-A'断面図



B-B'断面図



C-C'断面図

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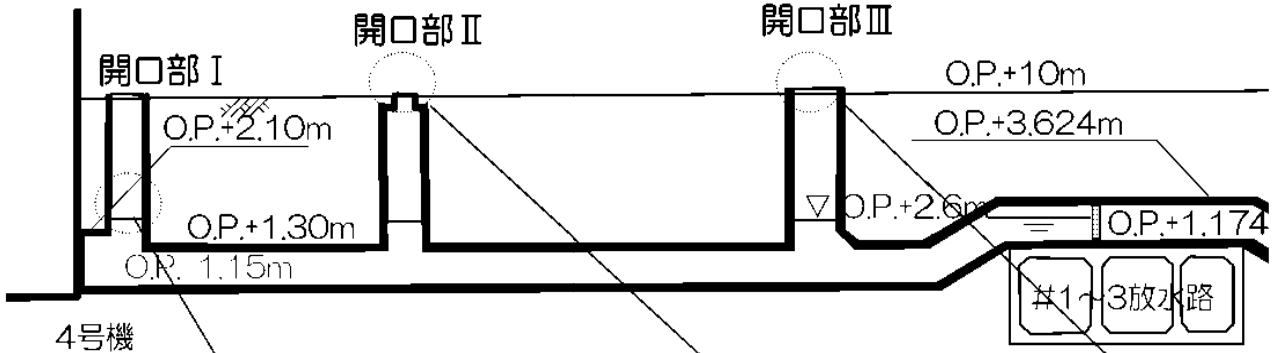
4．2　4号機海水配管トレンチ　調査状況

開口部３ヶ所の調査を実施。その結果、開口部Ⅰは津波により流入したと思われるガレキが確認され，ポンプを設置するには，それらを撤去する必要があることが判明。
開口部Ⅱは、上部に砕石およびサブドレンの配管が設置されていることから，引き続き調査を実施予定。
開口部Ⅲについては、水中ポンプを底盤から1m上まで降ろせることを確認。ポンプをO.P.約±0mの位置へ設置完了。
現状での連通状況等を確認するため，揚水試験を実施。
揚水試験においては，開口部Ⅲに設置したポンプにより，４号機タービン建屋へ移送。

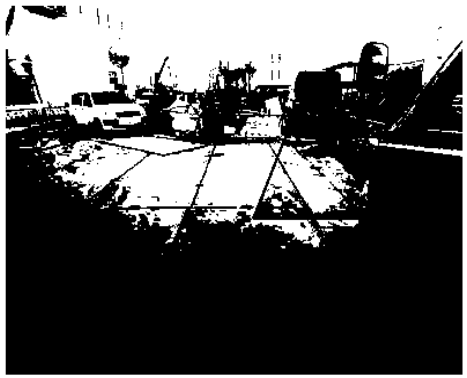


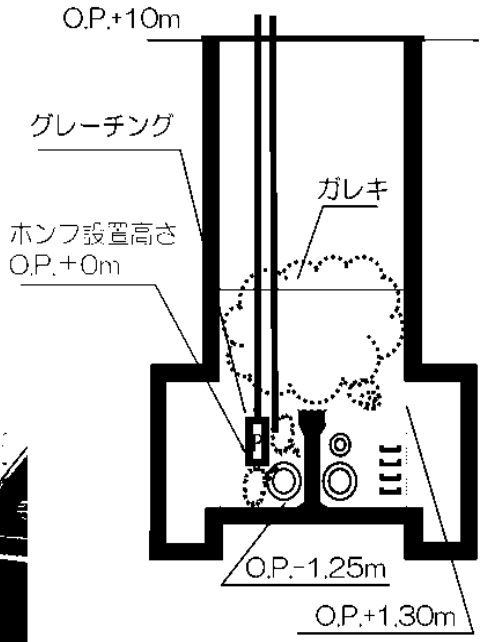
開口部Ⅰ

上部から撮影

開口部Ⅱ※

開口部Ⅲ※





開口部Ⅲポンプ設置状況

※緑色のハッチングは開口部の想定位置。
※写真は、カメラ・ポンプ挿入前に撮影。

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4．3　4号機海水配管トレンチ　揚水試験結果

■12/19に揚水試験を実施。開口部Ⅲから105m^{3}揚水し，４号機タービン建屋へ移送した結果，タービン建屋およびトレンチの水位に変化は生じなかった。

■試験時に測定したトレンチの水質は、至近のT/Bの水質とほぼ同等であった。

■以上のことから、タービン建屋とトレンチ間には連通があると考えられる。

【揚水試験の概要】

12月19日(金)
10:00　揚水開始(約35m^3/h)
13:00　揚水終了

水位	12/19 10:00	12/19 13:00
４号機タービン建屋	O.P.+2.50	O.P.+2.50
４号機海水配管トレンチ	O.P.+2.58	O.P.+2.58

} 水位の変化なし

【水質】

区分	至近のT/B	４号機海水配管トレンチ	
採取日	H26.10.21	H26.12.19（試験後）	H26.12.3（試験前）
塩化物イオン	170 ppm	200 ppm	170 ppm
全γ	480 Bq/cm^3	324 Bq/cm^3	270 Bq/cm^3
Cs-134	120 Bq/cm^3	77 Bq/cm^3	63 Bq/cm^3
Cs-137	360 Bq/cm^3	247 Bq/cm^3	206 Bq/cm^3
全β	590 Bq/cm^3	285 Bq/cm^3	285 Bq/cm^3
トリチウム	4.4 Bq/cm^3	3.5 Bq/cm^3	3.3 Bq/cm^3

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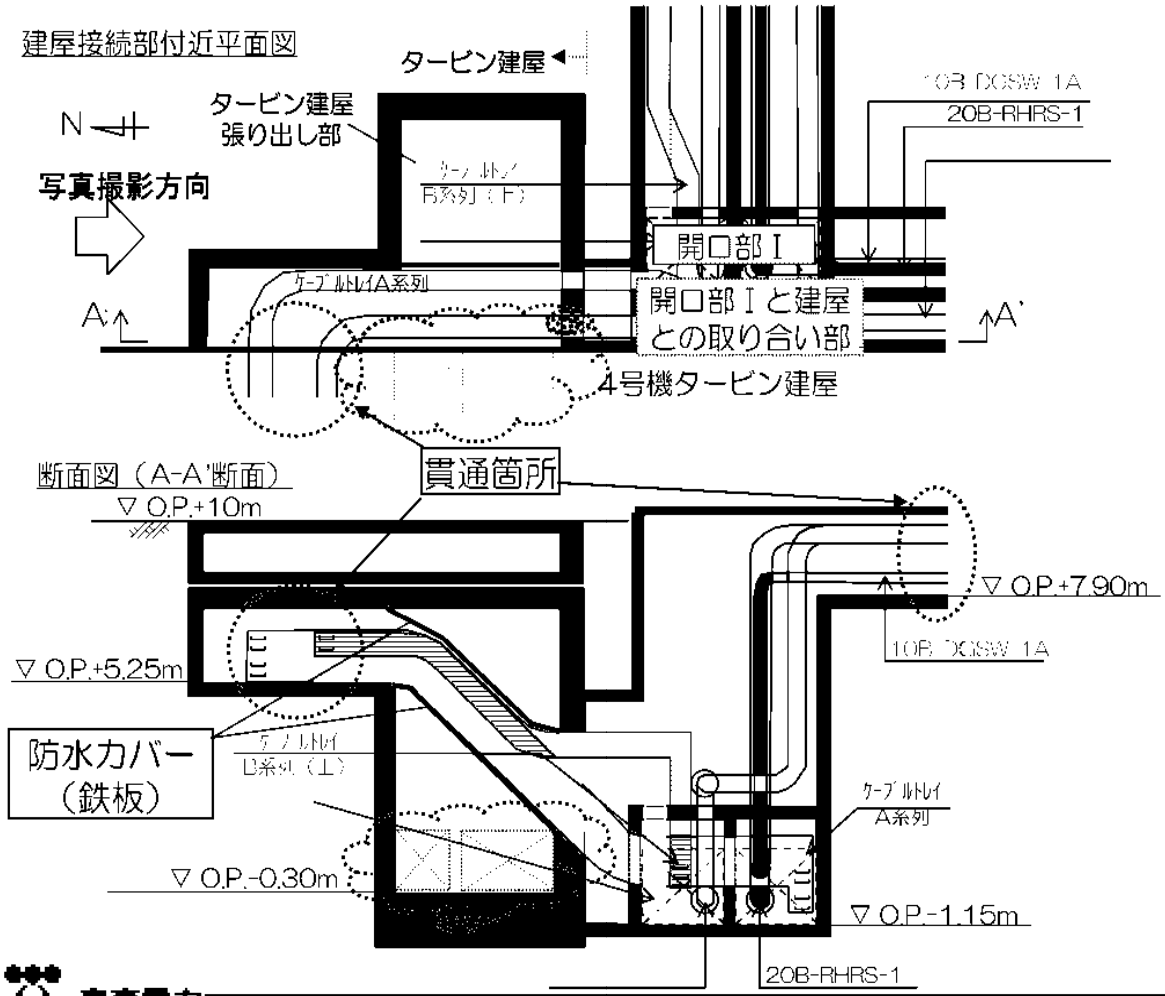
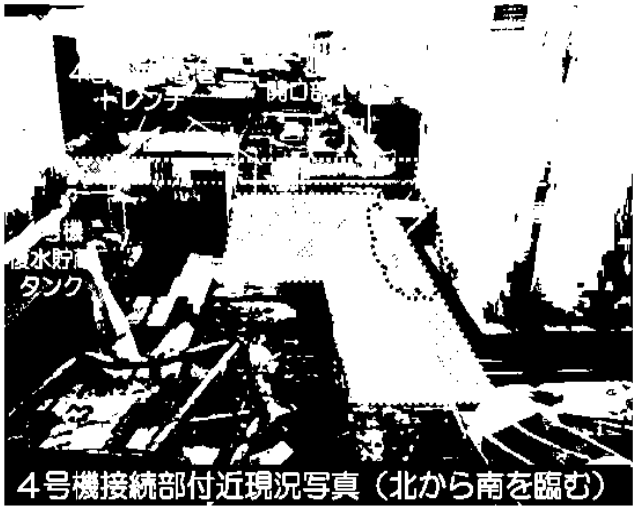
4．4　4号機海水配管トレンチ　追加調査状況

- 海水配管トレンチに収納されている，ケーブルトレイ・配管の図面上の貫通箇所（青枠）は，現状の水位よりも高所にあることから，タービン建屋張り出し部に貫通箇所があると想定。





4号機接続部付近現況写真（北から南を臨む）

- 左図赤枠で示す箇所（タービン建屋内）に開口があり，トレンチに収納されていない配管が設置されていることを確認。
- トレンチ内ケーブルトレイがタービン建屋張り出し部を通過している箇所には防水カバーが設置してあり，トレンチとタービン建屋は分離されていたが，現状，防水カバーの機能が損なわれているものと考えられる。

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４．５　４号機海水配管トレンチ　今後の施工方針

■ 揚水試験の結果，４号機においてもトレンチとタービン建屋の間に連通が確認された。

■ 海水配管トレンチとタービン建屋を分離していた防水カバーの機能が損なわれ，トレンチとタービン建屋が連通したものと推定。

■ 水有り充填に際し，現状想定される貫通部付近の高さを考慮すると，流動性の高い閉塞材料では建屋側へ流出する恐れがあるため，建屋とトレンチの連通の阻害を図り，建屋側への過度の流出を防止する必要がある。

■ 連通の阻害方法は，間詰め充填を基本とするが，間詰め充填の実施場所として，下記の候補箇所において，現場状況等を踏まえて検討中。候補箇所の優先順位は下記のとおり。

① 想定される貫通部付近
→ 施工性確認が必要だが，閉塞材料にてトレンチ内全域を充填可能

② 開口部Ⅰ
→ ガレキの撤去等準備作業に時間を要するが，ほぼトレンチ内全域を充填可能

③ 開口部Ⅱ
→ 地上部の支障物が少なく，作業上の対応が比較的容易だが，トレンチが分断されてしまうため，全体の充填は段階的の実施となる

■ 間詰め充填実施後，施工計画を立案し，速やかに内部充填を実施。

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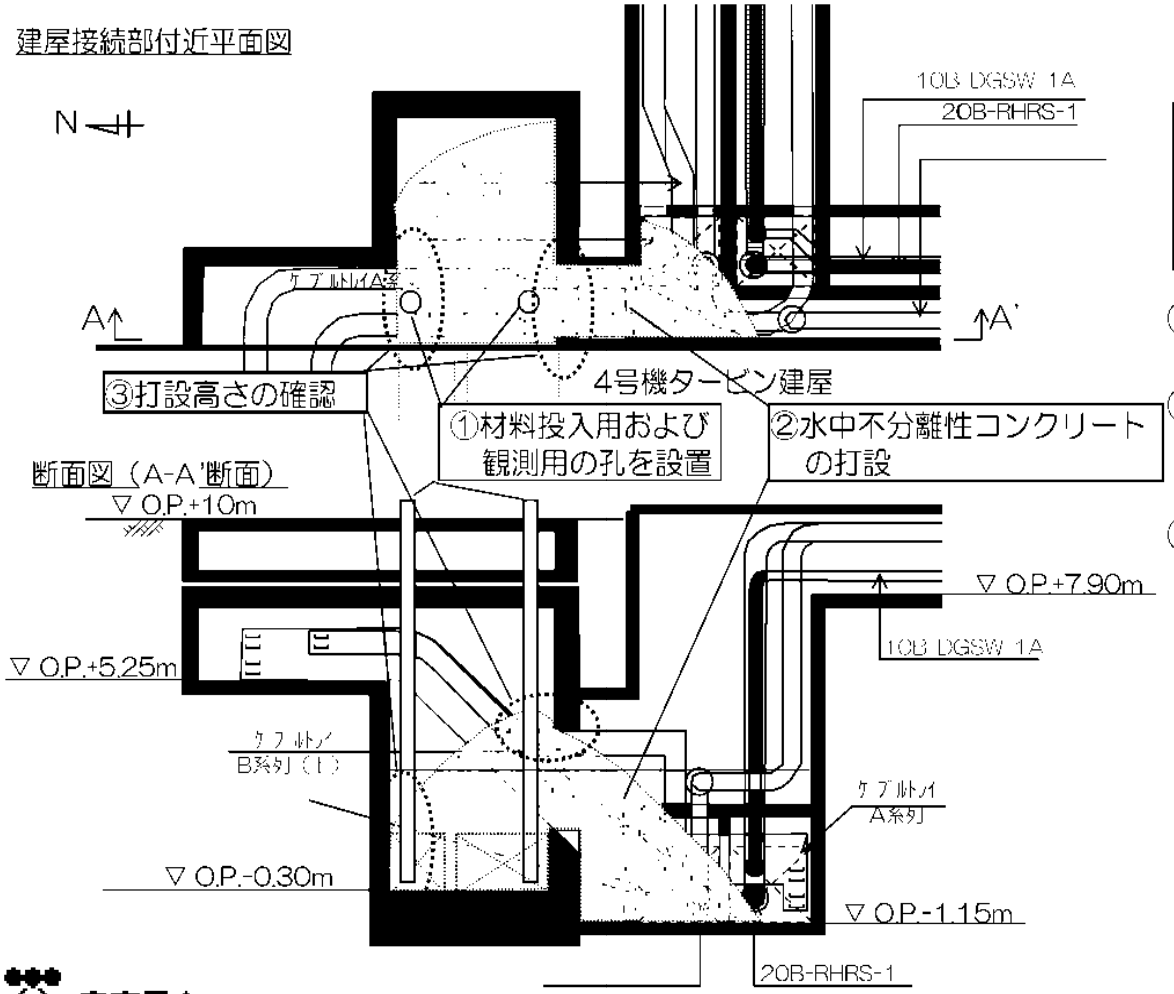
4．6　4号機海水配管トレンチ　間詰め方法①（貫通部付近施工案）

- 調査結果に基づき，トレンチと建屋の連通の阻害を行うため，間詰め充填を実施する。
- 間詰めについては，水中不分離性コンクリートにより行うことを基本とする。



■ 先に挙げた間詰め充填候補箇所のうち，想定される貫通部付近で間詰めを実施した場合における手順・方法を例示。

① 調査結果に基づき，躯体頂版を削孔，材料投入用および観測用の孔を設置する。

② ２号機立坑Ａでの知見を考慮し，流動性の低い水中不分離性コンクリートをトレミー工法により打設し，立ち上げる。

③ 貫通部付近において貫通部より高く積みあがっていること，およびトレンチとの境目付近で，水面より高く積みあがっていること（左図赤丸）を確認する。

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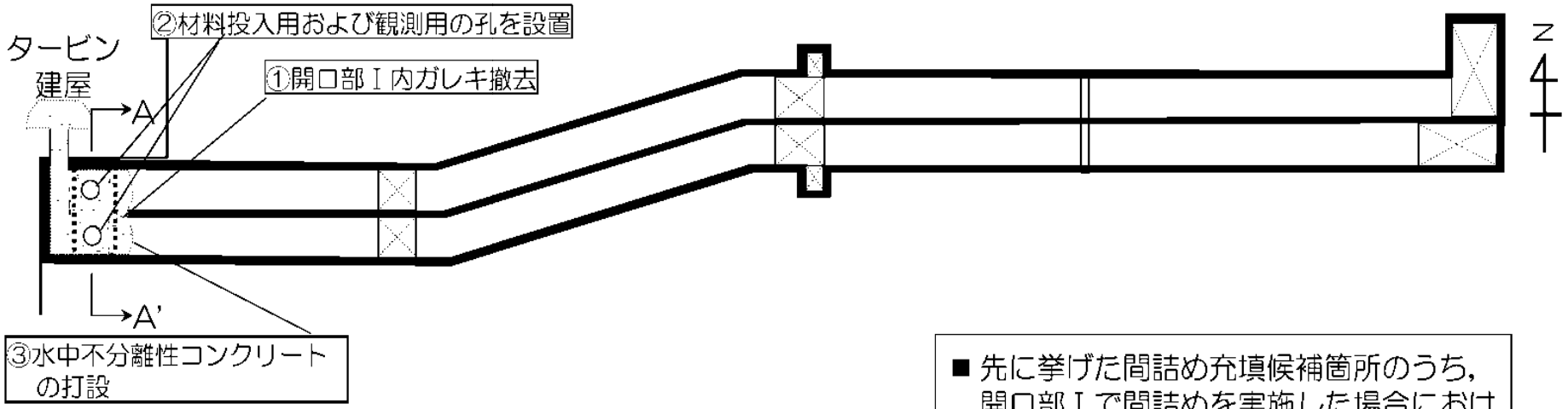
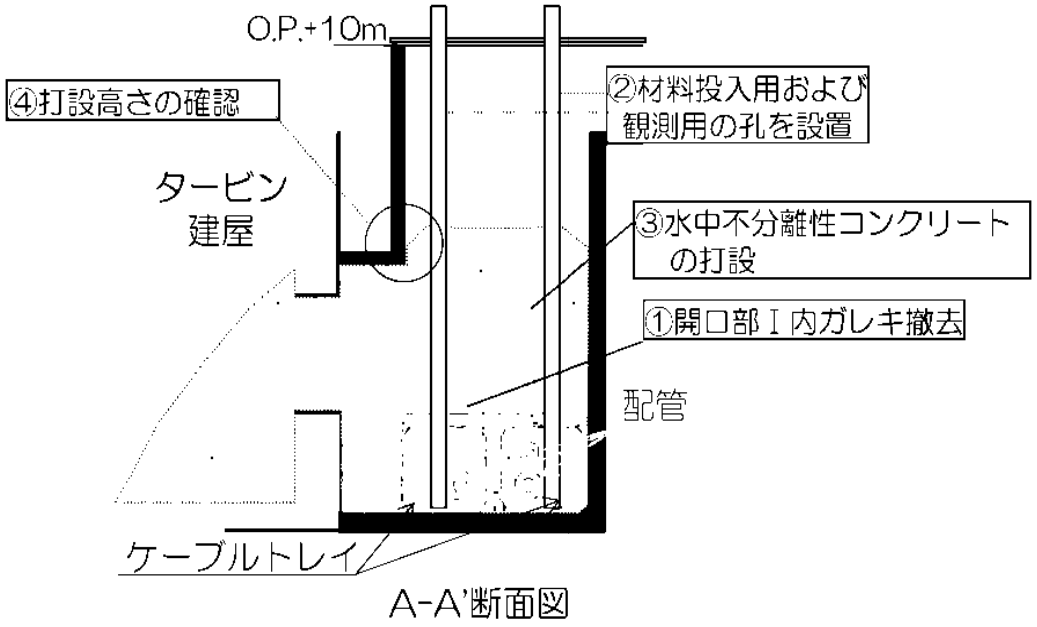
4．6　4号機海水配管トレンチ　間詰め方法②（開口部Ⅰ施工案）





A-A'断面図

■ 先に挙げた間詰め充填候補箇所のうち，開口部Ⅰで間詰めを実施した場合における手順・方法を例示。

① 開口部Ⅰ内のガレキを撤去する。
② グレーチングを削孔，材料投入用および観測用の孔を設置する。
③ 流動性の低い水中不分離性コンクリートをトレミー工法により打設し，立ち上げる。
④ 建屋との境目付近で，水面より高く積みあがっていること（左図赤丸）を確認する。

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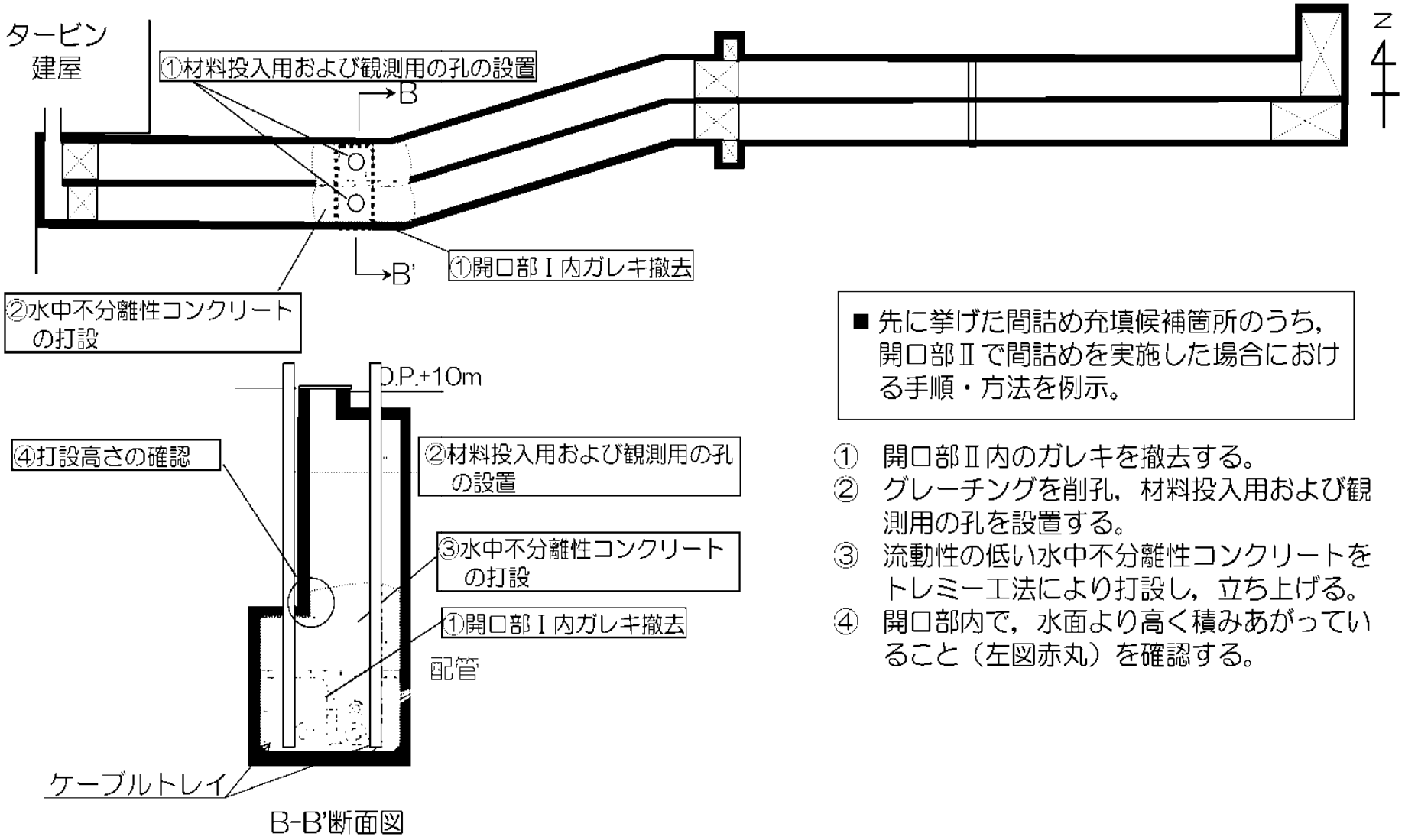
4．6　4号機海水配管トレンチ　間詰め方法③（開口部Ⅱ施工案）



■ 先に挙げた間詰め充填候補箇所のうち，開口部Ⅱで間詰めを実施した場合における手順・方法を例示。

① 開口部Ⅱ内のガレキを撤去する。
② グレーチングを削孔，材料投入用および観測用の孔を設置する。
③ 流動性の低い水中不分離性コンクリートをトレミー工法により打設し，立ち上げる。
④ 開口部内で，水面より高く積みあがっていること（左図赤丸）を確認する。

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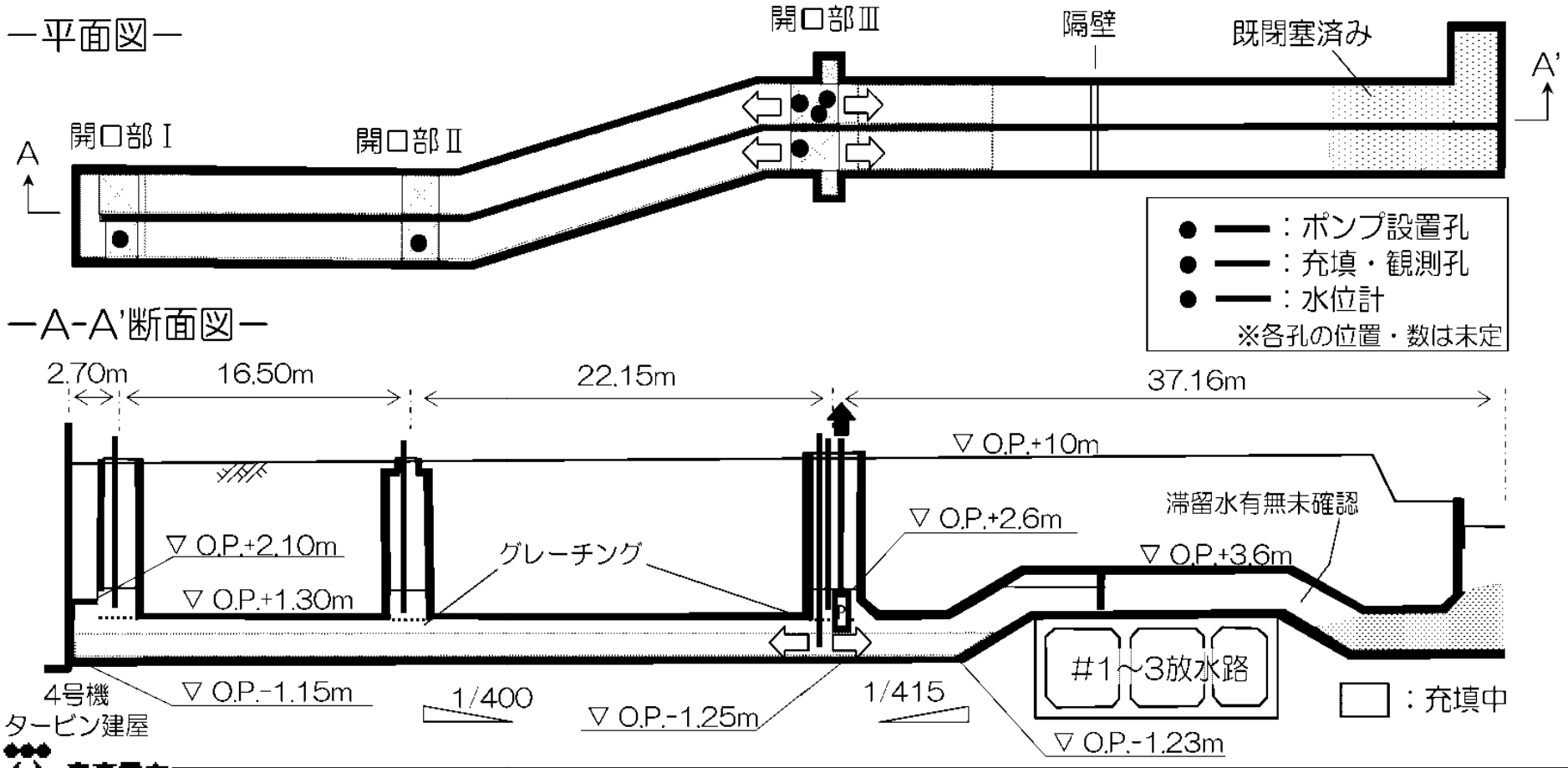
4．7　4号機海水配管トレンチ　トンネル充填施工手順（案）①

① 開口部Ⅲより，管の筒先を底版または既充填面から10cm程度の高さに設置し，閉塞材料を投入。
② 打設中は開口部Ⅲのポンプを使用して，材料投入分を移送。
③ ①・②を繰り返し，数日かけ，天井付近まで充填を実施。
④ 充填中は打設位置において充填高さを計測・管理するとともに，各開口部にて水位計測・管理を実施。

（なお，貫通部付近での間詰め後の施工手順を記載しており，間詰めの実施箇所により変更の可能性あり。）



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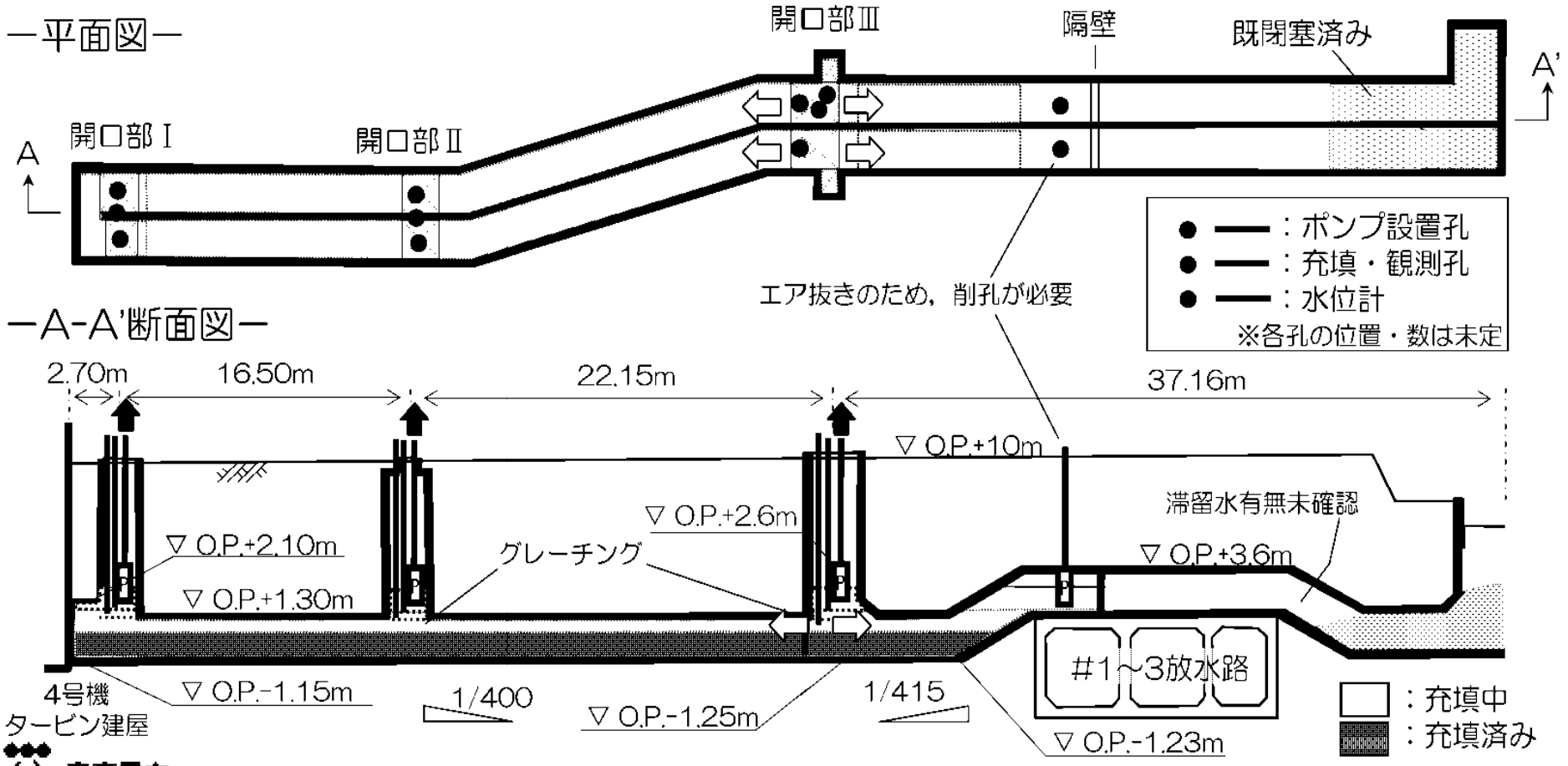
4．7　4号機海水配管トレンチ　トンネル充填施工手順（案）②

① 放水路跨ぎ部において，エア抜きのため，頂版を削孔。併せてポンプを設置。
② 各開口部においてポンプの設置が完了次第，天井部の充填を実施。既充填面から10cmの高さに筒先を設置し，材料を投入。（１日で打設完了）
③ 打設中は各開口部のポンプを使用して，材料投入分を移送。必要に応じて放水路跨ぎ部からも移送。
④ 充填中は各位置において充填高さを計測・管理するとともに，各開口部にて水位計測・管理を実施。



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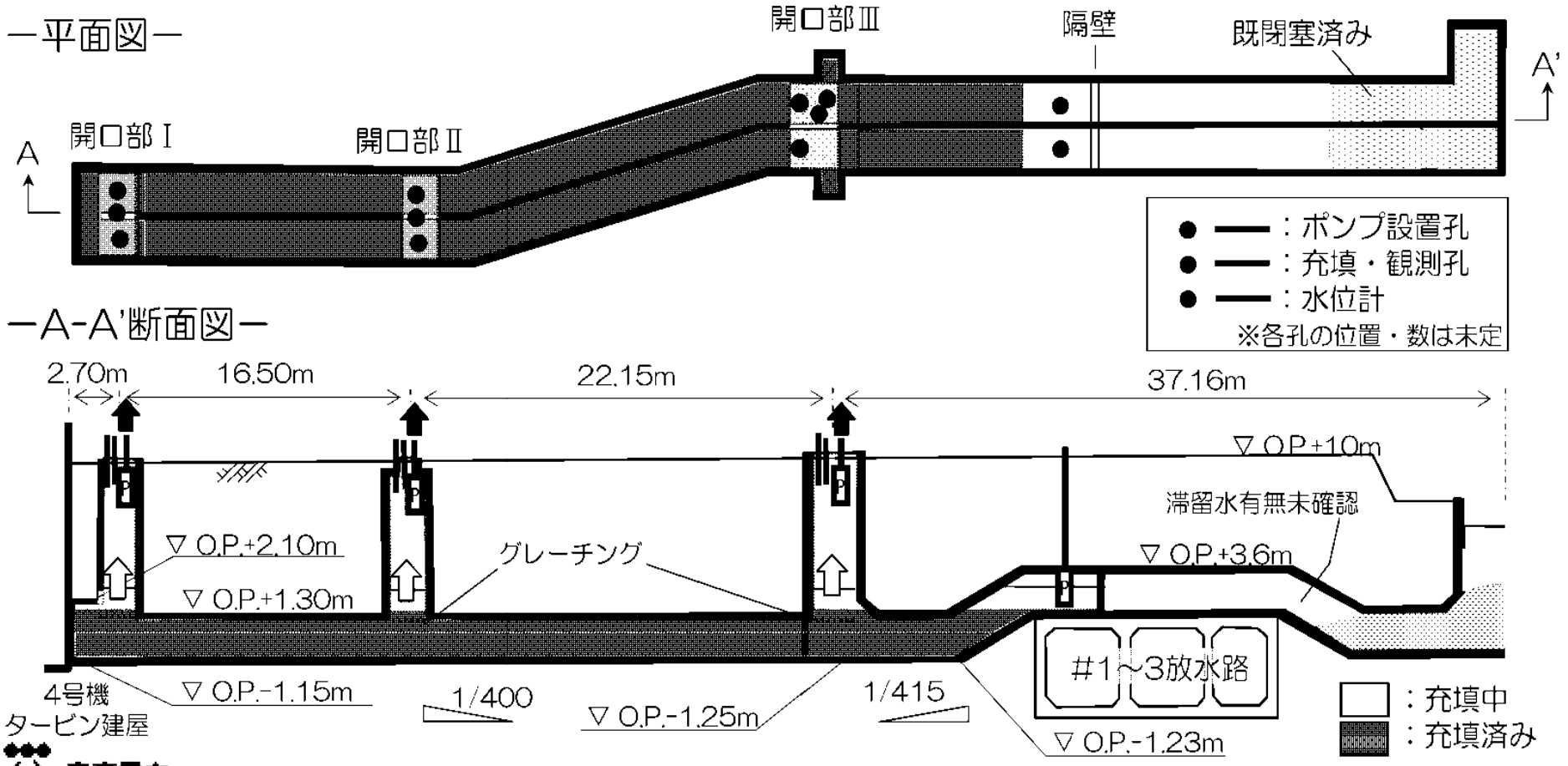
4．7　4号機海水配管トレンチ　トンネル充填施工手順（案）③

① 各開口部のポンプにより立坑から移送し，立坑部分を閉塞。
② 充填中は各位置において充填高さを計測・管理するとともに，各開口部にて水位計測・管理を実施。充填に際し，ポンプ，充填孔，水位計は引き上げる



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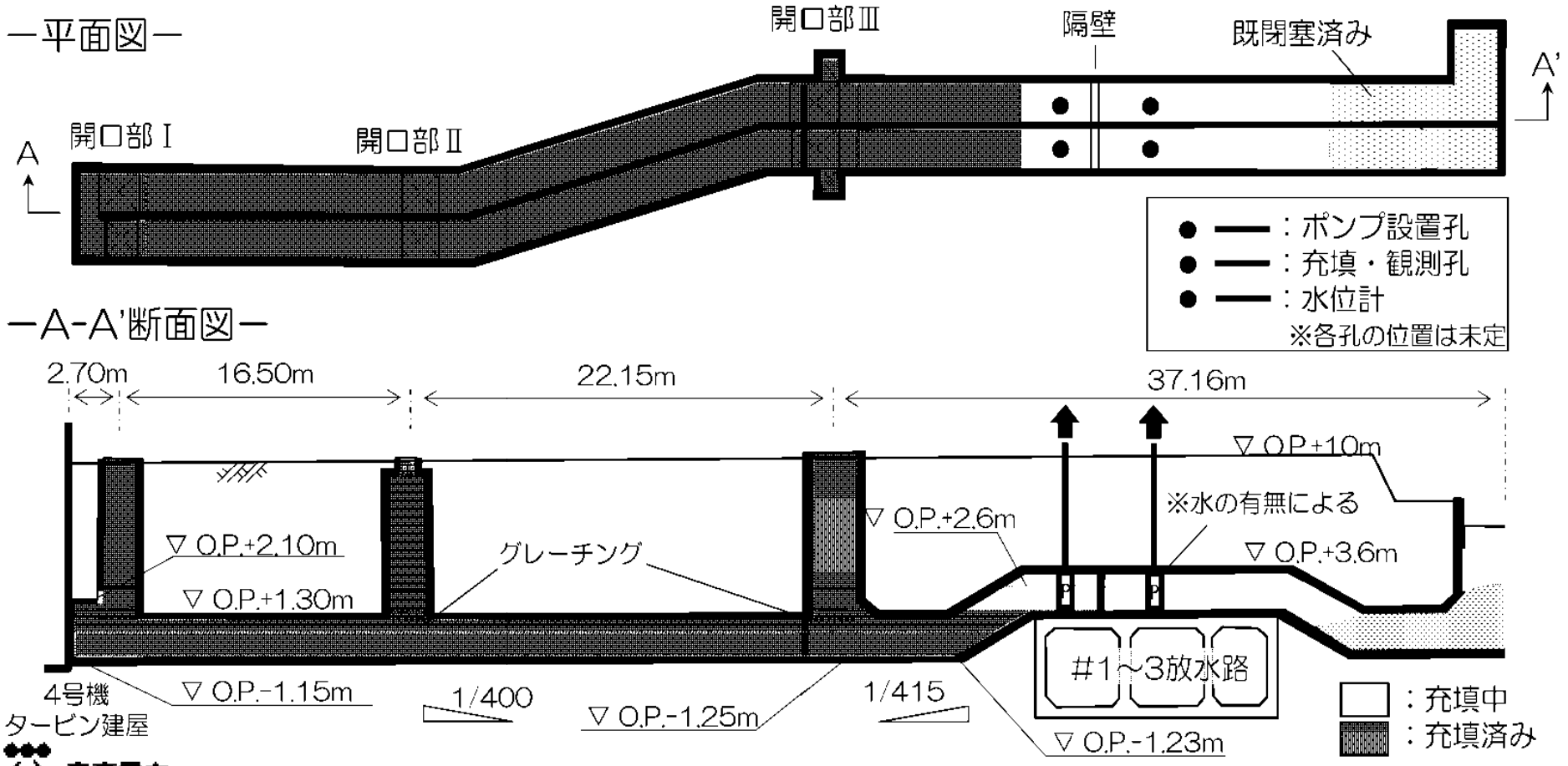
4．7　4号機海水配管トレンチ　トンネル充填施工手順（案）④

① 放水路跨ぎ部に設置済みのポンプを使用し，放水路跨ぎ部の移送を行う。
② 併せて，隔壁の海側において，滞留水の有無を確認。滞留水が存在する場合，ポンプの設置を行い同様に移送を実施する。



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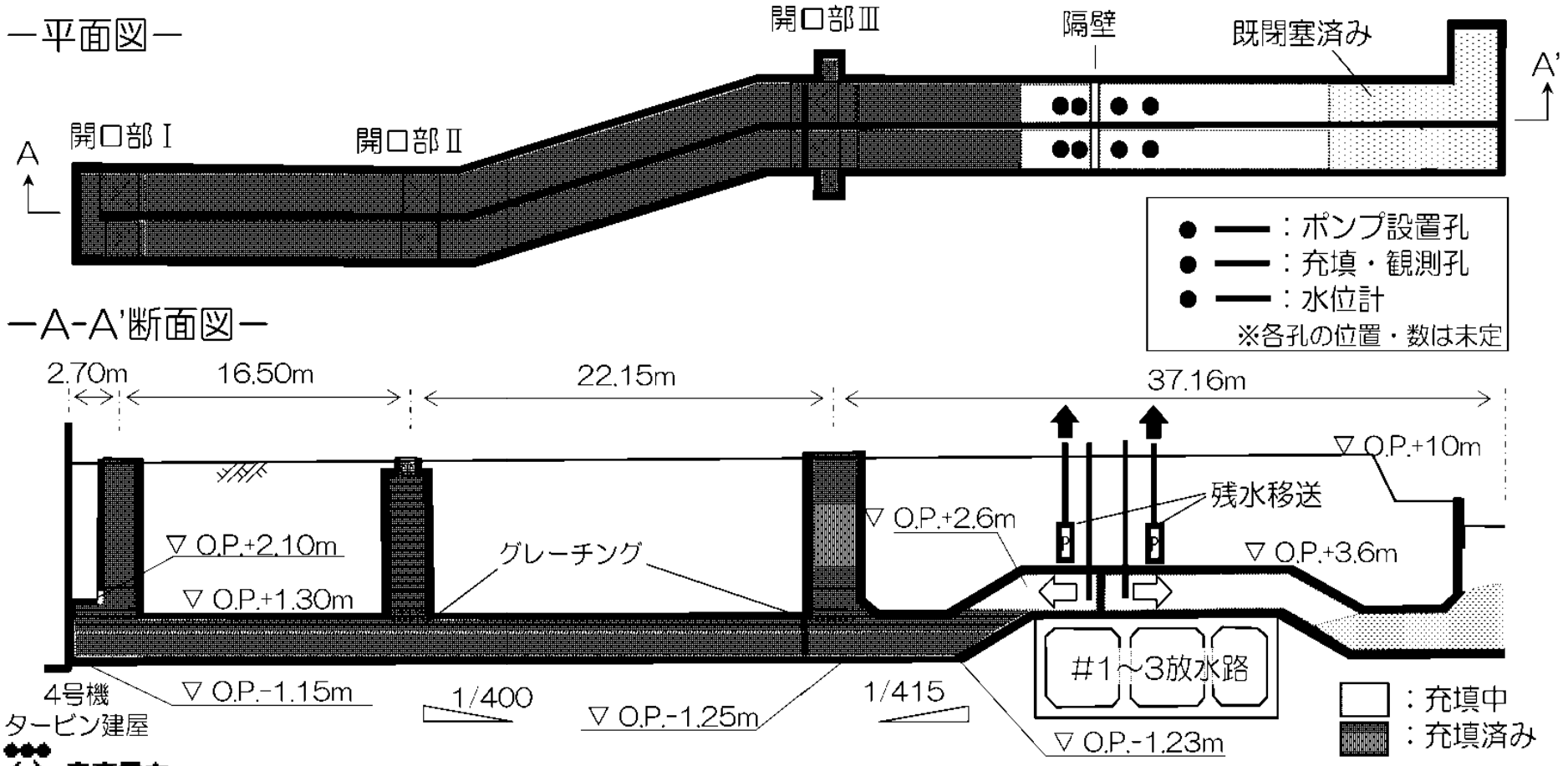
4．7　4号機海水配管トレンチ　トンネル充填施工手順（案）⑤

① ポンプを頂版より上に設置する。
② 筒先を底版から10cmの高さに設置し，材料を投入。残水は頂版上に設置したポンプにより移送する。
③ 閉塞確認は，投入していない充填・観測孔から観測し，閉塞材料が天井高さより高く打ちあがったことを確認することにより行う。



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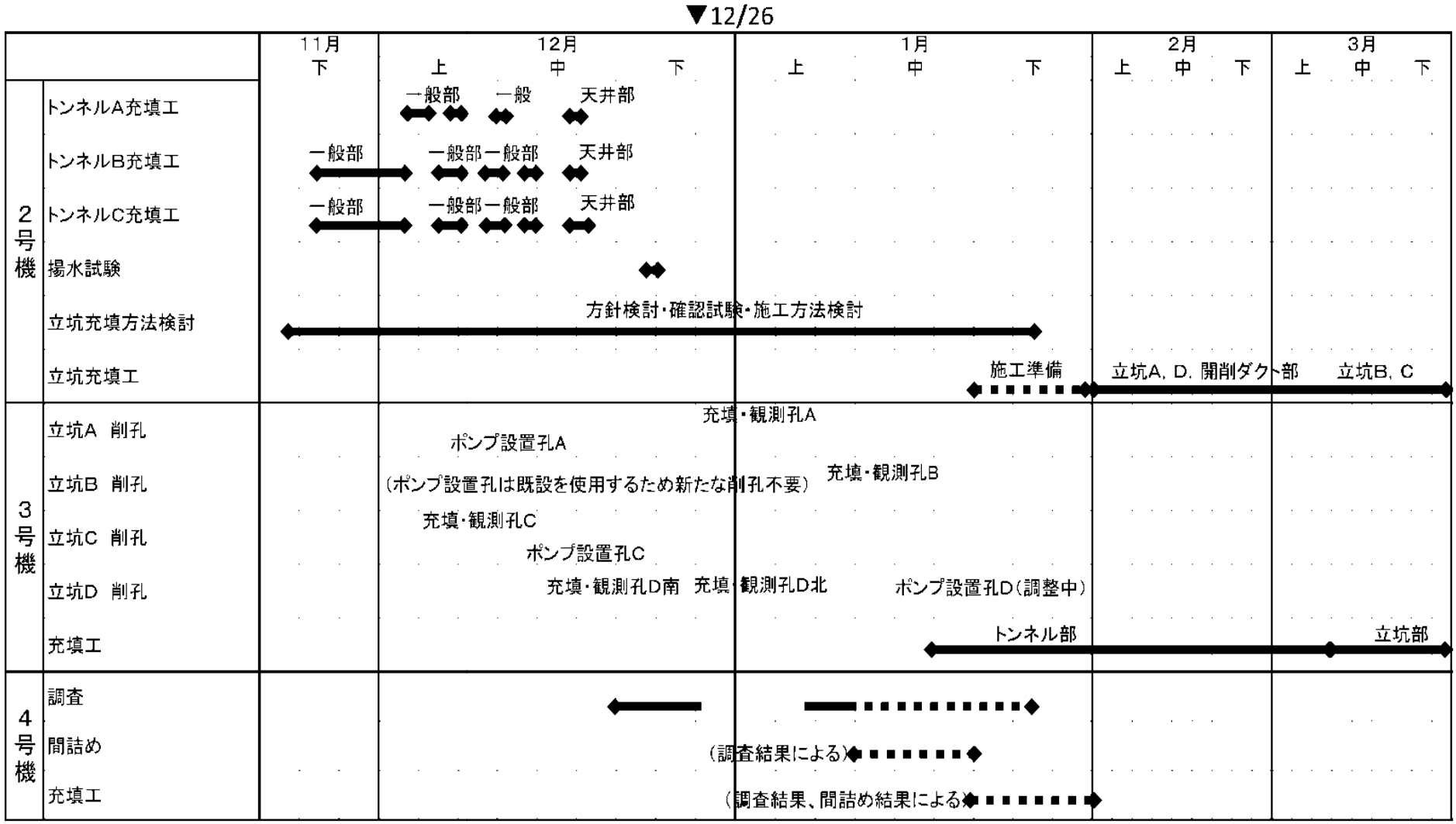
5. トレンチ閉塞の工程



天候・現場状況により変更の可能性あり

無断複製・転載禁止　東京電力株式会社

特定原子力施設監視・評価検討会
（第30回）
資料3

福島第一原子力発電所における廃炉作業に伴い追加的に上昇する敷地境界実効線量（評価値）の制限達成に向けた対策について

平成26年12月26日
東京電力株式会社

東京電力
TEPCO

無断複製・転載禁止　東京電力株式会社

1．敷地境界実効線量（評価値）の制限について

■ 実効線量の制限値

「特定原子力施設への指定に際し東京電力株式会社福島第一原子力発電所に対して求める措置を講ずべき事項について」で求められている実効線量の制限から超過しているため，以下のとおり段階的な制限を定め、対策を施すことにより達成を目指す。

時期	平成27年３月末	平成28年３月末
制限値	2mSv/年未満※	1mSv/年未満

※タンクに貯蔵された汚染水以外に起因する敷地境界における実効線量（評価値）の低減目標は、平成27年３月末までに１mSv/年未満とする。

ただし、以下の３つを起源とする敷地境界における実効線量（評価値）の低減目標は、実施計画の認可日から継続して１mSv/年未満とする。

- 実施計画（変更認可申請中のものも含む）に記載されているものであって、敷地の外に排出する水
- 原子炉建屋から放出される気体廃棄物
- タンクに貯蔵された汚染水以外に起因する直接線・スカイシャイン線

平成27年３月末の要求事項

- 実効線量の制限値：2mSv/年未満
- RO濃縮水貯槽以外に起因する実効線量：1mSv/年未満

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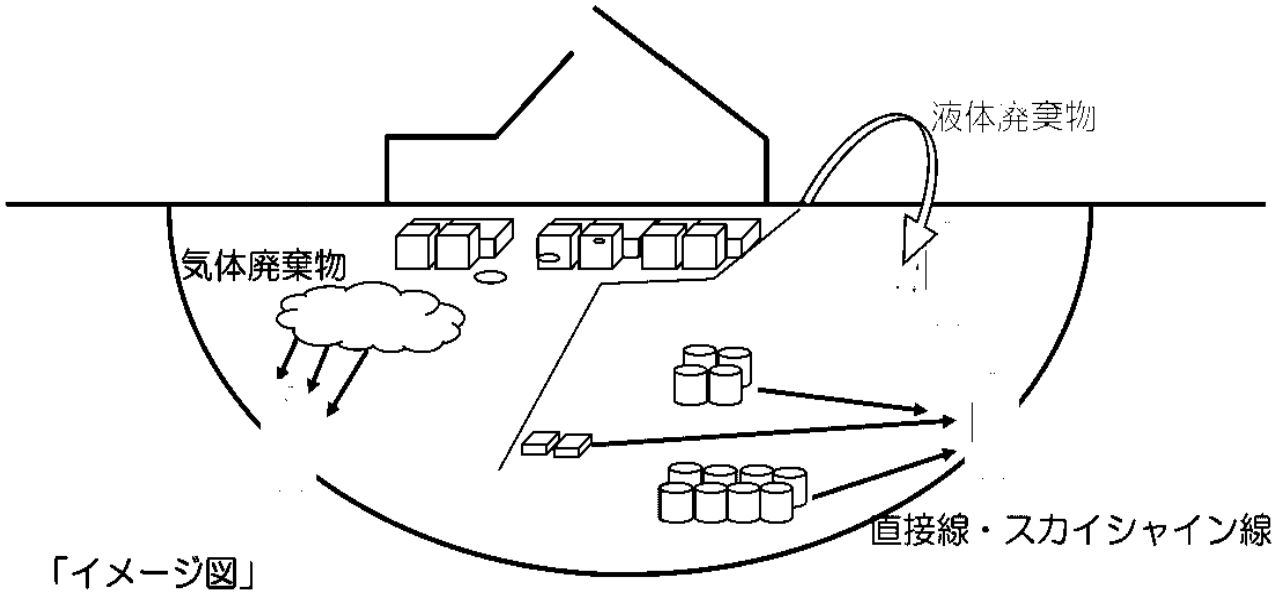
2．実効線量の評価について

○実効線量の評価は、下記の**全ての仮定**を取り込んで評価している。

・気体廃棄物：**放射性雲からの影響が最大となる地点に24時間・365日間立ち続けると仮定**した評価

・液体廃棄物：**最も濃い液体廃棄物を約2ℓ/日・365日間飲み続けると仮定**した評価

・直接線・スカイシャイン線：構内に設置した施設からの直接線・スカイシャイン線が最大となる地点に**24時間・365日間立ち続けると仮定**した評価



「イメージ図」

東京電力 TEPCO 無断複製・転載禁止　東京電力株式会社

3．敷地境界実効線量の目標達成に向けた対策

■目標達成に向けた対策

(1)RO濃縮水貯槽に起因する実効線量

・ＲＯ濃縮水処理を進めるため、多核種除去設備（既設・増設・高性能）による浄化処理を実施してきている。

・更に、重層的なリスク低減策（モバイル型ストロンチウム除去装置等）により、早期の浄化処理を進め、敷地境界における実効線量（評価値）の低減を図る。

(2) RO濃縮水貯槽以外に起因する実効線量

①気体廃棄物：

・現在，行っている放出量評価の保守性を低減することにより，実効線量（評価値）の精度向上を図る。

②固体廃棄物及び設備：

・設置済の多核種除去設備について，実態に合わせた線源条件に見直しを実施した。

・増設多核種除去設備や高性能多核種除去設備については，適切な遮へい設計を実施し，実効線量（評価値）の低減を図った。

・敷地境界へ影響が大きい固体廃棄物の線源条件の見直しを引き続き実施し，実効線量（評価値）の低減を図る。

③液体廃棄物等：

・排水路の清掃：排水路及び側溝の清掃を実施中。

・道路の清掃：道路清掃を平成２６年１０月までに実施した。

・敷地の除染：敷地の瓦礫撤去，除染を実施中。

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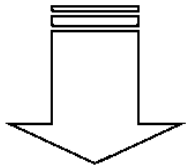
(1)RO濃縮水貯槽に起因する実効線量低減に向けた取り組み状況

（1）目標達成に向けた対策：RO濃縮水貯槽に起因する実効線量
①全体方針

汚染水のリスク低減のため、今年度は以下について重点的に取り組んでいるところ。



・処理設備の増強により、早期に汚染水処理を進め、敷地境界線量を低減
（H26.12.15：9.19mSv/年 → 今年度末：1mSv/年未満）

・信頼性の高い溶接型タンクの増設により、タンクからの汚染水漏えいリスクを低減

（1）目標達成に向けた対策：RO濃縮水貯槽に起因する実効線量
②汚染水の処理状況・見通し

・H26年度末までに、RO濃縮水（今後発生分も含む）
発生想定量は、約37万ｔとなる見通し（12/16時点）。

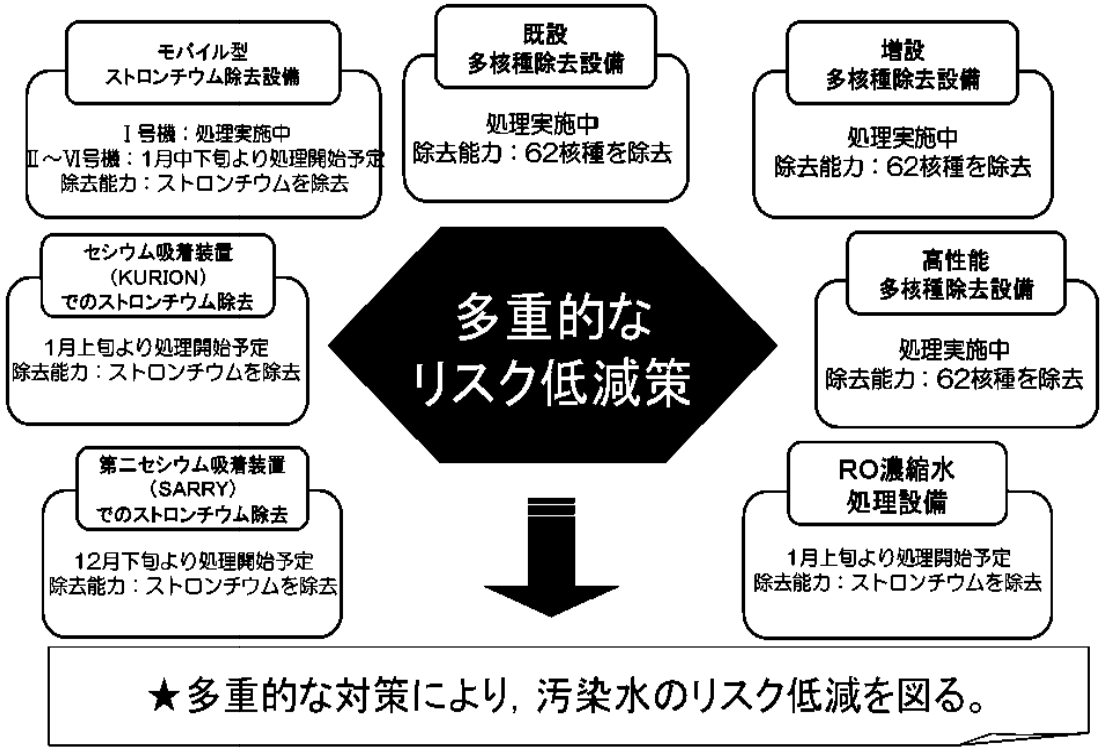
・今後、多核種除去設備（以下ALPS）及びその他浄化処理
設備によりRO濃縮水を処理予定。

【12/16以降の処理想定量 】
・ALPS処理水：約20万ｔ
・Sr処理水　　：約18万ｔ

【H26年度末時点の保有水内訳】
・ALPS処理水：約43万ｔ
・Sr処理水　　：約18万ｔ

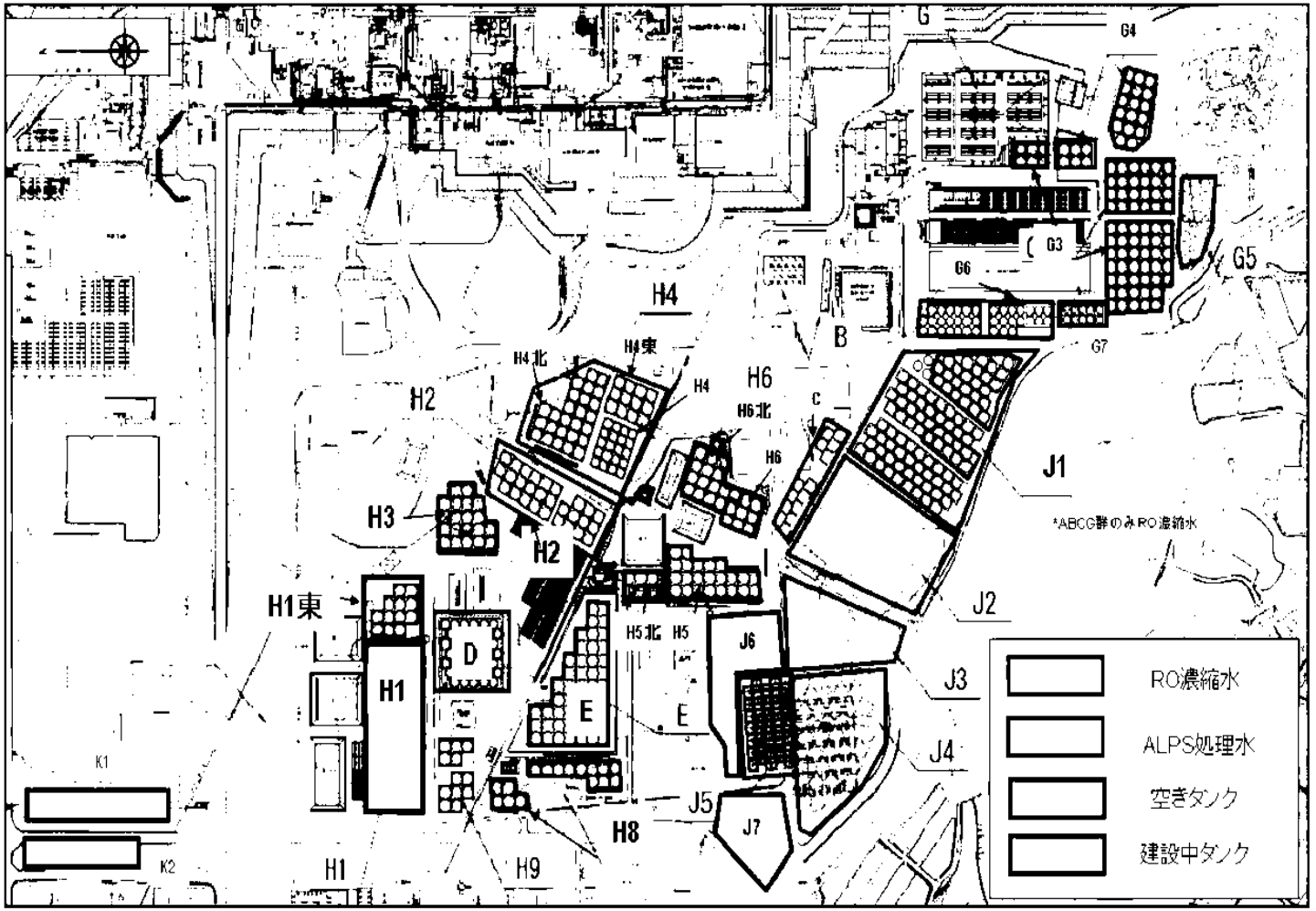
（1）目標達成に向けた対策：RO濃縮水貯槽に起因する実効線量
②汚染水の処理状況・見通し

- 今年度の汚染水への対応は，タンクに貯留されているRO濃縮水の処理を実施
- 処理設備としては，RO濃縮水に含まれる62核種の放射性核種を除去する既設/増設/高性能ALPSのほか，モバイル型のSr除去装置やSARRYでのSr同時吸着塔設置等の重層的対策により，可能な限り早期に汚染水の貯留リスクを低減
- これらの対策の実施により，タンクに貯留された汚染水由来の敷地境界における実効線量を1mSv/年未満に低減



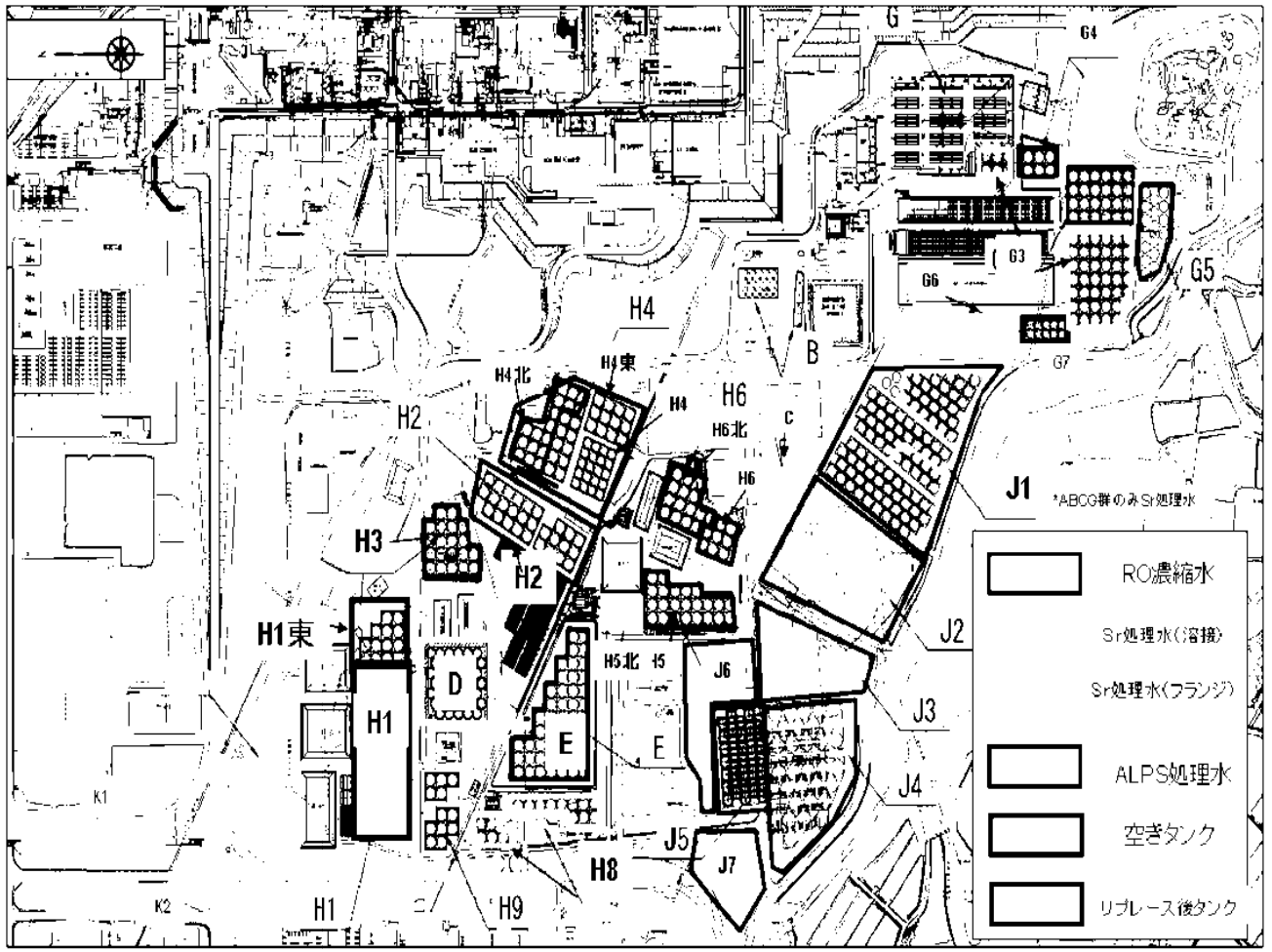
（1）目標達成に向けた対策：RO濃縮水貯槽に起因する実効線量
③現在のタンク内保有水の状況（１２／１９現在）

現時点（１２／１９現在）のタンク内保有水の配置・保管状況



（1）目標達成に向けた対策：RO濃縮水貯槽に起因する実効線量
③平成26年度末時点のタンク内保有水の見通し

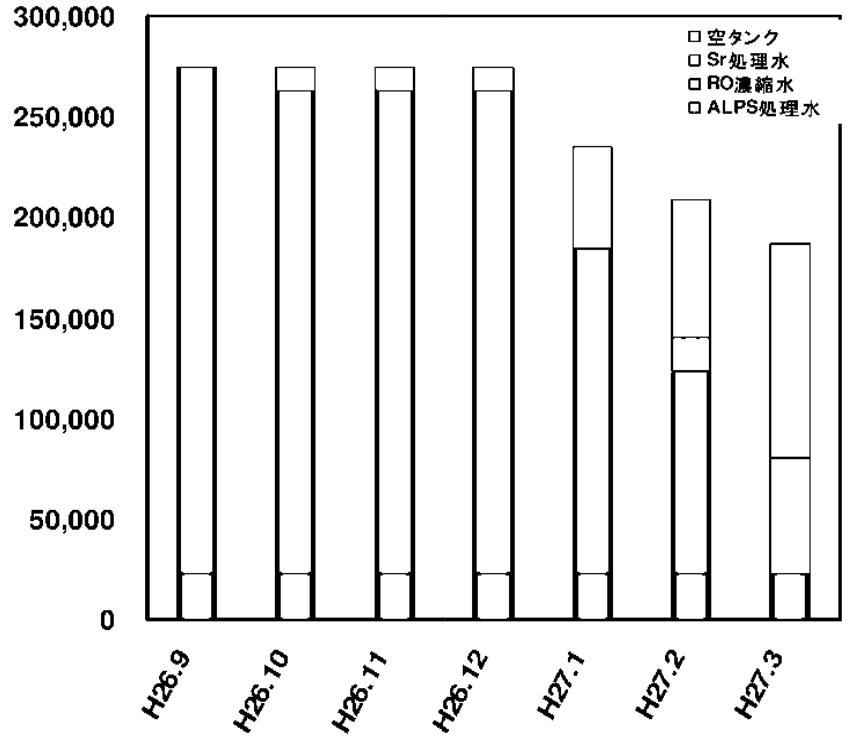
今年度末のタンク内保有水の配置・保管見通し
→敷地境界線量の制限値（1mSv／年）未満を達成する見通し。



（1）目標達成に向けた対策：RO濃縮水貯槽に起因する実効線量
④フランジタンクについて

フランジタンクは、平成２６年度末段階で６万ｔ程度Sr処理水を保有する見通しだが、これらについては浄化処理完了後に更なるリスク低減の観点から、ＡＬＰＳ浄化処理を行い新しい溶接タンクへ保管する。

なお、フランジタンクについては、漏えい防止の観点から処理を優先的に進める予定。



～補足事項～
ＲＯ濃縮水の処理及びタンク建設の進捗状況に応じて各タンクへの処理水・浄化水の貯留計画を適宜見直す。

Sr処理水総量：約6万ｔ
（H26年度末時点フランジタンク保有分）

→ ALPS処理により来年度早期にフランジ型タンクの使用解消の見込み

(*)H26.12.26時点の想定

（1）目標達成に向けた対策：RO濃縮水貯槽に起因する実効線量 ⑤敷地境界線量の見通し

ALPS・その他浄化処理設備によるRO濃縮水の浄化処理の進展により、ＲＯ濃縮水貯槽由来の敷地境界線量は1mSv／年を下回る見通し。

1mSv/年未満を達成するため、敷地境界から近い比較的濃度の高いRO濃縮水貯槽の処理を優先的に進める等、敷地境界線量低減に配慮した浄化処理を進めていく。

(2)RO濃縮水貯槽以外に起因する実効線量低減に向けた取り組み状況

①気体廃棄物

②固体廃棄物及び設備

③液体廃棄物等

（2）目標達成に向けた対策：RO濃縮水貯槽以外に起因する実効線量
①気体廃棄物（精度向上）

放出量評価の精度向上

⇒現在，行っている放出量評価の保守性を低減する。

気体廃棄物の放出量 = ①放射性物質濃度×②流量
⇒放出量から敷地境界における年間の実効線量を評価

	現状	今後
①放射性物質濃度	月１回の測定を用いた評価	連続データを用いた評価
②流　量		

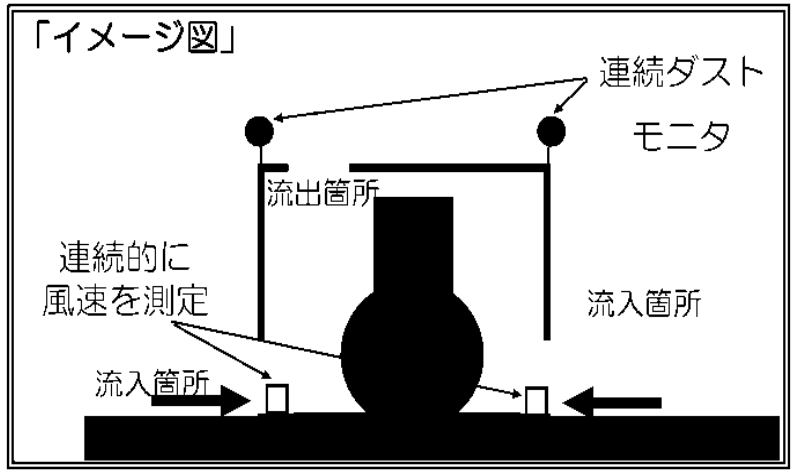
＜今後の評価手法（案）＞

①放射性物質濃度

原子炉建屋上部における連続ダストモニタの値を参考とする評価方法を検討中。

②流量

流量測定が可能な開口部に風速計を設置し連続的な風速データ取得方法を検討中。



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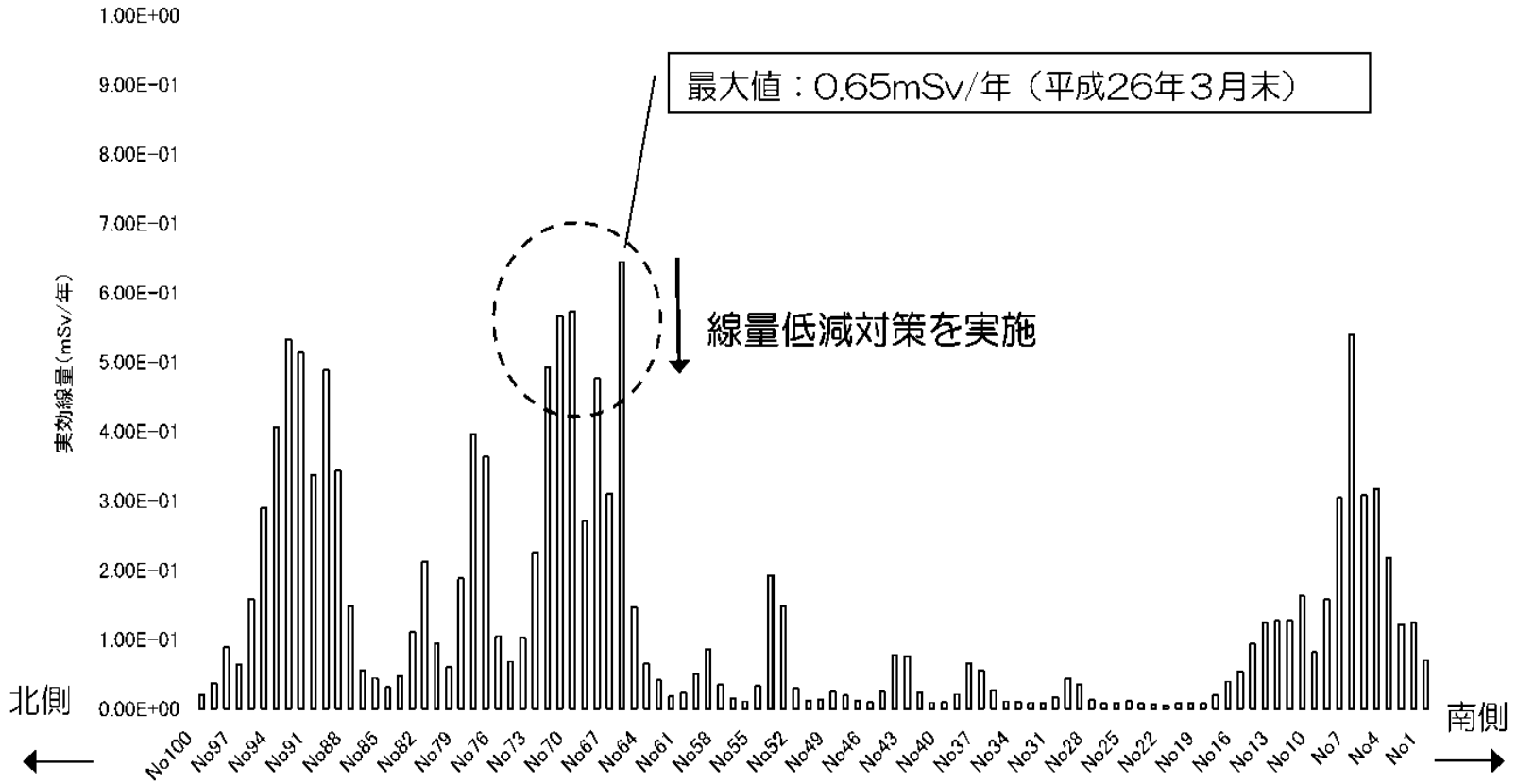
（2）目標達成に向けた対策：RO濃縮水貯槽以外に起因する実効線量
②固体廃棄物及び設備（H26年3月末の評価値とそれ以降の対策）

H26年３月末の評価値



線量低減対策～敷地西側
○多核種除去設備の線源条件の見直し・増設多核種除去設備の適切な遮へい設計(実施済「平成26年８月認可」)
○高性能多核種除去設備の適切な遮へい設計（実施済「平成26年９月認可」）

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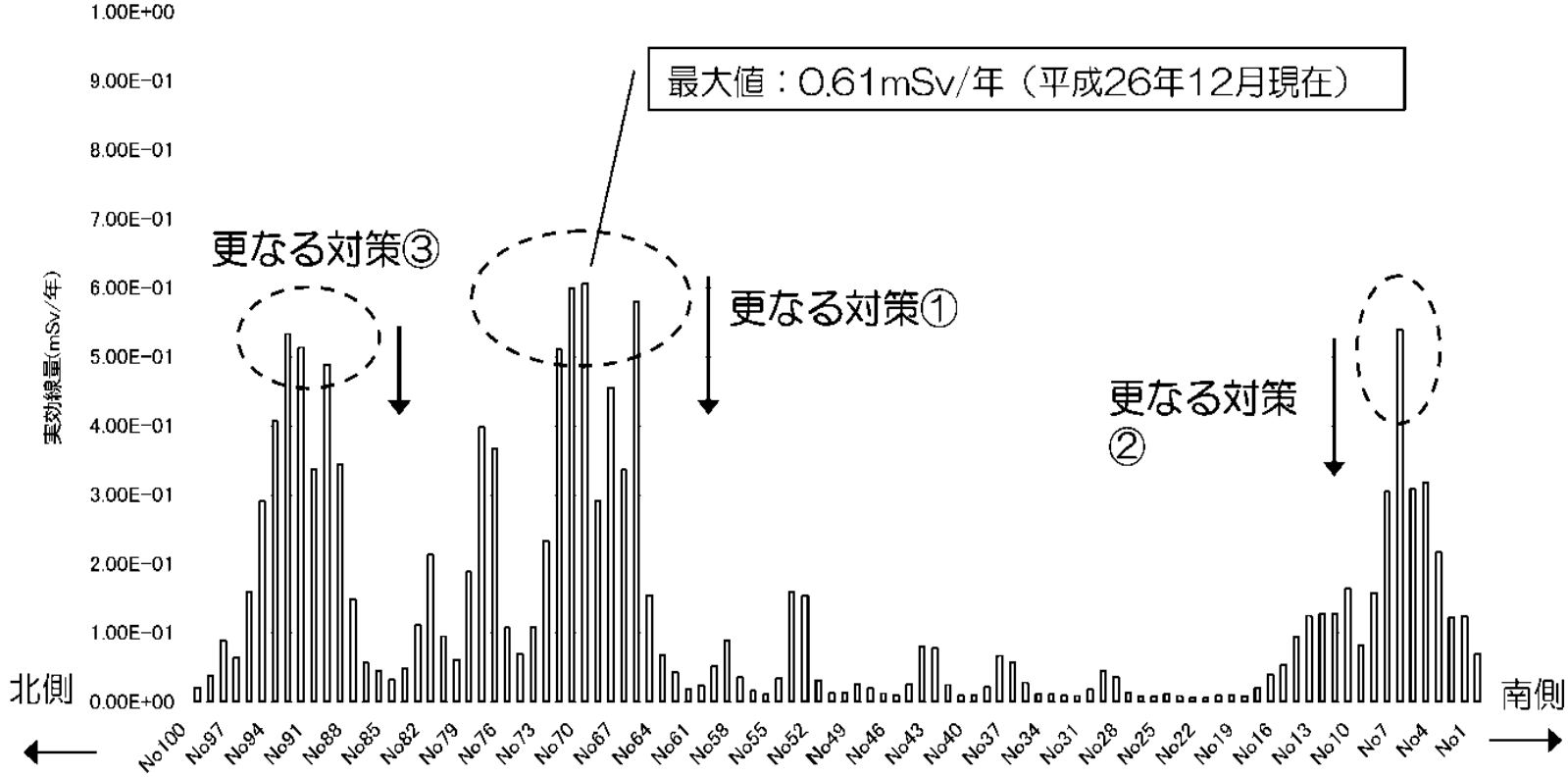
（2）目標達成に向けた対策：RO濃縮水貯槽以外に起因する実効線量
②固体廃棄物及び設備（H26年12月現在の評価値とそれ以降の更なる対策）

H26年12月現在の評価値



更なる対策①～敷地西側
○ドラム缶等仮保管施設(蛇腹ハウス),瓦礫類一時保管エリアQ・W、伐採木一時保管エリアVの実態に合わせた線源条件の見直し(実施予定)

更なる対策②～敷地南側
○使用済セシウム吸着塔一時保管施設の実態に合わせた線源条件の見直し（実施予定）

更なる対策③～敷地北側
○瓦礫類一時保管エリアの実態に合わせた線源条件の見直し(実施予定)

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（2）目標達成に向けた対策：RO濃縮水貯槽以外に起因する実効線量 ③液体廃棄物等

（1）液体廃棄物の種類と運用

管理対象とする水は、以下の５種類であり、排水、構内散水を実施中のもの、運用目標を新たに定めて管理を実施していく予定のもの、運用目標を変更する予定のものがある。

- 地下水バイパス水
- ５，６号機滞留水
- タンクの堰内雨水
- サブドレン、地下ドレン水
- 構内一般排水路

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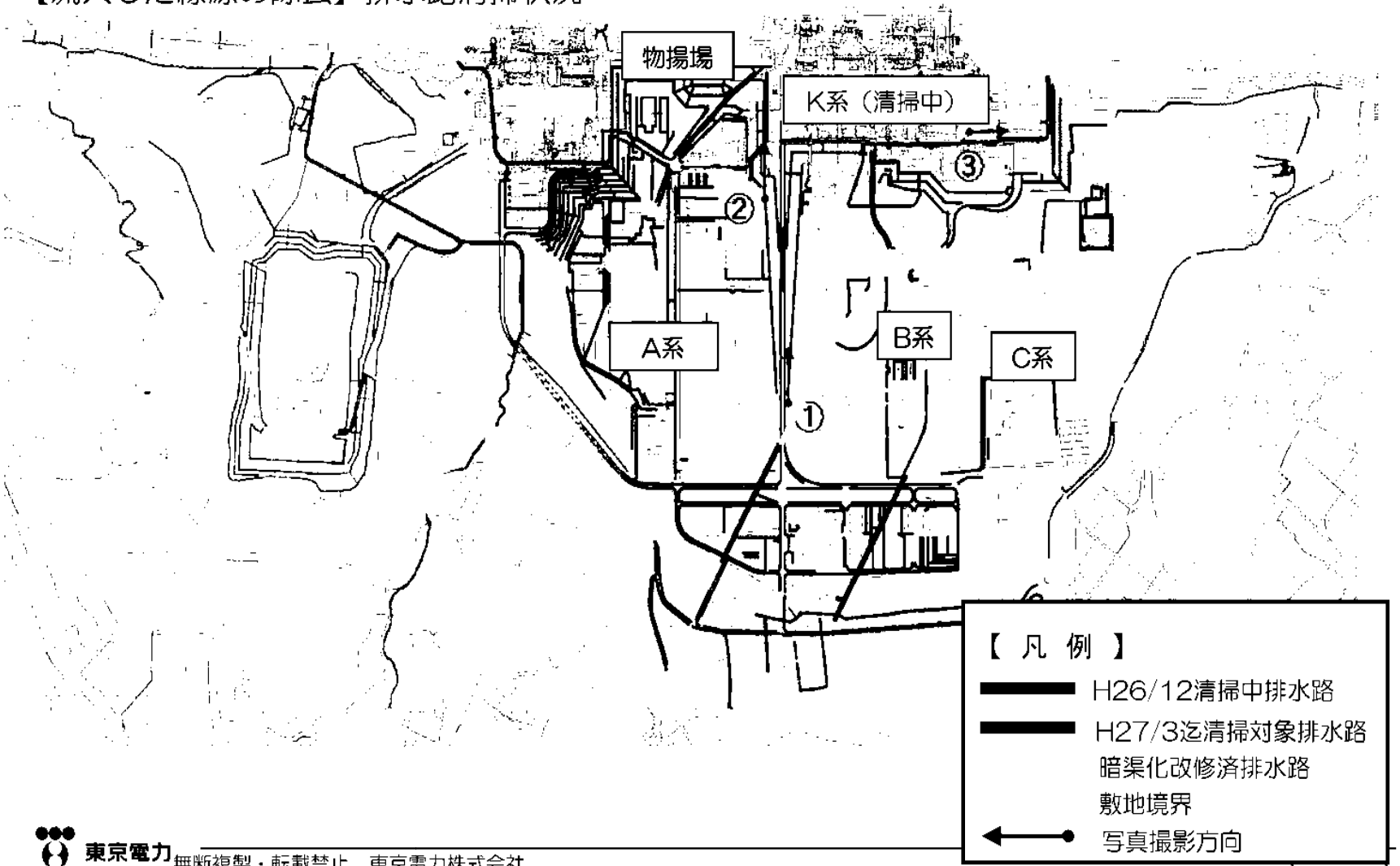
（2）目標に向けた対策：RO濃縮水貯槽以外に起因する実効線量
③液体廃棄物等

（2）これまでの取り組み

【流入した線源の除去】排水路清掃状況



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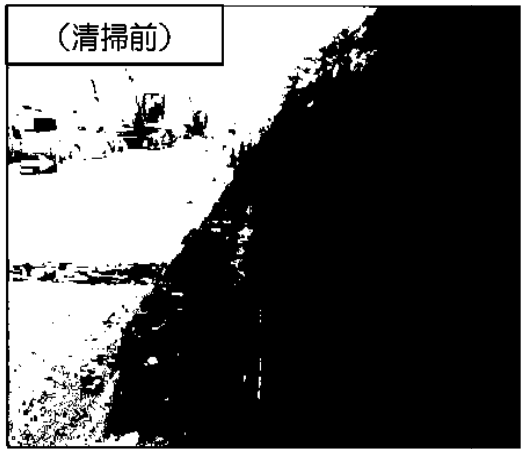
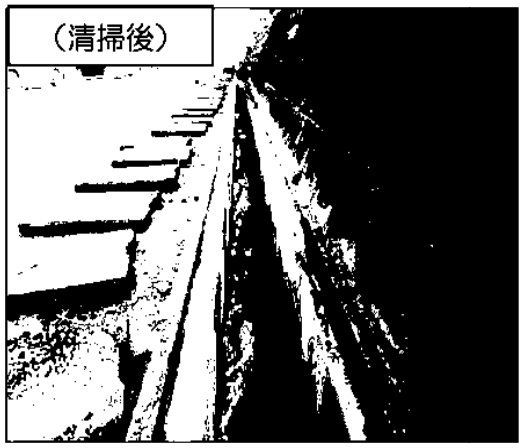
(2)目標達成に向けた対策：RO濃縮水貯槽以外に起因する実効線量
③液体廃棄物等

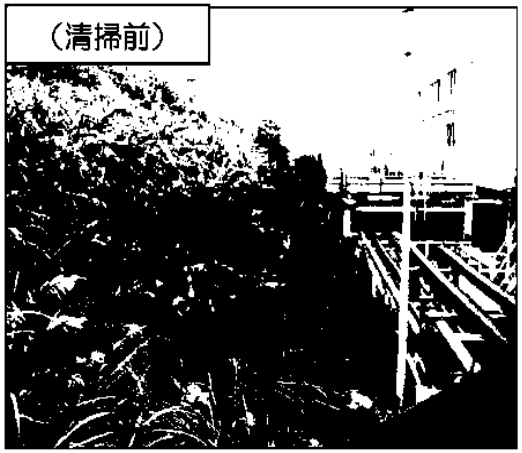
（2）これまでの取り組み
【流入した線源の除去】排水路清掃状況

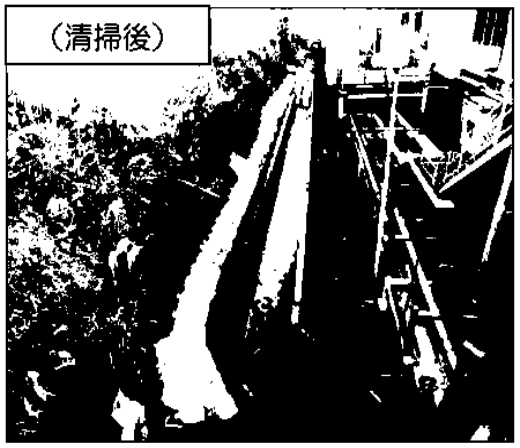
【写真①】大熊通り



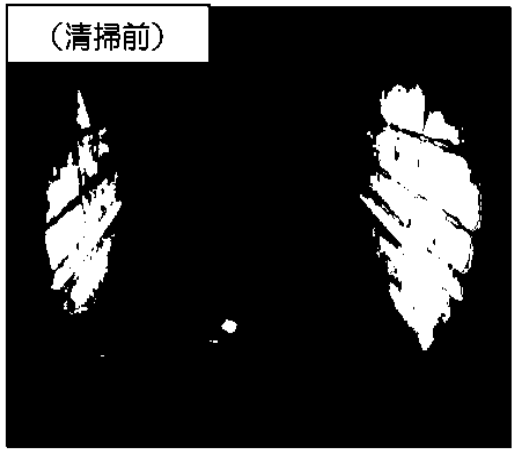


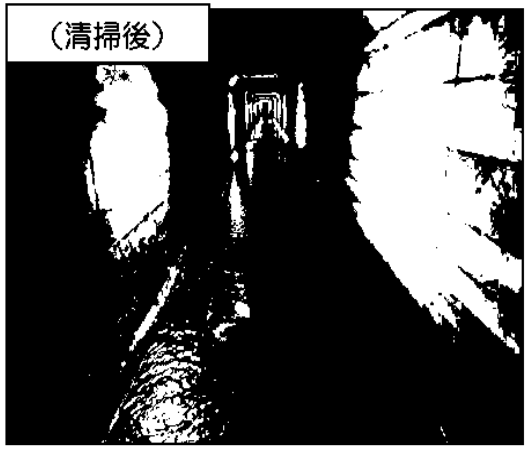
【写真②】旧事務本館北側





【写真③】K排水路内部





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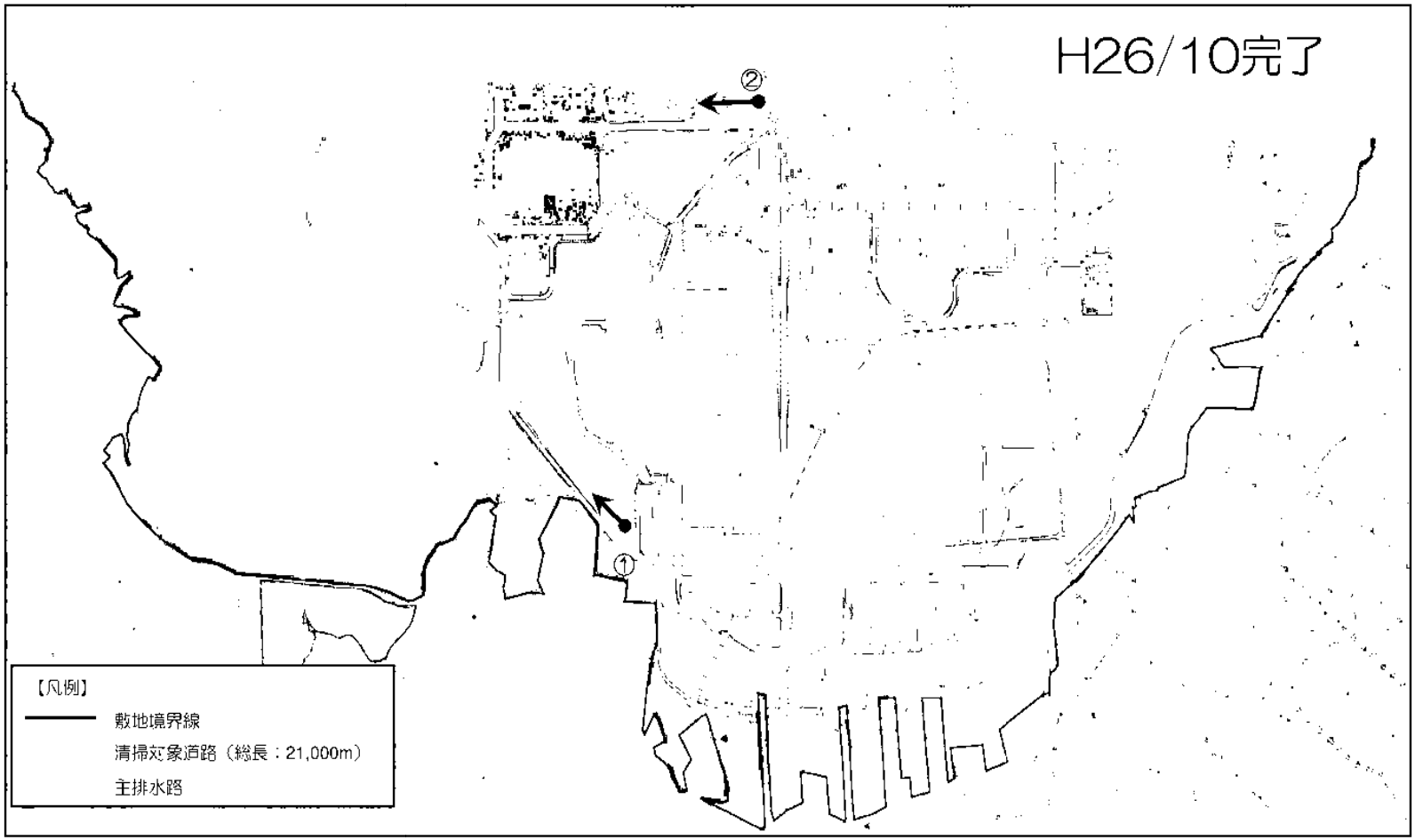
（2）目標達成に向けた対策：RO濃縮水貯槽以外に起因する実効線量
③液体廃棄物等

（2）これまでの取り組み
【流入源の除去】道路清掃状況



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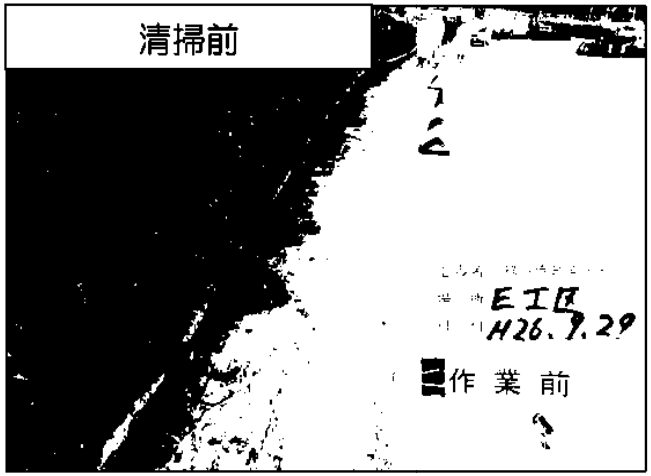
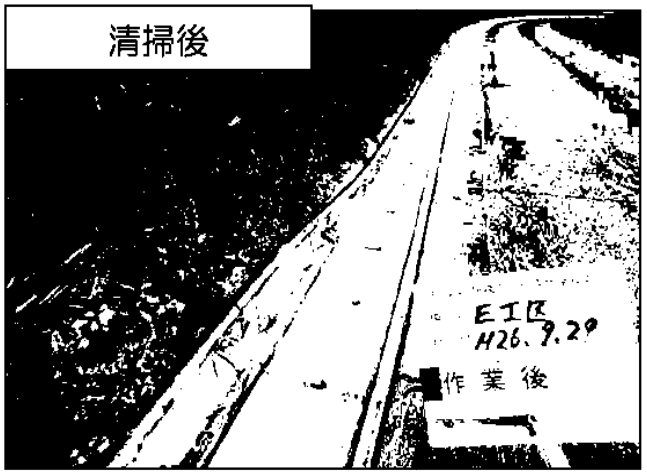
（2）目標達成に向けた対策：RO濃縮水貯槽以外に起因する実効線量
③液体廃棄物等

（2）これまでの取り組み

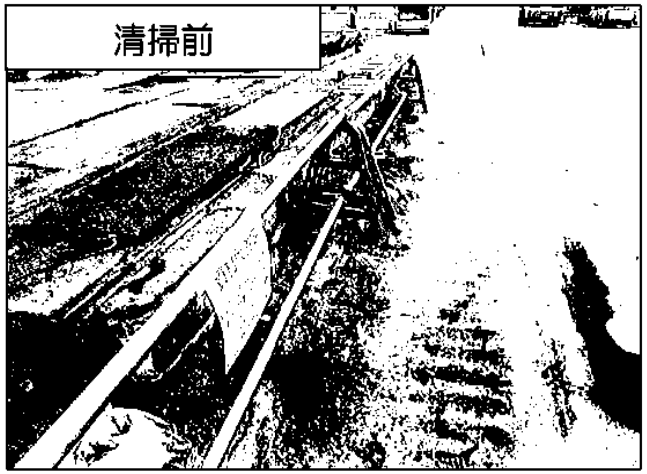
【流入源の除去】道路清掃状況

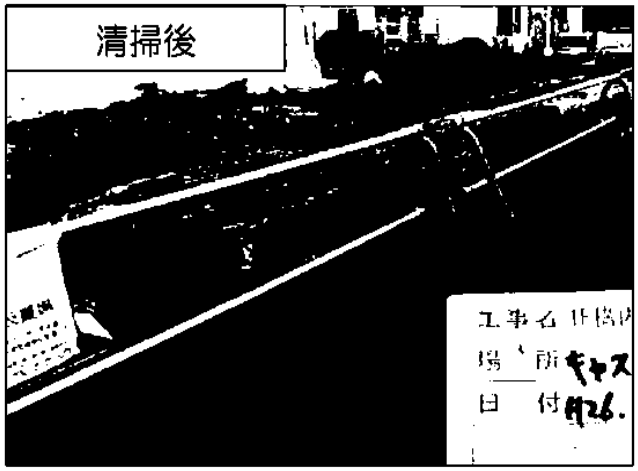
【写真①】





【写真②】





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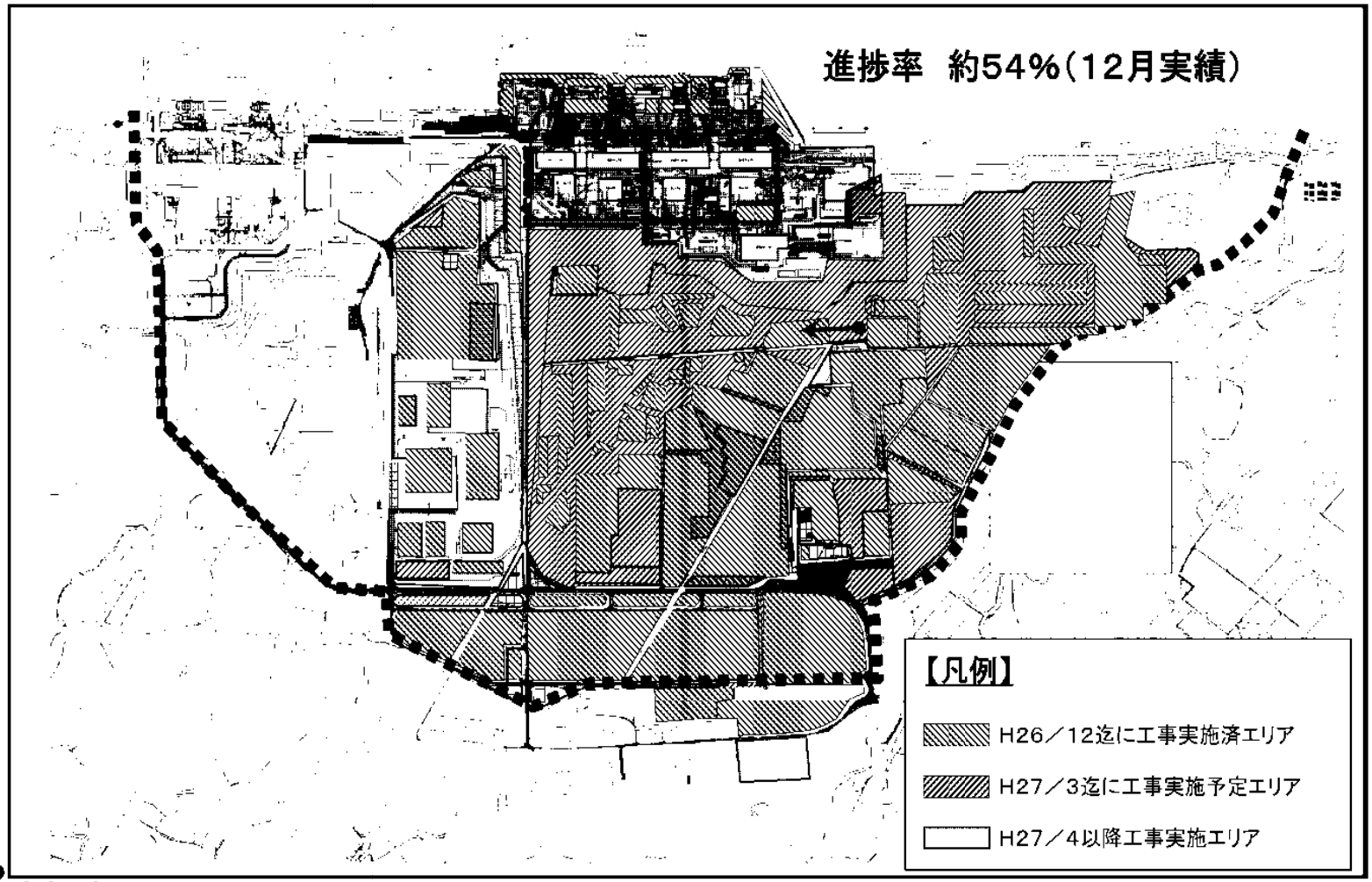
（2）目標達成に向けた対策：RO濃縮水貯槽以外に起因する実効線量 ③液体廃棄物等

（2）これまでの取り組み

【流入源の除去】瓦礫撤去・除染状況



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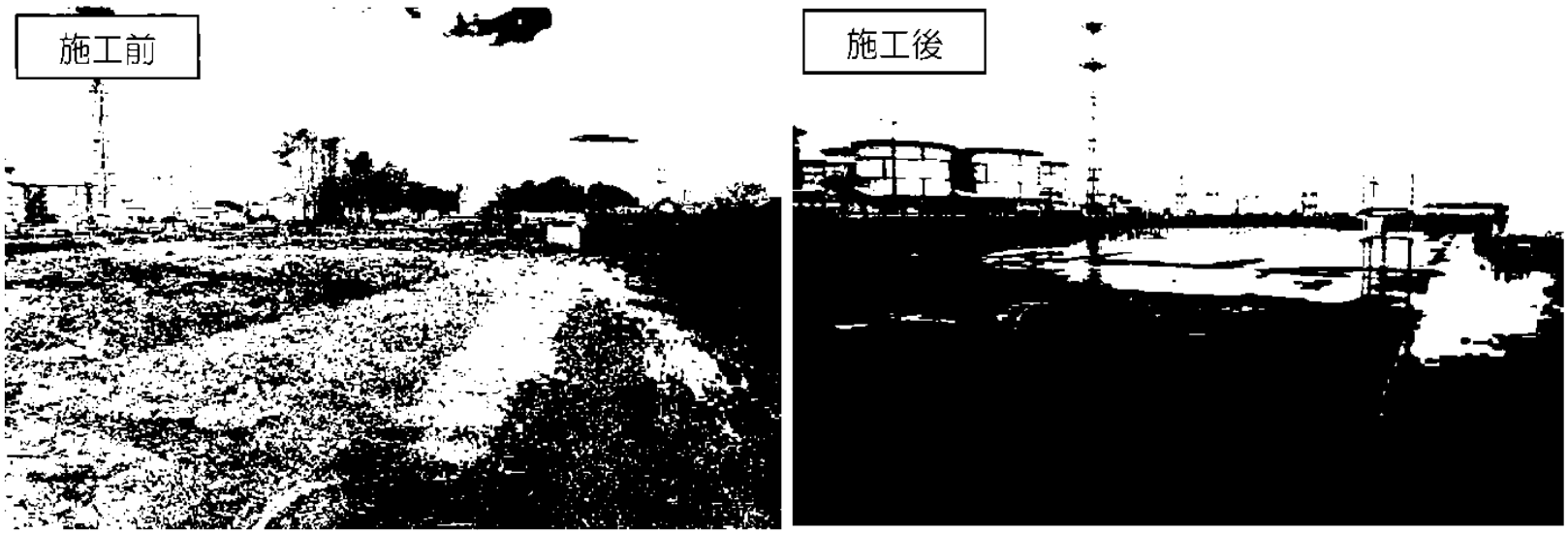
（2）目標達成に向けた対策：RO濃縮水貯槽以外に起因する実効線量 ③液体廃棄物等

（2）これまでの取り組み
【流入源の除去】瓦礫撤去・除染状況

【写真①】



※　本エリアについては、瓦礫撤去・除染工事の実施後に雨水浸透防止のためのフェーシングを施工済み

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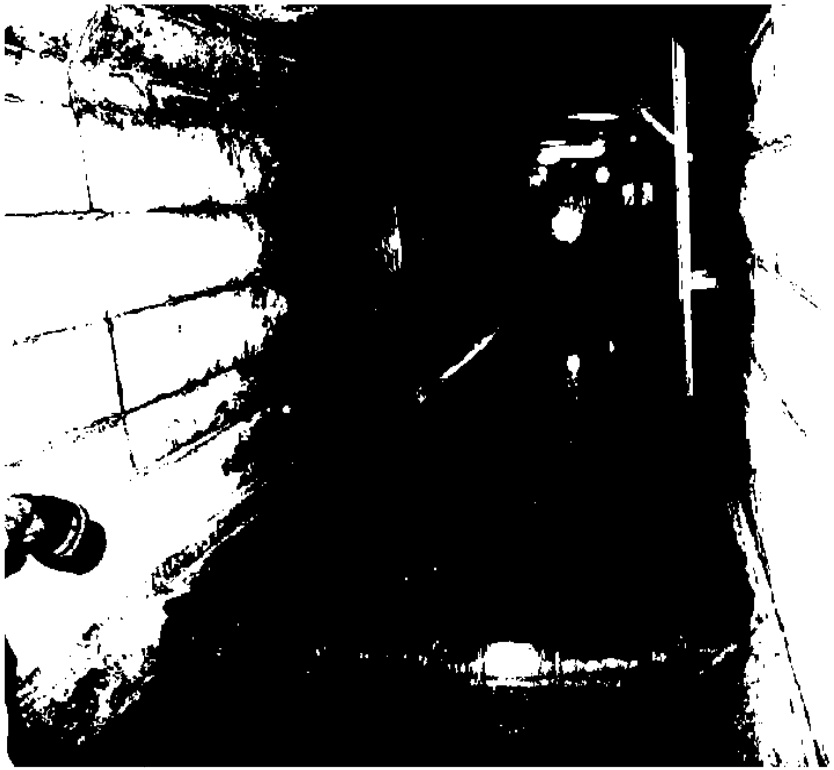
（2）目標達成に向けた対策：RO濃縮水貯槽以外に起因する実効線量 ③液体廃棄物等

（3）今後の取り組み

【流出した線源の除去】汚泥の流出防止（汚泥堰の設置）

＜汚泥堰の設置（K排水路の例）＞



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（2）目標達成に向けた対策：RO濃縮水貯槽以外に起因する実効線量 ③液体廃棄物等

（4）評価対象核種の選定

- 液体廃棄物等は、雨水、地下水、生活排水に由来する水である。また、現在は、液体廃棄物等には、事故時の影響によるフォールアウト等による汚染以外の放射性物質が混入するリスクは大幅に軽減されている。
- フォールアウト等の影響で、敷地内の土壌、地下水等にて検出されている核種は主にCs134、Cs137、Sr90、H3である。数多くの試料を、実効性をもって迅速に評価していくため、これらの核種にて液体廃棄物の管理を行う。
- なお、過去にフォールアウト等による汚染以外の放射性物質が混入した可能性を否定できず、かつそれらの清掃等が行えない系統を流れる水については、Cs134、Cs137、Sr90、H3 以外の核種も分析し、評価を行うことを検討する。

（5）排水路における３ヶ月平均濃度算出方法

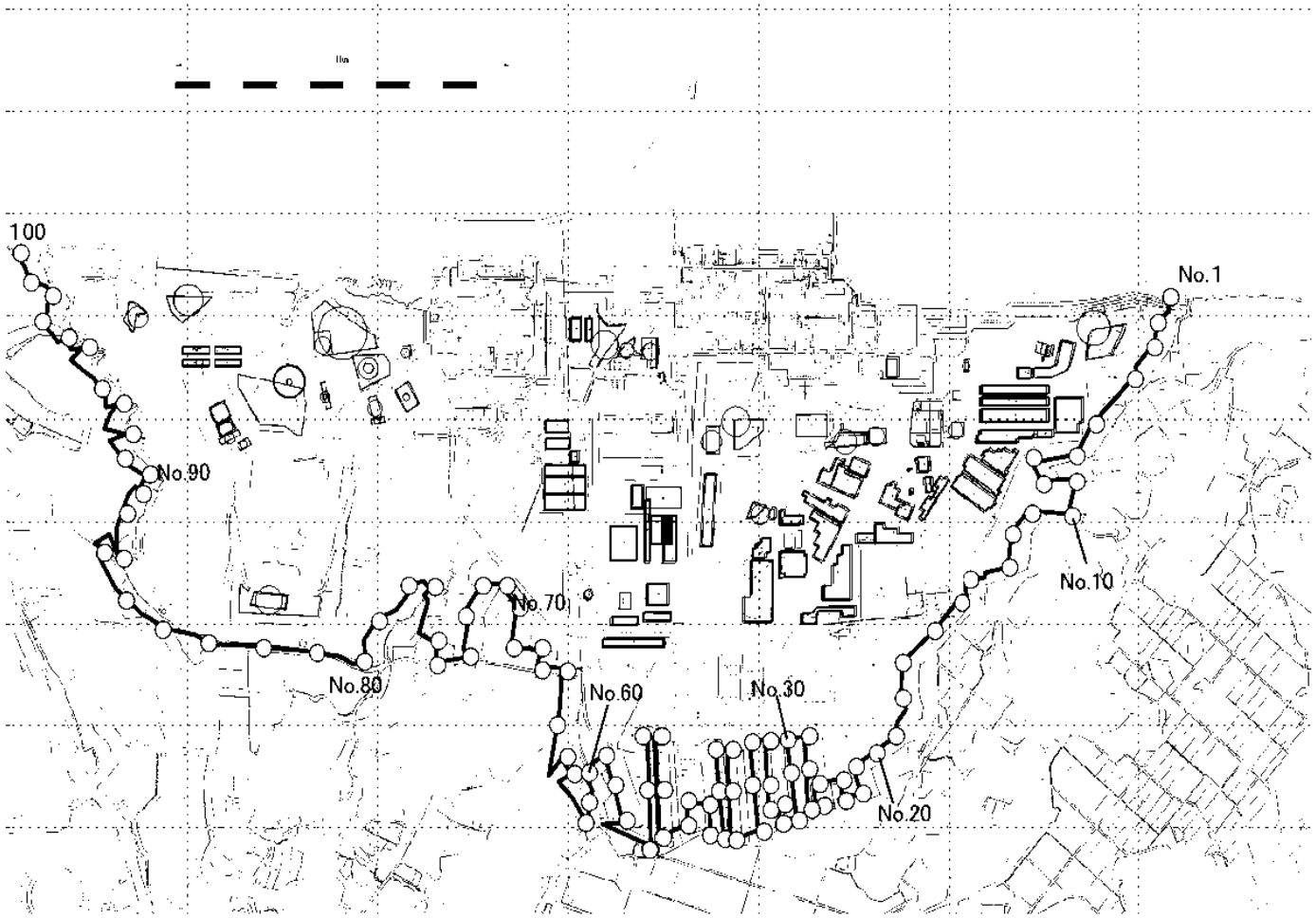
- サンプリング，評価方法については，実態に即した手法について引き続き検討していく。

無断複製・転載禁止　東京電力株式会社

4. 目標達成に向けた対策：スケジュール

東京電力 TEPCO 無断複製・転載禁止　東京電力株式会社

《参考》敷地境界における直接線・スカイシャイン線の評価地点



東京電力 無断複製・転載禁止　東京電力株式会社

特定原子力施設監視・評価検討会
（第30回）
参考1

福島第一における４号機使用済燃料プールからの燃料取り出しについて

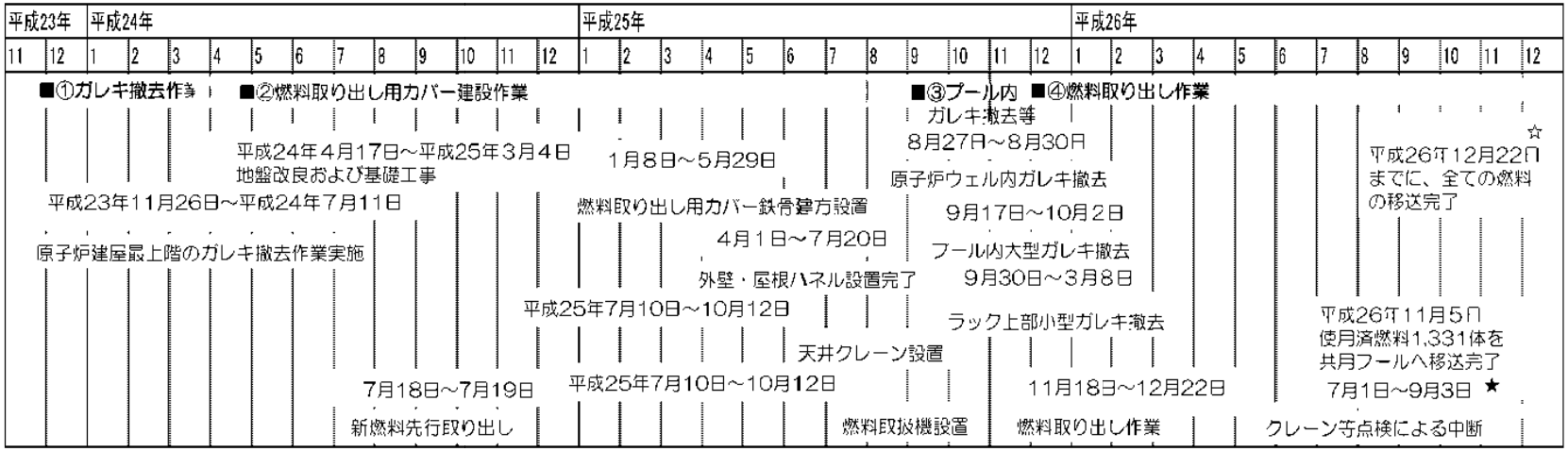
平成26年12月26日

東京電力株式会社

東京電力
TEPCO

無断複製・転載禁止　東京電力株式会社

1．４号機使用済燃料プールからの燃料取り出しの時系列と主な作業内容



使用済燃料プール内貯蔵体数（震災時）

号機	使用済燃料プール（体数）			
	保管容量	使用済燃料	新燃料	合計
1号機	900	292	100	392
2号機	1240	587	28	615
3号機	1220	514	52	566
4号機	1590	1331	204	1535
1～4号機計	4950	2724	384	3108
5号機	1590	1374	168	1542
6号機	1770	1456	248	1704
共用ﾌﾟｰﾙ	6840	6375	-	6375

4号機　燃料取り出し実績

平成24年7月18日～平成24年7月19日
　新燃料2体　→　共用プール

平成25年11月18日～平成26年11月5 日
　新燃料22体　→　共用プール
　使用済燃料1331体　→　共用プール

平成26年11月15日～平成26年12月22日
　新燃料180体　→　6号機

共用プール　燃料搬出実績

平成25年6月27日～平成26年3月6日
　使用済燃料1004体　→　キャスク仮保管設備

【参考１－１】オペレーティングフロア上部のガレキ等の撤去

①ガレキ撤去前
（撮影日：平成23年９月22日）

②撤去作業中の様子
（撮影日：平成24年５月28日）

③撤去作業終了後
（撮影日：平成24年７月５日）

■オペフロ上部のガレキ撤去作業 ： 平成23年11月26日～平成24年７月11日

●燃料を取り出すために、水素爆発で破損したオペレーティングフロア上のガレキを撤去
●震災時、定検中であったため、オペレーティングフロア上に残置された圧力容器上蓋等を撤去

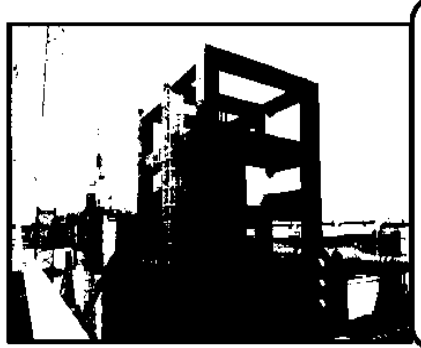
⑤圧力容器上蓋の撤去
（撮影日：平成24年９月13日）

④格納容器上蓋の撤去
（撮影日：平成24年８月10日）

【参考１－２】燃料取り出し用カバー・燃料取出設備の設置

①鉄骨建方着工前
（撮影日：平成24年12月18日）

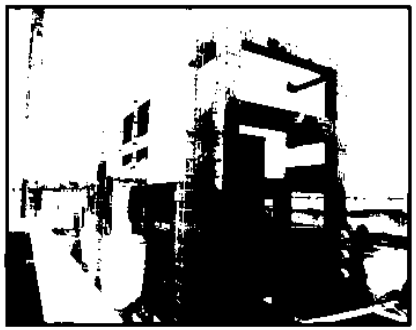
②第一節　鉄骨建方完了
（撮影日：平成25年1月14日）



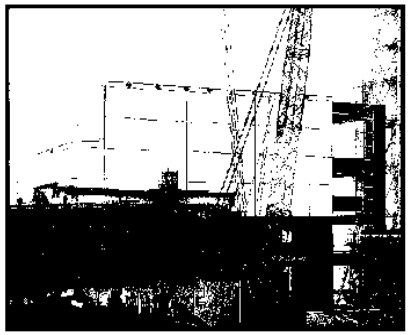
③原子炉建屋上部を除く鉄骨建方完了
（撮影日：平成25年4月10日）

■地盤改良・基礎工事
平成24年4月17日～平成25年3月4日
■鉄骨建方設置
平成25年1月8日～平成25年5月29日
■外壁・屋根パネル設置
平成25年4月1日～平成25年7月20日
■天井クレーン設置
平成25年6月7日～平成25年9月25日
■燃料取扱機設置
平成25年7月10日～平成25年10月12日

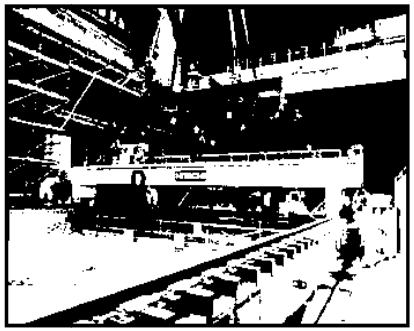
●燃料取り出し作業環境を整えるために燃料取り出し用カバーを設置
●カバー内部には、既存の燃料取出設備と同等の安全機能（落下防止策等）、構造強度・耐震性を有する設備を設置



④鉄骨建方完了
（撮影日：平成25年5月29日）



⑦外壁・屋根パネル設置完了
（撮影日：平成25年7月20日）



⑥燃料取扱機　部材据付け
（撮影日：平成25年7月10日）

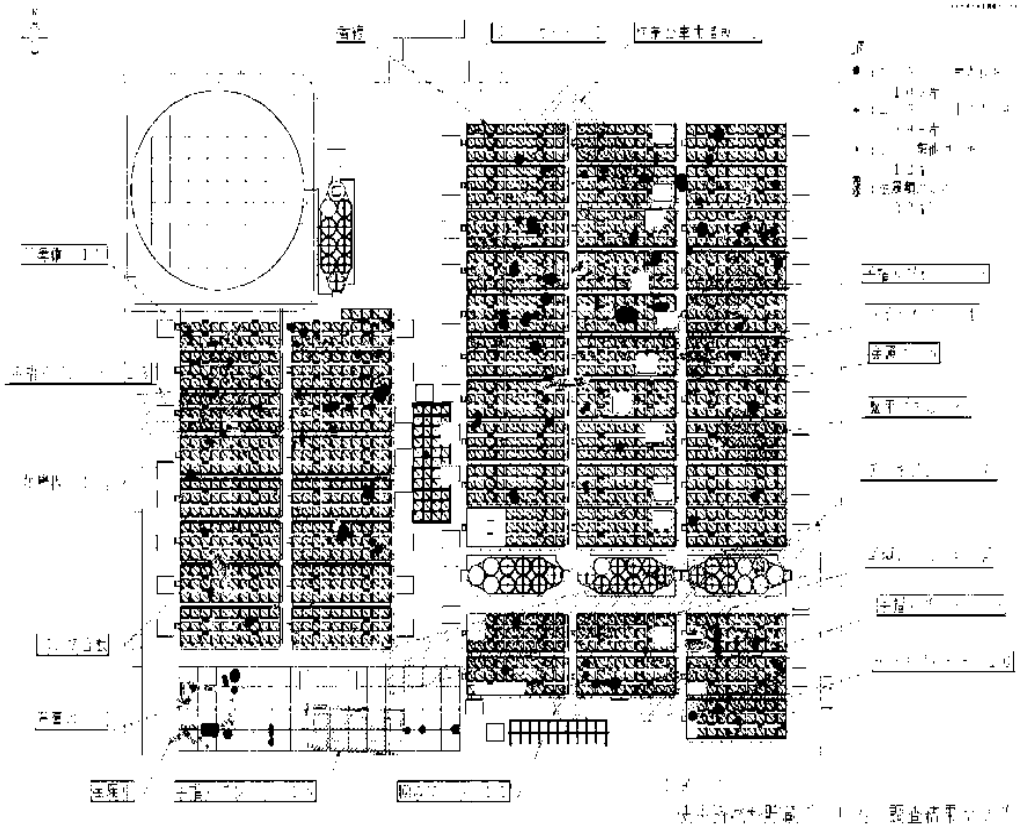
⑤クレーン部材吊り上げ
（撮影日：平成25年6月7日）

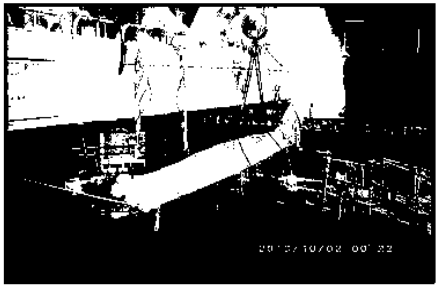
■外壁パネル等を含む大きさ
約69m（南北）×約31m（東西）
×約53m（地上高）
■鉄骨に使用した鋼材の量
約4,000t
※東京タワーで使用された鋼材と同程度

【参考１－３】使用済燃料プール内のガレキ撤去

●事前の水中調査に基づき、様々な大きさ・形状の治具を用いて、一つひとつ、ガレキを撤去することで、燃料取り出し時のリスクを軽減

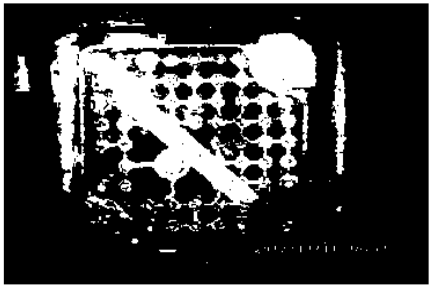
■使用済燃料プール内大型がれき撤去　：　平成25年９月17日～平成25年10月２日
■使用済燃料プール内小型がれき撤去　：　平成25年９月30日～平成26年３月８日





①大型ガレキの撤去
（撮影日：平成25年10月２日）

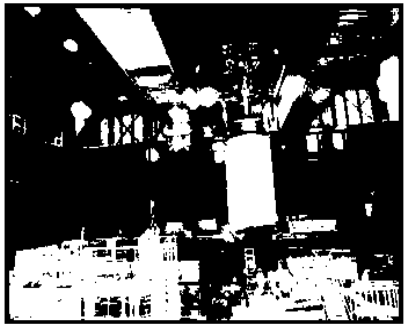
②燃料ラック上部ガレキ吸引作業
（撮影日：平成25年10月11日）



③吸引作業後
（撮影日：平成25年10月11日）

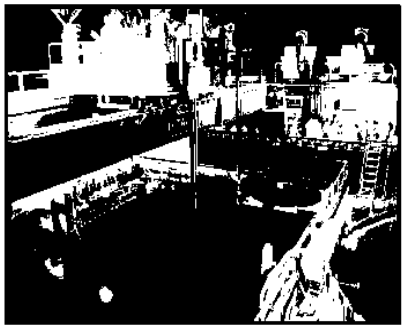
【参考１－４】燃料取り出し作業

■燃料取り出し開始
平成25年11月18日
■使用済燃料1,331体の
取り出し完了
平成26年11月５日
■全ての燃料1,535体の
取り出し完了
平成26年12月22日



①キャスクを使用済燃料プールへ移動
（撮影日：平成25年11月18日）

②燃料を掴みラックから引き上げ
（撮影日：平成25年11月20日）

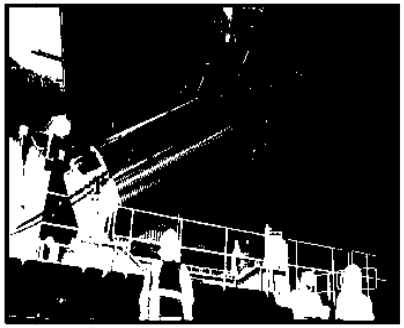


③燃料取り出し作業
（撮影日：平成25年11月18日）

④キャスクへの装填
（撮影日：平成25年11月26日）

●燃料とラックの隙間に小さなガレキが入り込んでいる可能性があるため、水中カメラなどで確認しながら慎重に作業を実施

⑤キャスクの吊り降ろし
（撮影日：平成25年11月21日）

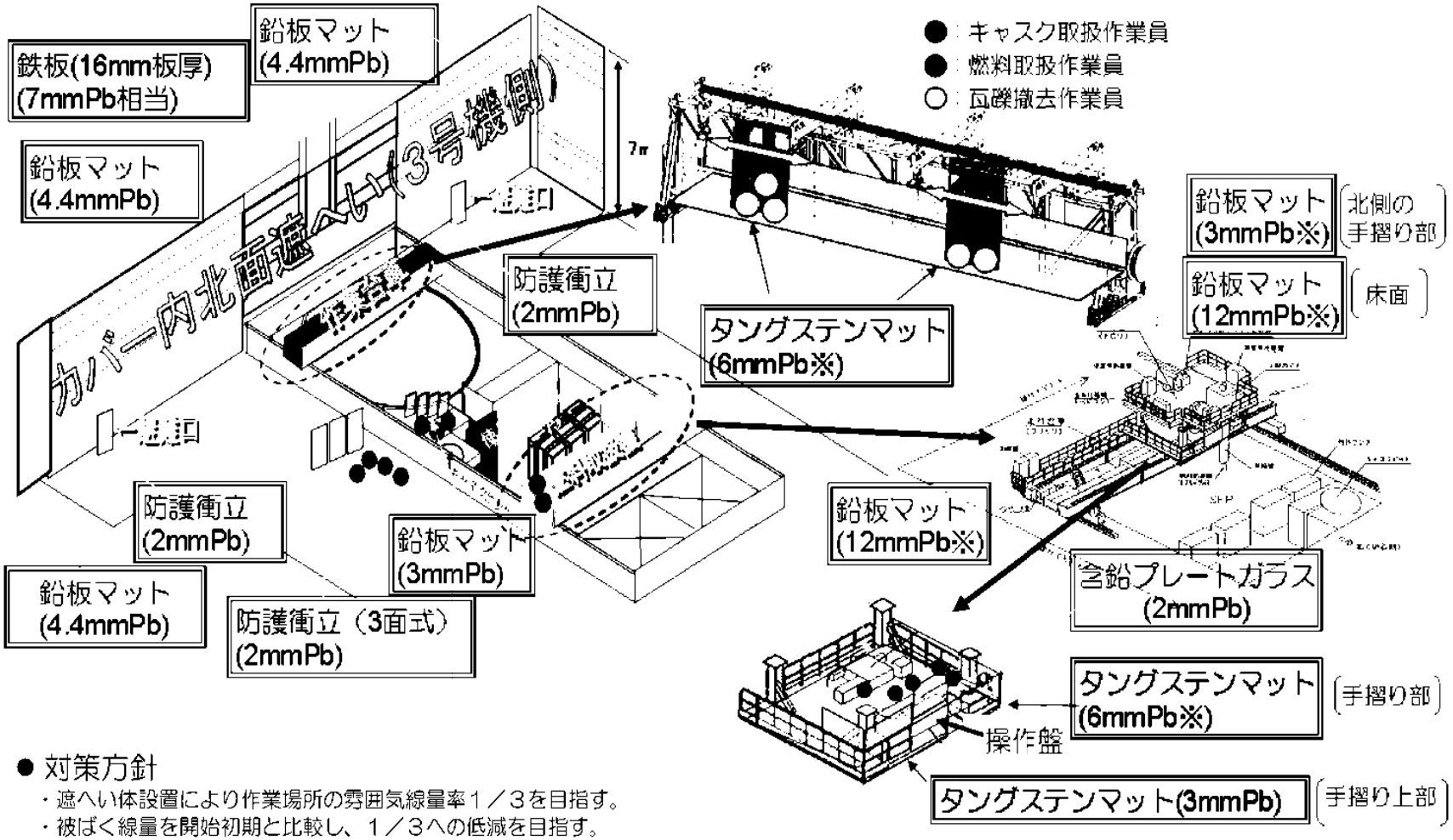


⑥トレーラーへの積み込み
（撮影日：平成25年11月21日）

⑦共用プールへの燃料格納
（撮影日：平成25年11月22日）

※写真の一部については、核物質防護などに関わる機微情報を含むことから修正しております。

2．４号機オペレーティングフロアの遮へい対策



● 対策方針
- 遮へい体設置により作業場所の雰囲気線量率１／３を目指す。
- 被ばく線量を開始初期と比較し、１／３への低減を目指す。

● 実施事項
- オペレーティングフロア上の線量率測定を行い、線源の推定と効果的な遮へい設置箇所の検討を行い、遮へい体を順次設置。
- 燃料取り出し作業を分析し、被ばく線量の多い作業を改善。

（※設置状況により，上図の通り遮へい体を設置できない箇所について，重量等を考慮し，可能な限り厚い遮へい体を設置）

2．４号機オペレーティングフロアの遮へい対策（平均被ばく線量）

■被ばく線量低減対策の実施結果

➢ 2014年4月18日　特定原子力施設監視・評価検討会（第２０回）

	燃料取り出し開始初期	現在
燃料取扱機運転作業※1,2	約0.093 [mSv/人･班]	約0.034 [mSv/人･班]（約63%減）
キャスク取扱作業※1,3	約0.26 [mSv/人・基]	約0.08 [mSv/人･基]（約69%減）

⇩

➢ ６１基目まで（NFT-22BでのSF輸送終了時）の値

	燃料取り出し開始初期	現在
燃料取扱機運転作業※1,2	約0.093 [mSv/人･班]	約0.026 [mSv/人･班]（約72%減）
キャスク取扱作業※1,3	約0.26 [mSv/人・基]	約0.07 [mSv/人･基]（約73%減）

※1：構内移動に伴う被ばく線量の推定値（燃料取扱機運転作業：約0.005mSv，キャスク取扱作業：約0.017～約0.023mSv）を除いた値

※2：燃料取扱機運転作業を1班当たり2時間実施した際の平均被ばく線量

※3：キャスク取扱作業を1基分実施した際の平均被ばく線量

【参考２－１】燃料取扱機運転作業の被ばく線量（基数毎）

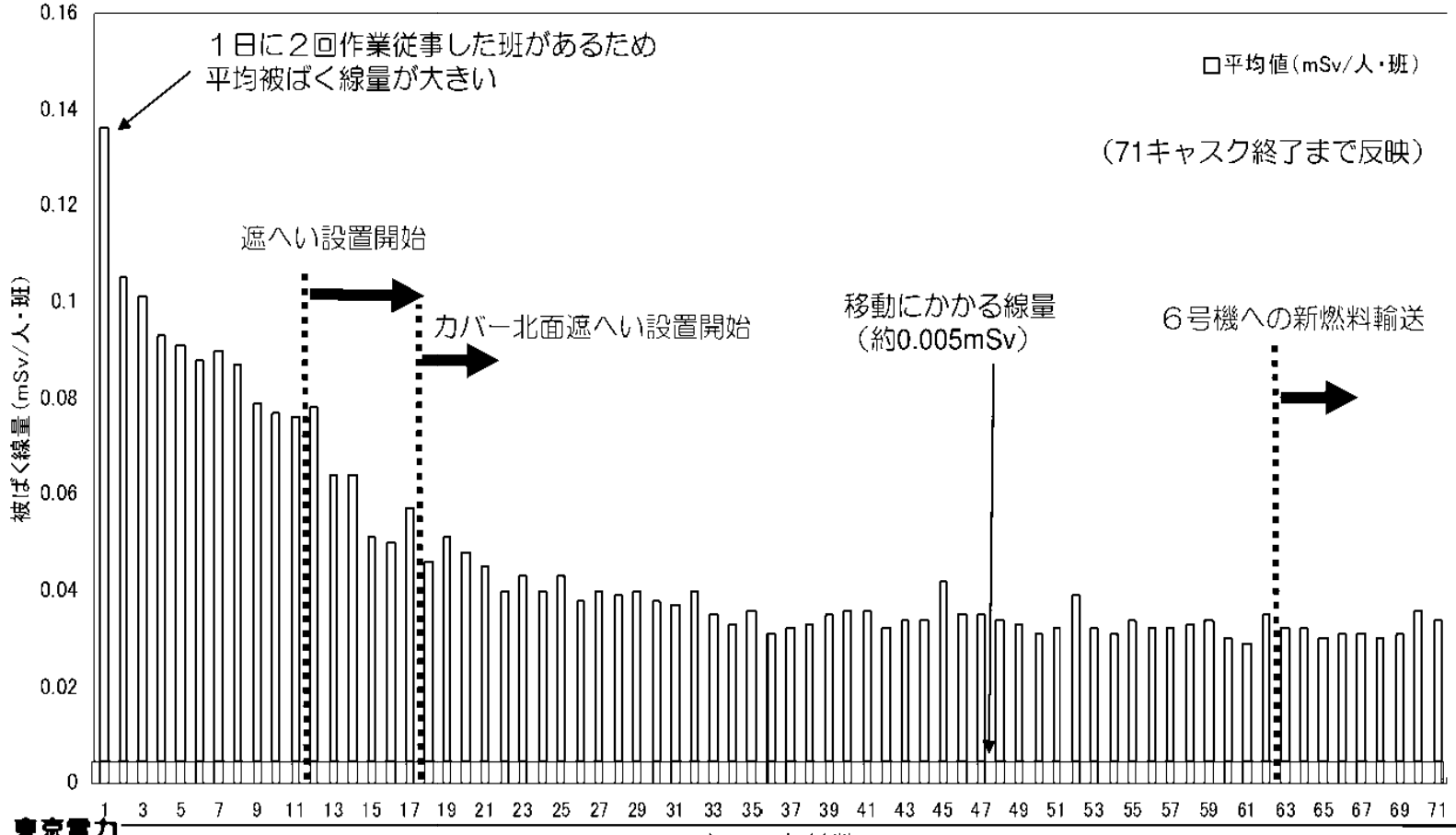
■燃料取扱機の１班・１作業員あたりの平均被ばく線量（約２時間作業の作業員一人あたりの平均被ばく線量）

・燃料取出し開始初期の平均被ばく線量（2～5キャスク目の平均）　　：約0.098mSv/人・班

・使用済燃料取出し後半の平均被ばく線量（59～61キャスク目の平均）：約0.031mSv/人・班

（参考：６号機への新燃料輸送での平均被ばく線量（68～70キャスク目の平均）：約0.032mSv/人・班）

■移動にかかる被ばく線量の推定値約0.005mSvを考慮すると，燃料取扱機運転作業の４号機における被ばく線量は，約0.093mSv/人・班→約0.026 mSv/人・班に低減。（約72%低減）



【参考２－２】キャスク取扱作業の被ばく線量（基数毎）

■キャスク１基・１作業員あたりの平均被ばく線量

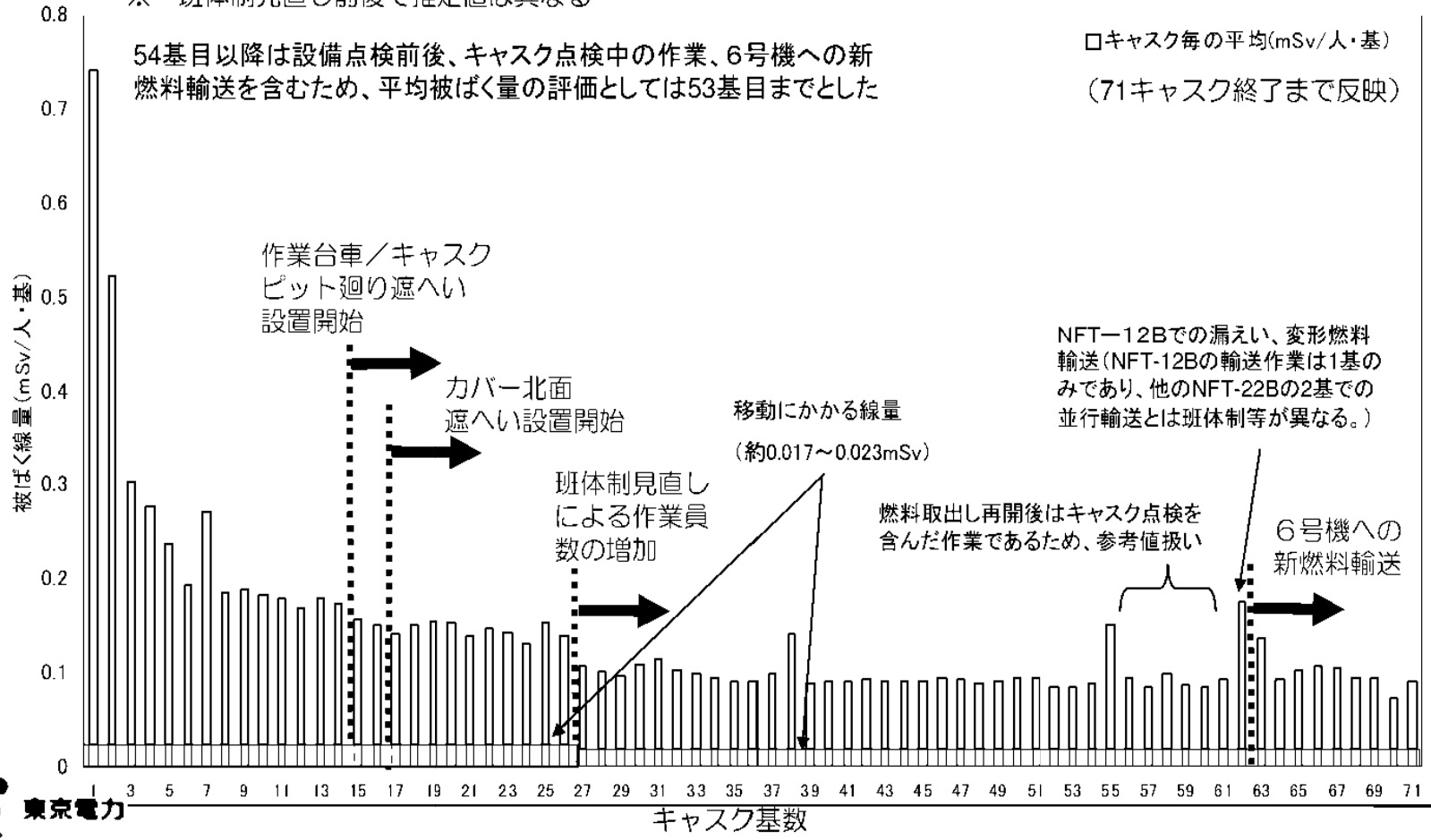
・燃料取り出し開始初期の平均被ばく線量（3～5キャスク目の平均）　　：約0.28mSv/人・基

・使用済燃料取り出し後半の平均被ばく線量（51～53キャスク目の平均）：約0.09mSv/人・基

（参考：６号機への新燃料輸送での平均被ばく線量（67～69キャスク目の平均）：約0.10mSv/人・基）

■移動にかかる被ばく線量の推定値約0.017mSv※～約0.023mSv※を考慮すると，キャスク取扱作業における４号機及び共用プールでの被ばく線量は，約0.26mSv/人・基→約0.07mSv/人・基に低減。（約73%低減）

※　班体制見直し前後で推定値は異なる



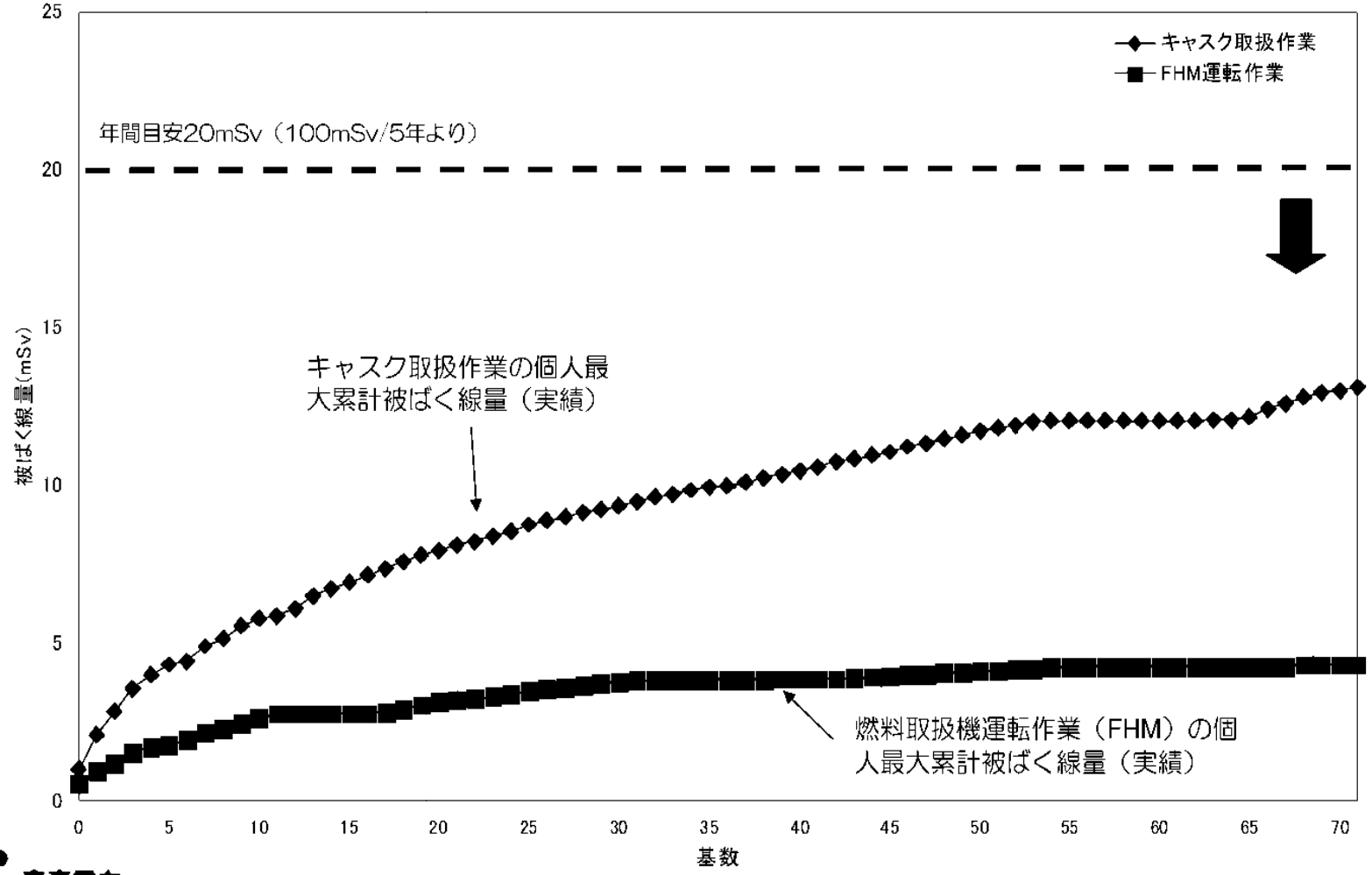
【参考２－３】７１基目終了までの個人最大累積線量の実績

○燃料取出し作業の個人最大累積線量は法令基準（100mSv/5年，50mSv/年）を大きく下回り、作業完了。

・燃料取扱機運転作業実績：4.32mSv　（準備作業日分最大0.57mSv含む）

・キャスク取扱作業実績※　：13.13mSv　（準備作業日分最大1.01mSv含む）

※NFT-12Bでの漏えい、変形燃料輸送除く。NFT-12B作業の個人最大累積線量は0.58mSv。

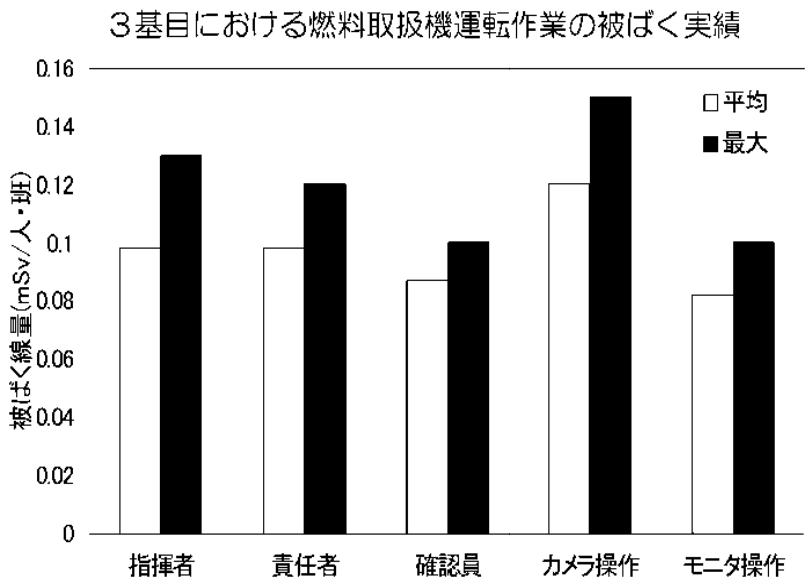


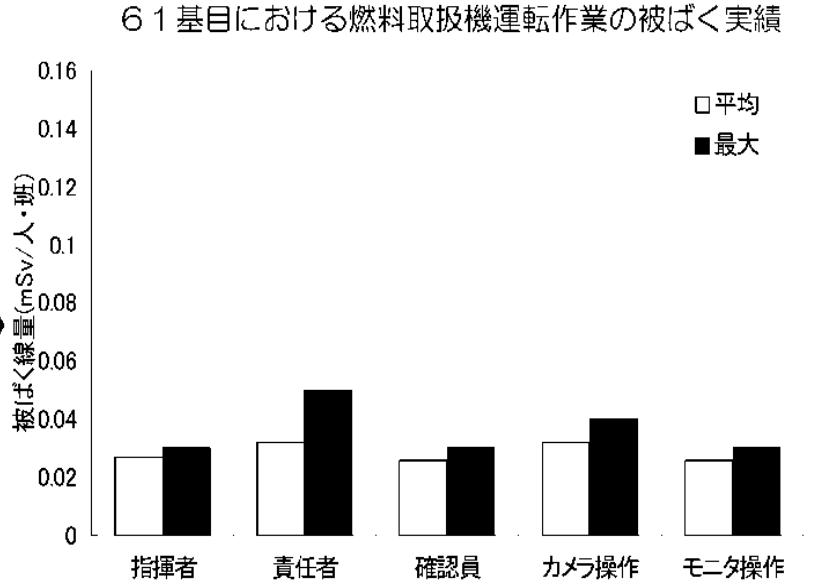
【参考２－４】燃料取扱機運転作業の燃料取り出し開始初期との線量の比較

・燃料取り出し開始初期である３基目と使用済燃料取り出し後半の６１基目を比較。

➢被ばく線量の最大値，平均値とも大きく低減。

➢各作業役割（指揮者，責任者，確認員，カメラ操作，モニタ操作）全て，大きく低減。





【参考２－５】キャスク取扱作業の燃料取り出し開始初期との線量の比較

・燃料取り出し開始初期である４基目※と至近の５３基目※の被ばく線量の分布を比較。0.1mSv程度を超える比較的高い被ばくがほとんど無い状態に改善されているとともに，全体的に分布がより低線量側にシフトしている。

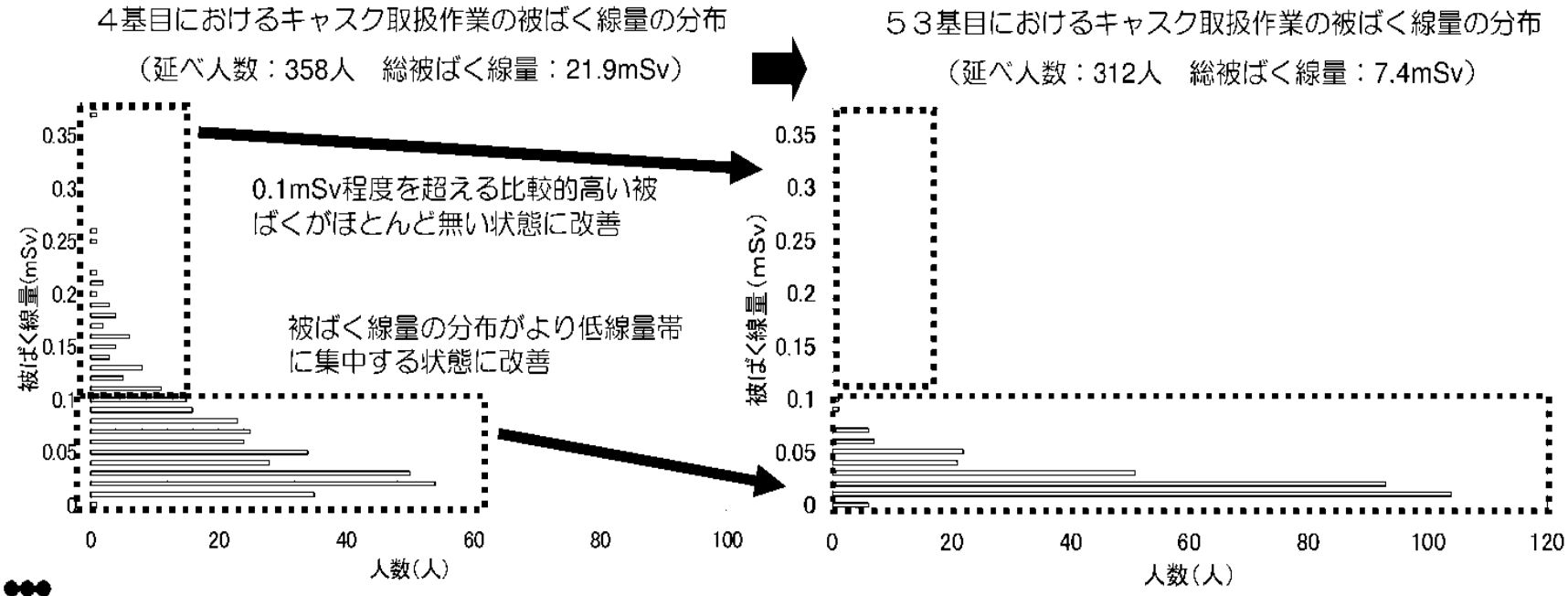
※前後のキャスクを含むため，実質２キャスク分の作業期間

・燃料取り出し開始初期において高線量であった作業は以下と推定。

・４号機キャスクピット周りの作業：遮へい対策，タングステンジャケットの装着等により改善

・共用プールでのキャスク内部水排水時の瓦礫回収作業：フィルターの遮へい，カメラ監視等により改善

・建屋外の作業：作業習熟の効果等により被ばく低減と推定



3．まとめ

➢震災時、４号機使用済燃料プールに保管されていた1,535体の燃料を取り出すため、様々な工事・準備、必要な許認可取得等を行い、 2013年11月、燃料取り出しの準備が完了。

・原子炉建屋上部のガレキ撤去（2011/9/21～2012/12）
・カバー／クレーン等の設置（2012/4/17～2013/11/12）
・使用済燃料プール内のガレキ撤去（2013/8/27～2014/3）
・許認可取得（2012/12/7～2013/11/12）
・作業手順書の整備、作業員の教育・訓練
・共用プールの空き容量確保（共用プールの復旧、キャスク仮保管設備の設置、乾式キャスクによる使用済燃料移送）、構内道路整備　等

➢2013年11月18日、燃料取り出し作業を開始し、安全かつ着実に作業を進め、目標通り2014年12月22日、全ての燃料取り出しが完了。

・使用済燃料の移送に先立ち、新燃料22体の取り出しを行い、作業手順の最終確認を実施
・震災前から存在する２体の漏えい燃料、１体の変形燃料についても、その状態に応じた方法により移送を実施
・遮へい体設置、作業改善等により作業エリアの雰囲気線量、作業者被ばくの低減対策に取り組み、開始当初の１／３という目標を達成
・当初懸念されたガレキと燃料（チャンネルボックス）とのかじりによる固着、また燃料・キャスク落下は発生せず、無事故・無災害で作業を完了

特定原子力施設監視・評価検討会
（第30回）
参考2

Ｊ６タンクエリアにおける
多核種除去設備処理水の漏えいについて

平成26年12月26日
東京電力株式会社

東京電力
TEPCO

無断複製・転載禁止　東京電力株式会社

1．発生事象

■概要

- J6-A1タンクが竣工したことから、多核種除去設備から当該タンクへ移送を実施することにしていた。
- その際、系統構成を誤り（施工中の配管につながる弁を開けていた）、施工中の配管端部（開口していた）から、移送していた多核種除去設備の処理水が漏えいした。
- 本事象については、汚染水が管理区域内に漏えいした事象であることから、法令報告事象と判断した。（今後、事故報告書を作成し、規制庁へ報告する）

■時系列（12月17日）

- 午後2時56分　多核種除去設備からJ6-A1へ移送を開始（初移送）
- 午後3時頃　F765弁の先の施工中の配管から多核種除去設備の処理水が漏えいしていることを当社社員が発見（耐圧漏えい検査終了の後、初めて当該配管を使用してのタンクへの移送を行う際に、社員を配置して確認していた）
- 午後3時03分　F765弁を閉止した後、多核種除去設備からの移送を停止
- 午後4時40分～　周辺の土砂を回収
  （12月18日も引き続き実施し、合計約5.7m^3の土砂を回収）
- 午後６時53分
  ～7時35分　配管トレンチ内等の漏えい水※を回収（約9m^3）
  ※当初から配管トレンチ内に入っていた雨水を含む

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1．発生事象

■漏えい状況

- 漏えい量　：最大約6m^3
- 漏えい水　：多核種除去設備での処理水
- 漏えい範囲：漏えい箇所周辺（約2m×約25m）
  漏えい箇所南側配管トレンチ内（長さ約16m）
  ※漏えい水は上記エリアに留まっており、海洋への流出はない
- 漏えいエリアの雰囲気線量：2～8μSv/h
  ※バックグランドと同等な値
- 漏えい水の分析結果（平成26年12月17日　採取・分析）

	多核種処理設備 処理水	漏えい箇所周辺の 漏えい水	配管トレンチ内の 漏えい水※
トリチウム	8.8×10^5Bq/L	5.0×10^5Bq/L	3.3×10^2～ 3.8×10^5Bq/L
全β	1.1×10^2Bq/L	4.7×10^1Bq/L	2.2×10^0～ 6.6×10^1Bq/L

※ 5箇所ある配管トレンチの
最大値と最小値

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2．原因と対策

■原因

- 当社設備運用部署は、当社工事実施部署から提供された施工図面を用いて、J6エリアへの移送に向けた手順書の作成していたが、施工図面の配管の見方を誤り、J6エリアへの配管ラインを誤認してしまった。更に設備運用部署は、この配管ラインを誤認した図面を元に、間違えた手順書を作成してしまった。

- 設備運用部署は、間違えた手順書に従い、施工中の配管につながる弁（F765弁）を開としてしまった。

- 設備運用部署は、手順書に基づき現場にて弁の開閉操作・開閉状態の確認を実施したが、配管の行き先までの確認は実施していなかった。

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2．原因と対策

■対策

「 施工図面の配管の見方を誤り、間違えた手順書を作成したこと」の対策

- 工事実施部署は、配管の接続箇所が明示されている図面を作成して設備運用部署に提示することとし、設備運用部署は、この図面を用いて手順書を作成する。

「施工中の配管につながる弁を開としたこと」の対策

- 工事実施部署は、施工中の配管と運用中の配管を仕切る弁について、設備運用部署で間違えて操作できないよう、弁を閉とした上で施錠管理を行う。

「現場にて配管の行き先の確認を実施しなかったこと」の対策

- 設備運用部署は、今後初めて使用する配管を用いて移送する際には、現場にて当該配管を追い、配管の行き先の確認を行うこととする。（12月18日に手順書改定済み）

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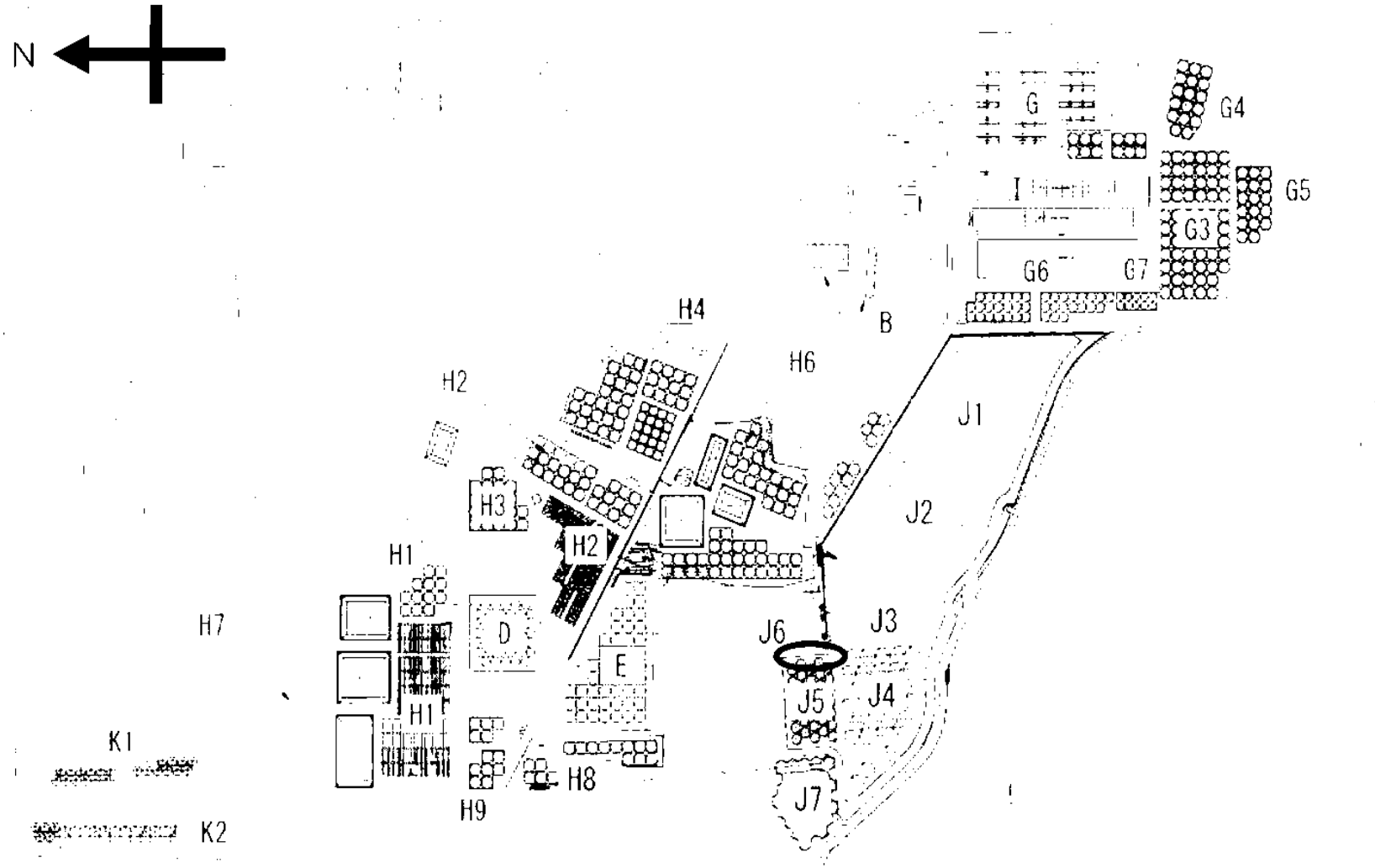
（参考１）発生位置



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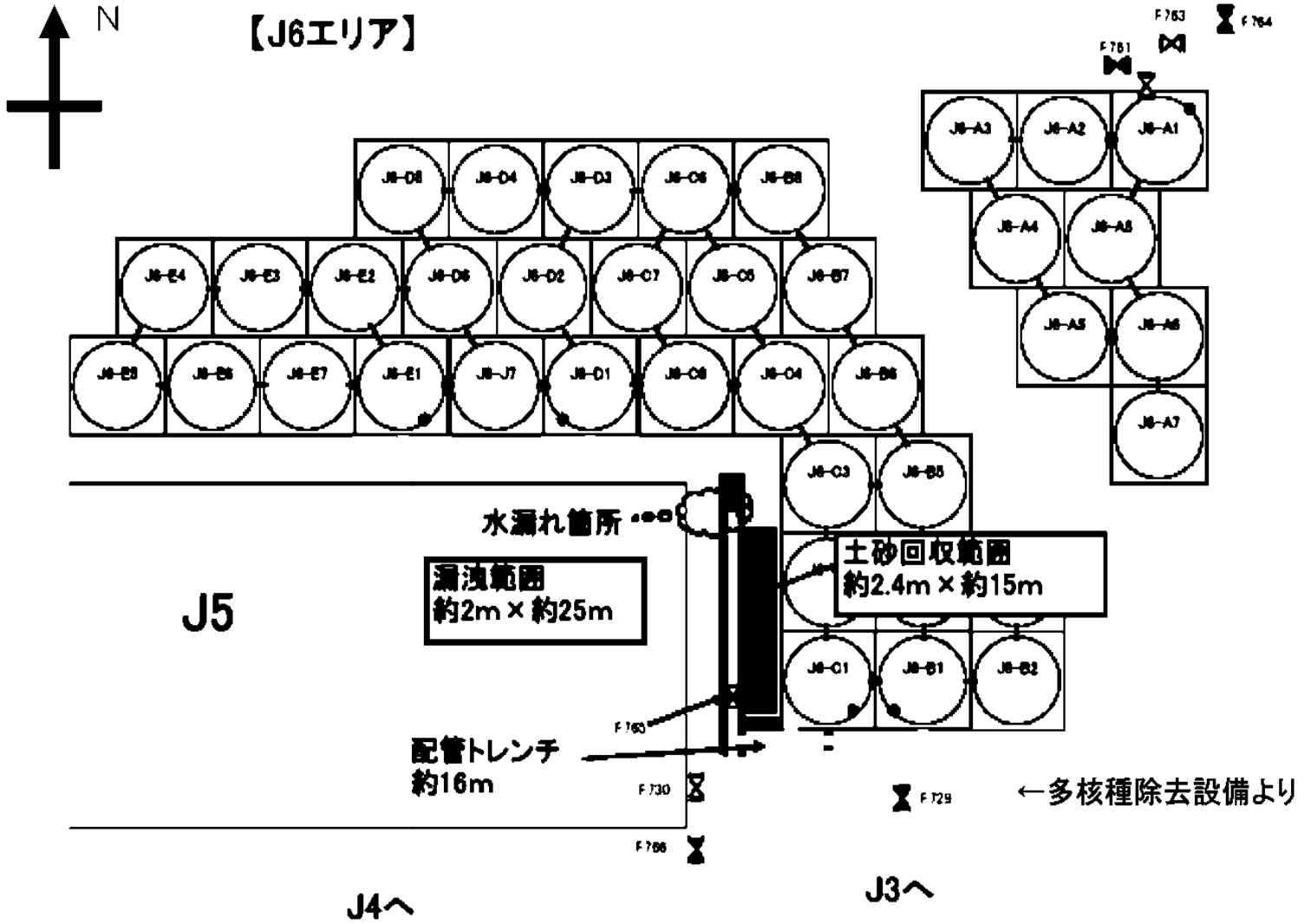
（参考２）発生位置



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（参考３）現場状況写真

漏えい水の流れ

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（参考４）漏えい量について

- 多核種除去設備からの移送量は50m^3/h

- 移送開始から移送停止まで7分であったことから、漏えい量は最大で6m^3と想定（実際には移送停止前に弁閉を実施し、漏えいを停止させている）

  50m^3/h×7分÷60分＝6m^3

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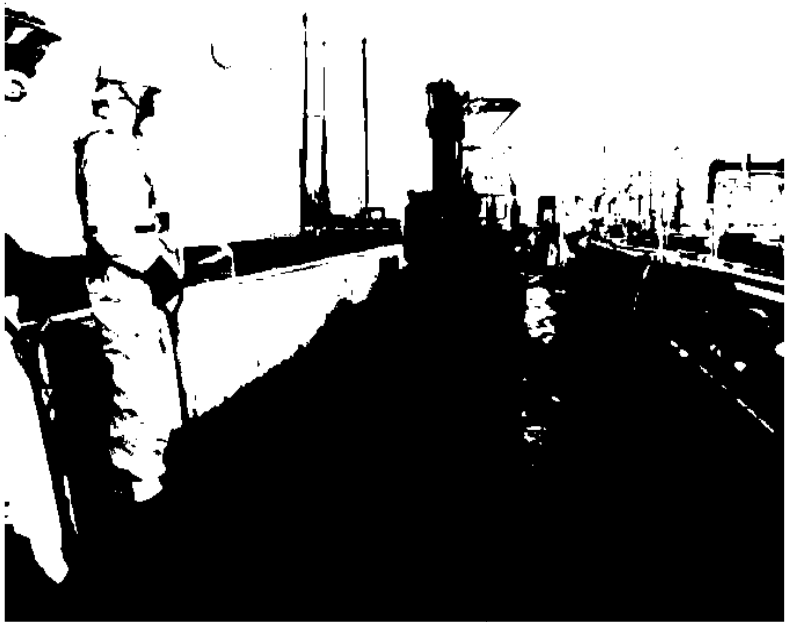
（参考５）周辺の土砂の除去状況

- 水たまりなど、漏えい水が流れた痕跡のある箇所については、12月17日,18日にかけて土砂の回収を実施　（回収範囲：約2.4m×約15m）



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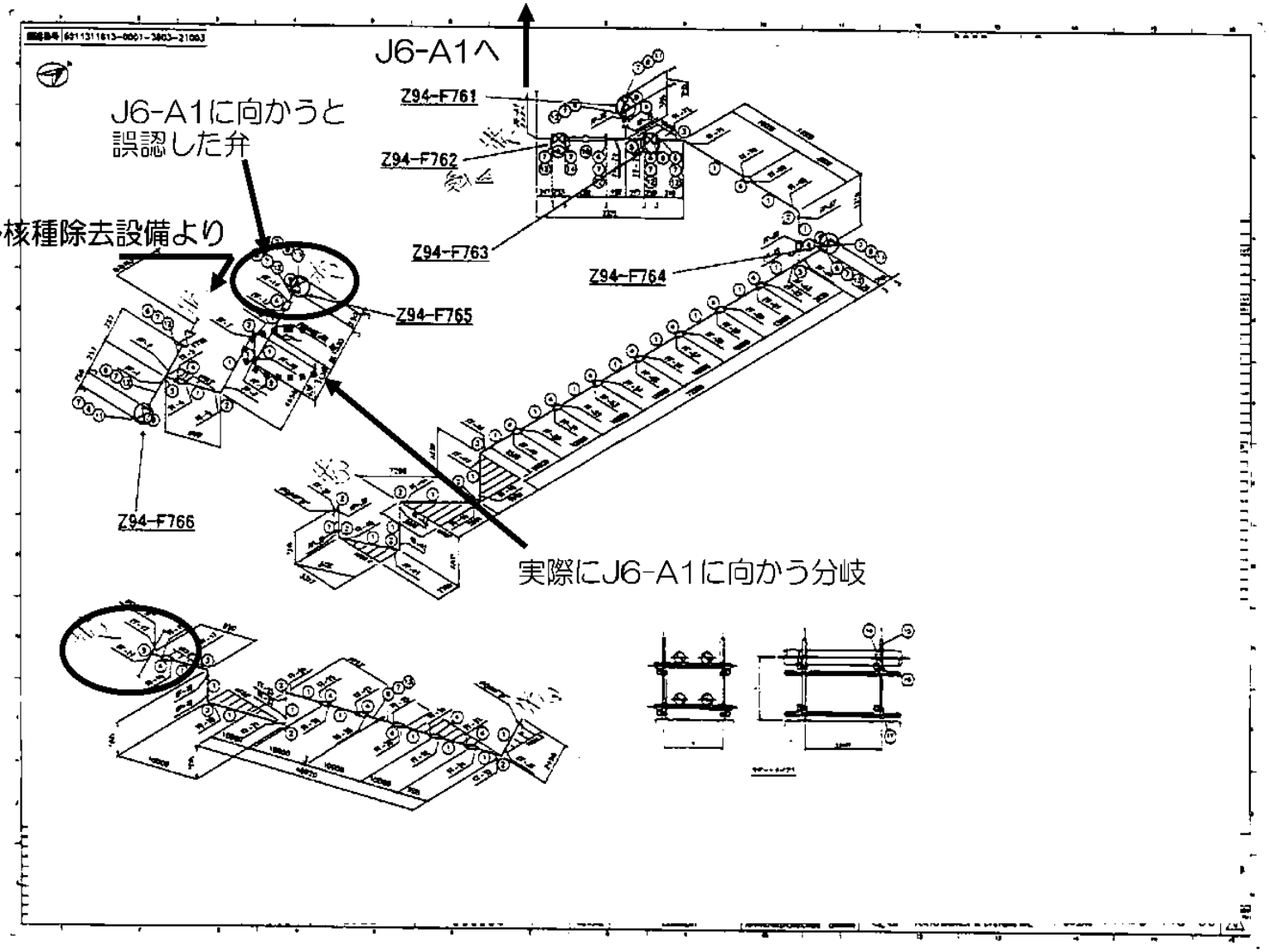
（参考６）手順書作成の際に使用した施工図面



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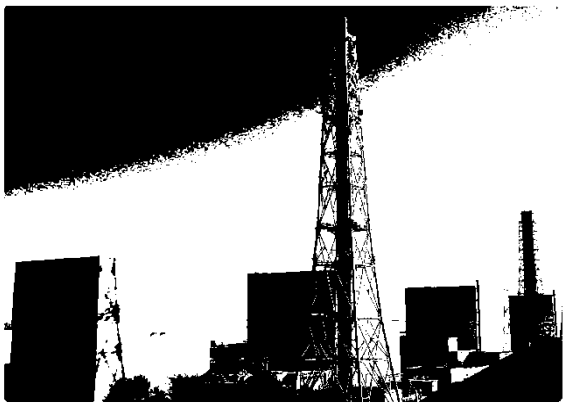
TOKYO ELECTRIC POWER COMPANY

The Development of and Lessons from the Fukushima Daiichi Nuclear Accident



Fukushima Daiichi Nuclear Power Station, prior to the accident
(from left to right: Units 1, 2, 3, and 4; photographed November 2009)

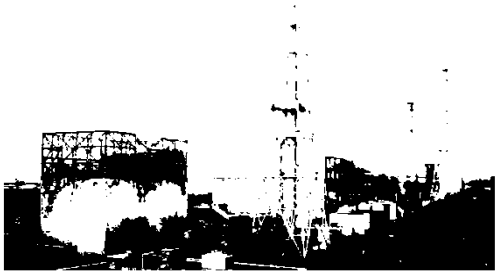
Published: March 2013, 1st edition - Tokyo Electric Power Company, Inc

Greetings and Introduction to This Booklet

We wish, first of all, to express our deepest apologies for the trouble and worry that we have imposed on so many people due to the accident at Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station. We are moving forward at TEPCO with our investigations and analysis of the development of the Fukushima nuclear accident so that such an accident does not occur again.

In this booklet, we report on the results of those investigations and explain the lessons we have taken away from this accident.

The accounts in this booklet about the Fukushima Daiichi and Daini nuclear power stations have been drawn up based on the material contained in TEPCO's Fukushima nuclear accident investigation report.



Fukushima Daiichi Nuclear Power Station, after the accident
(from left to right, Units 1, 2, 3, and 4; photographed March 16, 2011)

How This Booklet Is Organized

Understanding the Fukushima Daiichi Nuclear Accident

Presenting information to help toward understanding the Fukushima Daiichi nuclear accident

Introduction

1-1. Shutting down, Cooling down, Confining inside P03
1-2. Cooling P05
1-3. What happens when cooling is performed? P07

Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

Explains how the accident developed at each unit of Fukushima Daiichi Nuclear Power Station and contrasts it with Fukushima Daini Nuclear Power Station, which did not experience a severe accident

Review

2-1. Outline of the development of the accident at Fukushima Daiichi Units 1, 2, and 3 P09
2-2. Scale of the Earthquake and Tsunami that struck Fukushima Daiichi Nuclear Power Station and Flooding Situation P11
2-3. Why did Unit 1 experience a severe accident? P13
2-4. The development of the accident at Unit 1 P15
2-5. Why did Unit 2 experience a severe accident? P17
2-6. The development of the accident at Unit 2 P19
2-7. Why did Unit 3 experience a severe accident? P21
2-8. The development of the accident at Unit 3 P23
2-9. Why was there a hydrogen explosion at Unit 4? P25
2-10. The development of the accident at Unit 4 P27
2-11. The magnification of damage due to simultaneous accidents at Units 1 to 4 P29
2-12. Why did Fukushima Daini Nuclear Power Station escape a severe accident? P31
2-13. Comparison of units with core damage and units in cold shutdown P33

Lessons Learned from Examination

Explaining the policy on future safety measures for nuclear power stations based on the lessons learned through the accident examination process.

Plans

3-1. Lessons obtained from the accident and future responses P35

Initiatives aimed at maintaining safety at Fukushima Daiichi Nuclear Power Station / TEPCO's efforts toward maintaining safety in the future / Regarding the release of information P37

1-1

Understanding the Fukushima Daiichi Nuclear Accident

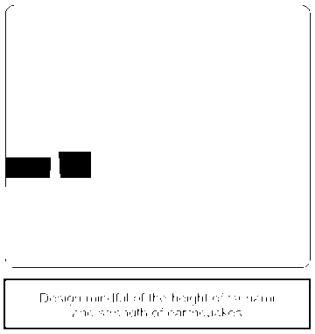
Shutting down, Cooling down, Confining inside

(in the case of Fukushima Daiichi Nuclear Power Station Unit 1)

**What is the philosophy behind how nuclear power stations are designed to maintain safety?
We begin by first explaining about "Shutting down, Cooling down, Confining inside", which underlies that philosophy.**

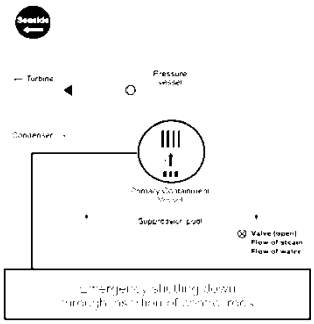
Nuclear reactors are designed to maintain safety based on a philosophy of "Shutting down, Cooling down, Confining inside."

0. Protect



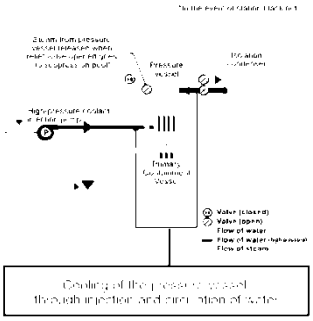
Elements on the site of a power station are designed with provisions for the onslaught of conceivable earthquakes and tsunami

1. Shutting down



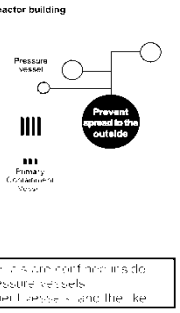
Control rods are swiftly inserted in emergencies such as major earthquakes and the reactor undergoes an emergency shutting down

2. Cooling down



Equipment for sending a large amounts of water into the reactor is installed so that the fuel does not rise to high temperatures and the reactor core is not heating while empty

3. Confining inside

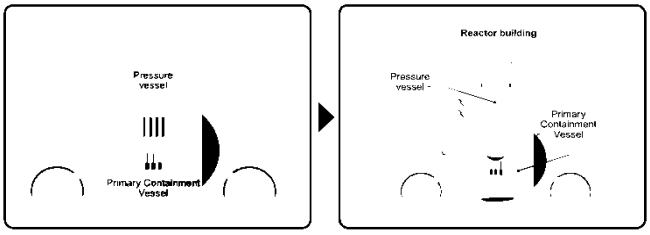


Protective walls are installed to confine inside radioactive materials so that they do not get outside even in an accident.

If cooling fails...

Water level in the pressure vessel falls, leading to core damage.

If cooling cannot be performed, it becomes difficult to continue to contain normal confinement inside.
When confining inside fails, it leads to the release of hydrogen and radioactive materials to the outside.



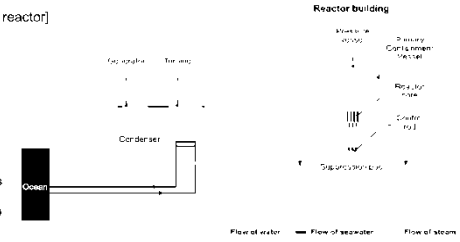
■ Names of each part of a nuclear power plant and the flow of heat in normal conditions (example of boiling water reactor)

[Flow of heat generated from reactor]

Steam produced by the reactor's heat is sent to the turbines

Turbines are turned by that steam, generating electricity

Steam that turned the turbines is cooled by the condenser and returned to water
(Normal seawater is used for cooling)



Next, we will explain about the mechanism for cooling a nuclear reactor. ▶

1-2

Understanding the Fukushima Daiichi Nuclear Accident

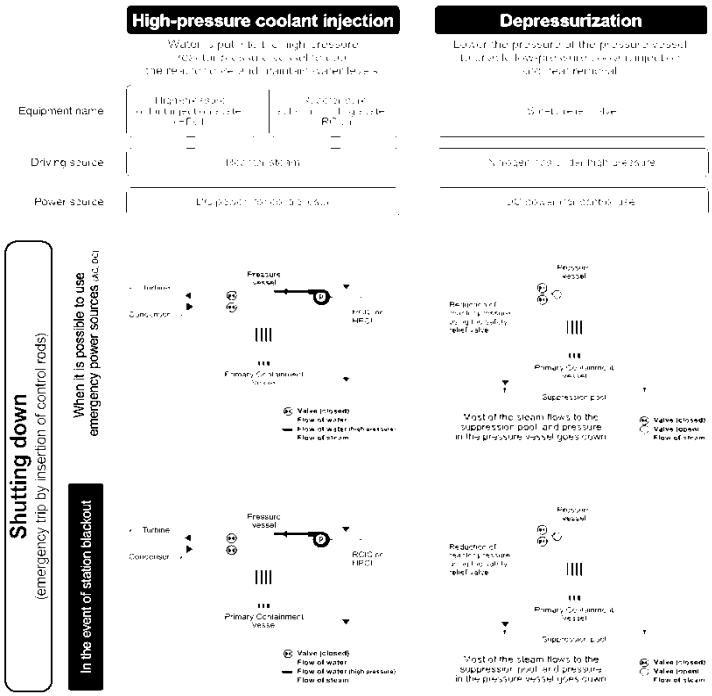
Cooling

(in the case of Fukushima Daiichi Nuclear Power Station Units 2 and 3)

The cause of the accident at Fukushima Daiichi Nuclear Power Station was the failure to "Cooling Down". Here, we explain the "cooling" mechanism of a nuclear power station.

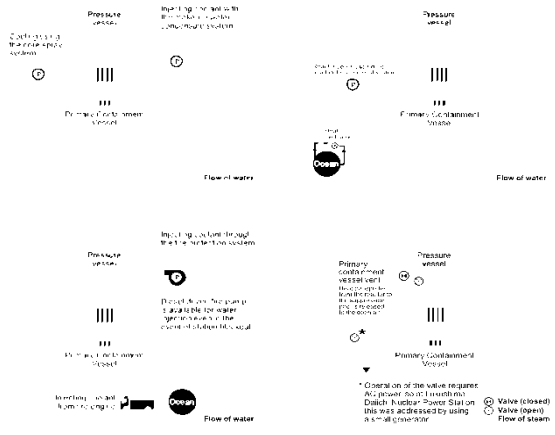
What does it mean to "cool" a nuclear reactor?

The objective of "cooling" a reactor is to achieve a state wherein the reactor is stabilized at "cold shutdown" (a condition in which the temperature of the water within the reactor is below 100°C). To do this requires the removal of what is known as the "decay heat" that the fuel in the reactor continues to produce. The operations that this in turn requires are coolant injection, depressurization and heat removal. Toward these ends, nuclear power stations are fitted with the equipment shown below.



The difference between "injecting coolant" and "removing heat"

Both "injecting coolant" and "removing heat" are methods for "cooling down." "Injecting coolant" is a method for getting cold water into a pressure vessel to cool the reactor core, while "removing heat" is method for transferring the heat of the reactor to water to release it outside. In an emergency, coolant—which is quite readily available—is injected. However, since the heat from the reactor core can end up being retained within the primary containment vessel when just injecting coolant, it is necessary to eventually perform "heat removal."



Next, we will explain in a little more detail what happens in a nuclear reactor and the primary containment vessel when these operations are performed. ▶ 06

1-3

Understanding the Fukushima Daiichi Nuclear Accident

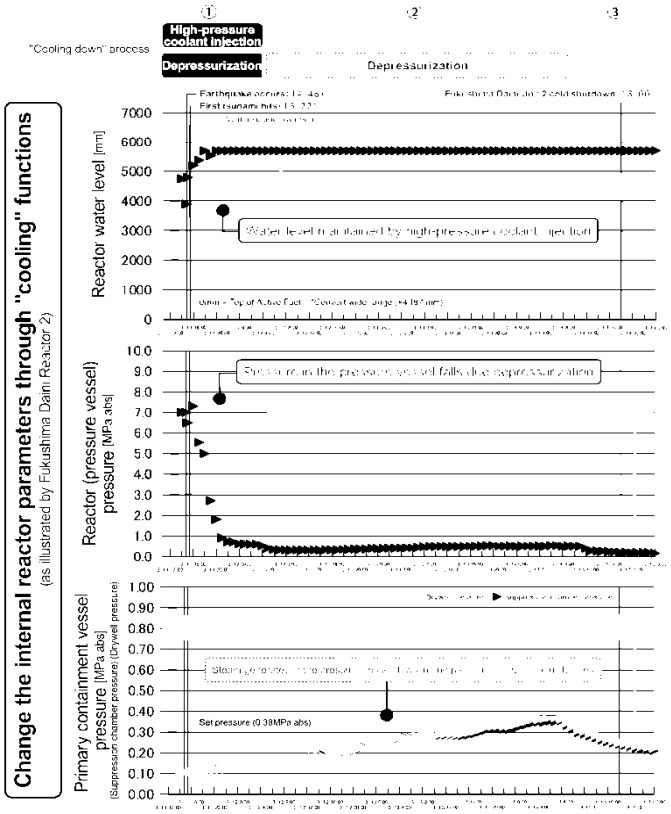
What happens when cooling is performed?

(in the case of Fukushima Daini Nuclear Power Station Unit 2)

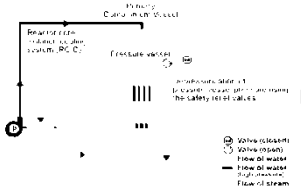
What happens inside the reactor and primary containment vessels when "cooling down" functions operate? We will explain this in connection with the parameter changes at Fukushima Daini Nuclear Power Station Unit 2, where it is relatively easy to see how the changes unfolded.

Change the internal reactor parameters through "cooling" functions

(as illustrated by Fukushima Daini Reactor 2)

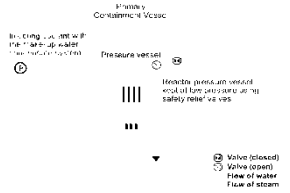


① High-pressure coolant injection / Depressurization



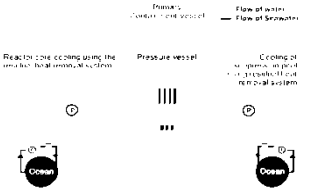
Water level is maintained by the HPCI system or RCIC system, and pressure in the pressure vessel is lowered using the safety relief valve

② Depressurization



Water level is maintained through low-pressure coolant injection (make-up water condensate system) and pressure in the primary containment vessel is raised by transferring steam from the pressure vessel to the primary containment vessel

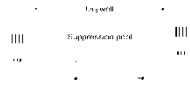
③



By starting heat removal, the flow of steam from the pressure vessel is halted while the primary containment vessel cools and its pressure gradually falls

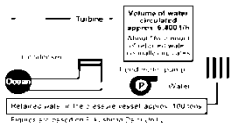
■ Differences in primary containment vessel shape

The shapes of the primary containment vessels at Fukushima Daiichi Units 1-5 (left) differ from those at Fukushima Daiichi Unit 6 and Fukushima Daini Units 1-4 (right), but they all play the same role.

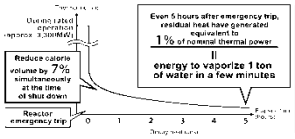


How much heat is generated?

■ **Volume of water circulating during normal operation**



■ **Decay heat progress after emergency reactor shutting down**



Heat continues to be generated in large amounts even after reactor shutting down, so it is necessary to continue cooling with large volumes of water.

Next we will outline how the accidents developed at Fukushima Daiichi Nuclear Power Station Units 1, 2, and 3. ▶

2-1

Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

Outline of the development of the accident at Fukushima Daiichi Units 1, 2, and 3

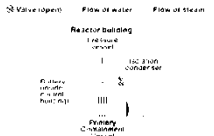
Units 1, 2, and 3 at Fukushima Daiichi Nuclear Power Station ended up experiencing severe accidents. These accidents had their origin in a loss of "cooling down" function. The general development of what happened thereafter was the same for Units 1, 2, and 3. The biggest reason for the loss of "cooling down" functions was the loss of the power sources used to operate and control those functions.

Outline of the development of the accident at Fukushima Daiichi Units 1, 2, and 3

Fukushima Daiichi Nuclear Power Station Units 1, 2, and 3—which had been operating at the time—experienced severe accidents in which there was a failure to keep the reactor cores cool after they had been shut down, resulting in damage to the cores.

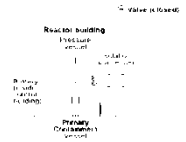
The accident developed in the same way at each unit: injecting coolant into the pressure vessels became impossible after reactor shutdown, the water in the pressure vessels ran out, fuel temperatures rose, hydrogen was generated in large quantities, the fuel melted, the pressure vessels were damaged, the primary containment vessels were damaged, and eventually both hydrogen and radioactive materials were released into the reactor buildings. The greatest underlying cause of the inability to perform cooling was that it became no longer possible to operate and control the "cooling down" systems due to a loss of power. The timing at which power and "cooling down" functions were lost differed from unit to unit, but the general outline of how the accident developed was the same at Units 1, 2, and 3.

1 Total power failure



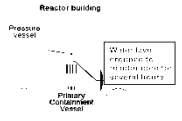
Transmission of offsite (AC) power failed primarily due to the earthquake, while the emergency diesel generators (AC) and batteries (DC) failed due to flooding from the tsunami.

2 Loss of "cooling down" functions



None of the cooling functions could be used due to the losses of power.

3 Water level drops

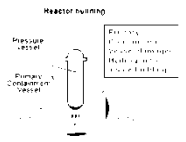


Due to decay heat, the water in the pressure vessel turned to steam and the water level dropped.

4 Core damage and hydrogen generation

With the drop in water level, the fuel became exposed and its temperature rose. This high temperature fuel reacted with water vapor to generate hydrogen, and the fuel itself became damaged due to the high temperature.

5 Hydrogen and radioactive material leaks



The pressure and primary containment vessels were damaged, and hydrogen and radioactive materials leaked inside the reactor building. (Hydrogen explosions occurred at Units 1 and 3, where hydrogen had built up inside the reactor buildings.)

Fukushima Daiichi Nuclear Power Station after the accident (from left to right, Units 1, 2, 3, and 4; photographed March 16, 2011)

We will explain in detail about developments at each unit from page 13.

Summary of developments at each unit

Next, we will discuss the damage from the earthquake and tsunami that struck Fukushima Daiichi Nuclear Power Station. ▶ 10

Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

2-2 Scale of the Earthquake and Tsunami that struck Fukushima Daiichi Nuclear Power Station and Flooding Situation

A tremendous tsunami struck the nuclear power station that had been brought to an emergency trip by the earthquake.
Flood waters reached buildings, and power supply equipment and other important facilities could no longer be used.

Maintain functionality of key safety facilities following an earthquake

No damage from the earthquake to key safety facilities has been confirmed.

A magnitude 9.0 earthquake occurred at 2:46 p.m. on March 11, 2011 (Friday), with an epicenter on the ocean floor off the coast of Sanriku. The Fukushima Daiichi Nuclear Power Station was among those hit by strong shaking. However, Units 1, 2 and 3—operating at the time of the earthquake—all made emergency trips. Additionally, their emergency diesel generators started up and cooling of their reactor cores began.

The earthquake caused damage to some routine equipment, such as power transmission and receiving facilities, but no damage to key safety facilities, such as emergency diesel generators and coolant injection and heat removal equipment, has been confirmed.

Occurred at 2:46 p.m. on March 11, 2011

Magnitude 9.0

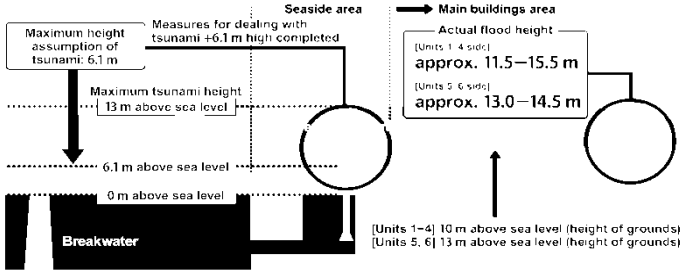
Visually confirmed on site

Confirmed through actual measurements

Confirmed through calculations

Key safety facilities are presumed to have retained important functions even after the earthquake

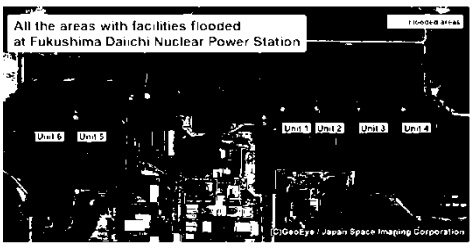
Height of Fukushima Daiichi Nuclear Power Station grounds and tsunami (illustration)



Almost all power, as well as coolant injection and heat removal function, was lost due to the tsunami

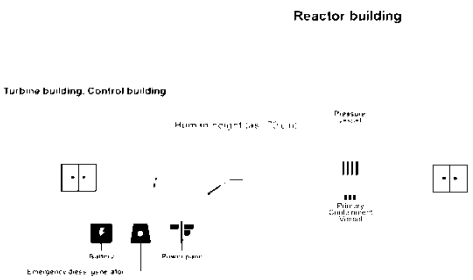
There was damage at Fukushima Daiichi Nuclear Power Station, including damage to outdoor equipment and flooding of important facilities.

Fukushima Daiichi Nuclear Power Station took a direct hit from an enormous tsunami about 50 minutes after the earthquake happened. Pumps and other outdoor equipment installed on the seaside for releasing heat from the reactor to the sea were damaged, and almost the entire site on which the reactors were built was flooded as a result of the tsunami. Also, water flooded into the turbine building and other structures and power-supply facilities became unusable. As a result, various key safety functions, such as the injection of coolant into reactors and the ability to monitor status, were lost. Furthermore, a variety of damage was inflicted, such as the spread of debris by the tsunami that prevented people from moving around the site.



Fukushima Daiichi Nuclear Power Station after having been damaged by the tsunami (overall view), photo taken March 19, 2011

Flooded power room (Fukushima Daiichi Nuclear Power Station Unit 2)



2 Review

Next, we will talk about the accident conditions at each reactor unit. ▶ 17

2-3

Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

Why did Unit 1 experience a severe accident?

Offsite power was lost due to the earthquake at Unit 1, but the emergency diesel generator started and function was preserved with respect to maintaining safety. However, owing to the tsunami, all power, both AC and DC, was lost and the Unit's "cooling down" function became unusable. Due to this, the water level in the reactor continued to drop, the reactor core was damaged, and the hydrogen generated as a result leaked inside the reactor building, leading to a hydrogen explosion.

The accident at Unit 1

When the earthquake occurred, the control rods were immediately inserted at Unit 1 and as designed, the reactor automatically tripped. The situation at Unit 1 was such that it had lost all offsite power due to the earthquake and condensers and other equipment had become unusable. However, the emergency diesel generators automatically started and cooling of the reactor by the isolation condenser*1 had begun.

But the tsunami that struck about 50 minutes after the earthquake and the flood waters that came with it caused the loss of the emergency diesel generators' batteries (DC power sources), and all sources for the power panels – and so forth. With the loss of all power sources, the isolation condensers tripped functioning, and the HPCI systems could not be activated. Additionally, owing to the loss of monitoring and measurement function, it became impossible to confirm the status of the reactor and other equipment. After this, the water in the pressure vessel continued to evaporate. About four hours later, the fuel was exposed above the water's surface and core damage began.

Because the surface temperature of the exposed fuel rods rose due to decay heat, the surface of the fuel rods reacted with the water vapor in the pressure vessel and large amounts of hydrogen were generated. The hydrogen that leaked from the damaged parts (thought to be leaked from the top flanges of reactor pressure vessel head and such processes by the temperature rises of the primary containment vessel) gathered in the upper parts of the reactor building, ignited for some reason and at 3:36 p.m. on March 12—about 24 hours after the tsunami struck—exploded. Also, the melted reactor core penetrated the bottom of the pressure vessel and eroded the concrete on the surface of the primary containment vessel.

The scattering of debris in the surrounding areas due to the hydrogen explosion was a major impediment to work, and was also a reason why responses to Units 2 and 3 were delayed.

*1 Isolation condenser: A device that cools the reactor core by cooling the steam in the pressure vessel to return it to water and then sending that water back to the pressure vessel.

*2 Power panel: equipment for receiving electricity from the electric power company, distributing it to the equipment with a switch, and if the power goes out, using the diesel generators and batteries that are available.

Conditions in a flooded power room

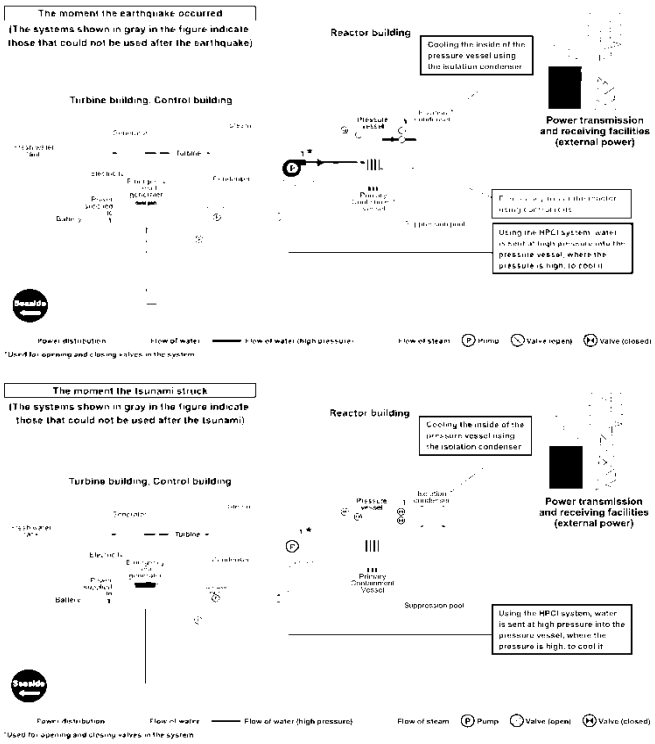
Unit 1 reactor building immediately after the hydrogen explosion

Damage to an isolation condenser

Accident issues of note (Unit 1)

Lessons from the accident	Problem(s) that arose
1: Protection from tsunami	• The buildings and areas outside were flooded due to the tsunami.
2: Guaranteeing power sources/means of injecting coolant	• All coolant injection and heat removal function was lost due to the loss of all AC and DC power. • Owing to the inability to inject coolant or remove heat, the water level inside the pressure vessel dropped and, approximately 4 hours after the tsunami, the core was damaged.
3: Impact mitigation after core damage	• The hydrogen generated due to the core damage leaked from the pressure and primary containment vessels to the inside of the reactor building and a hydrogen explosion occurred. • The melted reactor core penetrated the pressure vessel and eroded the concrete of the primary containment vessel.
4: Assessing the situation at the plant	• Due to all power having been lost, the means for illumination, communication, monitoring, and measuring were lost. In addition, all units had simultaneously fallen into a crisis situation. This all produced confusion in the initial response and inadequacies in the sharing of information.
5: Improvements to the recovery work environment	• Due to concerns about major aftershocks and attendant tsunami as well as the scattering of debris, accessibility to the site and the capacity to do work there were reduced.

Changes at Unit 1 when the earthquake happened and the tsunami struck



2-4

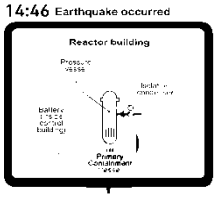
Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

The development of the accident at Unit 1

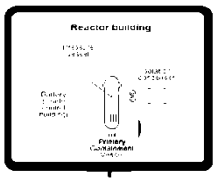
The development of the accident at Unit 1

The nuclear reactor underwent an emergency trip after the earthquake. Offsite power had been lost, but the emergency diesel generator started automatically. The isolation concenser was used and cooling of the reactor core proceeded. However, with the loss of all electrical power due to the tsunami, the cooling functions provided by the isolation condenser and the HPCI system were lost. With the means for cooling having been lost, the water level inside the pressure vessel dropped. Core damage proceeded, the hydrogen that was generated leaked into the reactor building, and a hydrogen explosion occurred.

14:46 Earthquake occurred



15:35 Tsunami hits

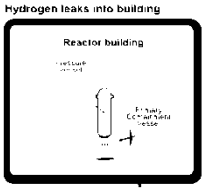


Isolation condenser became unusable due to the tsunami

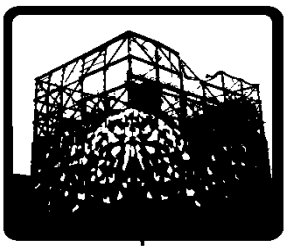
The isolation condenser can perform cooling just by opening and closing a valve. The valve on the isolation condenser was opened and closed to slowly cool the reactor core after the earthquake. However, this valve was closed when all power was lost due to the tsunami. It could not be reopened for that reason, and the isolation condenser lost its cooling function.

With the loss of power due to the tsunami, cooling of the reactor core became problematic

Hydrogen leaks into building

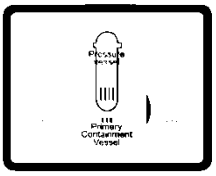


15:36 Hydrogen explosion in the Unit 1 reactor building

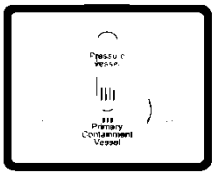


Water vapor reacted chemically with zirconium on the exterior of the fuel rods and hydrogen was generated in a large massive amounts

Water level inside the pressure vessel dropped



Hydrogen generation occurred



It is possible that the sequence with respect to the drop in water level, core damage, and hydrogen generation occurred in a different order due to uncertainties over the amount of coolant injected.

Valve (closed) Valve (open)
Flow of water Flow of water (high pressure) Flow of steam

2-5

Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

Why did Unit 2 experience a severe accident?

Even after all power had been lost in the tsunami the RCIC continued to operate at Unit 2. However, depressurization took time after the RCIC tripped and conditions leading to core damage developed. As a result, while a hydrogen explosion did not occur, a large amount of radioactive material eventually was released.

The accident at Unit 2

When the earthquake occurred, the control rods were immediately inserted at Unit 2 and as designed, the reactor automatically tripped. The situation at Unit 2 was such that it had lost all offsite power due to the earthquake and condensers and other equipment had become unusable. However, the emergency diesel generator started automatically and the reactor core isolation cooling system (RCIC) was also able to operate. After this, the emergency diesel generators, batteries, power panels, and all sources of power were lost due to the tsunami and the flood waters that came with it, with the result that the monitoring, measuring, and operational functions or meters and gauges could not be used, along with light sources.

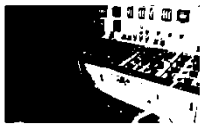
The situation followed almost the same course as at Unit 1 up to this point. However in the case of Unit 2 the RCIC had been operating prior to the tsunami striking. Even after all power was lost it continued to operate, and so it was able to continue coolant injection for about three days. During that period, a power-supply car was connected to the power panels that escaped being submerged and should have been able to perform coolant injection with other cooling systems. Work to maintain power was moving forward, but because of cables being damaged by a hydrogen explosion that occurred at 3:36 p.m. on the 12th at Unit 1, the power-supply car became unusable. Furthermore, a hydrogen explosion occurred at Unit 3 at 11:01 a.m. on the 14th. The fire engine and hoses that had been completely readied were damaged and became unusable. At 1:25 p.m. that same day, the RCIC tripped. Time was required after this had been confirmed for pressure to be reduced. The water level fell, the reactor core was damaged, and at the same time hydrogen was generated.

It is presumed that hydrogen leaked into the reactor building with the damage to the pressure and primary containment vessels following the core damage. Still at Unit 2, a panel on the side of the upper part of the reactor building opened due to the impact of the hydrogen explosion at Unit 1. It is surmised that for this reason, hydrogen escaped to the outside and an explosion of the reactor building was avoided.

On the other hand, we surmise that a great deal of radioactive material to be released from any of the three buildings came from Unit 2. We presume that this is because at Units 1 and 3 the "venting"—an operation that entails the removal of a certain amount of radioactive materials via the water in the suppression pool and releasing the gas to outside the primary containment vessel—was successful. We presume that at Unit 2, in contrast, the vent line could not be thrown open, venting failed, and gas that includes radioactive materials direct from the primary containment vessel leaked out.

Work being done after the loss of power (main control room for Units 1 and 2)

Connecting collected batteries to meters and gauges (main control room for Units 1 and 2)

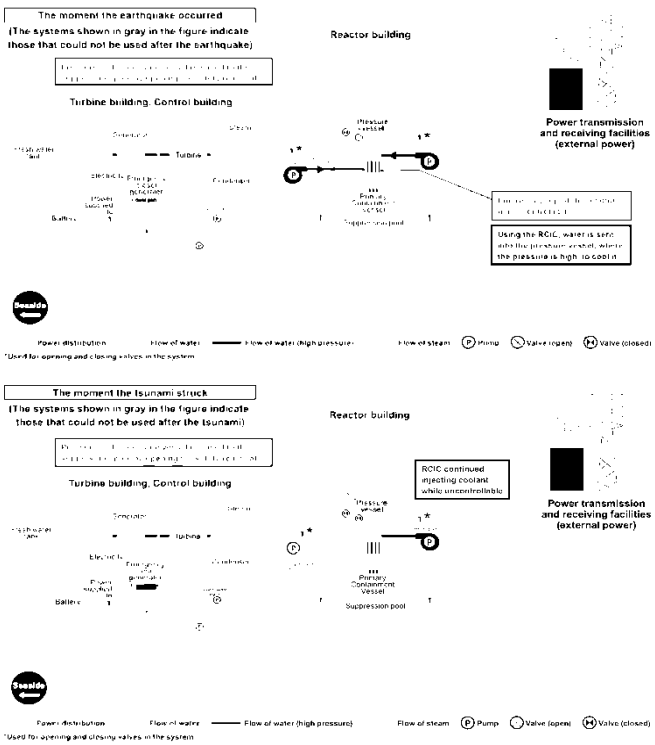


Panel on the side of the upper part of the reactor building opened with the hydrogen explosion at Unit 1

Accident issues of note (Unit 2)

Lessons from the accident	Problem(s) that arose
1: Protection from tsunami	• The buildings and areas outside were flooded due to the tsunami.
2: Guaranteeing power sources/means of injecting coolant	• Due to the loss of all AC and DC power, all coolant injection and heat removal functions were lost except the RCIC. At the same time, the RCIC became uncontrollable. It operated for several days, but subsequently tripped. • After the RCIC tripped, time was needed to reduce the pressure of the pressure vessel. The water level fell and core damage eventually occurred.
3: Impact mitigation after core damage	• After the core was damaged, the primary containment vessel was also damaged and both hydrogen and radioactive material were leaked to the outside
4: Assessing the situation at the plant	• Due to all power having been lost, the means for illumination, communication, monitoring, and measuring were lost. In addition, all units had simultaneously fallen into a crisis situation. This all produced confusion in the initial response and inadequacies in the sharing of information.
5: Improvements to the recovery work environment	• Owing to concerns about major aftershocks and attendant tsunami, as well as the scattering of debris due to the tsunami and the hydrogen explosions at Units 1 and 3, accessibility to the site and the capacity to do work there were reduced. • The power-supply car and fire engines that had been prepared were damaged by the hydrogen explosions at Units 1 and 3. • The work environment worsened strikingly owing to a lack of resources for dealing with an increase in radiation doses and for managing radiation, as well as the accident response extending to last many days

Changes at Unit 2 when the earthquake happened and the tsunami struck



2-6

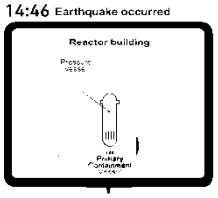
Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

The development of the accident at Unit 2

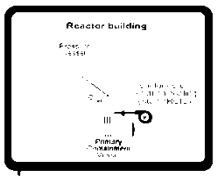
The development of the accident at Unit 2

The nuclear reactor underwent an emergency trip after the earthquake. Offsite power had been lost, but the emergency diesel generator started automatically. The RCIC was used and cooling of the reactor core proceeded. The RCIC continued to operate for about three days even after all power had been lost due to the tsunami, but on March 14, it tripped. An attempt was made to shift to low-pressure coolant injection by depressurization, but due to the impact of hydrogen explosions at adjacent plants and difficulties in moving ahead with the work, the water level in the pressure vessel dropped during the interim, the core was damaged, and conditions developed to the point of hydrogen being generated. As a result, while a hydrogen explosion did not occur, a large amount of radioactive material eventually was released.

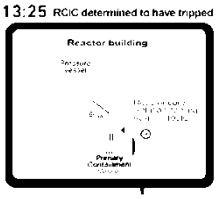
14:46 Earthquake occurred



15:35 Tsunami hits

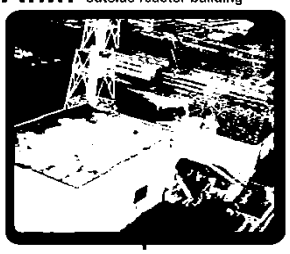


13:25 RCIC determined to have tripped



19:54 Start coolant injection

A.M. Release of radioactive materials outside reactor building



Valve automatically opened by SRV

Power provided by batteries (DC power) with diesel-driven emergency power generator stopped

Cooling with water inside pressure vessel (high pressure) by RCIC (steam turbine driven coolant injection system)

RCIC operation is confirmed

Coolant injection function is lost

Loss of core cooling function (core damage)

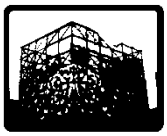
Fuel assembly melt (core damage)

Pressure vessel damage

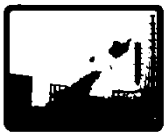
Container vessel damage

Cause of core damage was failure to reduce pressure

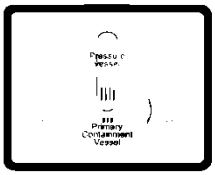
At Unit 2 and Unit 3, after the reactor cores stopped, water levels in the reactors were maintained (the reactors cooled) owing to the operation of HPCI systems that can inject coolant into pressure vessels experiencing high pressure. However, after a certain amount of time the HPCI systems tripped and the situation was such that they could not be restarted. In such a case, it was necessary to lower the pressure in the pressure vessels, inject coolant into those vessels using the low-pressure coolant injection system, and cool the reactor cores. However, because it was not possible either to quickly open the "safety relief valve" in order to reduce pressure, or to inject coolant, water levels in the pressure vessels dropped and the reactor cores were damaged.



15:36 Hydrogen explosion in the Unit 1 reactor building
(panel opened on the side of the upper part of Unit 2 reactor building)



11:01 Hydrogen explosion in the Unit 3 reactor building



Hydrogen generation occurred

It is possible that the sequence with respect to the drop in water level, core damage, and hydrogen generation occurred in a different order due to uncertainties over the amount of coolant injected.

Valve (closed) / Valve (open) / Pump
Flow of water / Flow of water (high pressure) / Flow of steam

2-7

Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

Why did Unit 3 experience a severe accident?

Injecting coolant continued at Unit 3 using the HPCI system even after the tsunami. However, depressurization took time after the HPCI system tripped and conditions that led to core damage developed. The hydrogen generated attendant with the core damage leaked into the reactor building and a hydrogen explosion occurred in that building.

The accident at Unit 3

When the earthquake occurred, the control rods were immediately inserted at Unit 3 and, as designed, the reactor automatically tripped. The situation at Unit 3 was such that it had lost all offsite power due to the earthquake and condensers and other equipment had become unusable. However, the emergency diesel generator started automatically and the reactor core isolation cooling system (RCIC) was also able to operate. All AC power was lost after this due to the tsunami striking and the attendant flooding. The DC power equipment for Unit 3 differed from Unit 1 and 2, however, in that it was installed at a slightly higher spot and so escaped flooding. For that reason, operation and control of the RCIC and HPCI could be maintained; it was also possible to continue monitoring reactor status using meters and gauges.

Coolant injection continued for approximately a day and a half, after which the HPCI system was tripped to change over to injecting coolant at low pressure (with a diesel driven fire pump). However, depressurization after this took time, the water level dropped, and the result was the generation of hydrogen and damage to the core.

Coolant injection from fire engines began after the fall in pressure had been confirmed, but owing to the hydrogen that had leaked from the primary containment vessel a hydrogen explosion occurred at 11:01 a.m. on March 14.

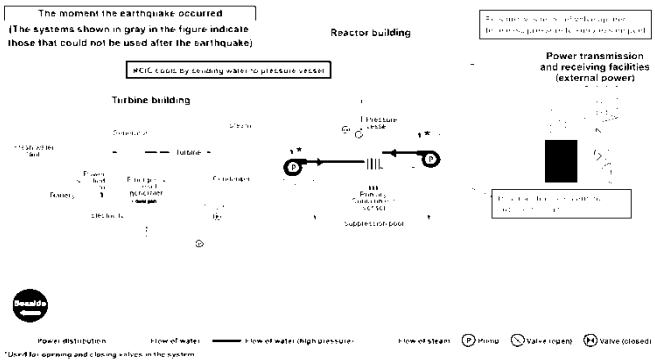
Seawater system pump that lost availability in the tsunami

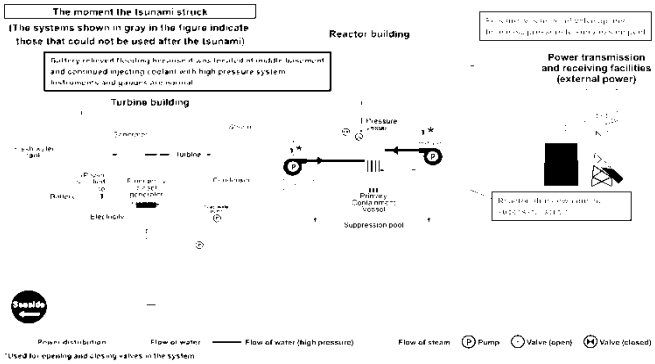
Unit 3 reactor building after the hydrogen explosion

Accident issues of note (Unit 3)

Lessons from the accident	Problem(s) that arose
1: Protection from tsunami	• The buildings and areas outside were flooded due to the tsunami.
2: Guaranteeing power sources/means of injecting coolant	• The loss of all AC power caused the loss of AC-powered coolant injection and heat removal function. • Once the HPCI system had tripped, depressurization in the pressure vessel took time, the water level dropped, and the result was core damage.
3: Impact mitigation after core damage	• The hydrogen generated due to the core damage leaked from the pressure and primary containment vessels to the inside of the reactor building and a hydrogen explosion occurred.
4: Assessing the situation at the plant	• The loss of AC power produced chaos in the initial response due to the fact that the means of lighting and communications were limited and all the units fell into a crisis situation simultaneously.
5: Improvements to the recovery work environment	• Due to concerns about major aftershocks and attendant tsunami, as well as the scattering of debris, accessibility to the site and the capacity to do work there were reduced. • The work environment worsened strikingly owing to a lack of resources for dealing with an increase in radiation doses and for managing radiation, as well as the accident response extending to last many days.

Changes at Unit 3 when the earthquake happened and the tsunami struck





2-8

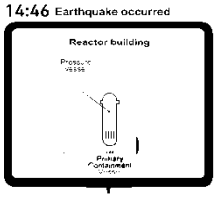
Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

The development of the accident at Unit 3

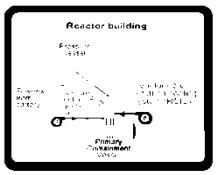
The development of the accident at Unit 3

The nuclear reactor underwent an emergency trip after the earthquake. Offsite power had been cut, but the emergency diesel generators started automatically. The RCIC was used and cooling of the reactor core proceeded. The emergency diesel generator ceased due to the tsunami. However, the batteries (DC power) relieved damage and so it was possible to control the RCIC and HPCI and continue cooling. A shift to low-pressure coolant injection was attempted in parallel with tripping the HPCI system, but depressurization in the pressure vessel did not go well and moving ahead with the work became difficult. During this time, the water level in the pressure vessel dropped, the reactor core was damaged, conditions developed to the point of hydrogen being generated. And at 11:01 a.m. on March 14, a hydrogen explosion occurred in the reactor building.

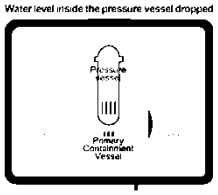
14:46 Earthquake occurred



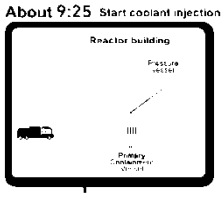
15:35 Tsunami hits



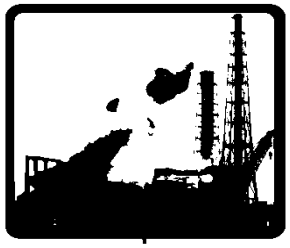
Water level inside the pressure vessel dropped



About 9:25 Start coolant injection



11:01 Hydrogen explosion in the Unit 3 reactor building



Water level

Reactor automatic scram

Power provided by external power supply and emergency diesel generator

Cooling with water using high-pressure coolant injection system

HPCI continued operation

Switch to HPCI system from RCIC system

Loss of cooling by condensate injection system (Cause unclear)

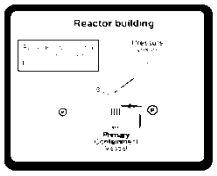
Fuel embrittlement and damage, Hydrogen generation

Pressure vessel damage

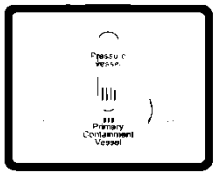
Container vessel damage

Hydrogen leak

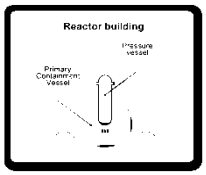
It is possible that the sequence with respect to the drop in water level, core damage, and hydrogen generation occurred in a different order due to uncertainties over the amount of coolant injected.



2:42 Trip the HPCI system



Hydrogen generation occurred



Hydrogen leaked into the building

Valve (closed) Valve (open) Pump
Flow of water Flow of water (high pressure) Flow of steam

2-9

Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

Why was there a hydrogen explosion at Unit 4?

Unit 4 was not in operation because planned outages were being conducted, but a hydrogen explosion occurred in the reactor building in the early morning on March 15. The cause is presumed to have been hydrogen generated at Unit 3 that flowed into Unit 4 through the exhaust pipes.

The accident at Unit 4

Unit 4 was undergoing regular inspection and operation had been stopped when the earthquake occurred, with all the fuel for the reactors having been moved to the spent fuel pool. The tsunami resulted in a total power failure. Both heat removal and coolant injection functions for the spent fuel pool were lost, and the drop in water levels at the spent fuel pool due to evaporation produced concerns. As of 4:08 a.m. on March 14 the water temperature of the spent fuel pool was confirmed to be 84°C, and the water level was forecast to drop to the upper tips of the fuel in late March.

For that reason, it was recognized that there was some leeway time-wise, but then, at 6:14 a.m. on March 15, a hydrogen explosion occurred in the reactor building of Unit 4. It is presumed that this is the reason why, attendant with the venting of the Unit 3 primary containment vessel, vented gases including hydrogen flowed into Unit 4 through the exhaust pipes.

Unit 4 reactor building after the hydrogen explosion

Conditions at the Unit 4 spent fuel pool, photographed June 29, 2011

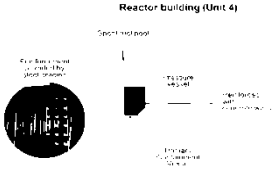
Accident issues of note (Unit 4)

- **Guaranteeing power sources/means of injecting coolant:** **all power was lost due to the earthquake and tsunami, and the means for injecting coolant and cooling the spent fuel pool were lost. Furthermore, dealing with the spent fuel pool had to be done in parallel with dealing with the reactors for the other units.**
- **Impact mitigation after the accident:** **hydrogen explosion occurred due to an inflow of hydrogen from Unit 3.**

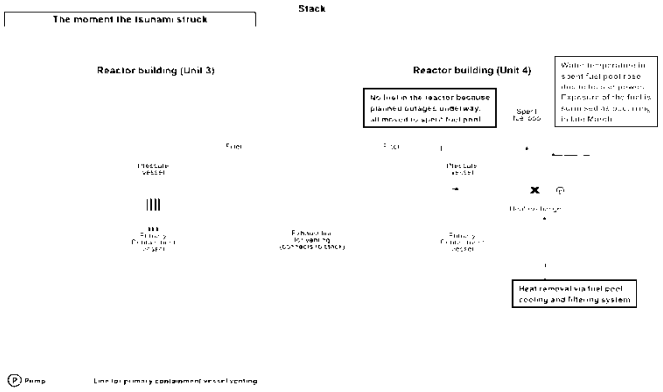
Reinforcement of Unit 4 spent fuel pool

The spent fuel pool was made with steel-reinforced concrete measuring 140 to 185 cm thick. For that reason, although the exterior walls were damaged at Fukushima Daiichi Unit 4, it has been confirmed that there has been no change from before the earthquake in the spent fuel pool's seismic resistance ability. Even if another earthquake of the same strength as the Great East Japan Earthquake occurred (strong 6 on the Japanese scale) no problems in safety terms would arise.

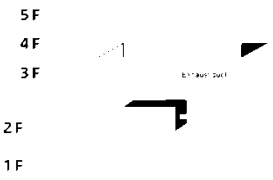
However, to further improve safety construction, the bottom of the pool was reinforced with steel posts and concrete walls, improving seismic tolerance by 20% (Completed in July 2011)



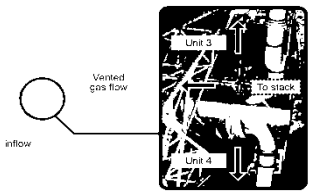
Changes at Unit 4 when the tsunami struck



Inflow route of hydrogen into Unit 4



Vented gas including hydrogen from Unit 3 flowed into Unit 4



2 Review

2-10

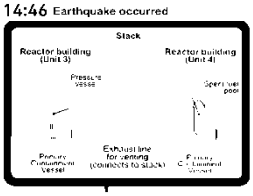
Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

The development of the accident at Unit 4

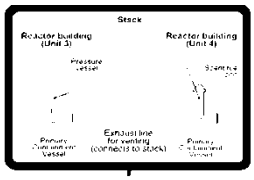
Changes in the reactor building (Unit 4)

Offsite power was also lost due to the earthquake at Unit 4, which was not in operation because planned outages were underway. After the tsunami struck, it was no longer possible to use the emergency diesel generator and all power was lost. Due to the loss of cooling and resupply functions attendant with the loss of power, there were worries about the drop in water level caused by the evaporation of water in the spent fuel pool, where the fuel was being stored. However, it was forecast that the fuel would not become exposed above the water's surface until late March. For that reason, it was recognized that there was some leeway time-wise for responding, but then a hydrogen explosion occurred in the reactor building due to an inflow of hydrogen into the Unit 4 reactor building through the vent lines attendant with the venting at Unit 3.

14:46 Earthquake occurred

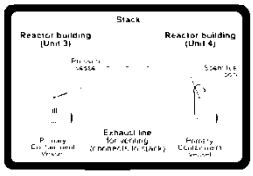


15:35 Tsunami hits



Power lost due to tsunami
Coolant functions and ability to resupply water lost

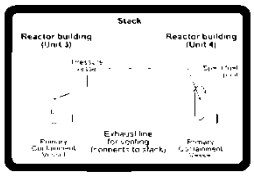
Rise of water temperature in spent fuel pool



The water temperature of the spent fuel pool confirmed to be 84°C; fuel forecast to be exposed above the water's surface in late March.

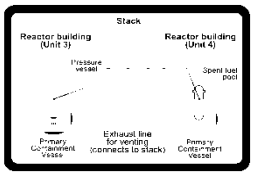
2 Review

Total power failure



Hydrogen inflow from Unit 3

Around 6:14 a.m. Hydrogen explosion in the Unit 4 reactor building



8:21 Begin injecting coolant into spent fuel pool

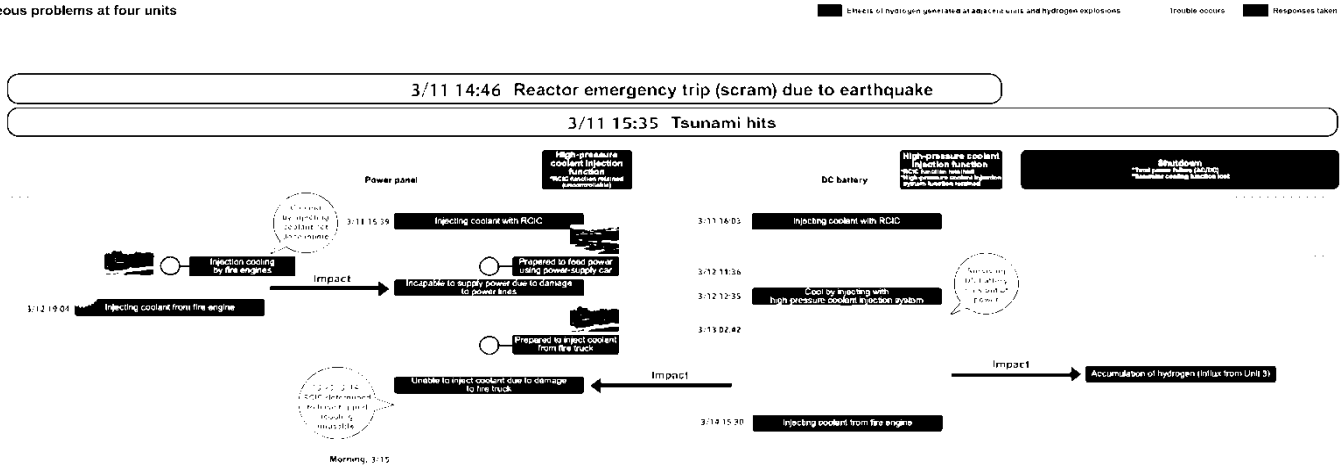
2-11

Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

The magnification of damage due to simultaneous accidents at Units 1 to 4

In the Fukushima nuclear accident, multiple reactors experienced disasters simultaneously, leading to the accident. This created a situation in which responses had to be pursued in parallel. In addition, the progression of the accident at one unit hindered the responses at the other ones.

Simultaneous problems at four units



Accident at adjacent reactor produces expansion of damage

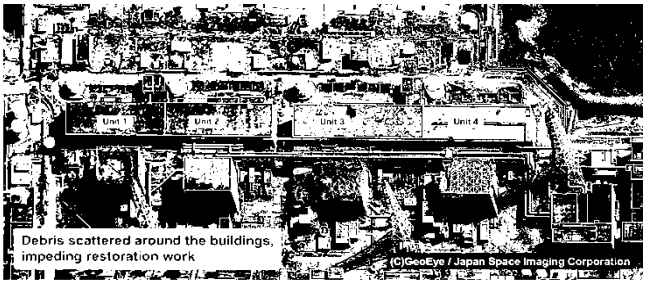
The situation after the tsunami was most urgent at Unit 1, where both coolant injection and heat removal had been interrupted. Preparations were being made to inject coolant into Unit 1 using fire protection lines and fire engines, but coolant injection did not happen in time. The water level in the reactor dropped, leading to the generation of hydrogen and eventually core damage. Also, the hydrogen that was generated leaked into the reactor building and, approximately one day after the tsunami at 3:36 p.m. on March 12, a hydrogen explosion occurred. The hydrogen explosion at Unit 1 damaged the power lines that had been laid down at Unit 2 as well as the power lines being readied at Unit 3. This had a big impact on the work being done to restore power at both Units 2 and 3.

Depressurization required more time at Unit 3 after the HPCI system tripped. The water level fell, leading to the generation of hydrogen and eventually core damage. Also, the hydrogen that was generated leaked into the reactor building and, approximately 67 hours after the tsunami at 11:01 a.m. on March 14, a hydrogen explosion occurred.

The fire engines and hoses being readied at Unit 2 were damaged by the hydrogen explosion at Unit 3 and could no longer be used. Additionally, the RCIC system tripped about two hours after the hydrogen explosion at Unit 3. Depressurization took more time following this, the water level dropped, and this eventually led to core damage.

At Unit 4, hydrogen discharged with the venting of the primary containment vessel at Unit 3 flowed into the reactor building and brought about a hydrogen explosion. In this way, one of the lessons learned from the events is that the progression of the accident at one unit had a big impact on restoration work at the other units.

The damage at Fukushima Daiichi Nuclear Power Station Units 1-4, photographed March 19, 2011



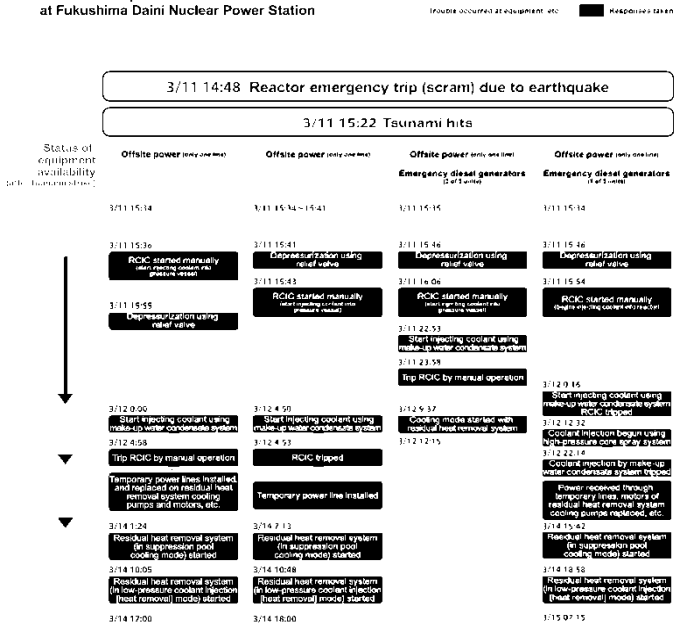
2-12

Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

Why did Fukushima Daini Nuclear Power Station escape a severe accident?

Fukushima Daini Nuclear Power Station Units 1, 2, 3, and 4 were all able to receive AC power of some sort even after the tsunami. Also, it was possible to put all of the units into cold shutdown by changing the motors of seawater pumps that had been damaged and laying down temporary cables to the motors while coolant was being injected.

Course of responses at Fukushima Daini Nuclear Power Station



Venting preparations moved forward

At Fukushima Daini Nuclear Power Station, heat removal functions were lost at Units 1, 2, and 4 due to the tsunami. Coolant was injected and the reactor cores were cooled, but there was no place for the steam (heat) generated by this to escape, and the pressure in the primary containment vessels gradually rose. For that reason, preparations were made to vent the primary containment vessels at each unit. However, thanks to the success of the efforts to restore heat removal function that were taking place in parallel, workers were able to achieve cold shutdowns without having to perform venting.

Responses at Fukushima Daini Nuclear Power Station

Like Fukushima Daiichi Nuclear Power Station, Fukushima Daini Nuclear Power Station was damaged by the earthquake and tsunami. However, the situation did not reach the point at which the cores were damaged, and all units achieved cold shutdown. The reason that can be offered as to why this was the case is that even after the earthquake and tsunami, offsite power sources and AC-power equipment could still be used and the reactors could be cooled.

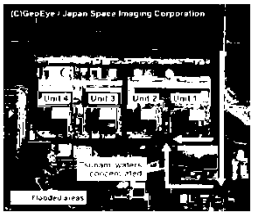
On the other hand, it was not possible to remove heat from the reactors because the seawater pumps were damaged by the tsunami.

For that reason, cooling of the pressure and primary containment vessels was carried out as the occasion demanded by, for example, making use of systems that did not require the support of the seawater pumps, such as the RCIC and the make-up water condensate system. By restoring power to the seawater pumps, achieved by replacing damaged seawater pump motors and laying temporary cables during that period, it became possible to remove heat and workers were able to bring all units into cold shutdown.

Much flooding occurred at Units 1 and 2 due to their being upstream, where the tsunami waters concentrated

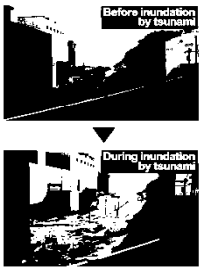
Luckily the area where the main buildings are located at Fukushima Daini Nuclear Power Station stands 12 meters above sea level, and also the tsunami that hit was lower compared to that at Fukushima Daiichi Nuclear Power Station, so the tsunami damage was lighter at Daini than it was at Daiichi. Unit 1 suffered the greatest damage of the four units lined up at Fukushima Daini.

This was because a road runs along the south side of the area where the main buildings are located at Unit 1, and the tsunami waters traveled up along the road in a concentrated fashion.



After tsunami caused damage (overall view)
Fukushima Daini Nuclear Power Station, photographed March 18, 2011

Conditions upstream of where tsunami concentrated



Door wrecked by water pressure

Work being done to replace seawater system pump motors (photographed following day)

Issues of note in escaping any accident (Fukushima Daini Nuclear Power Station)

- **The earthquake and tsunami caused a great deal of damage. However, offsite power sources and AC-powered equipment could still be used and it was possible to provide electricity to some equipment.**
- **Most of the emergency coolant injection equipment needed for cooling could not be used owing to damage to the seawater pumps and so forth, but normal coolant injection equipment not needed for heat removal was put to use as the occasion demanded and cooling of the reactors continued.**
- **The seawater pumps and so forth were successfully restored during the time it took for steam (heat) to accumulate in the primary containment vessels. For that reason, it was possible to remove heat to the sea before gas was released into the open air by venting the primary containment vessels.**

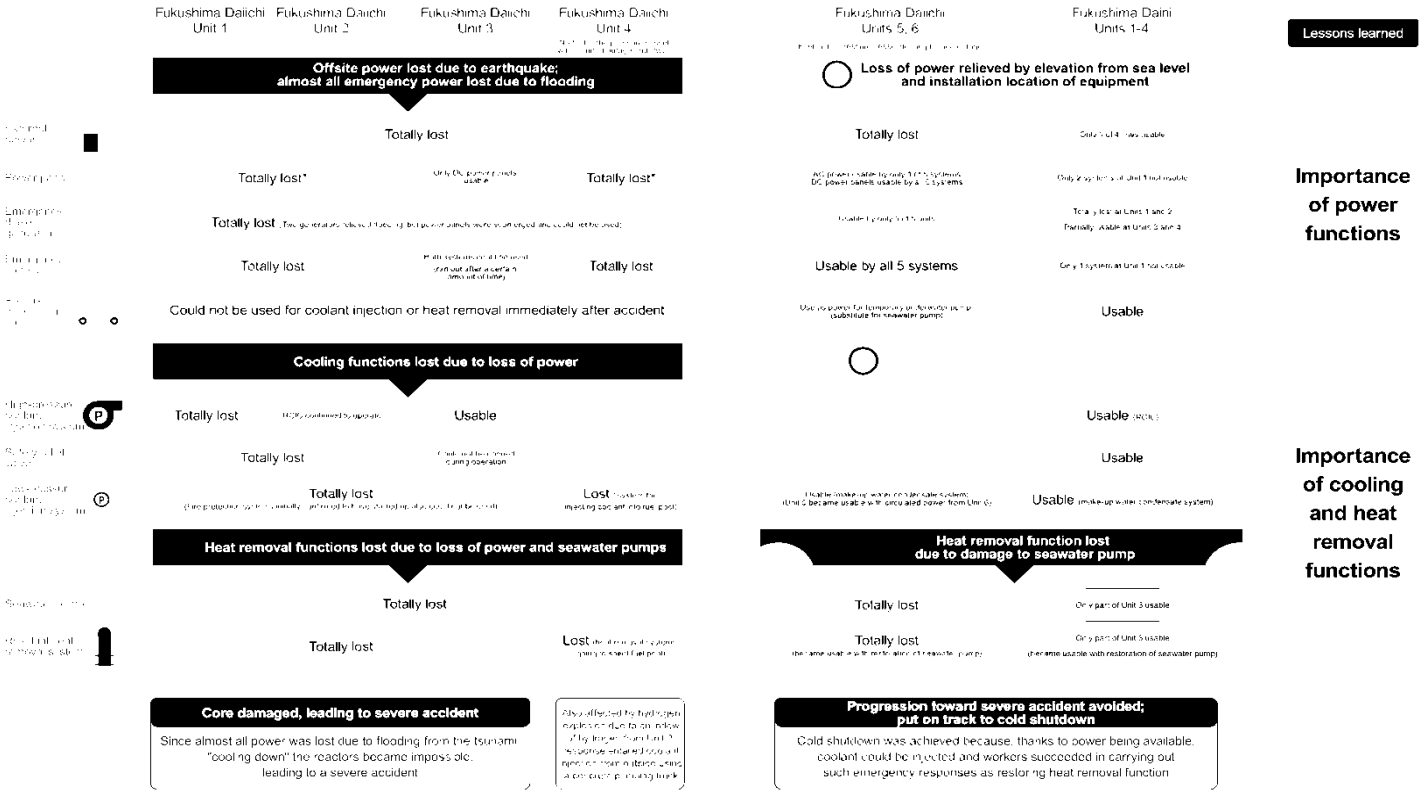
2-13

Why did Fukushima Daiichi Nuclear Power Station end up experiencing a severe accident?

Comparison of units with core damage and units in cold shutdown

Despite the fact that they were damaged by the earthquake and tsunami like Fukushima Daiichi Nuclear Power Station Units 1-4, Units 5 and 6 at that station, as well as Fukushima Daini Nuclear Power Station, escaped a severe accident. What were the differences in these cases?

Comparative view of equipment damage situation after the tsunami struck (Fukushima Daiichi: Units 1-6, Fukushima Daini: Units 1-4)



3-1

Lessons Learned from Examination

Lessons obtained from the accident and future responses

Work is being done to apply the lessons from the accident at Fukushima Daiichi Nuclear Power Station in order to fortify and promote safety measures based on the philosophy of defense in depth so that, no matter what kind of situation may arise, conditions do not once again reach the point of becoming a severe accident.

Defense in depth is a philosophy in which one prepares countermeasures corresponding to the various stages of a situation.

[Using an automobile accident by way of example...]

(1) Maintain brakes and tires so that trouble does not occur

Stage 1: Prevent trouble from occurring

(2) Emergency brakes and automatic braking systems to prevent accidents

Stage 2: Prevent the situation from developing into an accident

(3) Seatbelts and airbags that prevent injuries after an accident

Stage 3: Prevent core damage after an accident

(4) Flares and rescue activities to reduce impact (secondary disasters, etc.) after an accident

Stage 4: Impact mitigation after an accident

What is defense in depth at a nuclear power station?

Defense in depth is a philosophy in which one groups safeguards and provisions into various stages. At a nuclear power station, defense in depth provides the foundation for maintaining safety. As the above illustration shows, measures have been devised as stage 1 for preventing trouble from occurring. Measures are also put in place for subsequent stages based on the idea that the measures for the previous stage may fail. This is to prevent any trouble that may occur from developing into an accident, and to prevent damage to a reactor core even if an accident should develop.

Countermeasures employed based on the defense in depth philosophy and lessons learned from the accident.

Lesson Defenses against tsunami were weak.

Countermeasures Thoroughgoing tsunami countermeasures will be implemented, such as working to make buildings watertight and constructing flood barriers and seawalls to reduce flooding on station grounds and the impact on facilities, even if a tsunami more powerful than that conceived at the design stage strikes.

This corresponds to the ability to stop nuclear reactors using control rods.
There were no problems when it came to making emergency trips at either Fukushima Daiichi or Fukushima Daini.

Lesson The means for injecting coolant in the event of total power loss had not been sufficiently prepared.

Countermeasures A variety of power sources have been prepared and power supply capabilities beefed up, such as by stationing power-supply cars on high ground unlikely to be affected by tsunami and making it possible to use DC power (batteries) for a long period of time.
Sources of water required for coolant injection in an accident have been increased by, for example, constructing reservoirs.
New procedures and means for injecting coolant will be prepared and the means for injecting coolant at high pressure bolstered.
The means for reducing the pressure of pressure vessels will be strengthened by making it possible to securely operate safety relief valves.
The means for injecting coolant at low pressure will be bolstered by, for example, stationing fire engines on high ground unlikely to be affected by a tsunami.
The means for removing heat will be strengthened by, for example, stationing mobile heat exchanger trucks on high ground unlikely to be affected by a tsunami.

Lesson The means for mitigating the impact after core damage had not been sufficiently prepared.

Countermeasures The means for mitigating the impact after core damage occurs will be strengthened by, for example, outfitting the interior of primary containment vessels with the means to cool them and installing venting equipment with filters in order to reduce the release of radioactive materials after an accident.

Plus

Lesson The means for handling responses — limited lighting and means of communication, the loss of means for monitoring and measuring, and a worsening working environment — had not been sufficiently prepared.

Countermeasures Measures to improve the working environment will be implemented, such as guaranteeing power for monitoring and measuring equipment in use, securing access roads to the scene after an accident occurs, and reinforcing the means of communication so that restoration work can be speedily carried out.

Initiatives aimed at maintaining safety at Fukushima Daiichi Nuclear Power Station

Mid-and-Long Term Roadmap for Fukushima Daiichi Nuclear Power Station
(announced December 2011)

Step 2 completed, December 16, 2011	Within 2 years of completing Step 2	Within 10 years of completing Step 2	30 to 40 years after completing Step 2
• Cold shutdown situation • Broad control of release of radioactive materials	• Until removal of fuel from spent fuel pool begun	• Time until removal of fuel debris* is begun *Debris: Materials made of fuel, cladding tubes, etc. that have fused and re-solidified	• Time until decommissioning completed

To guarantee safety for the mid-to-long term at Fukushima Daiichi Nuclear Power Station Units 1–4, TEPCO has put together a roadmap comprising objectives and schedules for work including decommissioning. The roadmap was approved by the Government-TEPCO Mid-to-Long Term Response Council in December 2011. The Roadmap is based on the principles of guaranteeing safety and transparency, and continuous reassessment of the roadmap itself. It also lays out as clearly as possible the timeline for carrying out various operations and countermeasures over the three-year period following cold shutdown. At present, work is being done to keep the reactors cooled, to continue to stably process standing water, to prevent the spread of ocean contamination, and to reduce the radiation dosages from the radioactive waste produced after the accident.

• Mid-and-Long Term Roadmap for Decommissioning Fukushima Daiichi Nuclear Power Station Units 1–4
http://www.tepco.co.jp/nu/fukushima-np/roadmap/conference-j.html

TEPCO's efforts toward maintaining safety in the future

Up to this point, we have discussed the development of the accident that occurred at Fukushima Daiichi Nuclear Power Station and the issues and lessons from that accident. Currently at TEPCO, we are reflecting on the Fukushima nuclear accident. We have also established a new structure in the company with the president at the top, and are engaged in reforms related to a variety of issues in the Nuclear Power Division, such as safety culture, safety measures, disaster prevention, risk and crisis management, the public release of information, and risk communications. We are making steady progress on these nuclear reforms, and are seeking to achieve safety standards that match the highest in the world.

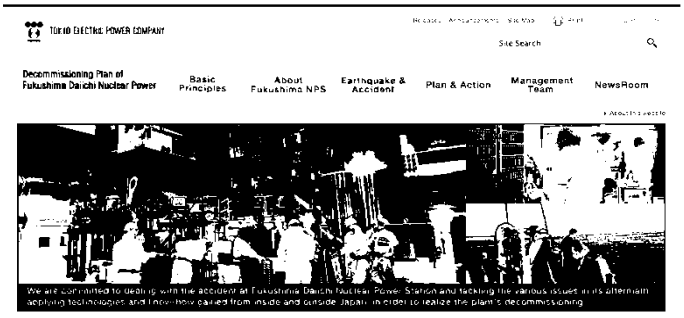
• Efforts toward nuclear reform
http://www.tepco.co.jp/nu/reform/index-j.html

Currently, safety measures of all kinds are being implemented at our nuclear power stations based on the lessons learned from the accident.

These measures are discussed in the 'Equipment Countermeasures Section' of the "Safety Measures at Kashiwazaki-Kariwa Nuclear Power Station".

Regarding the release of information

Information related to the accident at Fukushima Daiichi Nuclear Power Station has been made available at our website, including the current status of each unit at the Fukushima Daiichi and Daini power stations, video reports on the status of the accident, accident investigation reports, and the Mid-and-Long Term Roadmap toward the Decommissioning of Fukushima Daiichi Nuclear Power Station Units 1–4.



• Decommissioning Plan of Fukushima Daiichi Nuclear Power
http://www.tepco.co.jp/en/decommission/index-e.html

*The URLs shown are current as of July 2014. They may change in the future.

Norton, Charles

From: Tateiwa, Kenji <tateiwa.kenji@tepco.co.jp>
Sent: Thursday, January 15, 2015 8:42 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST

Nuclear Sector Colleagues,

Happy New Year!
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 16, 2015 at 2 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (12/25/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf
(English translation as of 11/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141127_01-e.pdf

1-3. Shortening the Length of Circulating Water Cooling System Loop
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_08-j.pdf

1-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

1-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_11-j.pdf

1-8. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (12/26/2014)
(only in Japanese)
2-1. Status of Filling Up Underground Seawater Piping Trenches
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_01.pdf

2-2. Measures to Achieve Incremental Effective Dose Limit at Site Boundary
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_03.pdf

2-3. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_05.pdf

2-4. Leakage of ALPS-Treated Water from J6 Tank Farm
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_06.pdf

3. IAEA to Review Fukushima Daiichi Decommissioning and Kashiwazaki Kariwa Operational Safety (1/7/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247076_6844.html

4. Figures and Video Clips Describing Various Water Management Measures
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

5. Overview of Fukushima Daiichi Accident and Lessons Learned (33 MB)
http://www.tepco.co.jp/en/decommision/accident/images/outline01.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, December 22, 2014 7:59 PM
Subject: [TEPCO Weekly Fukushima Update Call] TUE, Dec. 23 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
TUE, Dec. 23, 2014 at 3 pm Eastern Standard Time
(**No call next two weeks**. Next call will be on **Fri, Jan. 16, 2015** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (12/19/2014)
(only in Japanese)
1-1. Removal of Cs and Sr from Seawater, etc.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_03-j.pdf

1-2. Unit 1 Reactor Building Refueling Floor Inspection Results
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_05-j.pdf

1-3. Applicability of Plastic Scintillation Fiber (PSF) to Detect Minor Leakage from Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_07-j.pdf

1-4. Leakage of ALPS-Treated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_08-j.pdf

1-5. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_09-j.pdf

2. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool (12/22/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

2-1. Video Clip Summarizing Path to Success (6 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w220b15k&catid=61795

2-2. Video Message from Mr. Hirose, TEPCO's President (5 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w785h9cj&catid=61783

2-3. Explanation Slides (only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141222_04-j.pdf

Happy holidays to you all!

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 11, 2014 10:07 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 12 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 12th, 2014 at 3 pm Eastern Standard Time
(**No call next week**. Next call will be on **TUE, Dec. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Overview of Measures to Treat Contaminated Water
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

2. Explanation on Subdrain and Groundwater Drain Systems to the Fishermen's Association of Iwaki City (12/10/2014)
(only in Japanese)
2-1. Confirmation of Stable Performance in Removing Radionuclides from Subdrain and Groundwater Drain
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_06-j.pdf

2-2. Basic Concept of Operating the Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_07-j.pdf

2-3. Detection of High Concentration of Radioactivity from Subdrain Pits # 18/19 and Measures Taken
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_09-j.pdf

3. Approval by NRA on Design Modification to add Sr Removal Capability to SARRY (Cs Removal) System (12/11/2014)
(only in Japanese; 8.8 MB, 372 pages)
http://www.tepco.co.jp/cc/press/betu14_j/images/141211j0101.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 04, 2014 9:35 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 5th, 2014 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Dec. 12** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Contaminated Water Countermeasures Committee (11/13/2014)
(only in Japanese)
1-1. Status of Contaminated Water Countermeasures and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_03-j.pdf

1-2. Recent Topics at 1F
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_04-j.pdf

1-3. Task Force on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_06-j.pdf

1-4. Demonstration Test for High-performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_07-j.pdf

1-5. Task Force on Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_08-j.pdf

1-6. Study on Shallow Ground Disposal of Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_09-j.pdf

1-7. Status of Contaminated Water Treatment Technology Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_10-j.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (11/25/2014)
(only in Japanese)
2-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_03-j.pdf

2-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_04-j.pdf

2-3. Procedure for Closure of Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_05-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (11/27/2014)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_05-j.pdf

3-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_07-j.pdf

3-4. Environmental Radion Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_08-j.pdf

3-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_10-j.pdf

3-6. 3D Laser Scanning in Unit 1 Torus Room
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_11-j.pdf

3-7. Solid Radioactive Waste Treatment and Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_12-j.pdf

3-8. Progress on Emergency Safety Enhancement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_14-j.pdf

4. Introduction of ICP-MS Method Allowing Quicker Measurement of Sr-90 in Water
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141127_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, November 24, 2014 10:51 AM
Subject: NO CALL THIS WEEK [TEPCO Weekly Fukushima Update Call] Next on Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Due to unavoidable change in schedule, I will have to **cancel the call planned for tomorrow (Tue, Nov. 25**.)
Next call will be on **Fri, Dec. 5th** at 3 PM.

Apologies for any inconvenience this may cause you.
Feel free to contact me should you have any questions.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Wednesday, November 12, 2014 7:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] THU, Nov. 13 at 3 pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
THU, Nov. 13, 2014 at 3 pm Eastern Standard Time
(**No call next week.** Next call will be on **TUE, Nov. 25** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Unit 1 Reactor Building Cover Roof Panel Removal (11/10/2014)
http://photo.tepco.co.jp/en/date/2014/201411-e/141110-01e.html

2. TEPCO's Statement on Detection of Trace Amounts of Cs-134 Off U.S. West Coast (11/11/2014)
http://www.tepco.co.jp/en/press/corp-com/release/2014/1243939_5892.html

2.1 Woods Hole Oceanographic Institution's Press Release
http://www.whoi.edu/news-release/Fukushima-detection

2.2 Discussion Board on the New REDDIT Journal of Science
http://www.reddit.com/r/science/comments/2lusz5/science_ama_series_im_ken_buesseler_an/?limit=500

3. Radioactivity in Seawater Near Fukushima Daiichi (11/12/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/index-e.html

3.1 Inside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/intake_canal_map-e.pdf

3.2 Outside the Port of 1F
http://www.tepco.co.jp/en/nu/fukushima-np/f1/smp/2014/images/seawater_map-e.pdf

4. Summary Status of Decommissioning Roadmap--English Translation (9/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d140925_01-e.pdf

5. Large-Scale Emergency Drill at Kashiwazaki Kariwa NPS (11/11/2014)
(only in Japanese)
http://www.tepco.co.jp/nu/kk-np/info/tohoku/2014/pdf/26110702.pdf

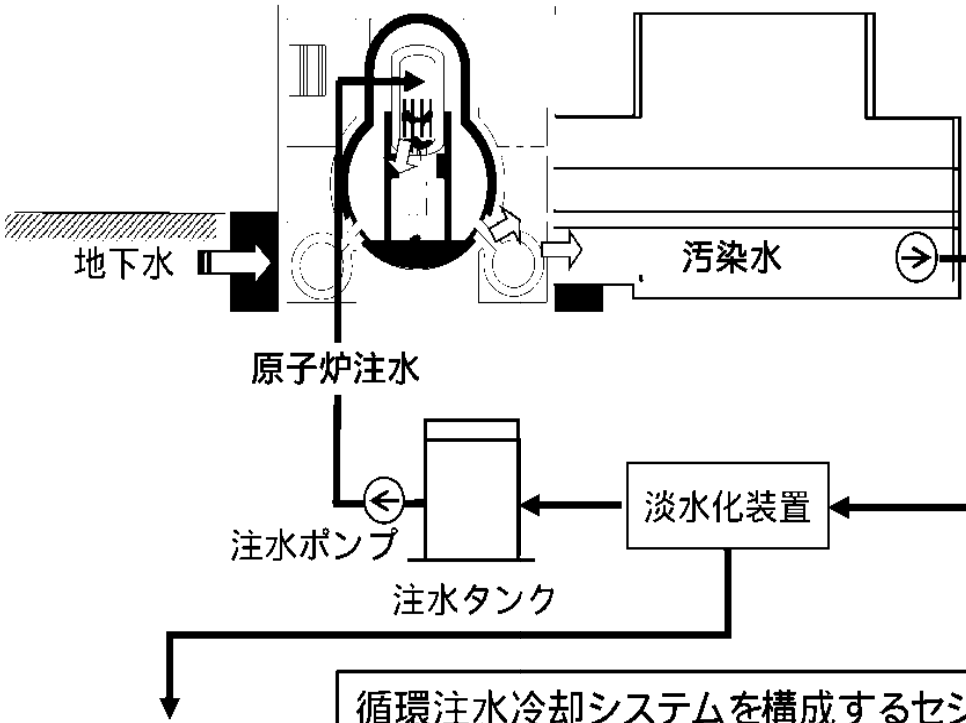
(photos)
http://photo.tepco.co.jp/en/date/2014/201411-e/141111-01e.html

All the best,
Kenji

セシウム吸着装置／第二セシウム吸着装置における ストロンチウム除去について

<参考資料>
平成27年1月19日
東京電力株式会社

≪循環注水冷却システム≫



セシウム吸着装置（KURION）／
第二セシウム吸着装置（SARRY）

貯蔵タンク
（Sr処理水※1）

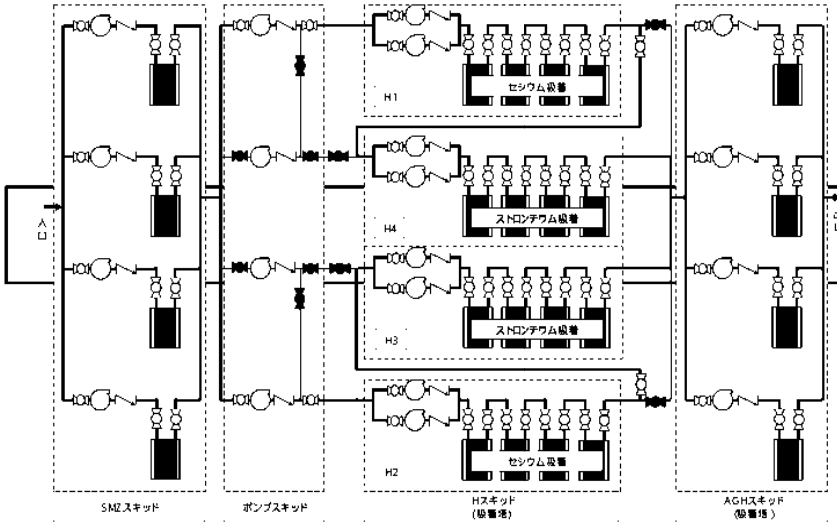
循環注水冷却システムを構成するセシウム吸着装置／第二セシウム吸着装置でセシウムの他にストロンチウム（Sr）を除去することで，タンク貯留水のリスクを低減

※1 セシウム吸着装置・第二セシウム吸着装置でのS除去、RO濃縮水処理設備およびモバイル型S除去装置の処理済水を総称したもの。

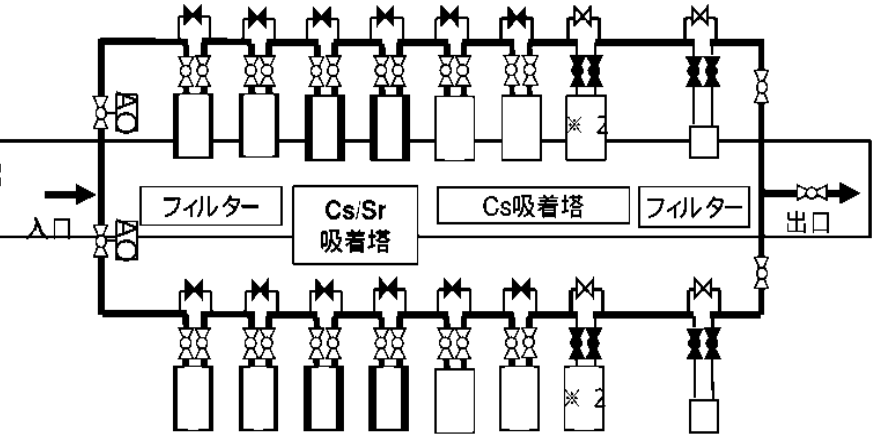
東京電力 TEPCO

セシウム吸着装置 / 第二セシウム吸着装置のSr除去について

≪セシウム吸着装置≫



≪第二セシウム吸着装置≫



※ 2 水質の変動に備えてCs吸着塔 1塔をスタンバイとする。

■Sr処理運転の実績
- セシウム吸着装置：平成27年1月6日～1月10日 [現在待機中]
- 第二セシウム吸着装置：平成26年12月26日より運転継続中

■Srの除去状況
- 入口Sr濃度：10^4Bq/cm^{3}オーダ，出口Sr濃度：10^2Bq/cm^{3}オーダであり，Srの濃度が低減されていることを確認済。

■Sr処理水の貯蔵について
- セシウム吸着装置，第二セシウム吸着装置による処理済水は，本日（1/19）11:00頃～，Sr処理水として貯蔵を開始した。

トレンチ内の汚染水除去の取組み（１）

平成２７年１月
東京電力株式会社

参考④

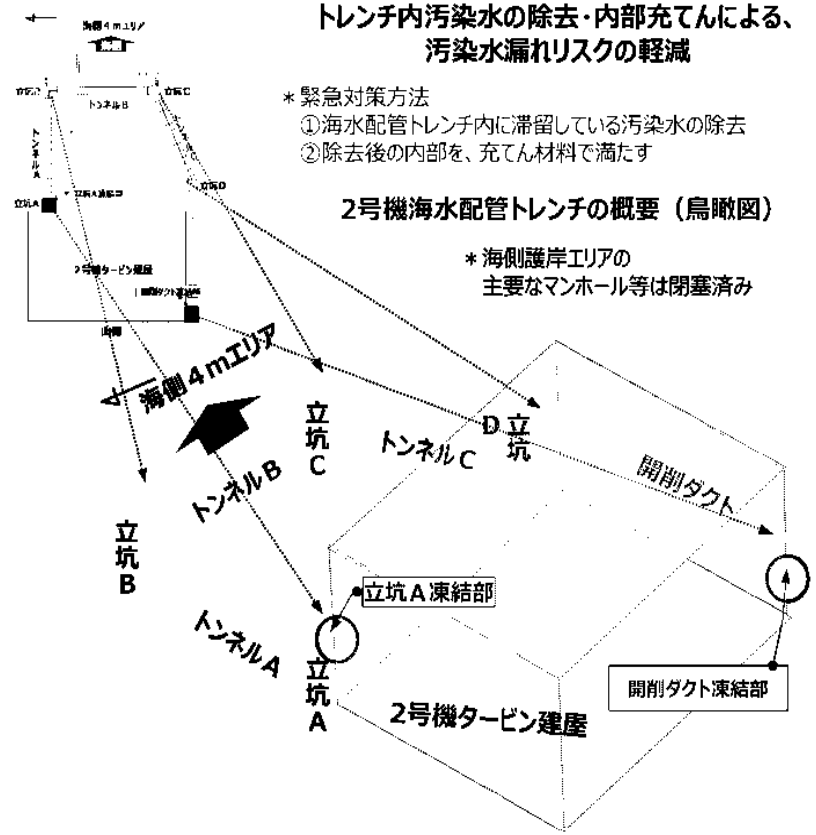
１．対策の目的について

トレンチ内汚染水の除去・内部充てんによる、汚染水漏れリスクの軽減

＊緊急対策方法
①海水配管トレンチ内に滞留している汚染水の除去
②除去後の内部を、充てん材料で満たす

2号機海水配管トレンチの概要（鳥瞰図）

＊海側護岸エリアの
主要なマンホール等は閉塞済み



２．これまでの進捗（2号機のタービン建屋とトレンチ間の止水）

項目	時期	詳細
①凍結管による止水の開始	4月～	立坑Aの止水（4月）、開削ダクトの止水(6月）開始
②凍結状況確認	8月	氷等の投入も実施し、約9割の凍結状況を確認
③止水促進	11月 6日 <完了>	止水を促進するため、凍結位置とタービン建屋の間にコンクリート等による間詰めを実施
④揚水試験の実施	11月17日	揚水試験を実施し、ポンプの稼働により、建屋と立坑Cで約20cmの水位差を確保出来ることを確認
⑤充てん作業の実施	11月25日～	充てんを開始し、12月18日トンネル部の充てん完了

３．水抜き・充てんの準備

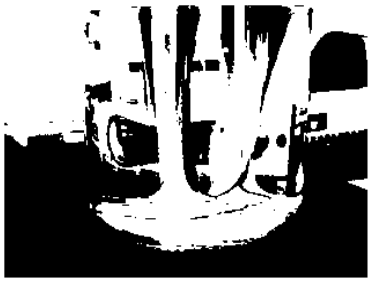
（１）汚染水除去に向けた準備　（2号機の状況）

①立坑にポンプを設置
②水位を監視するため水位計を設置

（２）充てん試験

・トレンチ内のトンネル、立坑及び内部の配管等を充てんするため、充てん試験を実施
・充てんを確実に行うため、水中での不分離性、流動性、高い充てん性を試験で確認

①水中不分離性の確認



水中に充てん材を直接投入しても
材料は分離しない
↔左写真参照
（高い水中不分離性）

※施工時は、管にて底の方から慎重に
充てん材を打設

②高い流動性の確認

約100mの水槽の片側から充てん材を
打設し、反対側から到達を確認し、
充てん材の状況を確認
※H26.9.8、H26.10,10
（高い流動性）

③充てん性の確認

水槽による充てん試験により、
配管等のすき間にも充てん
することを確認（高い充てん性）
※左写真：ケーブルトレー部分参照

↔②の流動性を確認する試験時に
充てん材が到達する箇所に
配管を設置し、状況を確認したもの

無断複製・転載禁止　東京電力株式会社

トレンチ内の汚染水除去の取組み（２）

４．水抜き･充てんの手順（2号機）

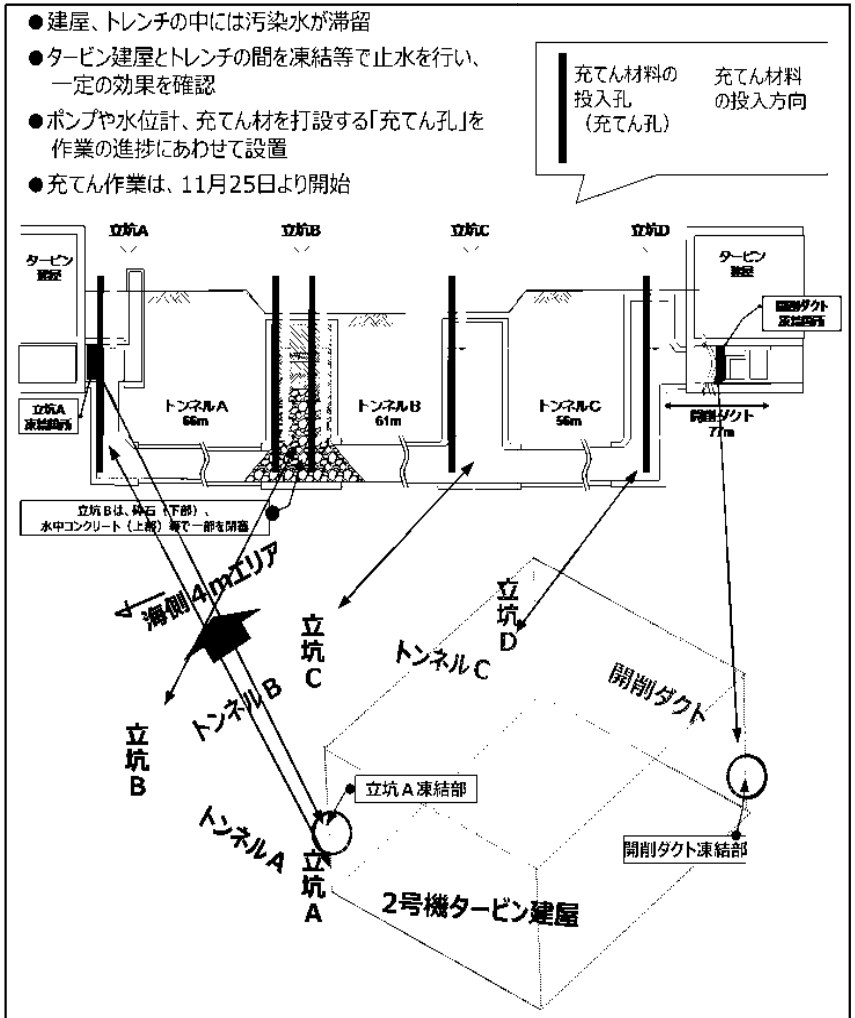
汚染水をあふれさせないように、水抜き･充てんを実施

水位を監視しながら、水抜き･充てんを実施

汲み上げた汚染水は、タービン建屋等へ移送

（１）2号機における「海水配管トレンチ」の充てん前の状況

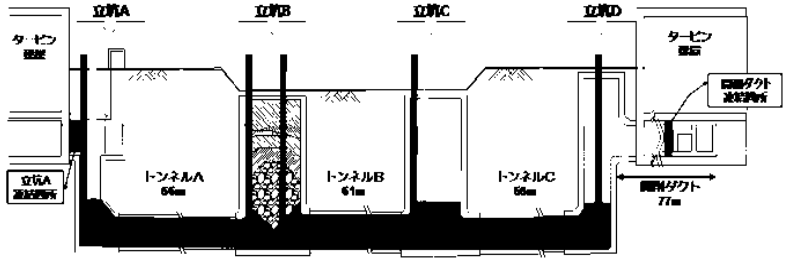
- 建屋、トレンチの中には汚染水が滞留
- タービン建屋とトレンチの間を凍結等で止水を行い、一定の効果を確認
- ポンプや水位計、充てん材を打設する「充てん孔」を作業の進捗にあわせて設置
- 充てん作業は、11月25日より開始



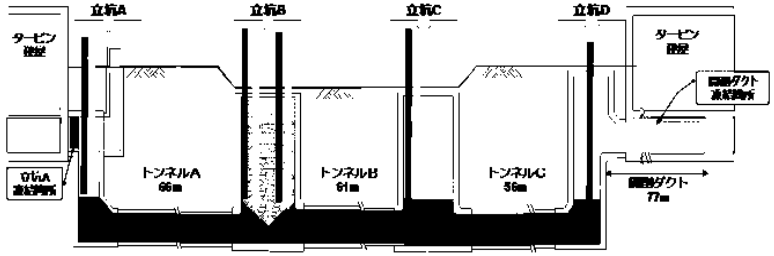
（２）2号機の海水配管トレンチ内の水抜き･充填（実施中）

●充てん材は、流動性、充てん性等が良いことから、低い位置にあるトンネル部（水平の部分） から水抜き、充てんを実施

①最初に行うトンネルの水平部分の充てんイメージ（ ■ ）
１２月１８日充てん完了



②次に行う立坑等の垂直部分の充てんイメージ（ ）
現在、立坑の充てんに向けて、施工方法の検討を実施中



他の海水配管トレンチの検討状況
2号機の経験を生かして３，４号機の海水配管トレンチに関しても、充てんの検討等を実施中

無断複製・転載禁止　東京電力株式会社

サブドレン及び地下水ドレンの運用方針の基本的な考え方（案）

参考①-1

1．基本的な考え方

（1）排水する水は地下水バイパスの運用目標を更に厳格化した運用目標を設定

核種	セシウム134	セシウム137	全ベータ	トリチウム
ベクレル／リットル	1	1	3（1）※	1,500

※おおむね10日に1回程度のモニタリングで1ベクレル／リットル未満を確認

（2）サブドレン、地下水ドレンの効果を最大限発揮する。

（3）サブドレン、地下水ドレン以外の水は混合しない。（希釈は行わない）

2．それぞれの核種での対応

（1）セシウム及び全ベータ（ストロンチウム90等）

一時貯水タンクにおいて地下水バイパスの運用目標以上の場合は、再度、浄化設備で浄化し、運用目標未満になるまで繰り返す。運用目標未満になるまでは海洋へは排水しない。

また、中継タンク及び集水タンクでもセシウム134及び137、全ベータの分析を適切な頻度で実施し、再浄化を行う事態を未然に防ぐ。

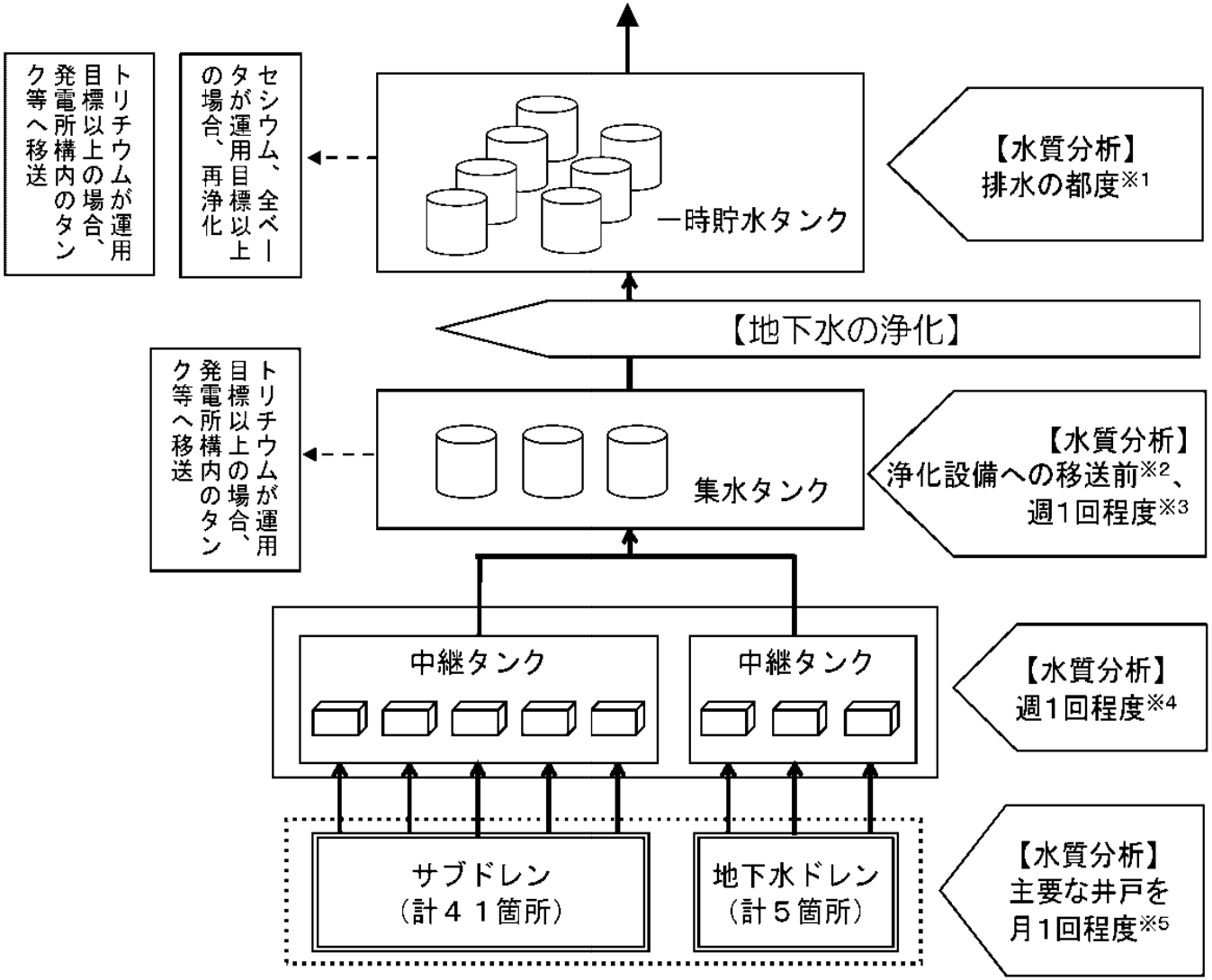
（2）トリチウム

一時貯水タンクにおいて地下水バイパスの運用目標以上の場合は、海洋へは排水せず、構内のタンクへ移送。

また、集水タンク毎に監視分析を実施するとともに、運用目標以上の場合は浄化設備に移送せず、構内タンク等へ移送し貯留するなど、未然に一時貯水タンクでの超過を防ぐ。

サブドレン・地下水ドレンの水質管理方法（1／2）

運用目標を満たしていることを確認して排水



※1　セシウム134、同137,全ベータ、トリチウムが運用目標未満であること、その他ガンマ核種が検出されていないことを確認。

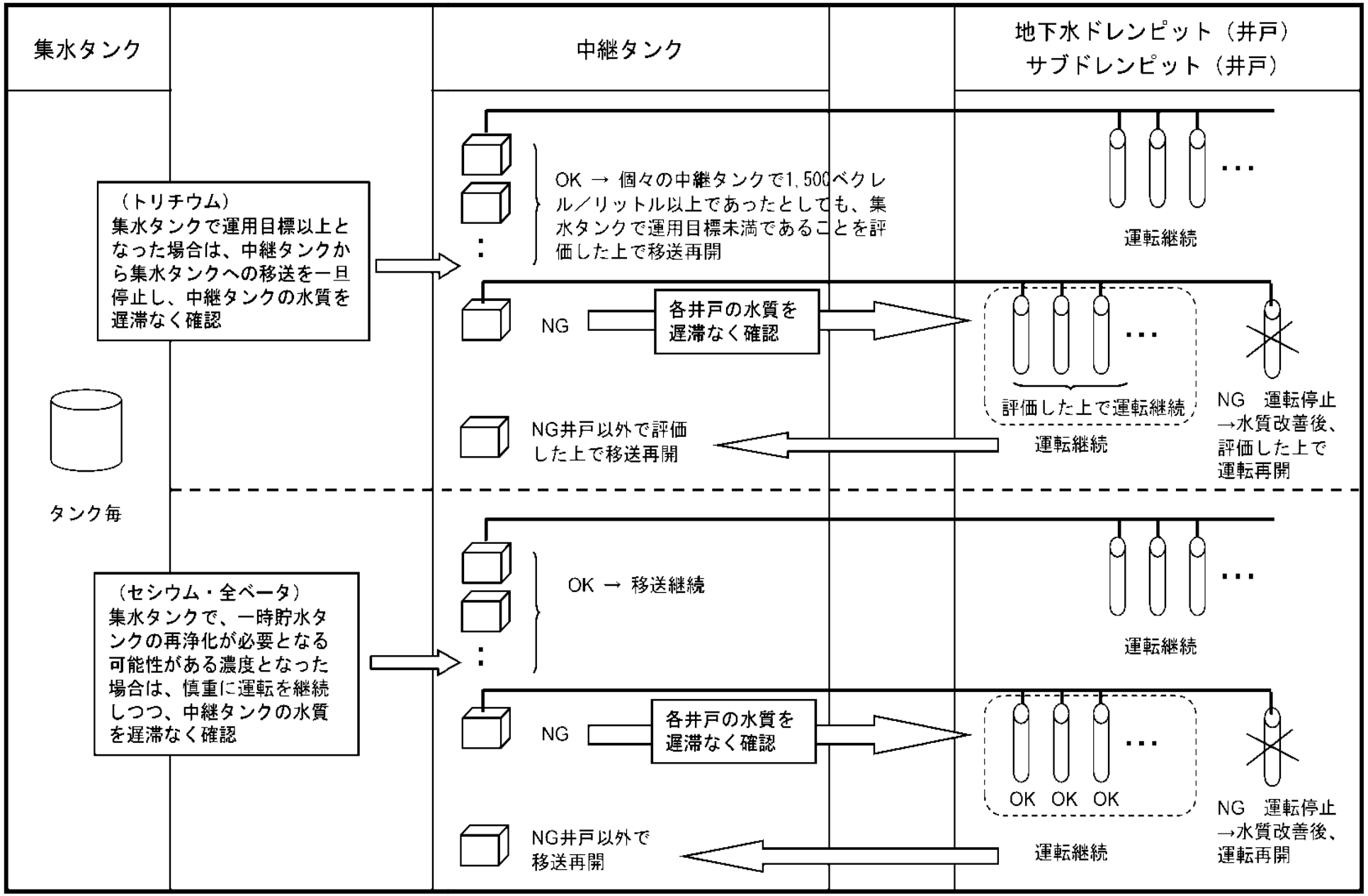
※2　トリチウムは浄化設備で浄化できないため、またセシウム134、同137は浄化設備での浄化機能の把握及び水質が急激に悪化する可能性に鑑みた傾向把握のため、浄化設備に移送する前、タンク毎に実施。

※3　全ベータは浄化設備での浄化機能の把握および水質の傾向把握のため、週１回程度実施。

※4　トリチウムは、中継タンクによっては、1,500ベクレル／リットル以上のものもありうるが、集水タンクで確実に運用目標未満となるよう、測定した濃度と移送量を踏まえ、中継タンクで集水タンクにおけるトリチウム濃度の評価を実施。セシウム134,同137,全ベータは、傾向把握のため実施。

※5　対象数が多いことや作業員の被ばく管理の観点から井戸毎の管理は実施しないが、確実に運用目標を満たすための傾向監視を目的に、主要な井戸の水質分析を1回／月程度実施。

サブドレン・地下水ドレンの水質管理方法（2／2）



サブドレン・地下水ドレンの水質分析（案）

《一時貯水タンクに溜めた水（浄化後）》

排出毎
（排出前に分析）

東京電力　及び

第三者機関（三菱原子燃料（株）、又は（株）化研、ほか調整中）【注1】

✓ 運用目標値より低い検出限界値で分析

《運用目標値》　【単位：ベクレル／リットル】

セシウム134	セシウム137	全ベータ	トリチウム
1	1	3	1，500

（参考1：告示濃度限度）

セシウム134	セシウム137	ストロンチウム90	トリチウム
60	90	30	60，000

（参考2：WHO飲料水水質ガイドライン）

セシウム134	セシウム137	ストロンチウム90	トリチウム
10	10	10	10，000

10日に1回程度
〔10日を超えない期間に1回〕

東京電力　及び

第三者機関（三菱原子燃料（株）、又は（株）化研、ほか調整中）

✓ 全ベータをより低い検出限界値（1ベクレル／リットル未満）で分析

月2回
（毎月初回浄化分）

東京電力　及び

第三者機関（（財）日本分析センター、（株）化研）【注1】

国の機関（(独)日本原子力研究開発機構）

✓ 排水毎の分析よりも検出限界値を下げ、核種を増やして詳細に分析
【単位：ベクレル／リットル】

〔セシウム134：約0．01、セシウム137：約0．01、ストロンチウム90：約0．01
全ベータ：約1、全アルファ：約4、トリチウム：約1～10〕

（1ヶ月分の排出水を加重平均したサンプル）

東京電力　及び

第三者機関（（財）日本分析センター、（株）化研）

✓ （加重平均サンプルにより）排出総ベクレル数を算出
分析精度は毎月初回浄化分と同じ

《集水タンクに溜めた水（サブドレン他浄化設備に移送する前）》

タンク毎
（サブドレン等浄化設備に移送する前に分析）

東京電力

✓ トリチウム監視分析【注2】により、運用目標である1，500ベクレル／リットルを下回ることを確認
✓ セシウム134,137の急激な変化が無いか監視（トリチウム分析と同時）

週1回

東京電力

✓ 浄化設備の浄化機能把握のため、全ベータを分析

《中継タンクの水（集水タンク移送前）》

週1回
・中継タンク（8基）を週1回の頻度で分析

東京電力

✓ トリチウム迅速分析により、集水タンクのトリチウム濃度に影響を与えないよう、傾向監視
✓ セシウム134,137、全ベータの傾向監視

（注1）**三菱原子燃料、化研、日本分析センター**は、東京電力と資本関係のない分析機関で、上記の他、必要に応じて追加的な分析も行う。
（注2）トリチウム監視分析とは、トリチウムのおおよその濃度を短期間で把握する手法であり、通常分析で約1.5日のところ約6時間で算出するもの。

Reference
January 19, 2015
Tokyo Electric Power Company

Regarding the fatal accident at Fukushima Daiichi NPS involving a cooperative company employee working on a rainwater receptacle tank

東京電力
TEPCO

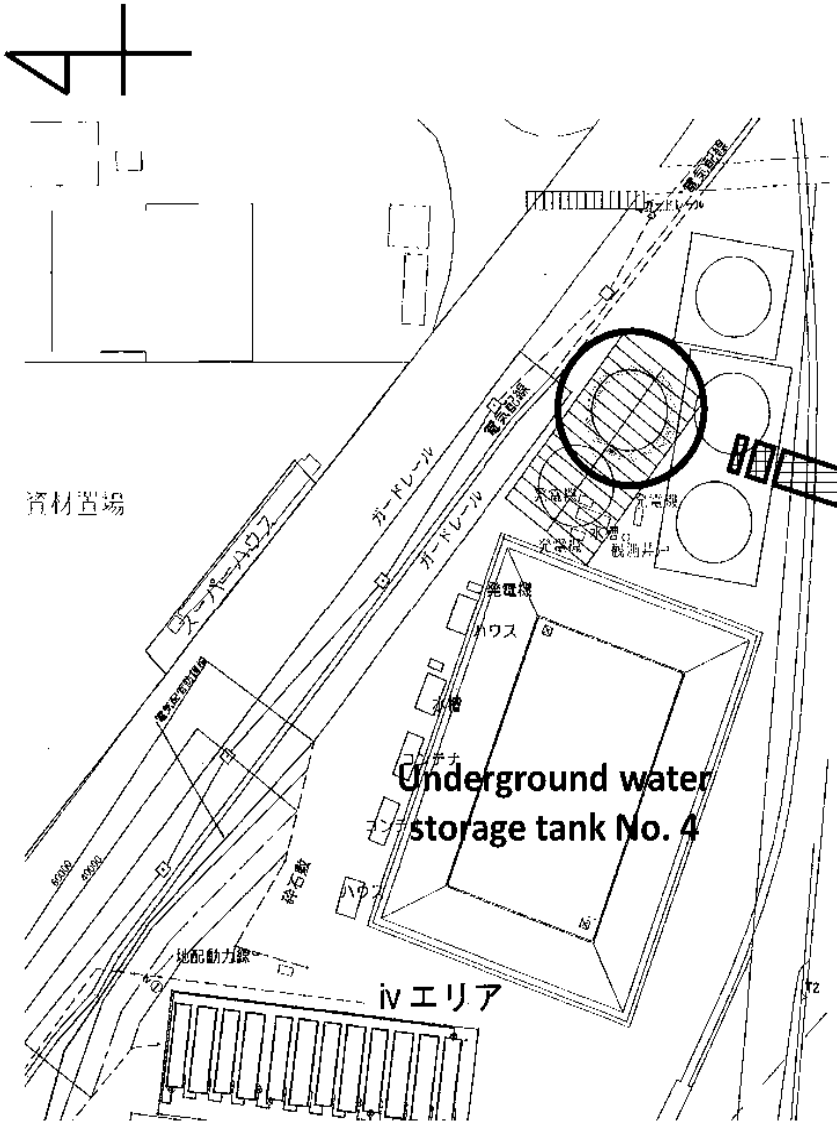
1. Accident Overview

Date and time:	Around 9:06 AM, January 19, 2015
Site:	Rainwater receiving tank No. 2 (on the east side of No. 4 underground storage tank area.)
Accident occurrence:	To conduct a water leakage check inside the rainwater receptacle tank No. 2 currently under construction in the J tank area, one Tepco employee and two workers from a cooperative company subcontracted by one of the construction partners entered the tank from a manhole located at the lower part on the side of the tank. The interior was too dark for the inspection, so one of the two workers climbed up to the top of the tank to let sunlight into the tank by moving the cover on the top plate. During this process, he fell with cover (weight approx. 51 kg) from the plate to the bottom of the tank (height: approx. 10 m)

Timeline

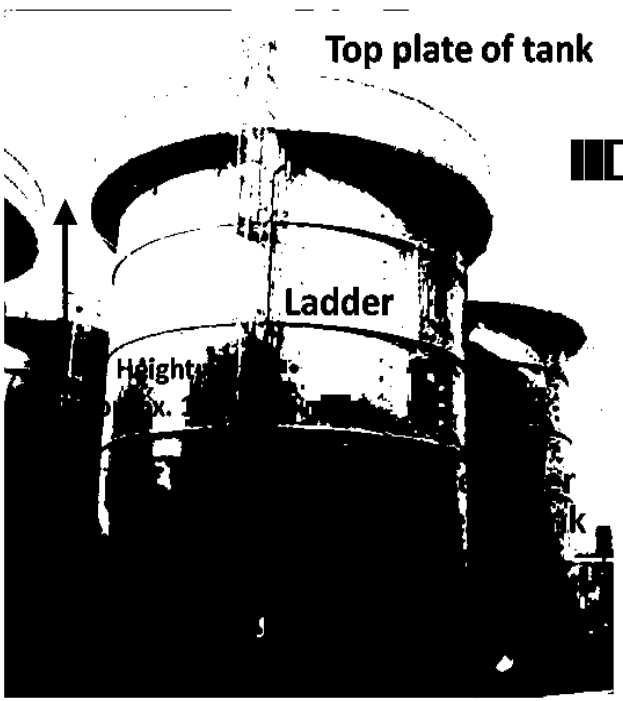
Around 9:06 AM	Accident occurred.
9:43	The victim transported to the emergency medical room (conscious, and no exposure to radiation)
10:08	A medical evacuation helicopter assigned. Note* The victim was ultimately transported by ambulance due to the bad weather conditions which made flying impossible.
10:31	The victim transported to the Iwaki-Kyoritsu Hospital by ambulance.
11:43	The victim arrived at the Iwaki-Kyoritsu Hospital.

2. Accident site

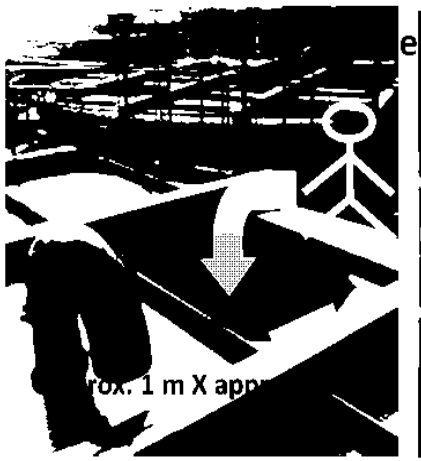


Rainwater receptacle tank No.2

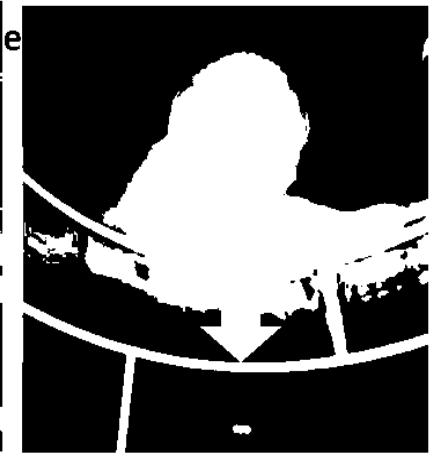
3. Accident situation



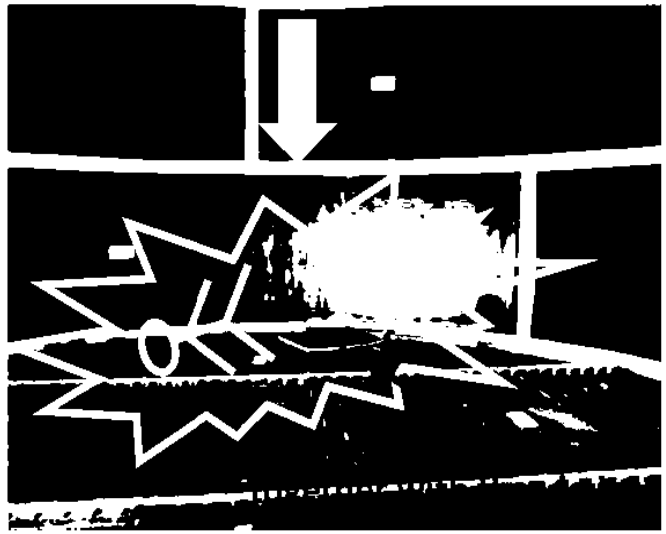
Rainwater receptacle tank No. 2



Top plate of the tank



Inside the tank



Tank bottom

Victim: Male in his fifties.

Injuries: Pneumothorax on the left side, the 4th, 5th, and 6th rib fractures on the left side, pubic and ischial bone fractures on the right side, unstable pelvic fracture, trochanteric fracture of the left femur. (according to the diagnosis made by ER doctor)

Protective gears worn: Tyvek overall, full-face mask, helmet, safety short boots, gloves (cotton gloves and double layered rubber gloves), and safety belt (unconfirmed whether the belt was in use)

Note: No further information on the accident was obtained from the victim before he deceased

4. Responses to the accident

In response to the tragic accident, the following measures have been reinforced among the workers, operators, and employees at the site as well as each cooperative company.

- Adhere to and carry out basic actions thoroughly
- Strict compliance with the work procedures, and
- Each worker to personally focusing on the job they are engaged in.

Norton, Charles

From: Tateiwa, Kenji (mobile) <tateiwa@wash.tepco.com>
Sent: Thursday, January 22, 2015 10:10 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 23, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 23, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 30** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Briefing Materials for Fishermen's Association of Iwaki City (1/16/2015)
(only in Japanese)
1-1. Addition of Sr-Removal Capability to KURION and SARRY Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150119_03-j.pdf
1-2. Illustration of Contaminated Water Removal Process from Underground Piping Trenches
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_10-j.pdf

1-3. Treated Water Discharge Criteria for Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_07-j.pdf

2. Contract Worker Dies After Falling Into Rainwater Receiving Tank at Fukushima Daiichi (1/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150119_01-e.pdf

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: (b)(6)

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 15, 2015 8:41 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST

Nuclear Sector Colleagues,

Happy New Year!
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 16, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (12/25/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf
(English translation as of 11/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141127_01-e.pdf

1-3. Shortening the Length of Circulating Water Cooling System Loop
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_08-j.pdf

1-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

1-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_11-j.pdf

1-8. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (12/26/2014)
(only in Japanese)
2-1. Status of Filling Up Underground Seawater Piping Trenches
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_01.pdf

2-2. Measures to Achieve Incremental Effective Dose Limit at Site Boundary
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_03.pdf

2-3. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_05.pdf

2-4. Leakage of ALPS-Treated Water from J6 Tank Farm
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_06.pdf

3. IAEA to Review Fukushima Daiichi Decommissioning and Kashiwazaki Kariwa Operational Safety (1/7/2015)

http://www.tepco.co.jp/en/press/corp-com/release/2015/1247076_6844.html

4. Figures and Video Clips Describing Various Water Management Measures
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

5. Overview of Fukushima Daiichi Accident and Lessons Learned (33 MB)
http://www.tepco.co.jp/en/decommision/accident/images/outline01.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, December 22, 2014 7:59 PM
Subject: [TEPCO Weekly Fukushima Update Call] TUE, Dec. 23 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
TUE, Dec. 23, 2014 at 3 pm Eastern Standard Time
(**No call next two weeks**. Next call will be on **Fri, Jan. 16, 2015** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (12/19/2014)
(only in Japanese)
1-1. Removal of Cs and Sr from Seawater, etc.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_03-j.pdf

1-2. Unit 1 Reactor Building Refueling Floor Inspection Results
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_05-j.pdf

1-3. Applicability of Plastic Scintillation Fiber (PSF) to Detect Minor Leakage from Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_07-j.pdf

1-4. Leakage of ALPS-Treated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_08-j.pdf

1-5. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_09-j.pdf

2. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool (12/22/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

2-1. Video Clip Summarizing Path to Success (6 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w220b15k&catid=61795

2-2. Video Message from Mr. Hirose, TEPCO's President (5 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w785h9cj&catid=61783

2-3. Explanation Slides (only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141222_04-j.pdf

Happy holidays to you all!

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 11, 2014 10:07 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 12 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 12th, 2014 at 3 pm Eastern Standard Time
(**No call next week**. Next call will be on **TUE, Dec. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Overview of Measures to Treat Contaminated Water
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

2. Explanation on Subdrain and Groundwater Drain Systems to the Fishermen's Association of Iwaki City (12/10/2014)
(only in Japanese)
2-1. Confirmation of Stable Performance in Removing Radionuclides from Subdrain and Groundwater Drain
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_06-j.pdf

2-2. Basic Concept of Operating the Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_07-j.pdf

2-3. Detection of High Concentration of Radioactivity from Subdrain Pits # 18/19 and Measures Taken
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_09-j.pdf

3. Approval by NRA on Design Modification to add Sr Removal Capability to SARRY (Cs Removal) System (12/11/2014)
(only in Japanese; 8.8 MB, 372 pages)
http://www.tepco.co.jp/cc/press/betu14_j/images/141211j0101.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 04, 2014 9:35 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, **Dec. 5**th, 2014 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Dec. 12** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: (b)(6)

[Major topics]
1. Contaminated Water Countermeasures Committee (11/13/2014)
(only in Japanese)
1-1. Status of Contaminated Water Countermeasures and Risk Map
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_03-j.pdf

1-2. Recent Topics at 1F
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_04-j.pdf

1-3. Task Force on Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_06-j.pdf

1-4. Demonstration Test for High-performance ALPS
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_07-j.pdf

1-5. Task Force on Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_08-j.pdf

1-6. Study on Shallow Ground Disposal of Tritiated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_09-j.pdf

1-7. Status of Contaminated Water Treatment Technology Demonstration Testing
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/c141113_10-j.pdf

2. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (11/25/2014)
(only in Japanese)
2-1. Status of Onsite Work Related to Contaminated Water Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_03-j.pdf

2-2. Response to Issues Raised at the Coordination Meeting
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_04-j.pdf

2-3. Procedure for Closure of Frozen Soil Wall
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141125_05-j.pdf

3. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (11/27/2014)
(only in Japanese)
3-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_04-j.pdf

3-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_05-j.pdf

3-3. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_07-j.pdf

3-4. Environmental Radion Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_08-j.pdf

3-5. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_10-j.pdf

3-6. 3D Laser Scanning in Unit 1 Torus Room
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_11-j.pdf

3-7. Solid Radioactive Waste Treatment and Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_12-j.pdf

3-8. Progress on Emergency Safety Enhancement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141127_14-j.pdf

4. Introduction of ICP-MS Method Allowing Quicker Measurement of Sr-90 in Water
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2014/images/handouts_141127_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, November 24, 2014 10:51 AM
Subject: NO CALL THIS WEEK [TEPCO Weekly Fukushima Update Call] Next on Fri, Dec. 5 at 3pm EST

Nuclear Sector Colleagues,

Due to unavoidable change in schedule, I will have to **cancel the call planned for tomorrow (Tue, Nov. 25**.)
Next call will be on **Fri, Dec. 5th** at 3 PM.

Apologies for any inconvenience this may cause you.
Feel free to contact me should you have any questions.

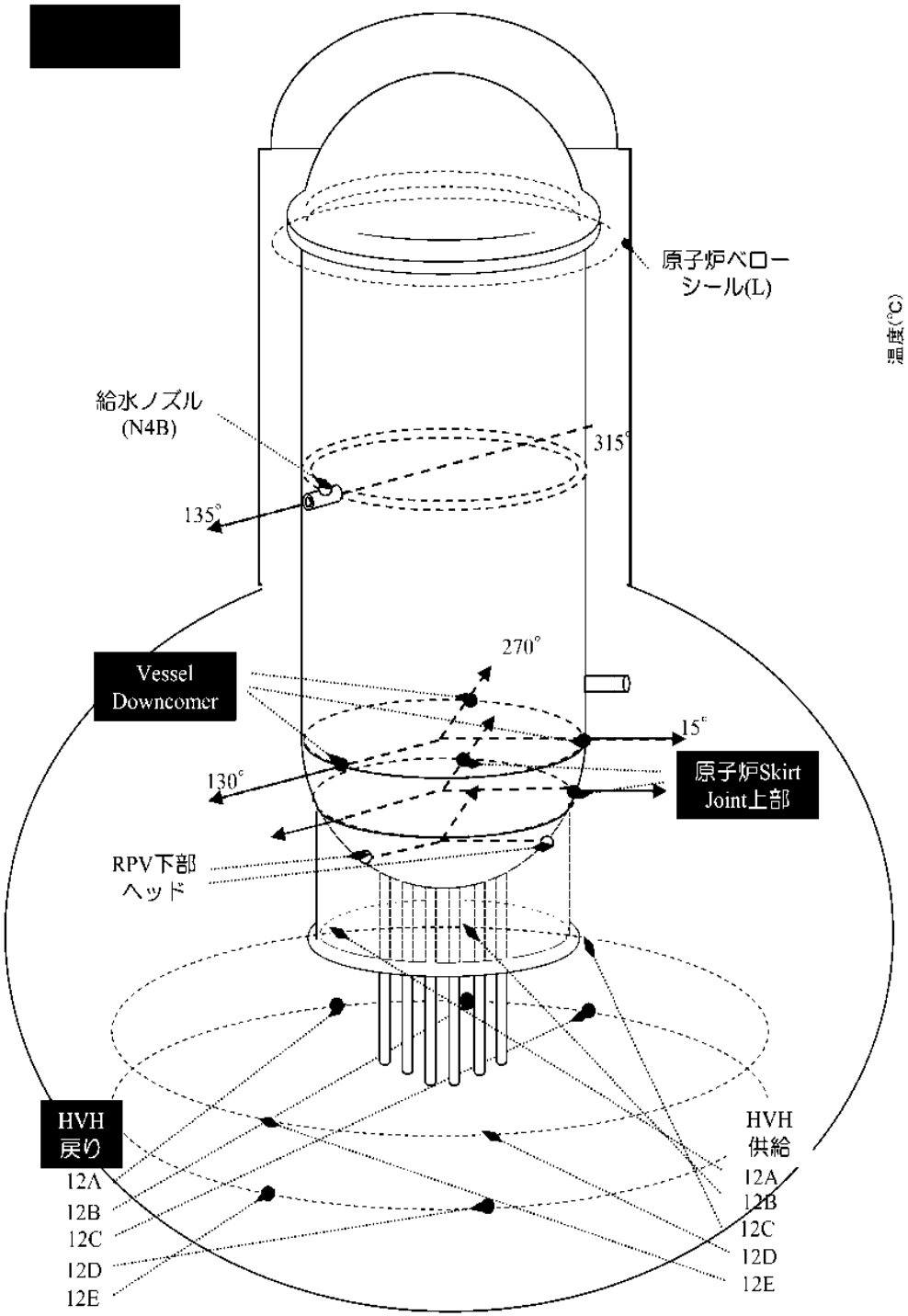
All the best,
Kenji

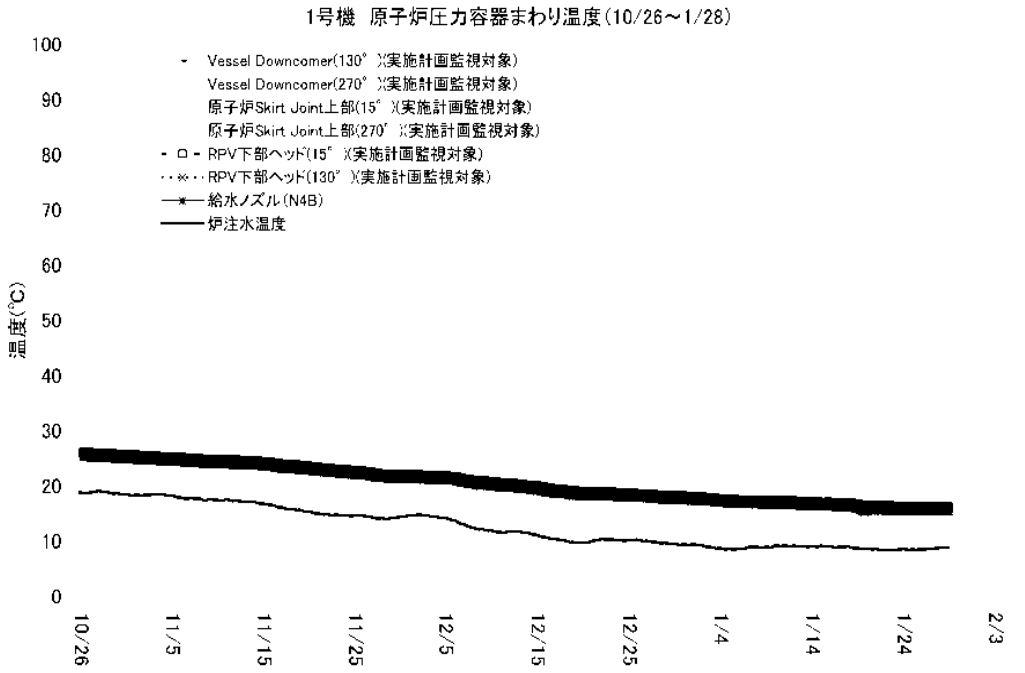
福島第一原子力発電所　プラント関連パラメータ

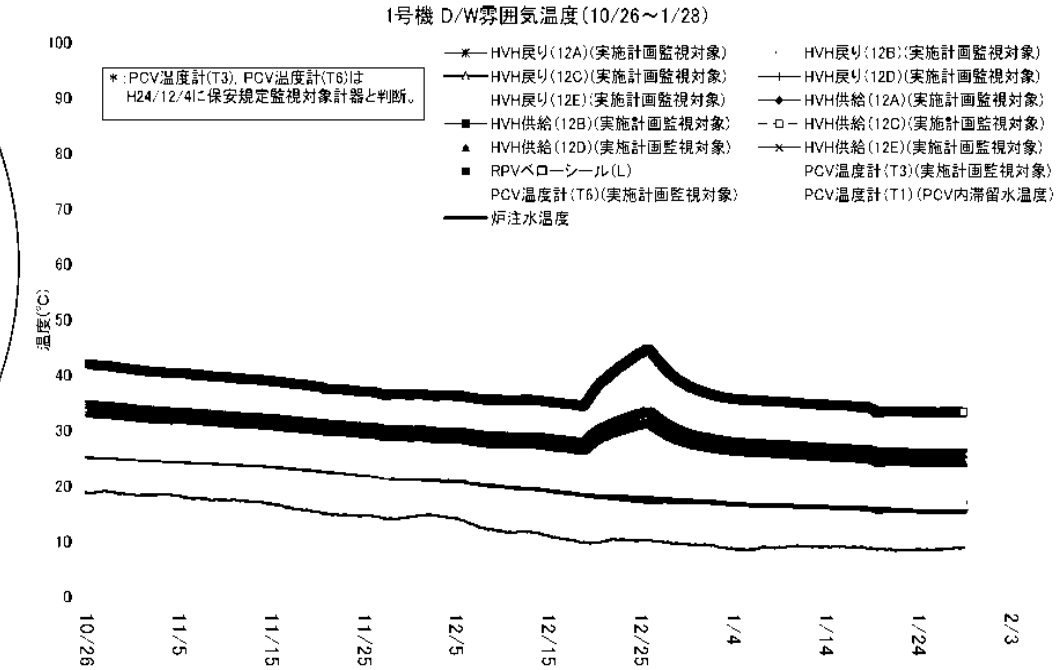
号機	1号機		2号機		3号機		4号機	
	12月24日	1月28日	12月24日	1月28日	12月24日	1月28日	12月24日	1月28日
原子炉注水状況	給水系：2.6m³/h CS系：2.0m³/h （12/24 11:00 現在）	給水系：2.5m³/h CS系：1.9m³/h （1/28 11:00 現在）	給水系：2.0m³/h CS系：2.3m³/h （12/24 11:00 現在）	給水系：1.9m³/h CS系：2.3m³/h （1/28 11:00 現在）	給水系：2.0m³/h CS系：2.4m³/h （12/24 11:00 現在）	給水系：1.9m³/h CS系：2.5m³/h （1/28 11:00 現在）	－	－
原子炉圧力容器底部温度	VESSEL BOTTOM HEAD （TE 263-69L1）：18.7℃ 原子炉 SKIRT JOINT 上部 （TE-263-69H1）：18.6℃ VESSEL DOWN COMMER （TE 263-69G2）：18.6℃ （12/24 11:00 現在）	VESSEL BOTTOM HEAD （TE 263-69L1）：16.2℃ 原子炉 SKIRT JOINT 上部 （TE-263-69H1）：16.1℃ VESSEL DOWN COMMER （TE 263-69G2）：16.1℃ （1/28 11:00 現在）	VESSEL WALL ABOVE BOTTOM HEAD （TE-2-3-69H3）：24.5℃ （12/24 11:00 現在）	VESSEL WALL ABOVE BOTTOM HEAD （TE-2-3-69H3）：21.7℃ （1/28 11:00 現在）	RPV下部ヘッド温度 （TE 2-3-69L1）：22.6℃ スカートジャンクション上部温度 （TE-2-3-69H1）：22.7℃ RPV底部ヘッド上部温度 （TE 2-3-69H1）：20.6℃ （12/24 11:00 現在）	RPV下部ヘッド温度 （TE 2-3-69L1）：19.3℃ スカートジャンクション上部温度 （TE-2-3-69H1）：19.4℃ RPV底部ヘッド上部温度 （TE 2-3-69H1）：17.5℃ （1/28 11:00 現在）		
原子炉格納容器内温度	HVH-12A RETURN AIR （TE-1625A）：19.0℃ HVH-12A SUPPLY AIR （TE-1625F）：18.4℃ （12/24 11:00 現在）	HVH-12A RETURN AIR （TE-1625A）：16.5℃ HVH-12A SUPPLY AIR （TE-1625F）：16.0℃ （1/28 11:00 現在）	RETURN AIR DRYWELL COOLER （TE-16-114B）：26.9℃ SUPPLY AIR D/W COOLER HVH2-16B （TE-16-114G#1）：24.3℃ （12/24 11:00 現在）	RETURN AIR DRYWELL COOLER （TE-16-114B）：23.7℃ SUPPLY AIR D/W COOLER HVH2-16B （TE-16-114G#1）：21.6℃ （1/28 11:00 現在）	格納容器空調機戻り空気温度 （TE-16-114A）：22.1℃ 格納容器空調機供給空気温度 （TE-16-114F#1）：20.1℃ （12/24 11:00 現在）	格納容器空調機戻り空気温度 （TE-16-114A）：19.1℃ 格納容器空調機供給空気温度 （TE-16-114F#1）：17.9℃ （1/28 11:00 現在）		
原子炉格納容器圧力	4.3kPa g （12/24 11:00 現在）	4.1kPa g （1/28 11:00 現在）	6.28kPa g （12/24 11:00 現在）	4.43kPa g （1/28 11:00 現在）	0.21kPa g （12/24 11:00 現在）	0.18kPa g （1/28 11:00 現在）		
窒素封入流量※1	RPV：28.96Nm³/h PCV：-Nm³/h ※2 （12/24 11:00 現在）	RPV：28.42Nm³/h PCV：-Nm³/h ※2 （1/28 11:00 現在）	RPV：15.92Nm³/h PCV：-Nm³/h ※2 （12/24 11:00 現在）	RPV：15.95Nm³/h PCV：-Nm³/h ※2 （1/28 11:00 現在）	RPV：16.97Nm³/h PCV：-Nm³/h ※2 （12/24 11:00 現在）	RPV：17.00Nm³/h PCV：-Nm³/h ※2 （1/28 11:00 現在）		
原子炉格納容器水素濃度　※3	A系：0.05vol% B系：0.06vol% （12/24 11:00 現在）	A系：0.03vol% B系：0.02vol% （1/28 11:00 現在）	A系：0.09vol% B系：0.07vol% （12/24 11:00 現在）	A系：0.06vol% B系：0.05vol% （1/28 11:00 現在）	A系：0.09vol% B系：0.08vol% （12/24 11:00 現在）	A系：0.07vol% B系：0.07vol% （1/28 11:00 現在）		
原子炉格納容器放射能濃度（Xe135）	A系：9.02E-04Bq/cm³ B系：1.14E-03Bq/cm³ （12/24 11:00 現在）	A系：1.08E-03Bq/cm³ B系：1.27E-03Bq/cm³ （1/28 11:00 現在）	A系：ND（2.1E-01Bq/cm³以下） B系：ND（2.0E-01Bq/cm³以下） （12/24 11:00 現在）	A系：ND（2.1E-01Bq/cm³以下） B系：ND（2.0E-01Bq/cm³以下） （1/28 11:00 現在）	A系：ND（3.0E-01Bq/cm³以下） B系：ND（3.0E-01Bq/cm³以下） （12/24 11:00 現在）	A系：ND（3.0E-01Bq/cm³以下） B系：ND（3.0E-01Bq/cm³以下） （1/28 11:00 現在）		
使用済燃料プール水温度	12.0℃ （12/24 11:00 現在）	13.0℃ （1/28 11:00 現在）	26.2℃ （12/24 11:00 現在）	26.3℃ （1/28 11:00 現在）	20.5℃ （12/24 11:00 現在）	21.2℃ （1/28 11:00 現在）	8.6℃ （12/24 11:00 現在）	7.7℃ （1/28 11:00 現在）
FPC メインサージタンク水位	3.12m （12/24 11:00 現在）	4.15m （1/28 11:00 現在）	3.26m （12/24 11:00 現在）	2.91m （1/28 11:00 現在）	4.28m （12/24 11:00 現在）	4.48m （1/28 11:00 現在）	36.08×100mm （12/24 11:00 現在）	39.38×100mm （1/28 11:00 現在）

※1：使用状態の温度・圧力で流量補正した値を記載する。
※2：窒素封入停止中
※3：指示値がマイナスの場合は0.00vol%と記載する。（水素濃度が極めて低い場合は、計器精度によりマイナス表示される場合があるため）

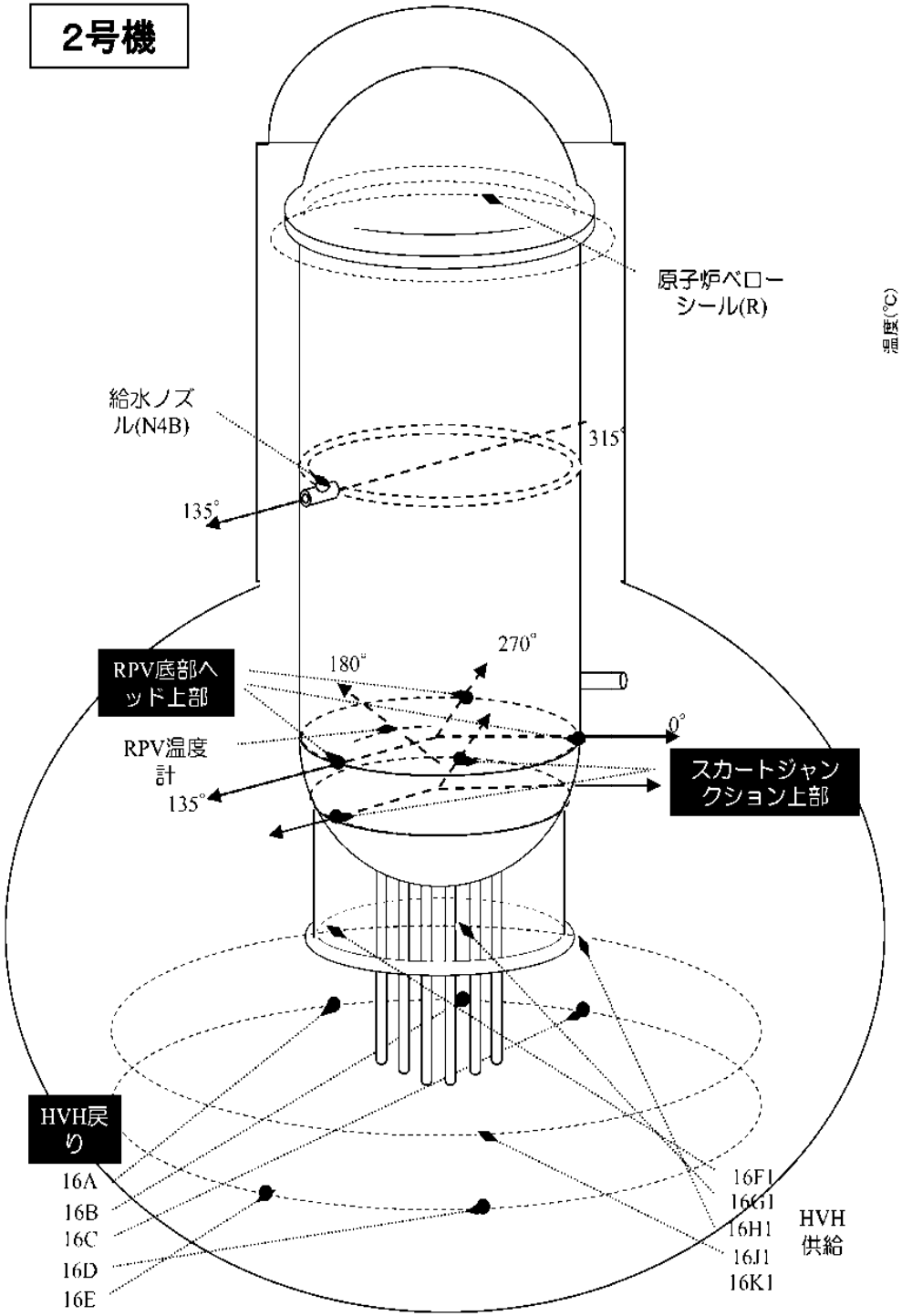
※注水冷却を継続することにより、1～3号機の原子炉圧力容器底部温度、格納容器気相部温度は、号機や温度計の位置によって異なるものの、至近1ヶ月において、約10℃～約40℃で推移。
格納容器内圧力や格納容器からの放射性物質の放出量等のパラメータについては有意な変動はなく、冷却状態の異常や臨界等の兆候は確認されていない。
以上より、総合的に冷温停止状態を維持しており、原子炉が安定状態にあることを確認。

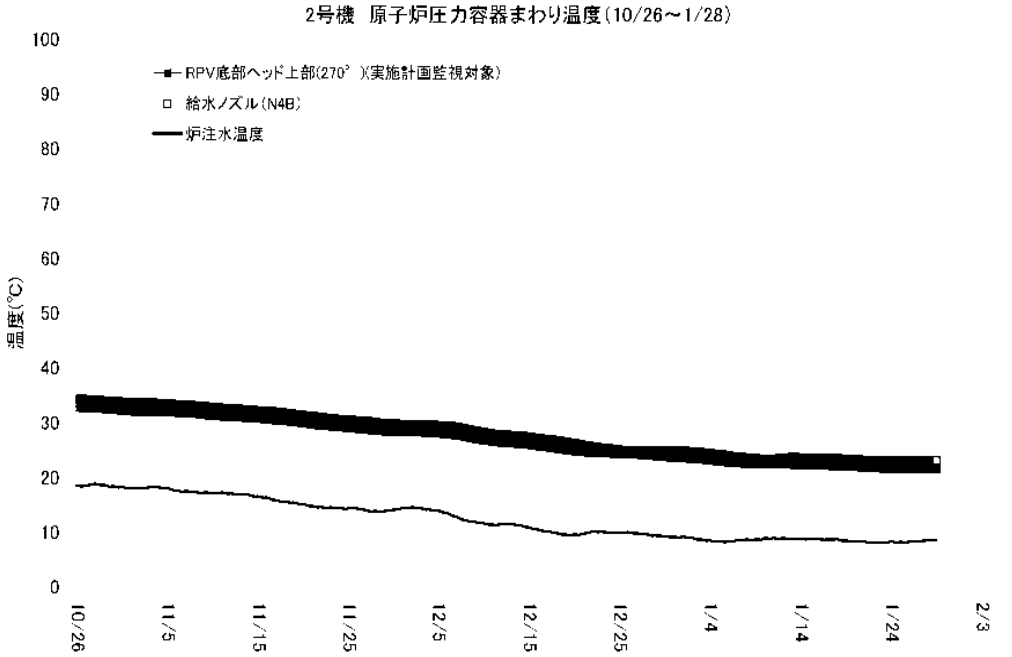

原子炉ベロー
シール(L)
給水ノズル
(N4B)
315°
135°
270°
Vessel
Downcomer
15°
130°
原子炉Skirt
Joint上部
RPV下部
ヘッド
HVH
戻り
12A
12B
12C
12D
12E
HVH
供給
12A
12B
12C
12D
12E

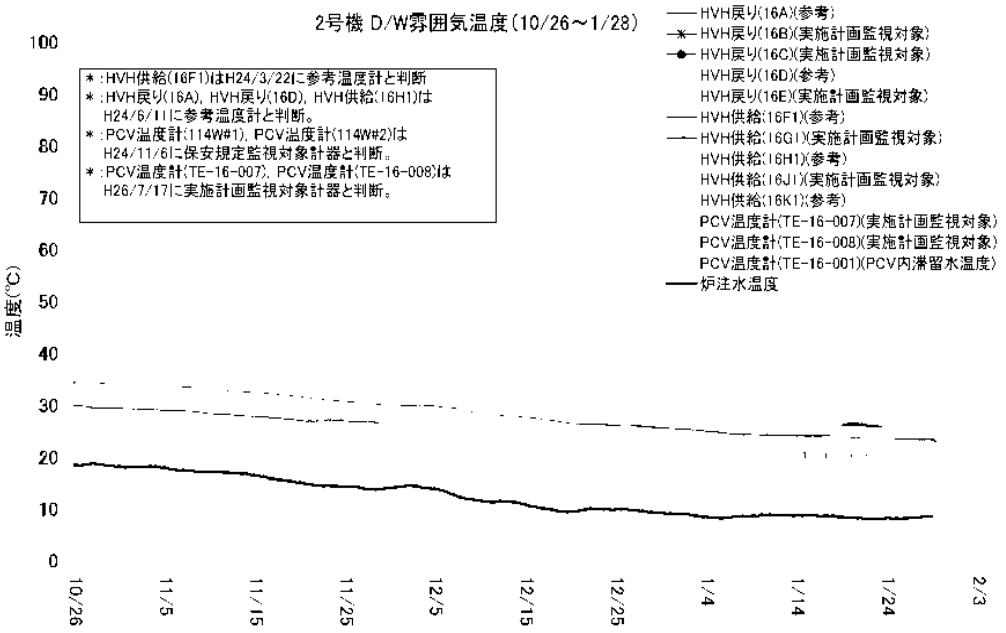

1号機 原子炉圧力容器まわり温度(10/26～1/28)
Vessel Downcomer(130°)(実施計画監視対象)
Vessel Downcomer(270°)(実施計画監視対象)
原子炉Skirt Joint上部(15°)(実施計画監視対象)
原子炉Skirt Joint上部(270°)(実施計画監視対象)
RPV下部ヘッド(15°)(実施計画監視対象)
RPV下部ヘッド(130°)(実施計画監視対象)
給水ノズル(N4B)
炉注水温度
温度(℃)
100
90
80
70
60
50
40
30
20
10
0
10/26
11/5
11/15
11/25
12/5
12/15
12/25
1/4
1/14
1/24
2/3

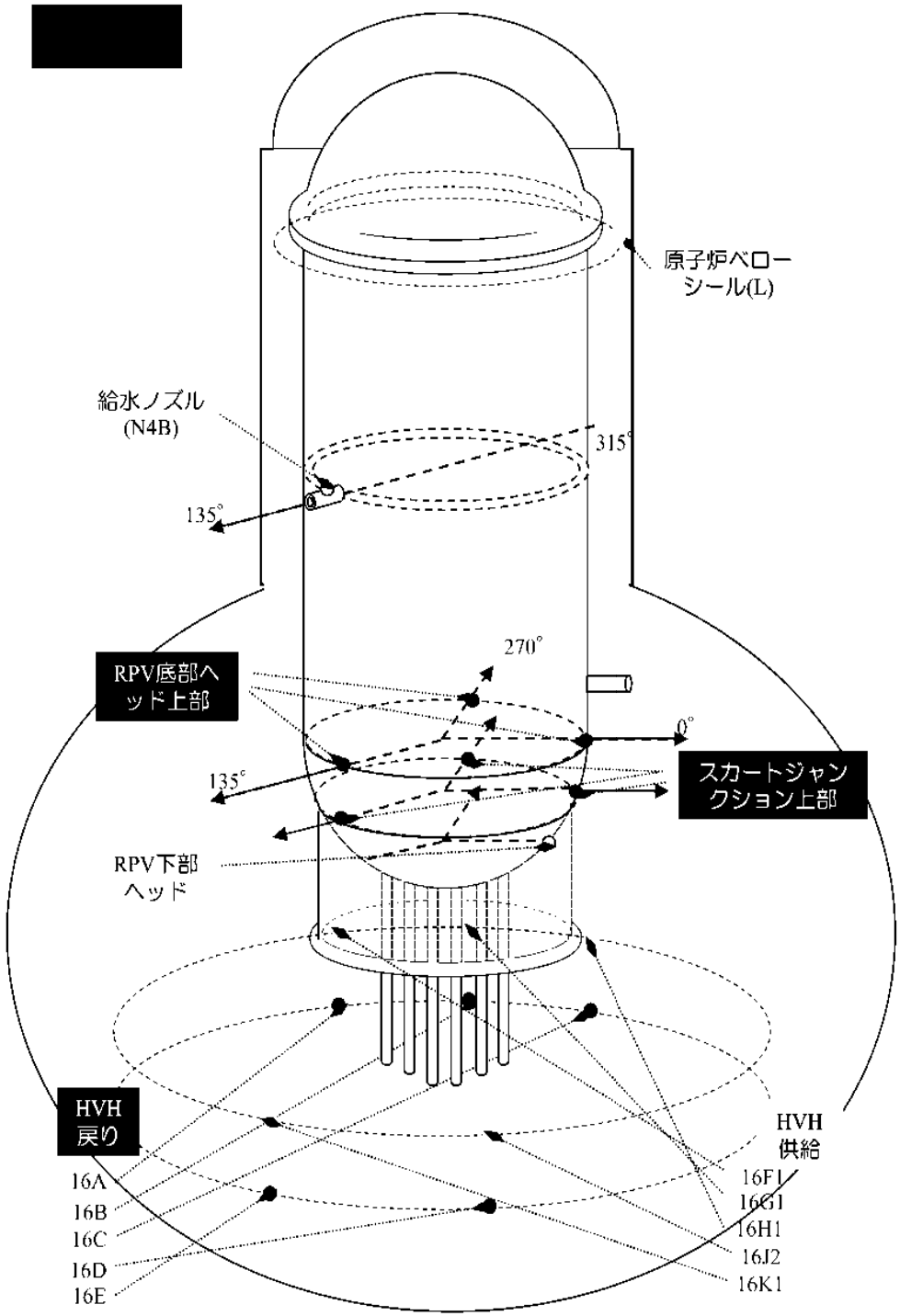

1号機 D/W雰囲気温度(10/26～1/28)
＊:PCV温度計(T3), PCV温度計(T6)は
H24/12/4に保安規定監視対象計器と判断。
HVH戻り(12A)(実施計画監視対象)
HVH戻り(12B)(実施計画監視対象)
HVH戻り(12C)(実施計画監視対象)
HVH戻り(12D)(実施計画監視対象)
HVH戻り(12E)(実施計画監視対象)
HVH供給(12A)(実施計画監視対象)
HVH供給(12B)(実施計画監視対象)
HVH供給(12C)(実施計画監視対象)
HVH供給(12D)(実施計画監視対象)
HVH供給(12E)(実施計画監視対象)
RPVベローシール(L)
PCV温度計(T3)(実施計画監視対象)
PCV温度計(T6)(実施計画監視対象)
PCV温度計(T1)(PCV内滞留水温度)
炉注水温度
温度(℃)
100
90
80
70
60
50
40
30
20
10
0
10/26
11/5
11/15
11/25
12/5
12/15
12/25
1/4
1/14
1/24
2/3

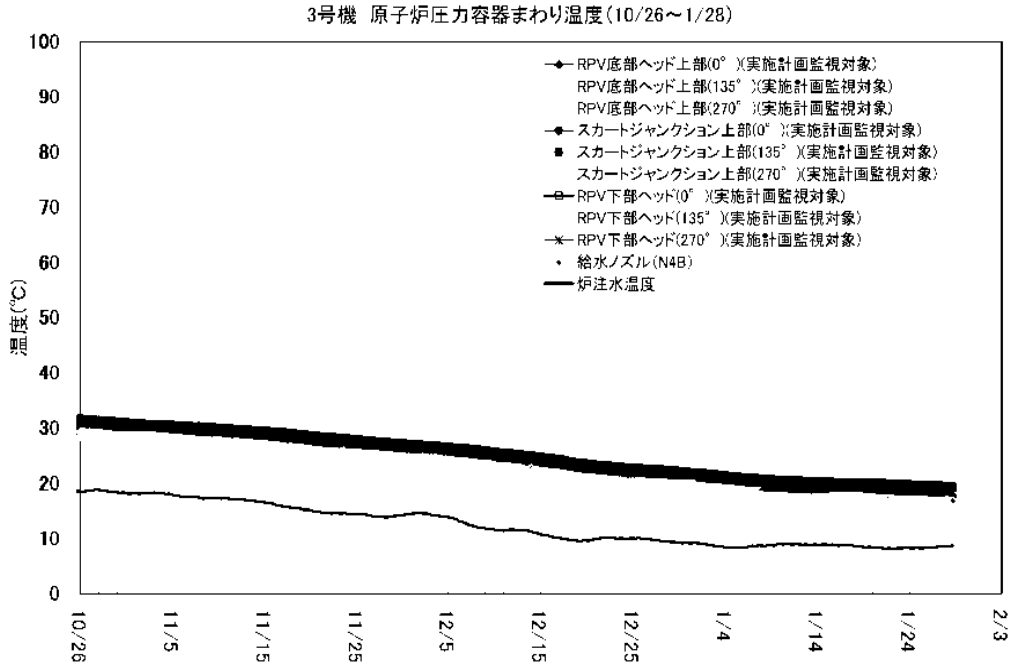
2号機

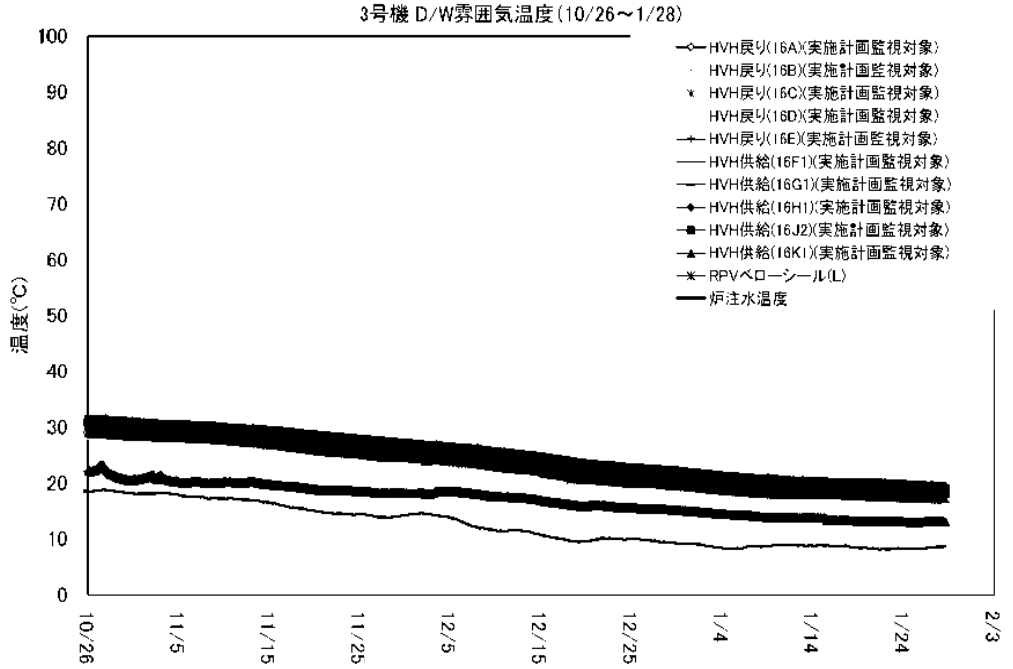

原子炉ベローシール(R)
給水ノズル(N4B)
315°
135°
RPV底部ヘッド上部
180°
270°
0°
RPV温度計
135°
スカートジャンクション上部
HVH戻り
16A
16B
16C
16D
16E
16F1
16G1
16H1
16J1
16K1
HVH供給


2号機 原子炉圧力容器まわり温度(10/26～1/28)
RPV底部ヘッド上部(270°)(実施計画監視対象)
給水ノズル(N4B)
炉注水温度
温度(℃)
100
90
80
70
60
50
40
30
20
10
0
10/26
11/5
11/15
11/25
12/5
12/15
12/25
1/4
1/14
1/24
2/3


2号機 D/W雰囲気温度(10/26～1/28)
＊:HVH供給(16F1)はH24/3/22に参考温度計と判断
＊:HVH戻り(16A), HVH戻り(16D), HVH供給(16H1)は H24/6/11に参考温度計と判断。
＊:PCV温度計(114W#1), PCV温度計(114W#2)は H24/11/6に保安規定監視対象計器と判断。
＊:PCV温度計(TE-16-007), PCV温度計(TE-16-008)は H26/7/17に実施計画監視対象計器と判断。
HVH戻り(16A)(参考)
HVH戻り(16B)(実施計画監視対象)
HVH戻り(16C)(実施計画監視対象)
HVH戻り(16D)(参考)
HVH戻り(16E)(実施計画監視対象)
HVH供給(16F1)(参考)
HVH供給(16G1)(実施計画監視対象)
HVH供給(16H1)(参考)
HVH供給(16J1)(実施計画監視対象)
HVH供給(16K1)(参考)
PCV温度計(TE-16-007)(実施計画監視対象)
PCV温度計(TE-16-008)(実施計画監視対象)
PCV温度計(TE-16-001)(PCV内滞留水温度)
炉注水温度
温度(℃)
100
90
80
70
60
50
40
30
20
10
0
10/26
11/5
11/15
11/25
12/5
12/15
12/25
1/4
1/14
1/24
2/3


原子炉ベロー
シール(L)
給水ノズル
(N4B)
315°
135°
270°
0°
135°
RPV底部ヘ
ッド上部
スカートジャン
クション上部
RPV下部
ヘッド
HVH
戻り
16A
16B
16C
16D
16E
HVH
供給
16F1
16G1
16H1
16J2
16K1


3号機 原子炉圧力容器まわり温度(10/26～1/28)
温度(℃)
RPV底部ヘッド上部(0°)(実施計画監視対象)
RPV底部ヘッド上部(135°)(実施計画監視対象)
RPV底部ヘッド上部(270°)(実施計画監視対象)
スカートジャンクション上部(0°)(実施計画監視対象)
スカートジャンクション上部(135°)(実施計画監視対象)
スカートジャンクション上部(270°)(実施計画監視対象)
RPV下部ヘッド(0°)(実施計画監視対象)
RPV下部ヘッド(135°)(実施計画監視対象)
RPV下部ヘッド(270°)(実施計画監視対象)
給水ノズル(N4B)
炉注水温度
10/26
11/5
11/15
11/25
12/5
12/15
12/25
1/4
1/14
1/24
2/3


3号機 D/W雰囲気温度(10/26～1/28)
温度(℃)
HVH戻り(16A)(実施計画監視対象)
HVH戻り(16B)(実施計画監視対象)
HVH戻り(16C)(実施計画監視対象)
HVH戻り(16D)(実施計画監視対象)
HVH戻り(16E)(実施計画監視対象)
HVH供給(16F1)(実施計画監視対象)
HVH供給(16G1)(実施計画監視対象)
HVH供給(16H1)(実施計画監視対象)
HVH供給(16J2)(実施計画監視対象)
HVH供給(16K1)(実施計画監視対象)
RPVベローシール(L)
炉注水温度
10/26
11/5
11/15
11/25
12/5
12/15
12/25
1/4
1/14
1/24
2/3

滞留水の貯蔵及び処理の状況概略

①建屋内滞留水水位及び貯蔵量
- 建屋内滞留水水位は運転上の制限を満足
- 処理装置（第二セシウム吸着装置）は運転中

②1～4号機タンク貯蔵量
- 淡水化装置による処理により，淡水及び濃縮塩水の貯蔵量は変動あり
- 蒸発濃縮装置は全台停止中

③5，6号機滞留水貯蔵量
- 構内散水によりF・Hエリア等タンク貯蔵量は変動あり

滞留水の貯蔵状況（1月22日時点）

東京電力株式会社
平成27年1月29日

①建屋内滞留水水位及び貯蔵量

施設	貯蔵量	T.P.建屋内水位
1号機	約13,100m³	OP.2,371
2号機	約15,200m³	OP.2,503
3号機	約20,800m³	OP.2,696
4号機	約16,200m³	OP.2,729
合　計	約65,300m³	

（合計）±2400[m3/30日]（合計）-900[m3/週]

貯蔵施設	貯蔵量	水位
プロセス主建屋	約13,670m³	OP.3,684
高温焼却炉建屋	約3,070m³	OP.1,735
合　計	約16,740m³	

（合計）+40[m3/30日]　（合計）+2160[m3/週]

	貯蔵量	貯蔵容量
廃液供給タンク	63m³	1,200m³
SPT(B)	880m³	3,100m³

（合計）+146[m3/30日]（合計）+101[m3/週]

④廃棄物発生量

廃スラッジ

保管量:597/700[m3]※3

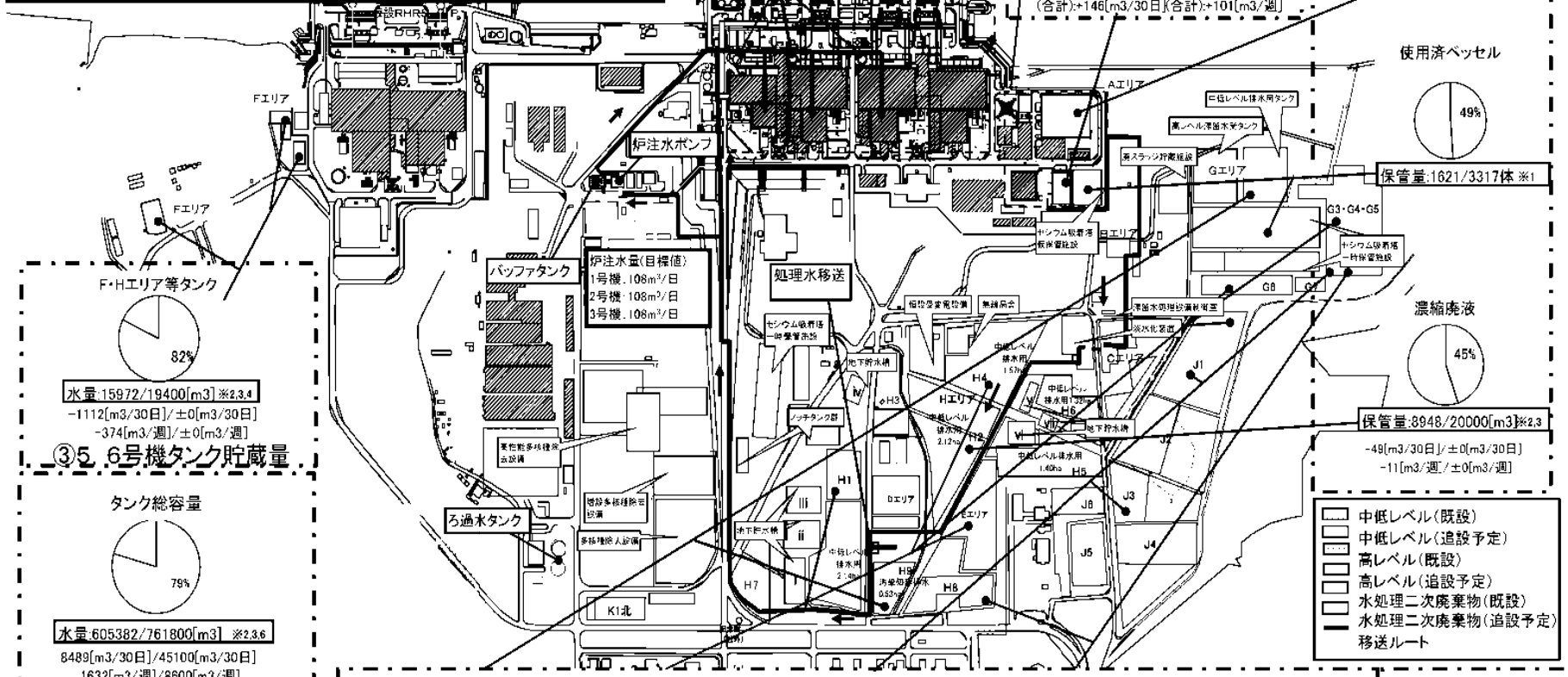
使用済ベッセル

保管量:1621/3317体 ※1

濃縮廃液

保管量:8948/20000[m3]※2,3

-49[m3/30日]/±0[m3/30日]
-11[m3/週]/±0[m3/週]



F・Hエリア等タンク

水量:15972/19400[m3]※2,3,4
-1112[m3/30日]/±0[m3/30日]
-374[m3/週]/±0[m3/週]

③5，6号機タンク貯蔵量

タンク総容量

水量:605382/761800[m3] ※2,3,6
8489[m3/30日]/45100[m3/30日]
1632[m3/週]/8600[m3/週]

タンク貯蔵量合計（②+③）

水量:約672967[m3]
12187[m3/30日]
3367[m3/週] ※7

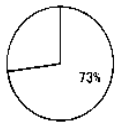
建屋内貯蔵量
＋
1～4号機タンク貯蔵量
（①+②）

②1～4号機タンク貯蔵量

②-a 淡水

水量:24454/27500[m3] ※2,3
-185[m3/30日]/±0[m3/30日]
-146[m3/週]/±0[m3/週]

②-b 濃縮塩水

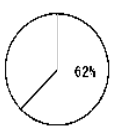


水量:272459/374200[m3]※2,3,8
-39542[m3/30日]/-17000[m3/30日]
-13668[m3/週]/-7500[m3/週]

②-c 処理水
（多核種除去設備等処理済水）

水量:279264/319500[m3]※2,3,5,8
+39977[m3/30日]/+45200[m3/30日]
+9547[m3/週]/+8700[m3/週]

②-d Sr処理水



水量:13233/21200[m3]※3,7
+8981[m3/30日]/-16900[m3/30日]
+6273[m3/週]/-7400[m3/週]

1～4号機タンク総容

水量:589410/742400[m3]※2,3,5,8
9601[m3/30日]/45100[m3/30日]
2006[m3/週]/8600[m3/週]

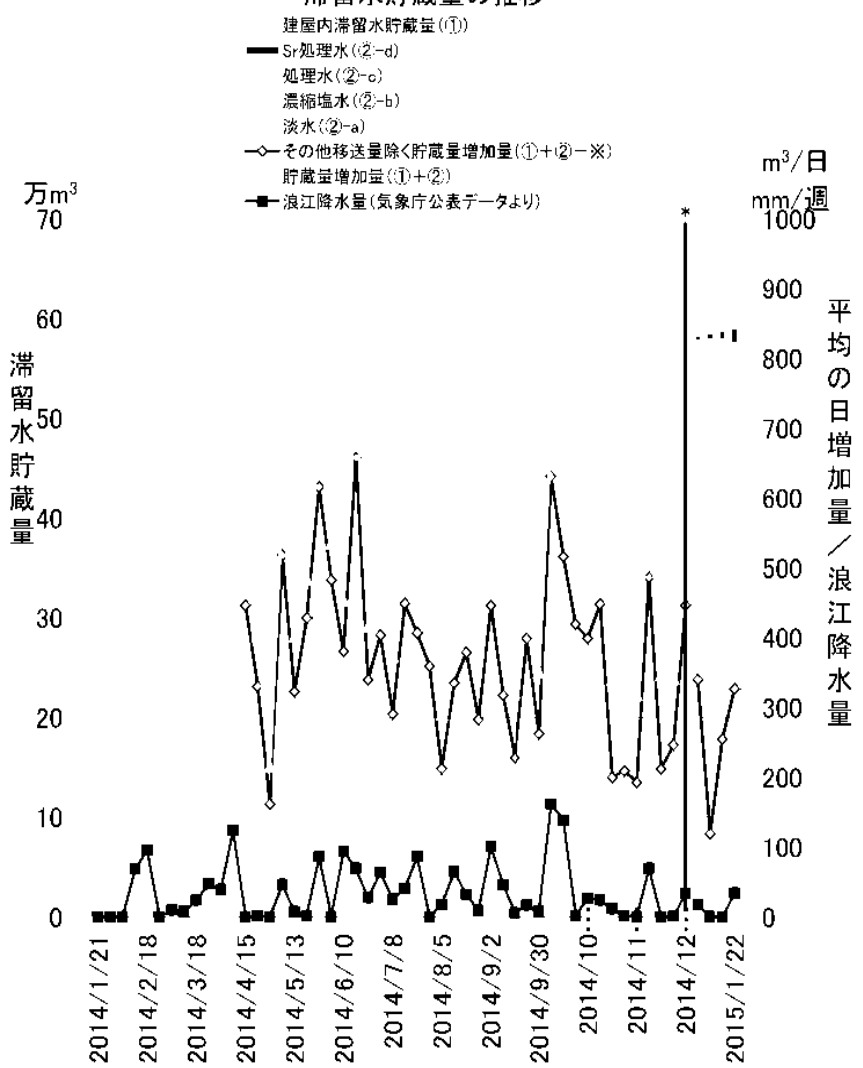
タンク堰内水の一時貯留量（＊1月27日時点の値を記載）
・ノッチタンク群　約1500(±0[m3])/約4900[m3]

※1 第二セシウム吸着装置使用済ベッセル及び多核種除去設備の保管容器，処理カラム及びモバイル式処理装置使用済ベッセルを含む
※2 装荷核動中につき水位が特定しないため参考扱い
※3 貯蔵容量は運用上の上限を示す（タンクの貯蔵容量は10の位を切り捨てて表記）
※4 Hエリアのタンク（約3,000m³分）を5,6号機滞留水に使用
※5 多核種除去設備（ホット試験中）の処理済水を貯蔵するが，タンクの運用状況に応じて淡水や濃縮塩水を貯蔵
※6 地下貯水槽を含まない。ろ過水タンクの貯蔵容量(4,600m³)を含む
※7 ウェルポイント(約850m³/週)，共用プールから高温焼却炉建屋(約20m³/週)の移送量約870m³/週を含む
※8 放射性物質濃度が高い多核種除去設備B系出口水を含む

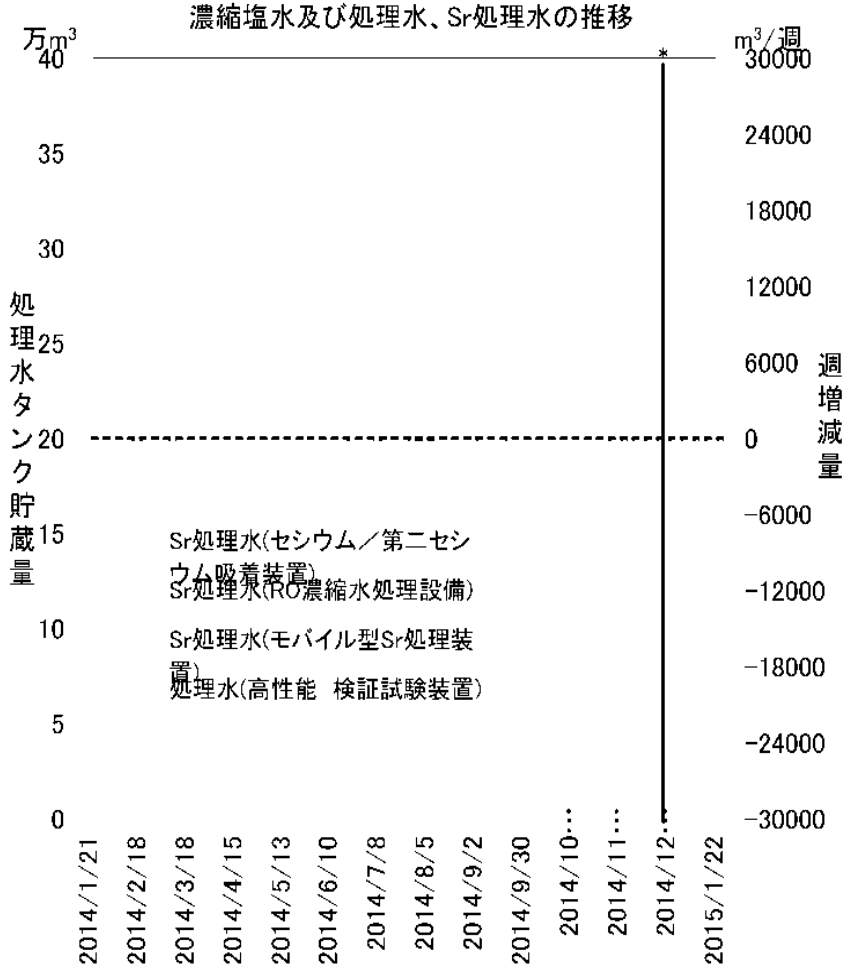
東京電力株式会社
平成27年1月29日

滞留水の貯蔵状況の推移

滞留水貯蔵量の推移



濃縮塩水及び処理水、Sr処理水の推移



①：建屋内滞留水貯蔵量（1～4号機、プロセス主建屋、高温焼却炉建屋、廃液供給タンク、SPT(B)）
②：1～4号機タンク貯蔵量（〔②-a淡水〕＋〔②-b濃縮塩水〕＋〔②-c処理水〕＋〔②-dSr処理水〕）
※：ウェルポイント汲み上げ量、海水配管トレンチへの氷投入量、多核種除去設備薬液注入量の合計
＊2015/1/1より集計日を変更（火曜日→木曜日）

処理水	累積処理水	期間処理水		定格処理量
	[m3]	[m3/週]	[m3/日]注1)	[m3/日]
既設多核種除去設備	196,386	3,299	471	750以上
増設多核種除去設備	63,957	4,393	628	750以上
高性能多核種除去設備	18,241	1,855	265	500以上
高性能　検証試験装置	680	0	0	50
Sr処理水	累積Sr処理水	期間処理水		定格処理量
	[m3]	[m3/週]	[m3/日]注1)	[m3/日]
RO濃縮水処理設備	8,317	5,609	801	500～900
セシウム吸着装置	664	664注2)	221注3)	600
第二セシウム吸着装置				1200
モバイル型Sr除去装置	Sr処理水		浄化処理中	
	[m3]		[m3]	
	4,252		4,000	

注1）週間処理量の平均値
注2）2015/1/19よりSr処理水として貯蔵を開始したため、1/19～1/22までの処理量
注3）2015/1/19～1/22間の処理量のため、3日間の平均値

東京電力株式会社
平成27年1月29日

各エリア別タンク一覧

〈平成27年1月22日　現在〉
※下線部は前回報告からの変更点

1～4号機用汚染水貯蔵タンク

堰エリア	基数	1基あたり容量（公称）〔m3〕	タンク型	貯蔵水	備　考
B南	5	450	鋼製円筒型タンク（フランジ接合）	淡水	
B北	15	300	鋼製円筒型タンク（フランジ接合）	淡水	
C	26	40	鋼製角型タンク（溶接）	濃縮塩水	
	52	40	鋼製角型タンク（溶接）	淡水	
C東	5	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
C西	8	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
D	31	1000	鋼製円筒型タンク（溶接）	濃縮塩水	
E	49	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
G1	72	100	鋼製横置きタンク（溶接）※土中埋設	淡水	
G3東	24	1000	鋼製円筒型タンク（溶接）	多核種除去設備 処理済水（既設）	
G3西	40	1000	鋼製円筒型タンク（溶接）	濃縮塩水	
G3北	6	1000	鋼製円筒型タンク（溶接）	濃縮塩水	
G4南	13	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	13基の内、2基は使用時期未定
	4	1000	鋼製円筒型タンク（フランジ接合）	Sr処理水	
G4北	6	1000	鋼製円筒型タンク（フランジ接合）	多核種除去設備 処理済水（既設）	
G5	17	1000	鋼製円筒型タンク（フランジ接合）	多核種除去設備 処理済水（既設）	
G6北	19	500	鋼製円筒型タンク（フランジ接合）	濃縮塩水	漏えいが確認されたため、1基使用停止 20−1=19
G6南	18	500	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
G7	10	700	鋼製円筒型タンク（溶接）	多核種除去設備 処理済水（既設）	
H1東	12	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H2北	17	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H2南	11	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H3	9	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	高線量箇所が確認されたため、2基使用停止 11−2=9
H4	20	500	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H4東	12	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H4北	21	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	漏えいが確認されたこと等から、2基撤去済み 23−2=21
H5	31	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H6	24	1000	鋼製円筒型タンク（フランジ接合）	濃縮塩水	
H8北	5	1000	鋼製円筒型タンク（溶接）	Sr処理水	濃縮塩水用からSr処理水用に転用
H8南	11	1000	鋼製円筒型タンク（溶接）	Sr処理水	濃縮塩水用からSr処理水用に転用
H9	5	1000	鋼製円筒型タンク（フランジ接合）	淡水	
H9西	7	1000	鋼製円筒型タンク（フランジ接合）	淡水	

1～4号機用汚染水貯蔵タンク

※下線部は前回報告からの変更点

堰エリア	基数	1基あたり容量（公称）〔m3〕	タンク型	貯蔵水	備　考
J1	65	1000	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（既設・増設）	
	1	1000	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（高性能検証試験装置）	
	34	1000	鋼製円筒型タンク（溶接）	濃縮塩水	
J2	19	2400	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（既設・増設）	
J3	9	2400	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（既設・増設・高性能）	
J4	15	2900	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（既設・増設・高性能）	
J5	35	1235	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（既設）	
J6	16	1200	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（既設・増設）	
K1北	10	1200	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（高性能）	
ALPS	4	1000	鋼製円筒型タンク（フランジ接合）	多核種除去設備処理済水（既設）	
高ALPS	3	1000	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（高性能）	
増ALPS	3	1000	鋼製円筒型タンク（溶接）	多核種除去設備処理済水（増設）	
水処理	1	8000	No.1ろ過水タンク	濃縮塩水	側板の一部に変形が認められたため、耐震評価を行いRO濃縮水貯水量を4600m³とした。
合計	820				

濃縮廃液

D	10	1000	鋼製円筒型タンク（溶接）	濃縮廃液	
H2	100	100	鋼製横置きタンク（溶接）	濃縮廃液	

高濃度滞留水受けタンク

G1	28	100	鋼製横置きタンク（溶接）※土中埋設	高濃度滞留水	非常用の受けタンクであり、現在未使用

5，6号機用汚染水貯蔵タンク

	基数	1基あたり容量（公称）〔m3〕	タンク型	貯蔵水	備　考
F2	6	35	鋼製角型タンク（溶接）	5，6号機滞留水	Aタンク
	6	42	鋼製角型タンク（溶接）	5，6号機滞留水	Aタンク
	4	110	鋼製角型タンク（溶接＋フランジ接合）	5，6号機滞留水	Bタンク
	5	160	鋼製円筒型タンク（フランジ接合）	5，6号機滞留水	Cタンク
	2	200	鋼製円筒型タンク（フランジ接合）	5，6号機滞留水	Cタンク
F1	3	299	鋼製円筒型タンク（フランジ接合）	5，6号機滞留水	hijタンク
	18	508	鋼製円筒型タンク（フランジ接合）	5，6号機滞留水	hijタンク
	5	1100	鋼製円筒型タンク（溶接）	5，6号機滞留水	Kタンク
H4北	3	1100	鋼製円筒型タンク（フランジ接合）	5，6号機滞留水	
合計	52				

（参考）

地下水バイパス用タンク

H3	9	1000	鋼製円筒型タンク（フランジ接合）	地下水	

Summary of Decommissioning and Contaminated Water Management

December 25, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment

Main works and steps for decommissioning

Fuel removal from Unit 4 SFP has been completed. Preparatory works to remove fuel from Unit 1-3 SFP and fuel debris (Note 1) removal are ongoing.

(Note 1) Fuel assemblies melted through in the accident.

Fuel Removal from SFP

Unit 1&2 / Unit 3 / Unit 4

Rubble removal & dose reduction → Installing FHM* → Fuel removal → Storage and handling

Unit 1: FY2017 Fuel removal will start (under consideration)
Unit 2: After FY2017 Fuel removal will start (under consideration)
Unit 3: FY2015 Fuel removal will start (planned)
Unit 4: 2014 Fuel removal will be completed

FHM*: Fuel Handling Machine

Fuel Debris (Corium) Removal

Unit 1-3

Dose reduction & Leakage identification → Stop leakage → Fuel debris removal → Storage and handling

After FY2017
Water stoppage of PCV lower part (under consideration)

Dismantling Facilities

Scenario development & technology consideration → Design & Manufacturing of devices/ equipment → Dismantling

Fuel removal from SFP

On December 22, 2014, all fuel removal from Unit 4 was completed.
Fuel removal from Unit 4 SFP commenced on November 18, 2013. Removal of spent fuel assemblies was completed on November 5, 2014, and removal of non-irradiated fuel assemblies was completed on December 22, 2014.

(Fuel-removal operation)

Three principles behind contaminated water countermeasures

Countermeasures for contaminated water (Note 2) are implemented with the following three principles:

(Note 2) The amount is decreasing due to measures such as groundwater bypass and water-stoppage of the buildings.

1. **Eliminate** contamination sources

(1) Multi-nuclide removal equipment

(2) Remove contaminated water in the trench (Note 3)

(Note 3) Underground tunnel containing pipes.

2. **Isolate** water from contamination

(3) Pump up ground water for bypassing

(4) Pump up ground water near buildings

(5) Land-side frozen walls

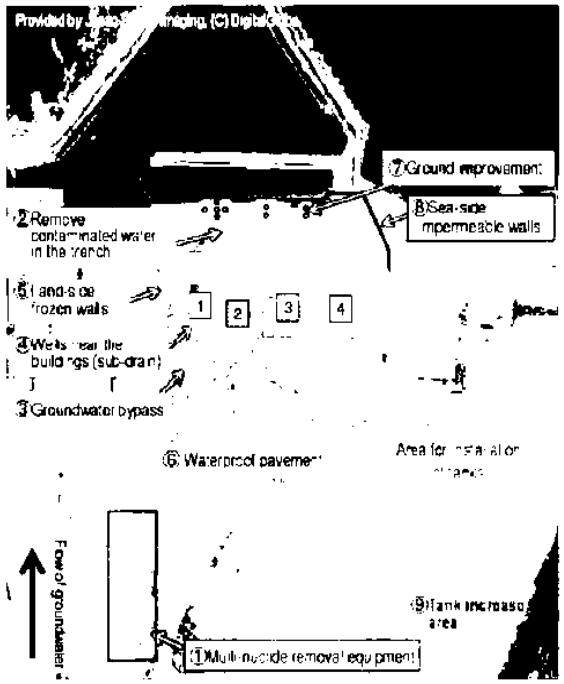
(6) Waterproof pavement

3. **Prevent leakage** of contaminated water

(7) Soil improvement by sodium silicate

(8) Sea-side impermeable walls

(9) Increase tanks (welded-joint tanks)



Multi-nuclide removal equipment (ALPS)

- This equipment removes radionuclides from the contaminated water in tanks, and reduces risks.
- It aims to reduce the levels of 62 nuclides in contaminated water to the legal release limit or lower (tritium cannot be removed.)
- Furthermore, additional multi-nuclide removal equipment is installed by TEPCO (operation started September 2014) as well as a subsidy project of the Japanese Government (operation started October 2014.)

(Installation status of high-performance multi-nuclide removal equipment)

Land-side impermeable walls with frozen soil

- The walls surround the buildings with frozen soil and reduce groundwater inflow into the same.
- On-site tests have been conducted since last August. Construction work started in June and the freezing operation will start within FY2014.

(Length: approx. 1,500m)

Sea-side impermeable walls

- The walls aim to prevent the flow of contaminated groundwater into the sea.
- Installation of steel sheet piles is almost (98%) complete. The closure time is being coordinated.

(Installation status)

Progress Status and Future Challenges of the Mid-and-Long-Term Roadmap toward the Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station Units 1-4 (Outline)

Progress status

- The temperatures of the Reactor Pressure Vessel (RPV) and the Primary Containment Vessel (PCV) of Units 1-3 have been maintained within the range of approx. 15-45°C*1 for the past month. There was no significant change in the density of radioactive materials newly released from Reactor Buildings in the air*2. It was evaluated that the comprehensive cold shutdown condition had been maintained.

*1 The values vary somewhat depending on the unit and location of the thermometer.
*2 The radiation exposure dose due to the current release of radioactive materials from the Reactor Buildings peaked at 0.03 mSv/year at the site boundaries. This is approx. 1/70 of the annual radiation dose by natural radiation (annual average in Japan: approx. 2.1 mSv/year).

Fuel removal from the Unit 4 spent fuel pool completed

Fuel removal from the Unit 4 spent fuel pool (SFP) commenced on November 18, 2013. On November 5, within a year since this work commenced, the transfer of spent fuel assemblies in the pool to the common pool was completed.

The transfer of non-irradiated fuel assemblies to the Unit 6 SFP was also completed on December 22.

This marks the completion of all fuel removal from the Unit 4. Based on this experience, fuel assemblies will be removed from the Unit 1-3 pools.

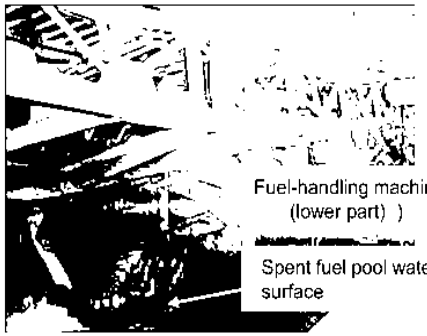
<Work conditions for transfer of the final fuel transportation container>

*Some portions of these photos in which classified information related to physical protection is included were corrected

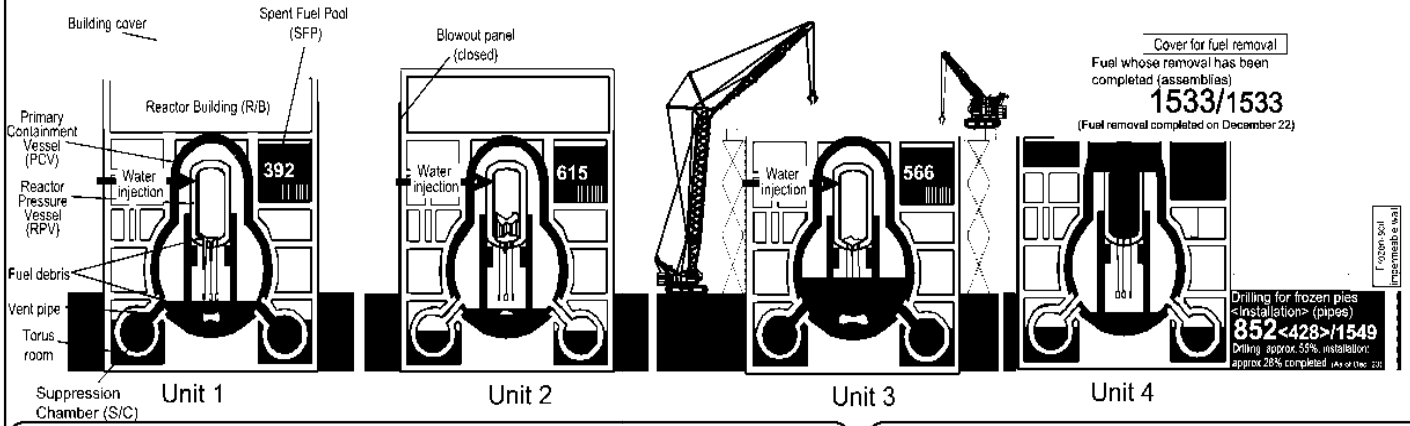
Investigation into the status of rubble and dust on the Unit 1 R/B top floor

Two roof panels of the Unit 1 Reactor Building (R/B) cover were removed, investigations into the status of rubble and the concentration of dust on the R/B top floor (operating floor) were conducted, and the roof panels were put back on December 4. A hole used for spraying of anti-scattering agents that had been expanded in October was also covered at that time.

The result of these investigations confirmed that no scattering of dust or conditions that would cause immediate damage to the fuel assemblies in the SFP were detected. It is scheduled for the roof panels to be removed once again after March, and for careful work to dismantle the roof covers to proceed.



<Status of rubble at the upper part of the Unit 1 spent fuel pool>



Leakage of water treated by multi-nuclide removal equipment

On December 17, a leakage of water that had undergone treatment by multi-nuclide removal equipment (ALPS) occurred due to the water being mistakenly sent to piping whose installation had not been fully completed. The leaked water and soil from the areas surrounding the leak have been recovered, and there was no outflow to the ocean.

The cause of this incident was operation using an incorrect procedure document. From here on, whenever valves connected to newly-installed piping are to be operated, the connection status of the piping will be confirmed with the work site prior to their operation.

Filling of Unit 2 seawater-pipe trench tunnel sections completed

Filling of the seawater-pipe trench(Note) which leads from the Turbine Building of Unit 2 on the sea side, with cement-based materials, commenced on November 25, and on December 18 the filling of the tunnel sections was completed.

After water is pumped up from the Vertical Shafts and the filling status of the tunnel sections is confirmed, preparations for filling the Vertical Shaft sections will proceed.

Note: The term "trench" means an underground tunnel containing pipes.

<Image of Unit 2 seawater-pipe trench>

Toward risk reduction of contaminated water

In addition to multi-nuclide removal equipment (ALPS), the installation of multiple purification systems to remove strontium is also proceeding.

The contaminated water in the initial group of tanks was treated using mobile strontium-removal equipment that circulates contaminated water in tanks and removes strontium from it.

The cesium absorption apparatus (KURION) and secondary cesium absorption apparatus (SARRY), which remove cesium from contaminated water transferred from the buildings, were modified to commence their operation with the added operation of the removal of strontium from the end of December.

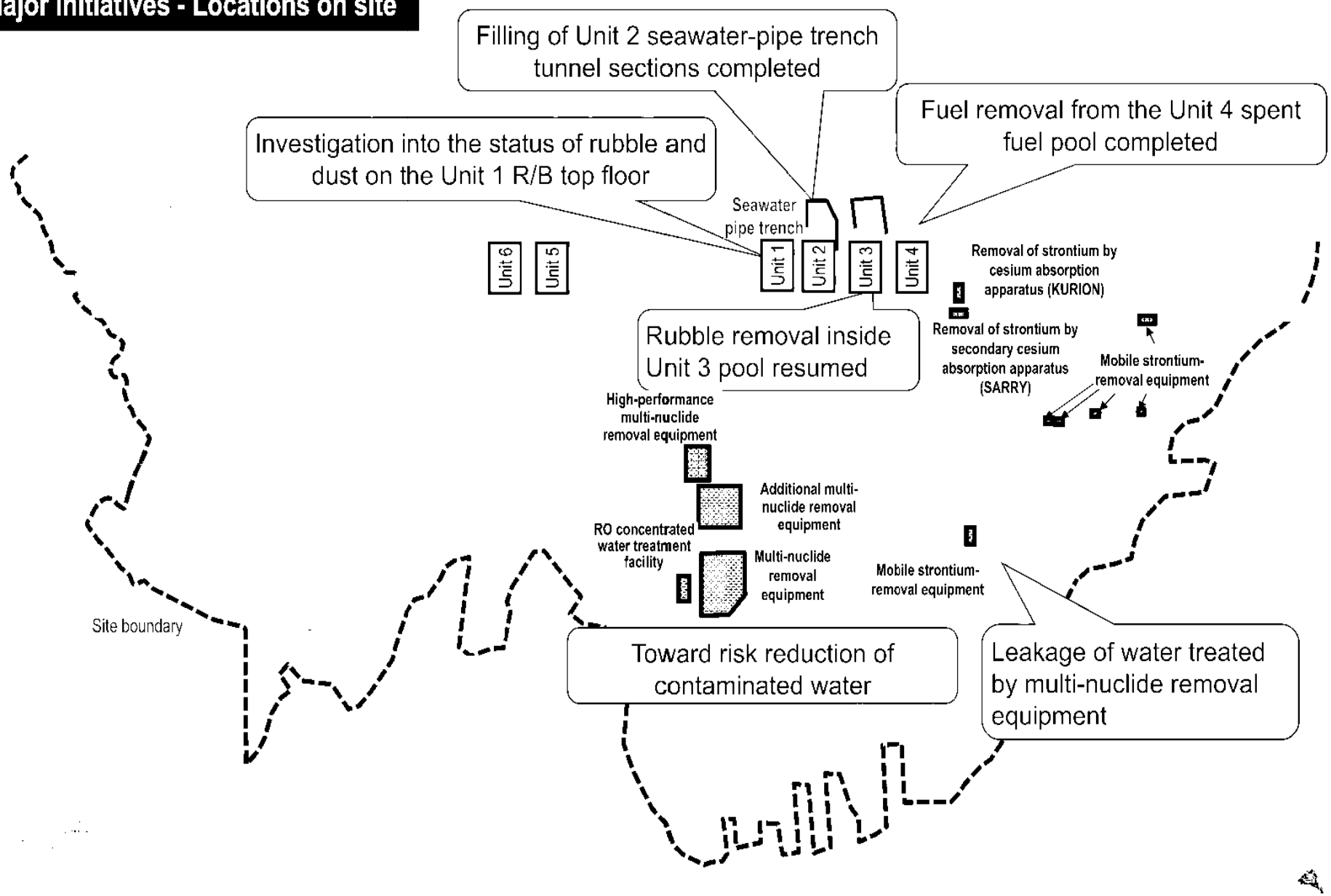
Preparations are also proceeding on RO concentrated water treatment equipment to treat contaminated water in tanks, and treatment will commence from January.

Rubble removal inside Unit 3 pool resumed

Although a console of a fuel-handling machine and other objects fell into the spent fuel pool during rubble removal work inside the pool, causing this work to be suspended, the rubble removal work was resumed on December 17, and the fallen console was removed from the spent fuel pool on December 19.

From early January, cover plates will be added as a measure to prevent falling objects such as in this case.

Major initiatives - Locations on site



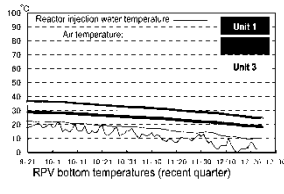
Provided by Japan Space Imaging, (C) DigitalGlobe

* Data of Monitoring Posts (MP1-MP8.)
Data of Monitoring Posts (MPs) measuring airborne radiation rate around site boundaries show 1.100 - 4.033μSv/h (November 26 - December 23, 2014.)
We improved the measurement conditions of monitoring posts 2 to 8 for precise measurement of air dose rate. Construction works such as tree-clearing, surface soil removal, and shield wall setting were implemented from Feb 10 to Apr 18, 2012.
Therefore monitoring results at these points are lower than elsewhere in the power plant site.
The radiation shielding panel around the monitoring post No. 6, which is one of the instruments used to measure the radiation dose of the power station site boundary, were taken off from July 10 to July 11, 2013, since the surrounding radiation dose has largely fallen down due to further cutting down of the forests etc.

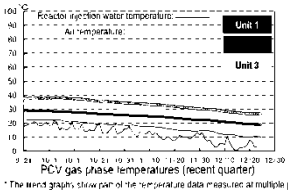
I. Confirmation of the reactor conditions

1. Temperatures inside the reactors

Through continuous reactor cooling by water injection, the temperatures of the Reactor Pressure Vessel (RPV) bottom and the Primary Containment Vessel (PCV) gas phase have been maintained within the range of approx. 15 to 45°C for the past month, though they vary depending on the unit and location of the thermometer.



RPV bottom temperatures (recent quarter)



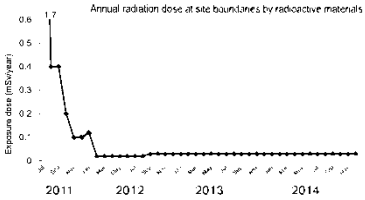
PCV gas phase temperatures (recent quarter)

* The latest graphs show part of the temperature data measured at multiple points.

2. Release of radioactive materials from the Reactor Buildings

The density of radioactive materials newly released from Reactor Building Units 1-4 in the air measured at site boundaries was evaluated at approx. 1.4 x 10^{-9} Bq/cm^3 for both Cs-134 and -137. The radiation exposure dose due to the release of radioactive materials was 0.03 mSv/year (equivalent to approx. 1/70 of the annual radiation dose by natural radiation (annual average in Japan: approx. 2.1 mSv/year)) at the site boundaries.

Annual radiation dose at site boundaries by radioactive materials (cesium) released from Reactor Building Units 1-4



(Reference)

* The density limit of radioactive materials in the air outside the surrounding monitoring area
  [Cs-134]: 2 x 10^{-5} Bq/cm^3
  [Cs-137]: 3 x 10^{-5} Bq/cm^3
* Dust density around the site boundaries of Fukushima Daiichi Nuclear Power Station (actual measured values):
  [Cs-134]: ND (Detection limit: approx. 1 x 10^{-9} Bq/cm^3)
  [Cs-137]: ND (Detection limit: approx. 2 x 10^{-9} Bq/cm^3)
* Data of Monitoring Posts (MPs)
  Data of Monitoring Posts (MPs) measuring airborne radiation rate around site boundaries showed 1.100 - 4.033μSv/h (November 26 - December 23, 2014).
  To measure the variation in the airborne radiation rate at MP2-MP8 more accurately, environmental improvement (tree trimming, removal of surface soil and shielding around the MPs) has been completed.

Note: Different formulas and coefficients were used to evaluate the radiation dose in the facility operation plan and monthly report. The evaluation methods were integrated in September 2012. As the fuel removal from the spent fuel pool (SFP) commenced for Unit 4, the radiation exposure dose from Unit 4 was added to the items subject to evaluation since November 2013.

3. Other indices

There was no significant change in indices, including the pressure in the PCV and the PCV radioactivity density (Xe-135) for monitoring criticality, nor was any abnormality of cold shutdown condition or sign of criticality detected. Based on the above, it was confirmed that the comprehensive cold shutdown condition had been maintained and the reactors remained in a stabilized condition.

II. Progress status by each plan

1. Reactor cooling plan

The cold shutdown condition will be maintained by cooling the reactor by water injection and measures to complement status monitoring will continue to be implemented.

➢ Replacement of the thermometer at the bottom of Unit 2 RP

- In April, attempts to remove and replace the thermometer installed at the bottom of the RPV, which had broken in February 2014, failed and the operation was suspended. The estimated cause was fixing or added friction due to rust having formed.
- It was confirmed with full-scale piping that it is possible for wire guides to be drawn out if rust-stripping chemicals that do not generate hydrogen are used (December 5). After training the workers involved, it is scheduled for the elimination to be implemented in January 2015.

2. Accumulated water-treatment plan

To tackle the increase in accumulated water due to groundwater inflow, fundamer Buildings will be implemented, while improving the decontamination capability of contaminated water.

➢ Operation of groundwater bypass

- From April 9, the operation of 12 groundwater bypass pumping wells groundwater. Release commenced from May 21 in the presence of Office for the Decommissioning and Contaminated Water Issue of th m^3 of groundwater had been released. The pumped up groundwater released after TEPCO and a third-party organization (Japan Chemic met operational targets.
- It was confirmed that the groundwater inflow into the buildings had d evaluation data by now through measures such as the groundwater Temperature Incinerator Building (HTI) (see Figure 1).
- It was confirmed that the groundwater level at the observation holes to the level before pumping at the groundwater bypass started.
- Due to a decrease in the flow rate of pumping well No.11 from arou on October 15. Confirmation of the situation revealed that exist bacteria, etc.). Chemicals for sterilization of bacteria were fed into th 9. Cleaning was also performed on pumping well Nos.10 and 1 detected (No.10: from early January 2015, No.12: from December 1

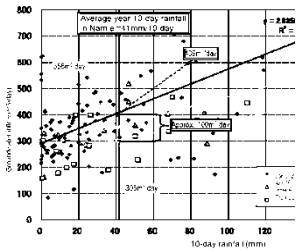


Figure 1: Analytical results of inflo

➢ Construction status of impermeable walls with frozen soil

- To facilitate the installation of frozen-soil impermeable walls surrour of Economy, Trade and Industry), drilling to place frozen pipes c drilling at 1,030 points (for frozen pipes: 852 of 1,549 points, for tem and installation of frozen pipes at 428 of 1,549 points had been com

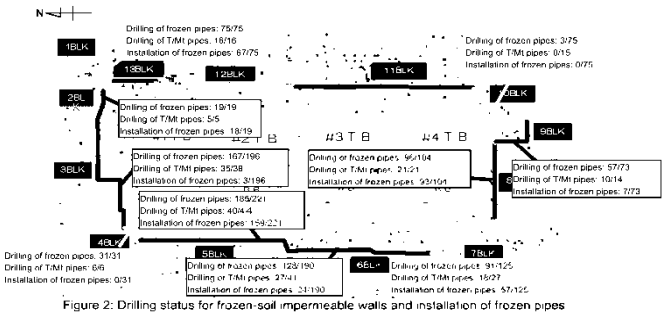


Figure 2: Drilling status for frozen-soil impermeable walls and installation of frozen pipes

➢ Closure of trench connecting to High Temperature Incinerator Building

- The trench connecting to the High Temperature Incinerator Building was closed off with grout as part of the work for water stoppage of the High Temperature Incinerator Building (October 29 to December 20). The volume of groundwater inflow into the building will be measured during planned shutdowns of the cesium absorption apparatus and secondary cesium absorption apparatus.

➢ Status of the subdrain system

- Though an increase in radioactive material density was detected in subdrain pit Nos. 18 and 19 (October 22), the density drastically declined after this. It was estimated that as those pits connect with pit Nos. 15 to 17, which could not be recovered due to high radiation level, via horizontal pipes, radioactive material was gradually drawn into them by pump operation. Pit No. 17 was blocked with filling material from November 14 to 21, and unrecovered pit Nos. 15 and 16 were separated from recovered pit Nos. 18 and 19. After blocking up pit No. 17, since there was no decrease in the water level of pit No. 17 even when groundwater was drawn from pit Nos. 18 and 19, and since there were no significant changes in radioactive material density in pit Nos. 18 and 19, it was confirmed that separation had been achieved successfully.

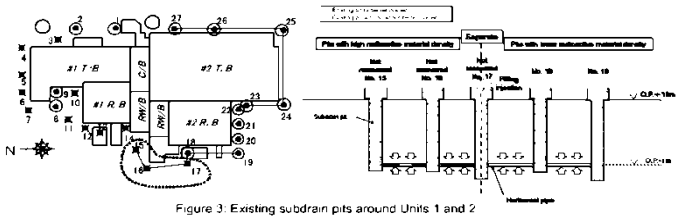


Figure 3: Existing subdrain pits around Units 1 and 2

➢ Operation of multi-nuclide removal equipment

- Regarding multi-nuclide removal equipment (existing, additional and high-performance), hot tests using radioactive water are underway (for existing equipment: System A: from March 30, 2013, System B: from June 13, 2013, System C: from September 27, 2013; for additional equipment: System A: from September 17, 2014, System B: from September 27, 2014, System C: from October 9, 2014; for high-performance equipment, from October 18, 2014). To date, approx. 181,000 m³ at the existing, approx. 47,000 r high-performance multi-nuclide removal equipment have been treate 9,500m³ stored in J1(D) tank, which contained water with a high den outlet).
- With the objective of detection at early stages if there is an i multi-nuclide removal equipment outlet water, continuous β-radia vessel outlets (existing: December 9 to 14, additional: November 3 for late December).

➢ Toward risk reduction of contaminated water stored in tank

- To purify RO concentrated salt water stored in tanks, mobile stront G4 south area (from October 2). Treatment of contaminated water i be implemented by December 22.
- The number of mobile strontium-removal units will be increased (imp purify RO concentrated salt water stored in tanks in the H5 north Secondary mobile strontium-removal equipment will also be installec the C and G6 areas (scheduled to commence in late January).
- In addition to multi-nuclide removal equipment (existing, ad strontium-removal equipment, treatment measures consisting of apparatus (KURION) and secondary cesium absorption apparatu December 10) are scheduled to commence at the end of Decemb contaminated water treatment (scheduled to commence in January) (implementation plan approved on December 22), are intended multiple approaches.

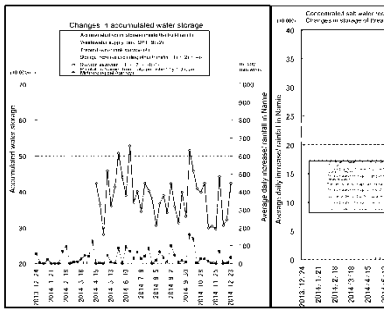


Figure 4: Status of accumulated wate

➢ Measures in Tank Areas

- Rainwater under the temporary release standard having accumulat tank area, was sprinkled on site after removing radioactive mater May 21 (as of December 22, a total of 13,500 m³). On December reservoir No.7 was completed.

➢ Removal of contaminated water from seawater-pipe trench

- Filling and closure of the Unit 2 seawater-pipe trench commenced the tunnel sections was completed. Water was pumped up from the status of the tunnel sections is currently being confirmed. Preparat based on these results.
- At the Unit 3 seawater-pipe trench Vertical Shaft D, drilling of holes was completed (December 5). Pumping tests were performed on De

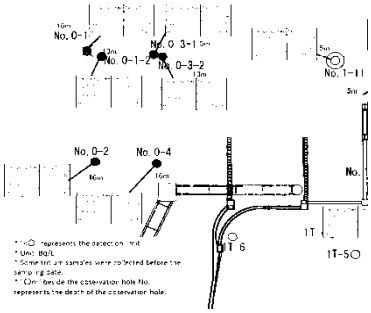
is connected to the Turbine Building. Decisions will be made on how to proceed based on the results of the pumping tests.
- The site conditions of the Unit 4 seawater-pipe trench will be confirmed.

3. Plan to reduce radiation dose and mitigate contamination

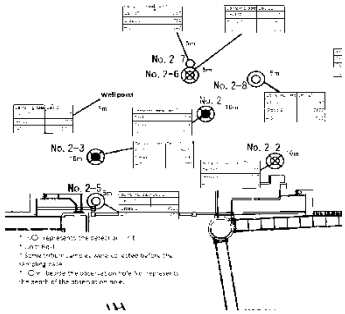
Effective dose-reduction at site boundaries and purification of the port water to mitigate the impact of radiation on the external environment

➢ Status of groundwater and seawater on the east side of Turbine Building Units 1 to 4

- Regarding the radioactive materials in groundwater near the bank on the north side of the Unit 1 intake, the density of tritium has been increasing at groundwater Observation Holes Nos. 0-1-2 and 0-4 since July, currently standing at around 9,000 and 23,000 Bq/L, respectively in these locations. Pumping of 1 m^3/day of water from Observation Hole No. 0-3-2 continues.
- Regarding the groundwater near the bank between the Unit 1 and 2 intakes, the density of gross β radioactive materials at groundwater Observation Hole Nos. 1 to 6 increased to 7.8 million Bq/L in October, but is currently standing at around 500,000 Bq/L. Though the density of tritium at groundwater Observation Hole Nos. 1 to 8 had become around 10,000 Bq/L, it fluctuated greatly after June, and is currently around 20,000 Bq/L.
  Though the density of tritium at groundwater Observation Hole No. 1-17, which had been around 10,000 Bq/L, increased to 160,000 Bq/L since October, it is currently standing at around 40,000 Bq/L. The density of gross β, which has been increasing since March, reached 1.2 million Bq/L by October and is currently standing at around 60,000 Bq/L. Water pumping from the well point (10 m^3/day) and the pumping well No. 1-16 (P) (1m^3/day) installed near the Observation Hole No. 1-16 continues.
- Regarding the radioactive materials in groundwater near the bank between the Unit 2 and 3 intakes, the densities of tritium and gross β radioactive materials are high on the north (Unit 2) side up to November. These densities have been decreasing since November, currently standing at around 3,000 and 20,000 Bq/L for tritium and gross β radioactive materials respectively. To increase the height of the ground improvement area with mortar, the volume of water pumped from the well point increased to 50 m^3/day (from October 31).
- Regarding the radioactive materials in groundwater near the bank between the Unit 3 and 4 intakes, a low density was maintained at all Observation Holes as up to November.
- Regarding the radioactive materials in seawater outside the sea-side impermeable walls inside the open channels of Units 1-4, a low density equivalent to that at the point to the north of the east breakwater was maintained as up to November.
- The density of radioactive materials in seawater within the port has been slowly declining as up to November.
- The radioactive material density in seawater at and outside the port entrance has remained within the same range previously recorded.
- Construction to cover the seabed soil within the port is underway to prevent contamination spreading due to stirred-up seabed soil (scheduled for completion at the end of FY2014). Modifications to the slurry plant were implemented at the time of the covering work in Area (2). Test construction was carried out from November 17, and since confirmation of the workability and the covering material quality were completed, construction resumed from December 14 (see Figure 8). As of December 23, 33% of the construction had been completed. The seabed of the intake open channels had been covered by FY2012.



<Unit 1 intake north side, between Unit 1 and 2 i



<Between Unit 2 and 3 intakes, between Unit 3 a

Figure 5: Groundwater density on the Turbin

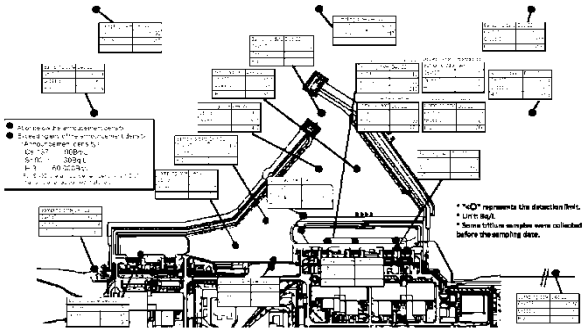


Figure 6: Seawater density around the port

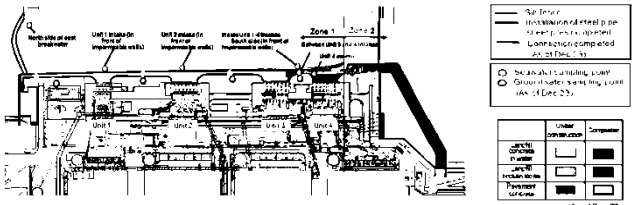


Figure 7: Progress status of impermeable walls on the sea side

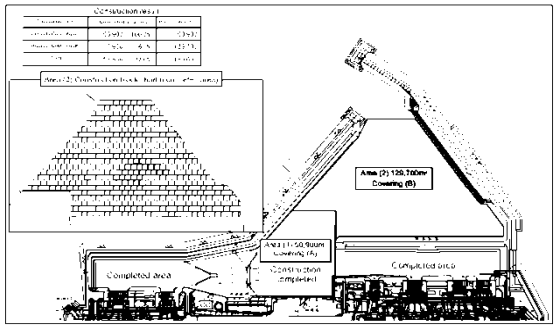


Figure 8: Progress status of the seabed soil covering within the port

4. Plan to remove fuel from the spent fuel pools

Work to help remove spent fuel from the pool is progressing steadily while ensuri fuel from the Unit 4 pool commenced on November 18, 2013 and efforts are being of 2014

➢ Fuel removal from the Unit 4 spent fuel pool

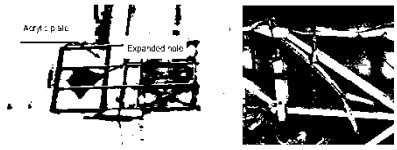
- Fuel removal from the spent fuel pool (SFP) commenced on Noven 1,331 spent fuel assemblies in the pool, as well as 202 non-irrad non-irradiated fuel assemblies were removed in advance in July 20 fuel removal from the Unit 4 Reactor Building.
- To evaluate long-term soundness of fuel assemblies removed from t assemblies transferred from the Unit 4 spent fuel pool to the commo results of the inspection were that no major damage to or distortion film thicknesses, or notable corrosion on the inner surfaces of lock n
- In order to confirm the post-transportation status of 2 leaked fuel a spent fuel pool to the common pool, visual inspections using under rods using fiberscopes were conducted (December 17, 18). The re summarized.

➢ Main work to help remove spent fuel at Unit 3

- During rubble removal inside the spent fuel pool, the console ar machine, which were scheduled for removal, fell (August 29) and t December 17 the rubble removal work resumed and the removal completed (December 19).

➢ Main work to help remove spent fuel at Unit 1

- Spraying of anti-scattering agents on the top floor of the Reactor Bu and concentration of dust were conducted, and the roof panels of th were put back on December 4. At that time, projecting members we part of a hole used for spraying of anti-scattering agents that had be
- After removing the two roof panels, the trends of the dust conditio radioactive materials in the air, and the results confirmed that due to in the concentration of dust.
- In the rubble investigation, confirmation in greater detail was ac investigations and other types of investigations performed in the pa the rubble to be removed in advance at the upper part of the Reac reviewed. On the underside of the collapsed roof, no conditions suc materials protruding from the water surface that would cause damag inside the pool were detected. Further investigations will be conduct



Covering status of expanded hole in roof panel of building cover

Existing steel frame at upper Reactor Building

Figure 9: Upper part of Unit 1 Reactor Building – Covering status of hole in roof

5. Fuel debris removal plan

In addition to decontamination and shield installation to improve PCV accessibili

required to prepare to remove fuel debris (such as investigating and repairing PCV leak locations)

➢ Development of technology for detection of fuel debris inside the reactor

- In order to gain an understanding of the positions and amounts of fuel debris, which is required for investigations into fuel debris removal methods, it is planned to carry out position measurement of the debris via imaging technology that uses muons (a type of elementary particle), which are derived from cosmic radiation. Measurement using muon radiography at Unit 1 is scheduled to commence from around early February.

6. Plan to store, process and dispose of solid waste and decommission reactor facilities

Promoting efforts to reduce and store waste generated appropriately and R&D to facilitate adequate and safe storage, processing and disposal of radioactive waste

➢ Management status of rubble and trimmed trees

- As of the end of November, the total storage volume of concrete and metal rubble was approx. 131,900 m³ (+8,600 m³ compared to at the end of October, area-occupation rate: 74%). The total storage volume of trimmed trees was approx. 79,700 m³ (+100 m³ compared to at the end of October, area-occupation rate: 58%). The increase in rubble was mainly attributable to construction to install tanks and impermeable walls with frozen soil. The increase in trimmed trees was mainly attributable to construction to install tanks.

➢ Management status of secondary waste from water treatment

- As of December 23, the total storage volume of waste sludge was 597 m³ (area-occupation rate: 85%). The total number of stored spent vessels and high-integrity containers (HIC) of multi-nuclide removal equipment was 1,433 (area-occupation rate: 43%).
- Operation of storage for cesium absorption vessels (3rd storage) which store HICs generated from the multi-nuclide removal equipment will commence on December 9, within the scope of approved use (768 assemblies).

7. Plan for staffing and ensuring work safety

Securing appropriate staff long-term while thoroughly implementing workers' exposure dose control. Improving the work environment and labor conditions continuously based on an understanding of workers' on-site needs

➢ Staff management

- The monthly average total of people registered for at least one day per month to work on site during the past quarter from August to October was approx. 13,700 (TEPCO and partner company workers), which exceeded the monthly average number of actual workers (approx. 10,700). Accordingly, sufficient people are registered to work on site.
- It was confirmed with the prime contractors that the estimated manpower necessary for the work in January (approx. 6,810 per day: TEPCO and partner company workers)* would be secured at present. The average numbers of workers per day for each month of the last fiscal year (actual values) were maintained with approx. 3,000 to 6,600 per month since the last fiscal year (See Figure 10).

  * Some works for which contract procedures have yet to be completed are excluded from the January estimate.
- The number of workers is increasing, both from within and outside Fukushima prefecture. However, as the growth rate of workers from outside exceeds that of those from within the prefecture, the local employment ratio (TEPCO and partner company workers) as of November was approx. 45%

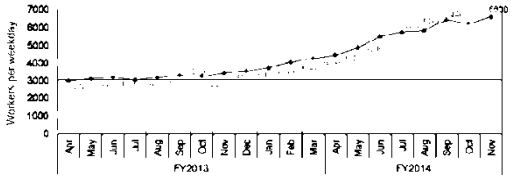


Figure 10. Changes in the average number of workers per weekday for each month since FY2013 (actual values)

- The average exposure dose of workers remained at approx. 1mSv/
  annual average exposure dose 20mSv/year ≒ 1.7mSv/month)
- For most workers, the exposure dose is sufficiently within the limi
  engaging in radiation work.

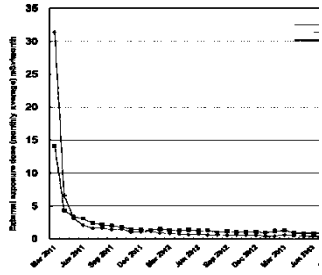


Figure 11: Changes in monthly individual worker e
(monthly average exposure dose since Mar

➢ Preventing infection and expansion of influenza and norovi

- Since October, measures for influenza and norovirus have been imp
  vaccination (subsidized by TEPCO) is being provided at the new Adı
  Daiichi Nuclear Power Station (from October 29 to December 5) and
  4 to January 30, 2015) for workers of partner companies. As of Dec
  vaccinated. In addition, a comprehensive range of other measures is
  to prevent infection and expansion (measuring body temperature, he
  response after detecting possible infection (control of swift entry/exit
  spaces).

➢ Status of influenza and norovirus cases

- From the 47th week of 2014 (November 10, 2014 to November 17,
  2014 to December 21, 2014), there were 108 cases of influenza i
  totals for the same period of the previous season were 1 case o
  infection. The totals for the entire previous season (December 20
  infection and 35 cases of norovirus infection.

➢ Status of implementation of work safety measures at Fukush

- Up until November of this fiscal year, 40 people were victims of wo
  Although various measures, such as the implementation of "Individu
  been established in the past to stop workers to take action withou
  have continued to occur. Furthermore, serious accidents such as ele
- It is currently recognized that issues which should be the responsibi
  sites in safe conditions, should also be addressed by TEPCO. W
  Safety Management Guidance Meetings led by contractors toge
  Superintendent are being held, with the goal of eliminating any furth

8. Others

➢ Leakage of water treated by multi-nuclide removal equipment

- On December 17, while sending water that had undergone treatment by multi-nuclide removal equipment (ALPS) to a tank, a valve connected to piping that was still under construction was opened due to an error regarding the system configuration, causing leakage from that piping (approx. 6m^3) to occur. Recovery of the leaked water and soil from the areas surrounding the leak were carried out, and there was no outflow to the ocean.
- Misidentified piping lines on the construction drawings had been left uncorrected, leading to the preparation of an incorrect procedure document. Since the causes of this incident consisted of failure to notice the errors in the procedure document and failure to confirm the actual line configuration, from here on whenever newly-installed valves are to be operated, the actual line configuration will be confirmed prior to their operation.

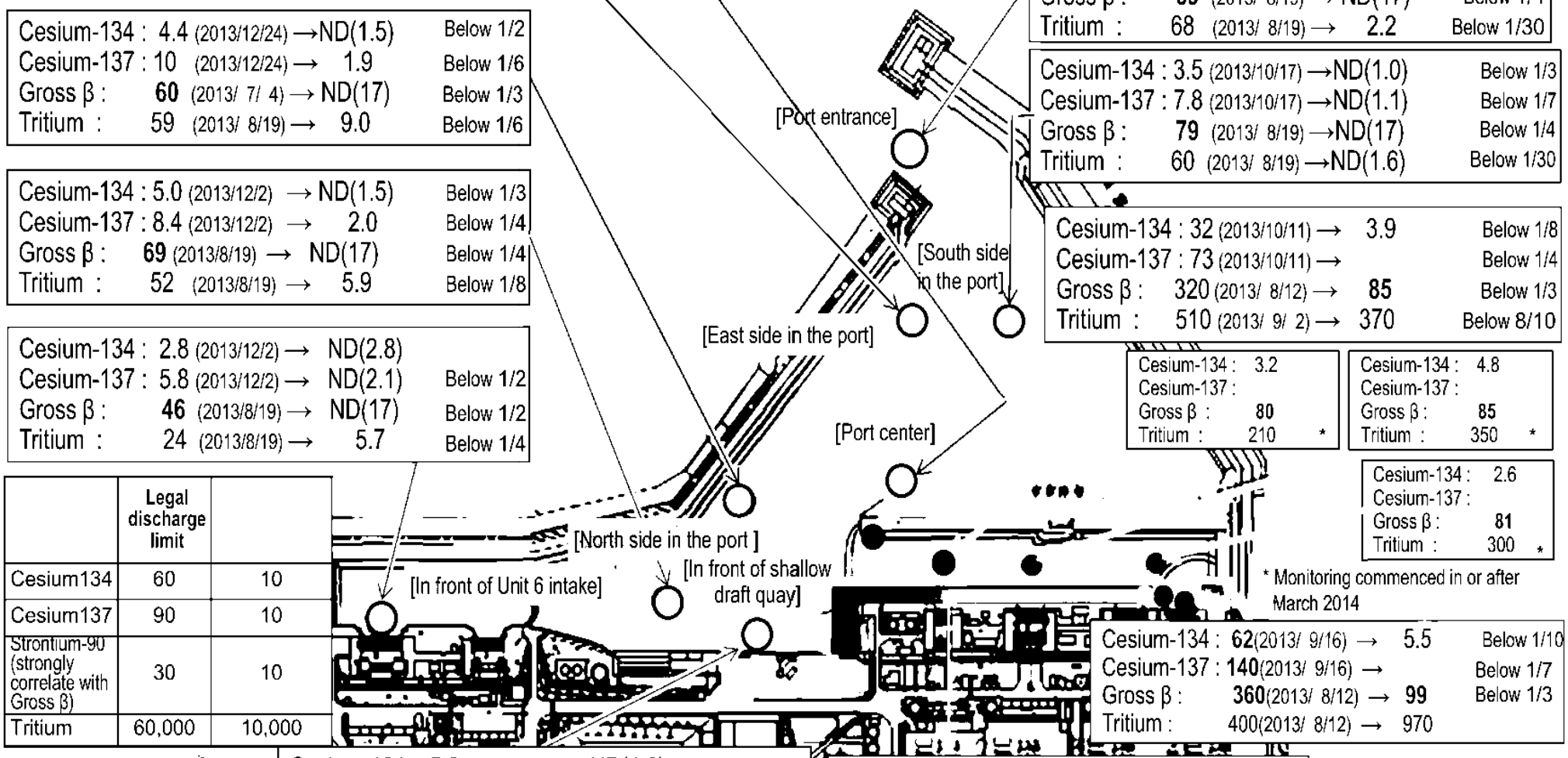
Status of seawater monitoring within the port (comparison between the highest values in 2013 and the latest values)

"The highest value" →"the latest value (sampled during December 15-22)"; unit (Bq/L); ND represents a value below the detection limit

Source: TEPCO website Analysis results on nuclides of radioactive materials around Fukushima Daiichi Nuclear Power Station http://www.tepco.co.jp/nu/fukushima-np/f1/smp/index-j.html

Sea side impermeable wall

Silt fence



Cesium-134 : 3.3 (2013/10/17) →ND(1.2) Below 1/2
Cesium-137 : 9.0 (2013/10/17) → 1.9 Below 1/4
Gross β : **74** (2013/ 8/19) → ND(17) Below 1/4
Tritium : 67 (2013/ 8/19) → 4.2 Below 1/10

Cesium-134 : ND(1.4)
Cesium-137 : 2.7
Gross β : ND(15) (Sampled in Dec. 22)
Tritium : 18

Cesium-134 : 3.3 (2013/12/24) →ND(1.1) Below 1/3
Cesium-137 : 7.3 (2013/10/11) → ND(1.4) Below 1/5
Gross β : **69** (2013/ 8/19) → ND(17) Below 1/4
Tritium : 68 (2013/ 8/19) → 2.2 Below 1/30

Cesium-134 : 4.4 (2013/12/24) →ND(1.5) Below 1/2
Cesium-137 : 10 (2013/12/24) → 1.9 Below 1/6
Gross β : **60** (2013/ 7/ 4) → ND(17) Below 1/3
Tritium : 59 (2013/ 8/19) → 9.0 Below 1/6

Cesium-134 : 3.5 (2013/10/17) →ND(1.0) Below 1/3
Cesium-137 : 7.8 (2013/10/17) →ND(1.1) Below 1/7
Gross β : **79** (2013/ 8/19) →ND(17) Below 1/4
Tritium : 60 (2013/ 8/19) →ND(1.6) Below 1/30

Cesium-134 : 5.0 (2013/12/2) → ND(1.5) Below 1/3
Cesium-137 : 8.4 (2013/12/2) → 2.0 Below 1/4
Gross β : **69** (2013/8/19) → ND(17) Below 1/4
Tritium : 52 (2013/8/19) → 5.9 Below 1/8

Cesium-134 : 32 (2013/10/11) → 3.9 Below 1/8
Cesium-137 : 73 (2013/10/11) → Below 1/4
Gross β : 320 (2013/ 8/12) → **85** Below 1/3
Tritium : 510 (2013/ 9/ 2) → 370 Below 8/10

Cesium-134 : 2.8 (2013/12/2) → ND(2.8)
Cesium-137 : 5.8 (2013/12/2) → ND(2.1) Below 1/2
Gross β : **46** (2013/8/19) → ND(17) Below 1/2
Tritium : 24 (2013/8/19) → 5.7 Below 1/4

Cesium-134 : 3.2
Cesium-137 :
Gross β : **80**
Tritium : 210 *

Cesium-134 : 4.8
Cesium-137 :
Gross β : **85**
Tritium : 350 *

Cesium-134 : 2.6
Cesium-137 :
Gross β : **81**
Tritium : 300 *

* Monitoring commenced in or after March 2014

	Legal discharge limit	
Cesium134	60	10
Cesium137	90	10
Strontium-90 (strongly correlate with Gross β)	30	10
Tritium	60,000	10,000

Cesium-134 : 5.3 (2013/8/ 5) → ND(1.6) Below 1/3
Cesium-137 : 8.6 (2013/8/ 5) → ND(1.8) Below 1/4
Gross β : **40** (2013/7/ 3) → ND(17) Below 1/2
Tritium : 340 (2013/6/26) → 6.4 Below 1/50

Cesium-134 : (2013/ 9/16) → 5.5 Below 1/5
Cesium-137 : (2013/12/16) → Below 1/3
Gross β : **390**(2013/ 8/12) → **110** Below 1/3
Tritium : 650(2013/ 8/12) → 930

Cesium-134 : **62**(2013/ 9/16) → 5.5 Below 1/10
Cesium-137 : **140**(2013/ 9/16) → Below 1/7
Gross β : **360**(2013/ 8/12) → **99** Below 1/3
Tritium : 400(2013/ 8/12) → 970

Summary of TEPCO data as of December 24

Note: The gross β measurement values include natural potassium 40 (approx. 12 Bq/L).

Status of seawater monitoring around outside of the port
(comparison between the highest values in 2013 and the latest values)

(The latest values sampled during December 15-22)

Unit (Bq/L); ND represents a value below the detection limit; values in ( ) represent the detection limit; ND (2013) represents ND throughout 2013

	Legal discharge limit	
Cesium134	60	10
Cesium137	90	10
Strontium-90 (strongly correlate with Gross β)	30	10
Tritium	60,000	10,000

[Northeast side of port entrance(offshore 1km)]

Cesium-134 : ND (2013) →ND(0.67)
Cesium-137 : ND (2013) →ND(0.68)
Gross β : ND (2013) →ND(17)
Tritium : ND (2013) → 1.8

[East side of port entrance (offshore 1km)]

Cesium-134 : ND (2013) →ND(0.50)
Cesium-137 : 1.6 (2013/10/18) →ND(0.59) Below 1/2
Gross β : ND (2013) →ND(17)
Tritium : 6.4 (2013/10/18) →ND(1.6) Below 1/5

[Southeast side of port entrance(offshore 1km)]

Cesium-134 : ND (2013) →ND(0.80)
Cesium-137 : ND (2013) →ND(0.64)
Gross β : ND (2013) →ND(17)
Tritium : ND (2013) →ND(1.6)

Cesium-134 : ND (2013) →ND(0.66)
Cesium-137 : ND (2013) →ND(0.58)
Gross β : ND (2013) →ND(17)
Tritium : 4.7 (2013/8/18) →ND(1.6) Below 1/2

[North side of north breakwater(offshore 0.5km)]

[Port entrance]

[South side of south breakwater(offshore 0.5km)]

Cesium-134 : ND (2013) →ND(0.51)
Cesium-137 : ND (2013) →ND(0.58)
Gross β : ND (2013) →ND(17)
Tritium : ND (2013) →ND(1.6)

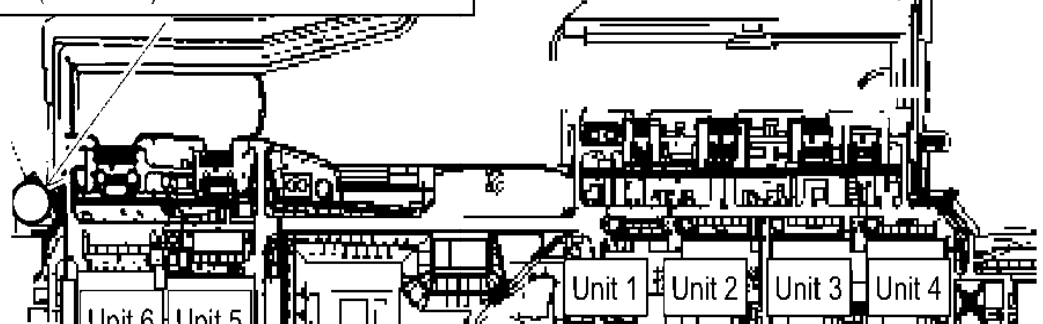
Cesium-134 : 3.3 (2013/12/24) → ND(1.1) Below 1/3
Cesium-137 : 7.3 (2013/10/11) → ND(1.4) Below 1/5
Gross β : 69 (2013/ 8/19) → ND(17) Below 1/4
Tritium : 68 (2013/ 8/19) → 2.2 Below 1/30

[North side of Units 5 and 6 discharge channel]

Cesium-134 : 1.8 (2013/ 6/21) →ND(0.55) Below 1/3
Cesium-137 : 4.5 (2013/ 3/17) →ND(0.72) Below 1/6
Gross β : (2013/12/23) →
Tritium : 8.6 (2013/ 6/26) → 3.7 Below 1/2

Cesium-134 : ND (2013) → ND(0.58)
Cesium-137 : 3.0 (2013/ 7/15) → ND(0.58) Below 1/5
Gross β : (2013/12/23) →
Tritium : 1.9 (2013/11/25) → 2.2

Note: The gross β measurement values include natural potassium 40 (approx. 12 Bq/L).



Sea side impermeable wall

Silt fence

[Around south discharge channel]

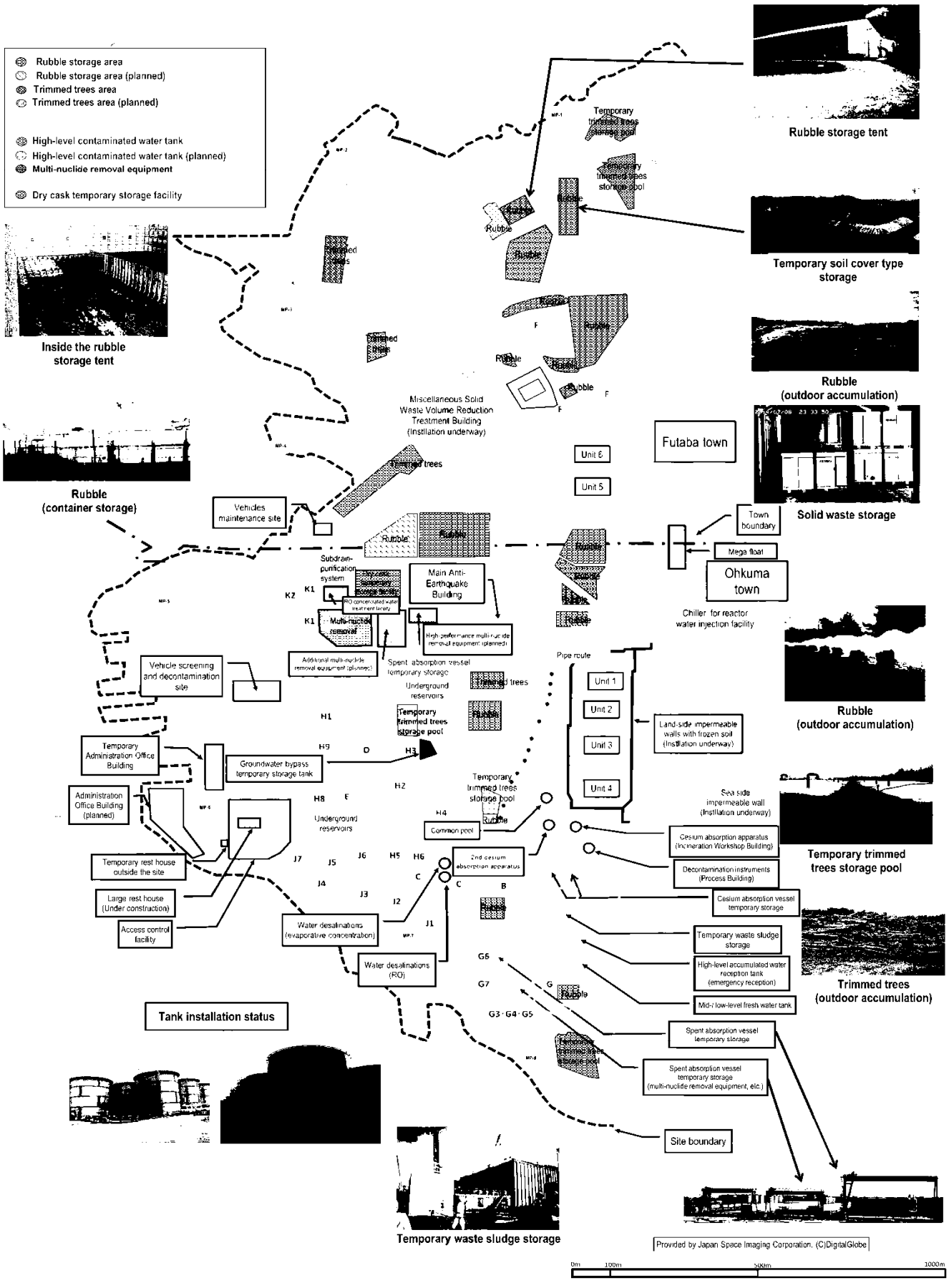
Summary of TEPCO data as of December 24

Source: TEPCO website, Analysis results on nuclides of radioactive materials around Fukushima Daiichi Nuclear Power Station, http://www.tepco.co.jp/nu/fukushima-np/f1/smp/index-j.html

Appendix 2

December 25, 2014

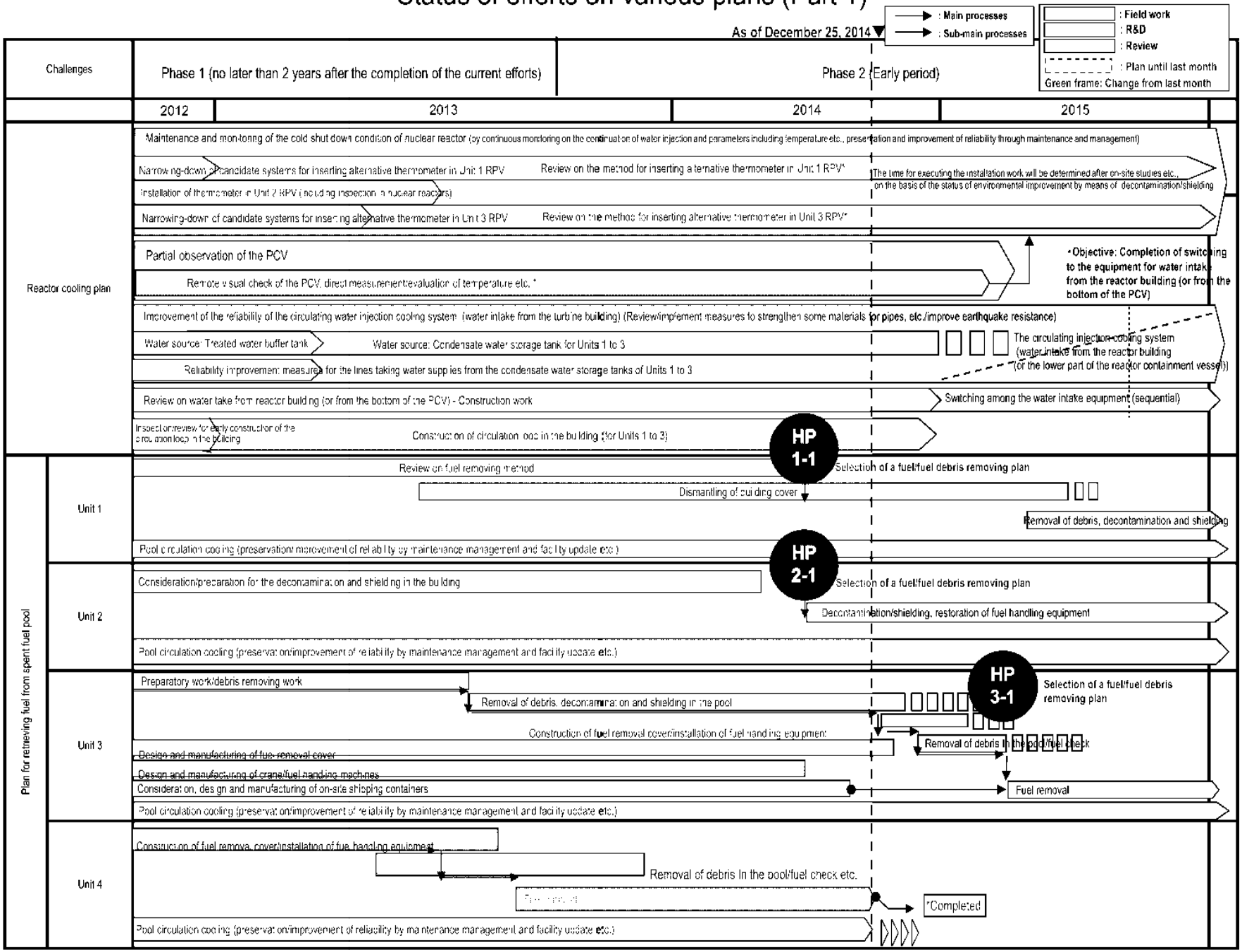
TEPCO Fukushima Daiichi Nuclear Power Station Site Layout



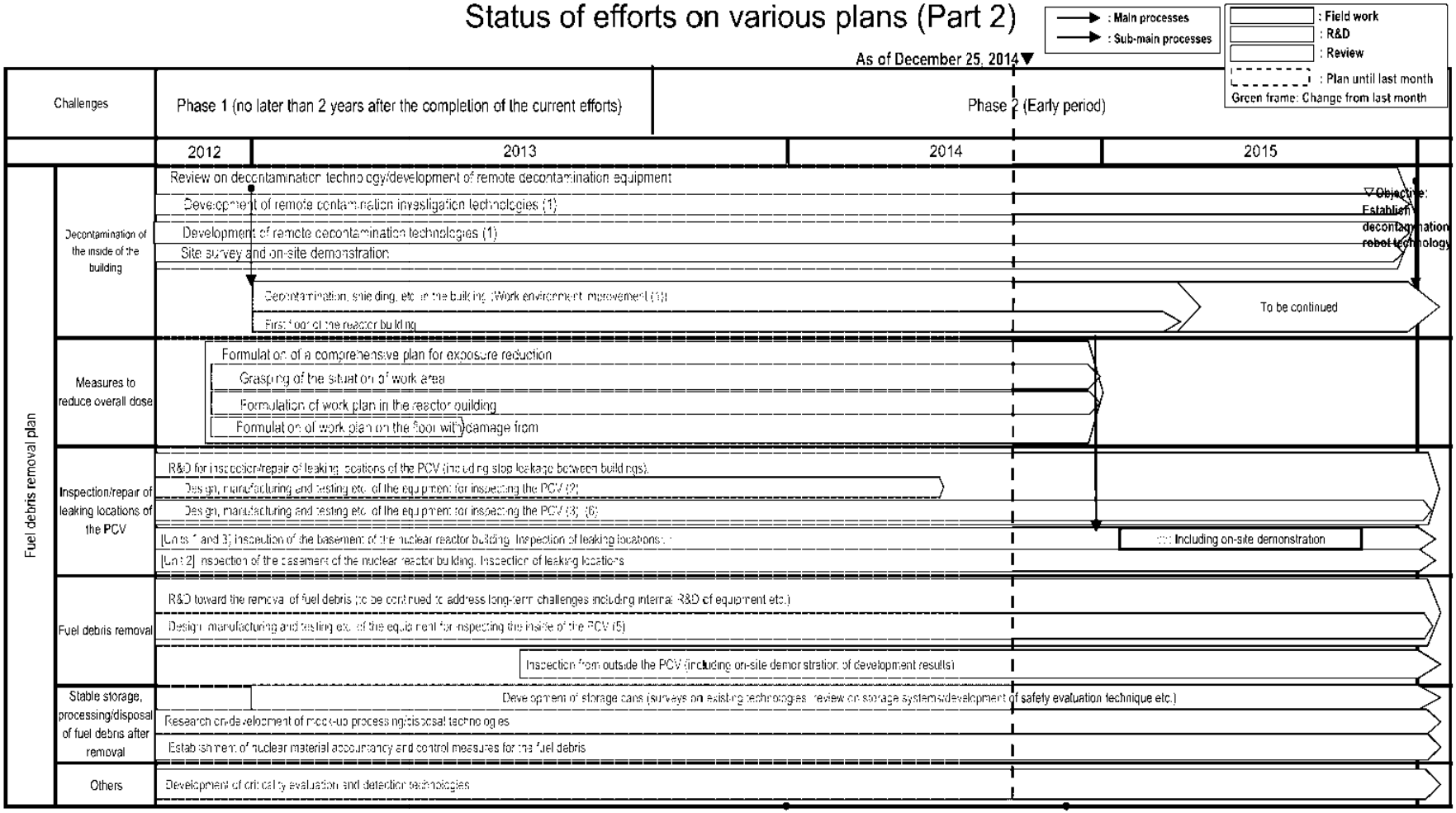
Status of efforts on various plans (Part 1)

Attachment 3

As of December 25, 2014



Status of efforts on various plans (Part 2)



Status of efforts on various plans (Part 3)

: Main processes
: Sub-main processes
: Field work
: R&D
: Review
: Plan until last month
Green frame: Change from last month

As of December 25, 2014

Challenges	The Phase 1 (no later than 2 years after the completion of the current efforts)		The Phase 2 (Early period)	
	2012	2013	2014	2015

Plan for maintaining and continuing the steady state of plant

Retained water treatment plan

- ▽Objective: Implement the measures to improve the reliability of the current facilities
- Retained water treatment by means of existing treatment facilities
- Improving the reliability of the current facilities, etc. (Improve the reliability of transfer, processing, and storage facilities).
- Treatment of retained water by water treatment facilities with improved reliability
- Replacement of branch pipe pressure hoses with PE pipes
- Measures to prevent the expansion of tank leakage (Reinforced concrete dam/embankment replacement by closed conduits), to be taken sequentially along with the installation of tanks
- Review on sub-drain restoration work
- Sub-drain restoration work
- Restore sub-drain facilities, reduce the amount of groundwater inflow (reduction in retained water)
- Review on sub drain and other purification facility • installation work
- Drawdown of groundwater in the building
- Groundwater bypass installation work
- Groundwater inflow is reduced (Retained water is decreased).
- Installation of multi-nuclide removal equipment
- Consider and implement measures to increase the processing amount
- Purification of on-site reservoir water
- Preparation work for frozen soil impermeable walls
- Reduce groundwater inflow rate (Reduce accumulated water)

Plans toward the reduction in the radiation dose and prevention of the spread of contamination in the entire power plant

Plan for preventing the spread of marine pollution

- Construction of sea side water barrier wall
- Landfilling etc. in the harbor area
- ▽Objective: Reduction of the risk of spreading marine contamination during the leakage of contaminated water
- Installation of steel pipe sheet pile
- Consideration of technologies for decontaminating radioactive strontium (Sr)
- Seawater circulation purification
- Sea water purification by fibrous adsorbent material (ongoing)
- Decontamination of Radioactive strontium (Sr)
- Covering etc. of dredge soil over sea routes and berths
- Monitoring of ground water and seawater (implemented on an ongoing basis)

Gas/liquid waste

- Operation of the gas management system of Units 1 to 3 PCVs
- Installation of ventilation equipment/closure of the opening of blow-out panel for Unit 2
- Measurement of dust concentration at the opening of buildings etc., on-site survey
- Improve the accuracy of gas monitoring
- Land and marine environmental monitoring (implemented in an ongoing basis)

Reduction in radiation dose at the site boundary

- ▽Objective: Control the radiation dose at the site boundaries caused by radioactive substance etc. additionally released from the entire power plant at 1mSv/year or less
- Reduction of radiation dose by shielding, etc.
- Reduction of radiation dose by the purification of contaminated water etc.
- Land and marine environmental monitoring (implemented in an ongoing basis)

Site decontamination plan

- Objective: Reduction to average 5 Sv/hour in the South side area on site except for around Units 1-4. ▽
- Systematic implementation of decontamination in the site of power generation plant

Status of efforts on various plans (Part 4)

: Main processes
: Sub-main processes

: Field work
: R&D
: Review
: Plan until last month
Green frame: Change from last month

As of December 25, 2014▼

Challenges	The Phase 1 (no later than 2 years after the completion of the current efforts)			The Phase 2 (Early period)	
	2012	2013		2014	2015
Plan for retrieving fuel from spent fuel pool: Cask for both transport and storage	Cask manufacturing				
Plan for retrieving fuel from spent fuel pool: Dry storage cask	Cask manufacturing				
Plan for retrieving fuel from spent fuel pool: Harbor	Wharf restoration work				
	Carrying-in of empty casks (sequential)				
Plan for retrieving fuel from spent fuel pool: Common pool	Already carried-in	Sequential carrying-in		Retrieval of fuel from the common pool	
	Inspection of existing dry storage casks (9 pieces)				
	Design/manufacturing of damaged fuel racks			Fixation	
	Storage of fuel retrieved from spent fuel pool (storage and management)				
Plan for retrieving fuel from spent fuel pool: Temporary cask storage facility	Design and production				
	Installation	Acceptance and interim storage of casks			
Plan for retrieving fuel from spent fuel pool: R&D	Evaluation of long-term integrity of fuel retrieved from spent fuel pool				
	Examination of the processing method of damaged fuel etc. retrieved from spent fuel pool				
Fuel debris removal plan: Installation of reactor building					
Fuel debris removal plan: Preservation of the integrity of RPV/PCV	Development of evaluation technology for integrity against corrosion of RPV/PCV				
	Corrosion protection (Reduction in dissolved oxygen contained in reactor cooling water by means of nitrogen bubbling)				
Plan for management and processing/disposal of solid radioactive waste, and the decommissioning of reactor facilities: Storage and management plans for solid wastes	Continuation of secure storage equipped with adequate shielding and scattering prevention measures				
	Development of storage management plans (Reduction in general or annual upper limit of storage)	Evaluation of waste prevention measures			Improvement of waste reducing management policy
		Establishment of vehicle maintenance shops			
		Update the storage management plan			Improvement of waste storage management policy
		Establishment of drum storage facility			
		Installation of incineration plants for miscellaneous solid wastes		*Reflection of actual performance	
	Transfer of cells in the soil-covered temporary storage facility				
	Soil covering work for felled trees				
	Reduction of radiation dose from stored secondary wastes from water treatment through shielding etc.				
	Evaluation of secondary wastes from water treatment and lifespan of storage containers			Facility renewal plan development	
Plan for management and processing/disposal of solid radioactive waste, and the decommissioning of reactor facilities: Processing/disposal plans for solid wastes	Development of R&D plan for safety processing/disposal	Verification of applicability of processing/disposal technologies in Japan and foreign countries			
		Waste characterization (radiochemistry analysis, assessment of volume etc.)			
Plan for management and processing/disposal of solid radioactive waste, and the decommissioning of reactor facilities: Decommissioning plans for reactor facilities	Development of feasible and rational decommissioning scenarios				
Implementation system and personnel procurement plan	Systematic cultivation/deployment of personnel, including the cooperative companies, and implementation of measures to stimulate motivation etc				
Plan to ensure the safety of work	Continuation of safety activities, maintenance and enhancement of radiation management, continuous ensurement of medical services, etc				
	Reduction of radiation dose in the rest area of the main office building, rest area in front of the important quake-proof building, and the important quake-proof building				

HP ND-1

Establishment of decommissioning scenarios

Progress toward decommissioning: Fuel removal from the spent fuel pool (SFP)

Immediate target | Commence fuel removal from the Spent Fuel Pool (Unit 4, November 2013)

Unit 4

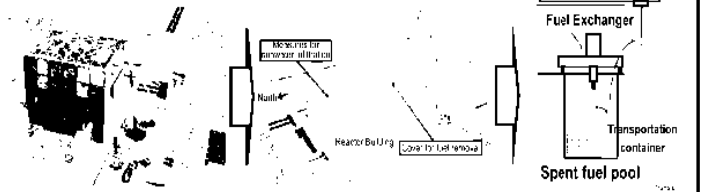
In the Mid- and Long-Term Roadmap, the target of Phase 1 involved commencing fuel removal from inside the spent fuel pool (SFP) of the 1st Unit within two years of completion of Step 2 (by December 2013). On November 18, 2013, fuel removal from Unit 4, or the 1st Unit, commenced and Phase 2 of the roadmap started.
On November 5, 2014, within a year since the fuel removal commenced, the transfer of 1,331 spent fuel assemblies in the pool to the common pool was completed.
The transfer of the remaining non-irradiated fuel assemblies to the Unit 6 SFP was completed on December 22, 2014.
(2 of the non-irradiated fuel assemblies were removed in advance in July 2012 for fuel checks)
This marks the completion of fuel removal from the Unit 4 Reactor Building.
Based on this experience, fuel assemblies will be removed from the Unit 1-3 pools.

Fuel removal status

Conditions in the Unit 4 SFP

Work is proceeding with appropriate risk countermeasures, careful checks and safety first

Steps toward fuel removal



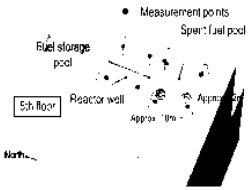
Removal of rubble from the roof of the Reactor Building — Completed in Dec. 2012

Installation of cover for fuel removal — From Apr. 2012 completed in Nov. 2013

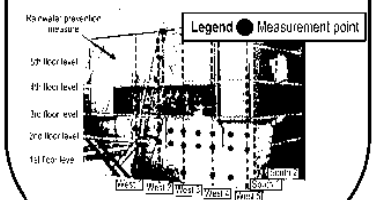
Removal — Commenced in Nov. 2013

Check of the soundness of the Reactor Building

Since May 2012, regular quarterly inspections have been conducted, which have confirmed that the soundness of the Reactor Building has been maintained.



Check for tilt (measurement of the water level)



Check for tilt (measurement of the external wall)

* Some portions of these photos, in which classified information related to physical protection is included, were corrected.

Unit 3

To facilitate the installation of a cover for fuel removal, installation of the gantry was completed (March 13, 2013). Removal of rubble from the roof of the Reactor Building was completed (October 11, 2013). Currently, toward the installation of a cover for fuel removal and the fuel-handling machine on the operating floor (*1), measures to reduce the radiation dose (decontamination and shielding) are underway (from October 15, 2013). Removal of large rubble from the SFP is also underway (from December 17, 2013).

Before removal of the large rubble

After removal of the large rubble

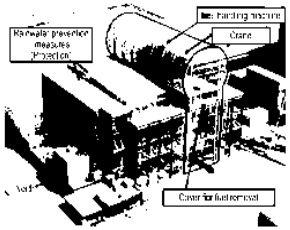


Image of the cover for fuel removal

Units 1 and 2

- Regarding Unit 1, to remove rubble from the top of the operating floor, there are plans to dismantle the cover over the Reactor Building. Two roof panels of the Unit 1 Reactor Building (R/B) were removed to facilitate investigation of the rubble status on the R/B top floor.
No scattering of dust or conditions that would cause immediate damage to the fuel assemblies in the SFP were detected.
- Regarding Unit 2, to prevent risks of reworking due to change in the fuel debris removal plan, the plan continues to be examined within a scope not affecting the scheduled commencement of removal.

Dismantling of the cover over Reactor Building Unit 1

To facilitate the early removal of fuel and fuel debris from the SFP, the cover over the Reactor Building will be dismantled to accelerate the removal of rubble on the operation floor. The radiation dose on the site boundaries will also increase compared to before the dismantling. However, through measures to reduce the release, the estimated impact of the release from Units 1 to 3 on the site boundaries (0.03mSv/year) will be limited.

(1) Spraying anti-scattering agents

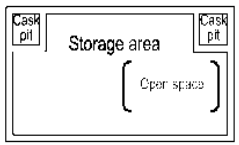
(2) Removing dust and dirt by suctioning devices

(3) Preventing dust from being stirred up via a windbreak sheet

(4) Enhancing the dust-monitoring system by installing additional monitors

Measures to reduce release

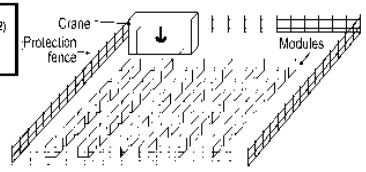
Common pool



An open space will be maintained in the common pool (Transfer to the temporary dry cask storage facility)

Progress to date
- The common pool has been restored to a condition allowing it to re-accommodate fuel to be handled (November 2012)
- Loading of spent fuel stored in the common pool to dry casks commenced (June 2013)
- Fuel removed from the Unit 4 spent fuel pool began to be received (November 2013)

Temporary dry cask (*2) storage facility



Spent fuel is accepted from the common pool

Operation commences on April 12, 2013; from the cask storage building, transfer of six sling dry casks completed (May 21, 2013); fuel stored in the common pool sequentially transferred

<Glossary>
(*1) Operating floor: During regular inspection, the roof over the reactor is opened while on the operating floor, fuel inside the core is replaced and the core internals are inspected.
(*2) Cask: Transportation container for samples and equipment including radioactive materials.

Progress toward decommissioning: Works to identify the plant status and toward fuel debris removal

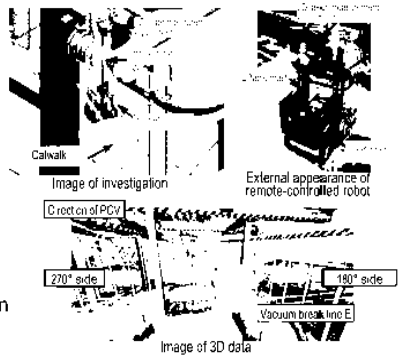
Immediate target	Identify the plant status and commence R&D and decontamination toward fuel debris removal

3D laser scan inside the Unit 1 R/B underground floor

The upper part of the underground floor (torus room) of Unit 1 R/B was investigated with a laser scan using a remote-controlled robot, and collected its 3D data.

The 3D data, which allows examination based on actual measurements, can be used to examine more detailed accessibility and allocation of equipment.

Combining it with the 3D data on the R/B 1st floor allows obstacles on both 1st and underground floors to be checked simultaneously. This allows efficient examination of positions to install repair equipment for PCVs and vacuum break lines.



Investigation in the leak point detected in the upper part of Unit 1 Suppression Chamber (S/C(*1))

Investigation in the leak point detected in the upper part of Unit 1 S/C from May 27 from one expansion joint cover among the lines installed there. As no leakage was identified from other parts, specific methods will be examined to halt the flow of water and repair the PCV.

Leak point

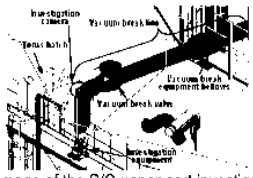
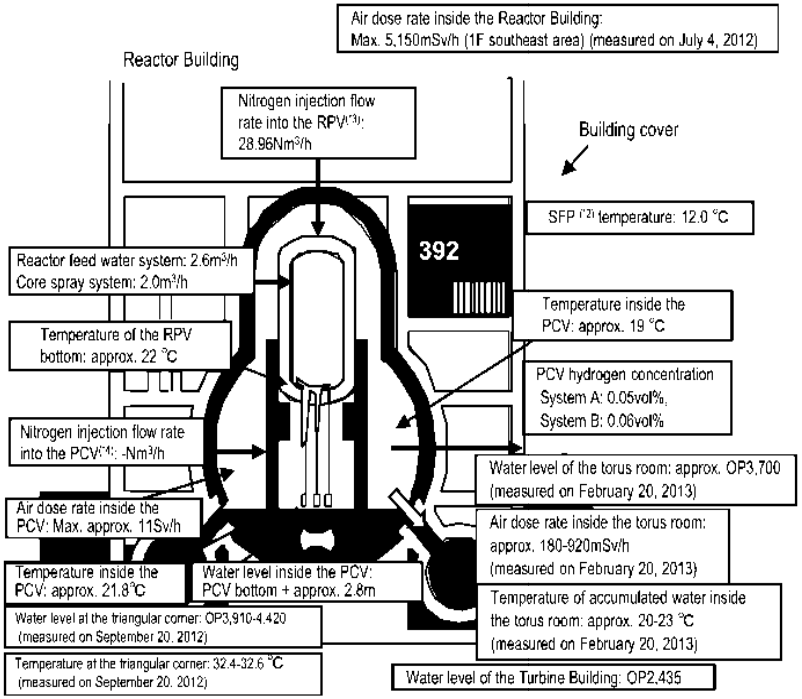


Image of the S/C upper part investigation

Unit 1



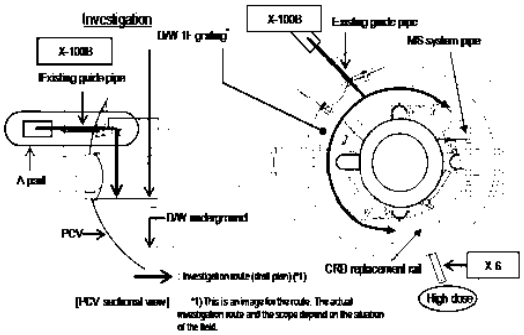
* Indices related to the plant are values as of 11:00, December 24, 2014

Status of equipment development toward investigating inside the PCV

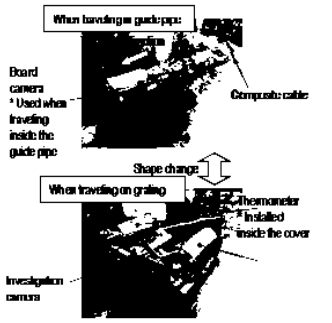
Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigation inside the PCV is scheduled.

[Investigative outline]
- Inserting equipment from Unit 1 X-100B penetration(*5) to investigate in clockwise and counter-clockwise directions.

[Status of investigation equipment development]
- Crawler-type equipment with a shape-changing structure which allows it to enter the PCV from the narrow access entrance (bore: φ100mm) and stably move on the grating is currently under development. A field demonstration is scheduled for the 2nd half of FY2014.



Investigative route inside the PCV (draft plan)



<Glossary>
(*1) S/C (Suppression Chamber): Suppression pool, used as the water source for the emergent core cooling system
(*2) SFP (Spent Fuel Pool)
(*3) RPV (Reactor Pressure Vessel)
(*4) PCV (Primary Containment Vessel)
(*5) Penetration; Through-hole of the PCV

Progress toward decommissioning: Works to identify the plant status and toward fuel debris removal

December 25, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment

Immediate target | Identify the plant status and commence R&D and decontamination toward fuel debris removal

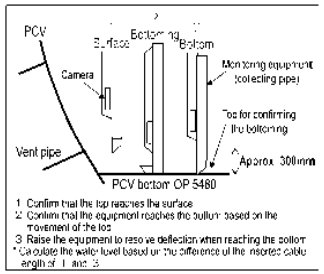
Installation of an RPV thermometer and permanent PCV supervisory instrumentation

(1) Replacement of the RPV thermometer

- As the thermometer installed at the Unit 2 RPV bottom after the earthquake had broken, it was excluded from the monitoring thermometers (February 19).
- On April 17, removal of the broken thermometer failed and was suspended. It was confirmed with full-scale piping that it is possible for wire guides to be drawn out if rust-stripping chemicals that do not generate hydrogen are used. The removal will be impermanent in around January 2015.

(2) Reinstallation of the PCV thermometer and water-level gauge

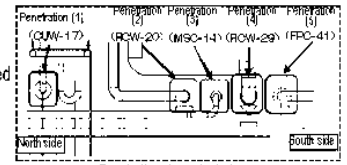
- Some of the permanent supervisory instrumentation for PCV could not be installed in the planned locations due to interference with existing grating (August 13, 2013).
- The instrumentation was removed on May 27, 2014 and new instruments were reinstalled on June 5 and 6. The trend of added instrumentation will be monitored for approx. one month to evaluate its validity.
- The measurement during the installation confirmed that the water level inside the PCV was approx. 300mm from the bottom.



Method to measure water levels when re-installing monitoring instrumentation for Unit 2 PCV

Investigative results on torus room walls

- The torus room walls were investigatec (on the north side of the east-side walls) using equipment specially developed for that purpose (a swimming robot and a floor traveling robot).
- At the east-side wall pipe penetrations (five points), "the status" and "existence of flow" were checked.
- A demonstration using the above two types of underwater wall investigative equipment showed how the equipment could check the status of penetration.
- Regarding Penetrations 1 - 5, the results of checking the sprayed tracer (*5) by camera showed no flow around the penetrations. (investigation by the swimming robot)
- Regarding Penetration 3, a sonar check showed no flow around the penetrations. (investigation by the floor traveling robot)



Penetrations investigated

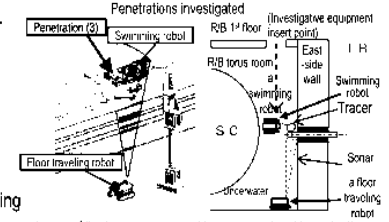
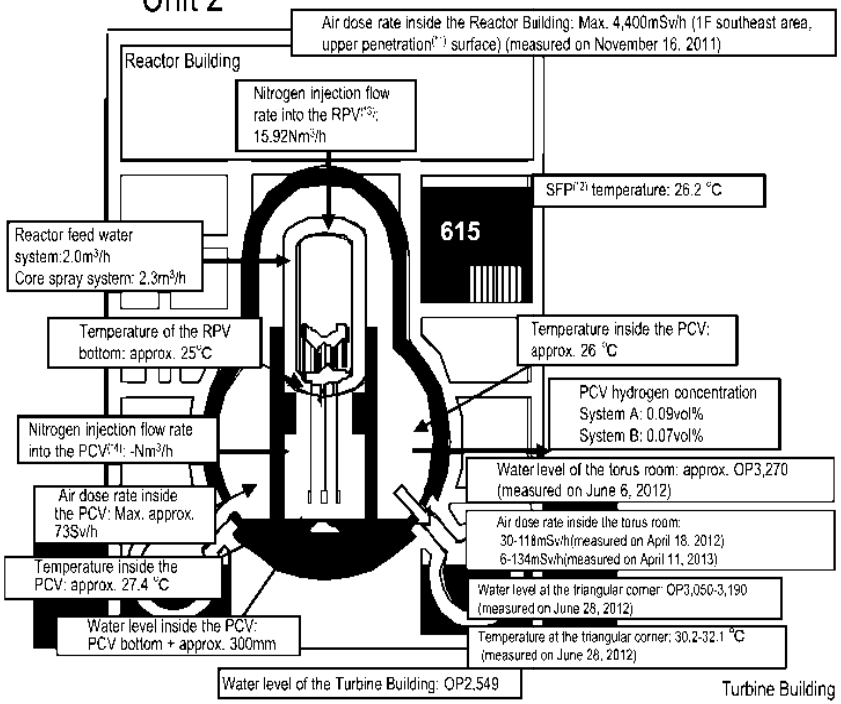


Image of the torus room east-side cross-sectional investigation

Unit 2



* Indices related to plant are values as of 11:00, December 24, 2014

Status of equipment development toward investigating inside the PCV

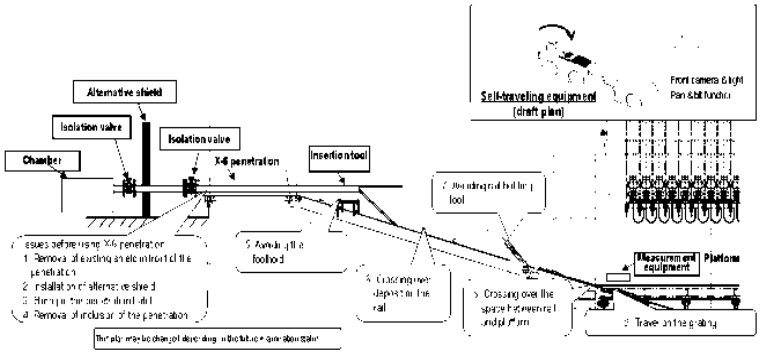
Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigations inside the PCV are scheduled.

[Investigative outline]

- Inserting the equipment from Unit 2 X-6 penetration(*1) and accessing inside the pedestal using the CRD rail to conduct investigation.

[Status of investigative equipment development]

- Based on issues confirmed by the CRD rail status investigation conducted in August 2013, the investigation method and equipment design are currently being examined. A demonstration is scheduled in the field in the 2nd half of FY2014.



Investigative issues inside the PCV and equipment configuration (draft plan)

<Glossary>
(*1) Penetration: Through-hole of the PCV (*2) SFP (Spent Fuel Pool)
(*3) RPV (Reactor Pressure Vessel) (*4) PCV (Primary Containment Vessel)
(*5) Tracer: Material used to trace the fluid flow. Clay particles

Progress toward decommissioning: Works to identify the plant status and toward fuel debris removal

December 25, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment
4/6

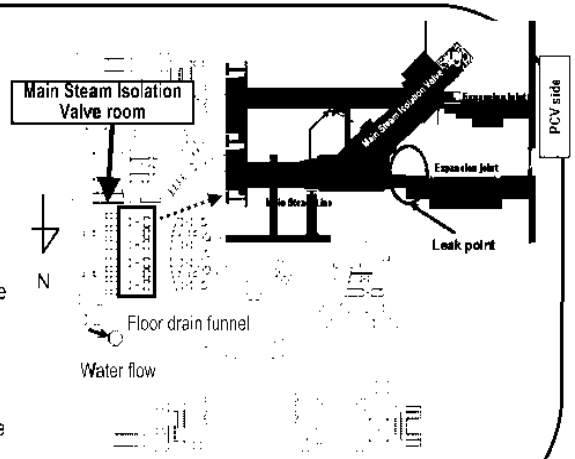
Immediate target | Identify the plant status and commence R&D and decontamination toward fuel debris removal

Water flow was detected from the Main Steam Isolation Valve* room

On January 18, a flow of water from around the door of the Steam Isolation Valve room in the Reactor Building Unit 3 1st floor northeast area to the nearby floor drain funnel (drain outlet) was detected. As the drain outlet connects with the underground part of the Reactor Building, there is no possibility of outflow from the building.

From April 23, image data has been acquired by camera and the radiation dose measured via pipes for measurement instrumentation, which connect the air-conditioning room on the Reactor Building 2nd floor with the Main Steam Isolation Valve Room on the 1st floor. On May 15, water flow from the expansion joint of one Main Steam Line was detected.

This is the first leak from PCV detected in Unit 3. Based on the images collected in this investigation, the leak volume will be estimated and the need for additional investigations will be examined. The investigative results will also be utilized to examine water stoppage and PCV repair methods.



Outline of the water-flow status

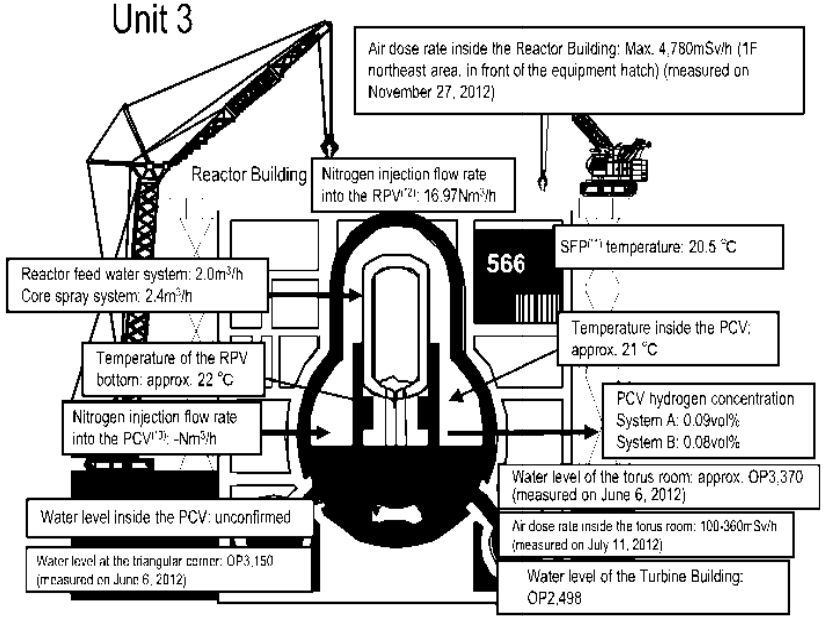
* Main Steam Isolation Valve: A valve to shut off the steam generated from the Reactor in an emergency

Decontamination inside R/B

-The contamination status inside the Reactor Building (R/B) was investigated by a robot (June 11-15, 2012).
-To select an optimal decontamination method, decontamination samples were collected (June 29 to July 3, 2012).
-To facilitate decontamination inside the Reactor Building, removal of obstacles on the 1st floor was conducted (from November 18, 2013 to March 20, 2014).

Robot for investigating the contamination status (gamma camera mounted)

Unit 3

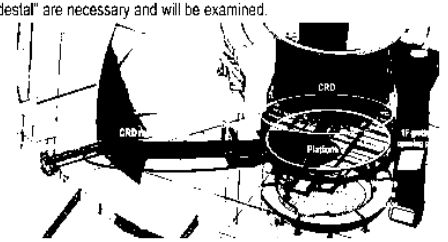


* Indices related to plant are values as of 11:00, December 24, 2014

Status of equipment development toward investigating inside the PCV

Prior to removing fuel debris, to check the conditions inside the Primary Containment Vessel (PCV), including the location of the fuel debris, investigation inside the PCV is scheduled. As the water level inside the PCV is high and the penetration scheduled for use in Units 1 and 2 may be under the water, another method needs to be examined.

[Steps for investigation and equipment development]
(1) Investigation from X-53 penetration
-From October 22-24, the status of X-53 penetration, which may be under the water and which is scheduled for use to investigate the inside of the PCV, was investigated using remote-controlled ultrasonic test equipment. Results showed that the penetration is not under the water.
-An investigation of the inside of the PCV is scheduled for around the 1st half of FY2015. Given the high radioactivity around X-53 penetration, the introduction of remote-controlled equipment will be examined based on the decontamination status and shielding.
(2) Investigation plan following the investigation of X-53 penetration
-Based on the measurement values of hydraulic head pressure inside the PCV, X-6 penetration may decline. It is estimated that access to X-6 penetration is difficult.
-For access from another penetration, approaches such as 'further downsizing the equipment" or "moving in water to access the pedestal" are necessary and will be examined.



<Glossary>
(*1) SFP (Spent Fuel Pool)
(*2) RPV (Reactor Pressure Vessel)
(*3) PCV (Primary Containment Vessel)

Progress toward decommissioning: Work related to circulation cooling and accumulated water treatment line

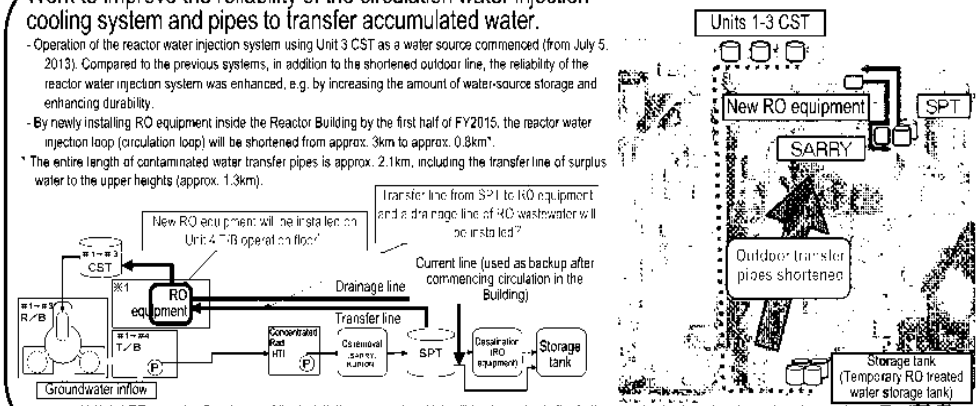
December 25, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment
5/6

Immediate target | Stably continue reactor cooling and accumulated water treatment, and improve reliability

Work to improve the reliability of the circulation water injection cooling system and pipes to transfer accumulated water.

- Operation of the reactor water injection system using Unit 3 CST as a water source commenced (from July 5, 2013). Compared to the previous systems, in addition to the shortened outdoor line, the reliability of the reactor water injection system was enhanced, e.g. by increasing the amount of water-source storage and enhancing durability.
- By newly installing RO equipment inside the Reactor Building by the first half of FY2015, the reactor water injection loop (circulation loop) will be shortened from approx. 3km to approx. 0.8km*.

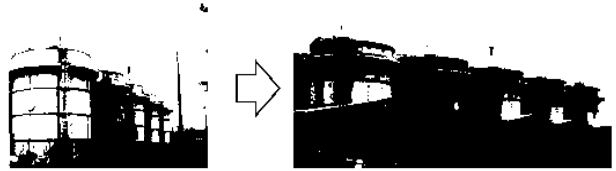
* The entire length of contaminated water transfer pipes is approx. 2.1km, including the transfer line of surplus water to the upper heights (approx. 1.3km).



*1 Unit 4 T/B operation floor is one of the installation proposals, which will be determined after further examination based on the work environment
*2 A detailed line configuration will be determined after further examination

Typhoon measures improved for Tank Area

-Enhanced rainwater measures were implemented, including increasing the height of fences to increase the capacity to receive rainwater and installing rain gutters and fence cover to prevent rainwater inflow. Though a total of 300mm of rainfall was recorded by typhoon Nos. 18 and 19, no outflow of contaminated rainwater from inside the fences was detected.



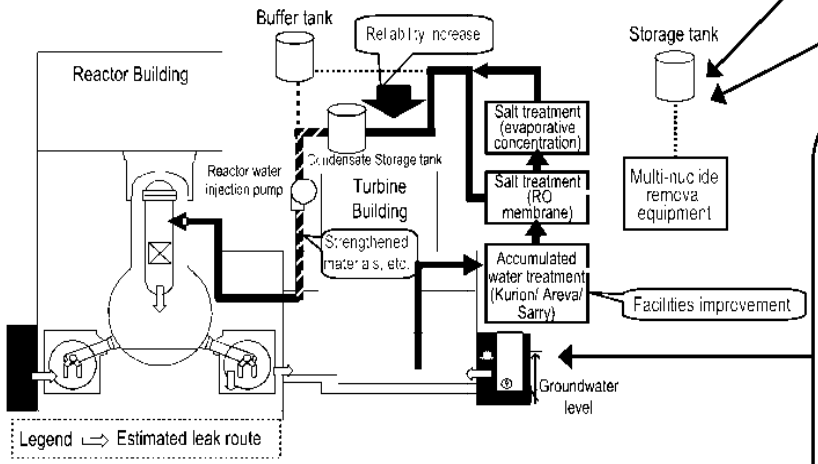
Before installing the fence cover — After installing the fence cover

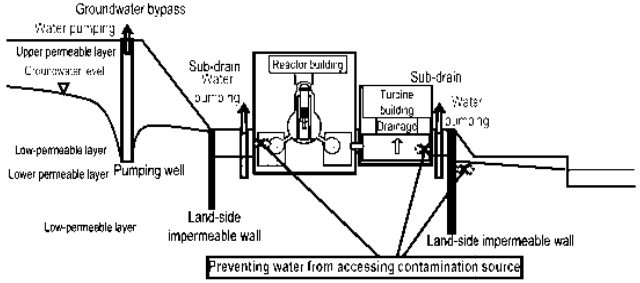
Risk reduction of contaminated water stored in tanks

In addition to multi-nuclide removal equipment (ALPS), the installation of multiple purification systems to remove strontium is also proceeding.

The contaminated water in the initial group of tanks was treated using mobile strontium-removal equipment that circulates contaminated water in tanks and removes strontium from it.

The cesium absorption apparatus (KURION) and secondary cesium absorption apparatus (SARRY), which remove cesium from contaminated water transferred from buildings, were modified to commence their operation with the added operation of the removal of strontium from the end of December.

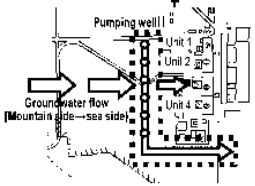




Preventing groundwater from flowing into the Reactor Buildings

Aiming to reduce the level of groundwater by pumping subdrain water, tests were conducted to verify the stable operation of water treatment facilities, including subdrain. The results showed that through purification by the system, the density of radioactive materials declined to below the operational target and no other γ nuclides were detected.

Reducing groundwater inflow by pumping sub-drain water



Measures to pump up groundwater flowing from the mountain side upstream of the Building to reduce the groundwater inflow (groundwater bypass) have been implemented.

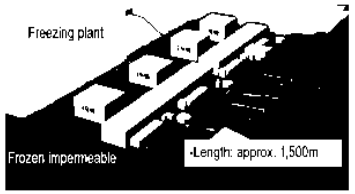
The pumped up groundwater is temporarily stored in tanks and released after TEPCO and a third-party organization have confirmed that its quality meets operational targets.

Through periodical monitoring, pumping of wells and tanks is operated appropriately.

At the observation holes installed at a height equivalent to the buildings, the trend showing a decline in groundwater levels is checked.

The analytical results on groundwater inflow into the buildings based on existing data showed a declining trend.

Via a groundwater bypass, reduce the groundwater level around the Building and groundwater inflow into the Building



To prevent the inflow of groundwater into the Reactor Buildings, installation of impermeable walls surrounding the buildings on the land side is planned.

Targeting efforts to commence freezing at the end of this fiscal year, drilling holes to install frozen pipes commenced from June 2.

Installing frozen impermeable walls around Units 1-4 to prevent the inflow of groundwater into R/B

<Glossary>
(*1) CST (Condensate Storage Tank)
Tank for temporarily storing water used in the plant.

Progress toward decommissioning: Work to improve the environment within the site

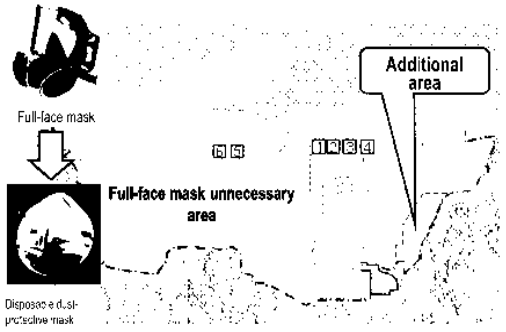
December 25, 2014
Secretariat of the Team for Countermeasures for Decommissioning and Contaminated Water Treatment

Immediate targets	- Reduce the effect of additional release from the entire power station and radiation from radioactive waste (secondary water treatment waste, rubble, etc.) generated after the accident, to limit the effective radiation dose to below 1mSv/year at the site boundaries. - Prevent contamination expansion in sea, decontamination within the site

Expansion of full-face mask unnecessary area

Operation based on the rules for mask wearing according to radioactive material density in air and decontamination/ ionization rules was defined, and the area is being expanded.

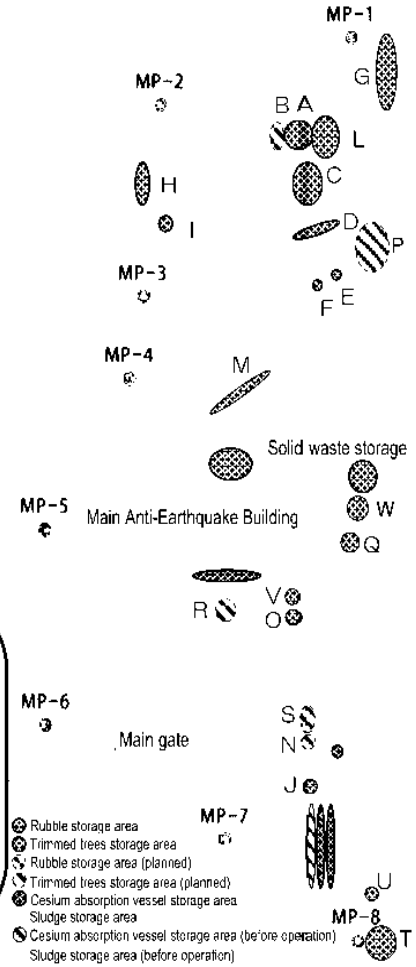
In the J tank installation area on the south side of the site, as decontamination was completed, the area will be set as full-face mask unnecessary area (from May 30), where for works not handling contaminated water, wearing disposable dust-protective masks will be deemed sufficient .



Expansion of work areas for women

Regarding female workers engaging in radioactivity-related jobs at the Fukushima Daiichi Nuclear Power Station, there has been no onsite work area since the East Japan Great Earthquake due to the increased radioactivity rate. However, improved work environment conditions mean female workers have been allowed to work within limited onsite areas since June 2012.

Based on the improved onsite work environment and the reduced potential for internal exposure, work areas for female workers will be expanded site-wide, excluding specified high-dose works and those for which the radiation dose exceeds 4mSv per exposure (from November 4.)

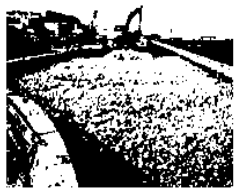


Installation of impermeable walls on the sea side

To prevent contamination expansion into the sea where contaminated water had leaked into groundwater, impermeable walls are being installed.

Installation of steel pipe sheet piles temporarily completed by December 4, 2013 except for 9 pipes.

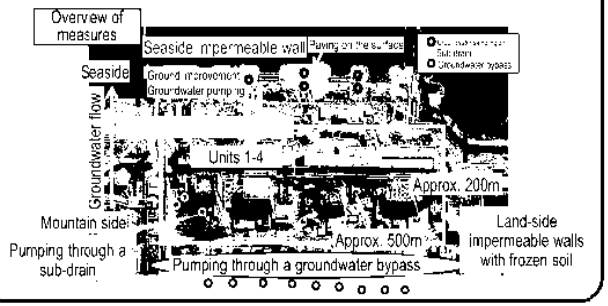
The next stage will involve installing steel pipe sheet piles outside the port, landfilling within the port, and installing a pumping facility to close before the construction completion.



Installation status of impermeable walls on the sea side
(Landfill status on the Unit 1 intake side)

Reducing radioactive materials in seawater within the harbor

-The analytical result for data such as the density and level of groundwater on the east (sea) side of the Building identified that contaminated groundwater was leaking into seawater.
-No significant change has been detected in seawater within the harbor for the past month, nor was any significant change detected in offshore measurement results as of last month.
- To prevent contamination expansion into the sea, the following measures are being implemented
(1) Prevent leakage of contaminated water
-Ground improvement behind the bank to prevent the expansion of radioactive materials.
(Between Units 1 and 2: completed on August 9, 2013;
between Units 2 and 3: from August 29 and completed on December 12, 2013;
between Units 3 and 4: from August 23, 2013 and completed on January 23, 2014)
- Pumping groundwater in contaminated areas (from August 9, 2013, scheduled to commence sequentially)
(2) Isolate water from contamination
- Enclosure by ground improvement on the mountain side
(Between Units 1 and 2: from August 13, 2013 and completed on March 25, 2014;
between Units 2 and 3: from October 1, 2013 and completed on February 6, 2014;
between Units 3 and 4 from October 19, 2013 and completed on March 5, 2014)
-To prevent the ingress of rainwater, the ground surface was paved with concrete (commenced on November 25, 2013 and completed on May 2, 2014)
(3) Eliminate contamination sources
-Removing contaminated water in branch trenches and closing them (completed on September 19, 2013)
-Removal of contaminated water in the seawater pipe trench
Unit 2: November 25, 2014 to December 18, 2014 - filling of tunnel sections with cement-based materials.
Unit 3: Drilling of holes to install frozen/ temperature-measurement pipes is completed.



廃炉・汚染水対策の概要

2015年1月29日
廃炉・汚染水対策チーム会合／事務局会議

「廃炉」の主な作業項目と作業ステップ

～4号機使用済燃料プールからの燃料取り出しが完了しました。1～3号機の燃料取り出し、燃料デブリ(注1)取り出しの開始に向け順次作業を進めています～

（注１）事故により溶け落ちた燃料。

使用済燃料プールからの燃料取り出し

	1、2号機	3号機	4号機
使用済燃料プールからの燃料取り出し	瓦礫撤去、除染	燃料取り出し設備の設置	燃料取り出し → 保管／搬出
	1号機：2017年度	燃料取り出し開始（検討中）	
	2号機：2017年度以降	燃料取り出し開始（検討中）	
	3号機：2015年度	燃料取り出し開始（予定）	
	4号機：2014年	燃料取り出し完了	

	1～3号機		
燃料デブリ（溶融燃料）取り出し	除染、漏えい箇所調査	止水、水張り	燃料デブリ取り出し → 保管／搬出

2017年度以降
原子炉格納容器下部の止水工事着手（検討中）

原子炉施設の解体等	シナリオ・技術の検討	設備の設計・製作	解体等

平成26年12月22日に４号機の全ての燃料取り出しが完了しました。
平成25年11月18日より４号機使用済燃料プールからの燃料取り出しを開始し、平成26年11月5日に使用済燃料の取り出しが、平成26年12月22日に新燃料の取り出しが完了しました。

（燃料取り出し状況）

「汚染水対策」の３つの基本方針と主な作業項目

～事故で溶けた燃料を冷やした水と地下水が混ざり、１日約４００トン(注2)の汚染水が発生しており、下記の３つの基本方針に基づき対策を進めています～

（注２）地下水バイパスや建屋止水工事などの対策により、減少傾向となっています。

方針１．汚染源を取り除く

①多核種除去設備等による汚染水浄化
②トレンチ(注3)内の汚染水除去

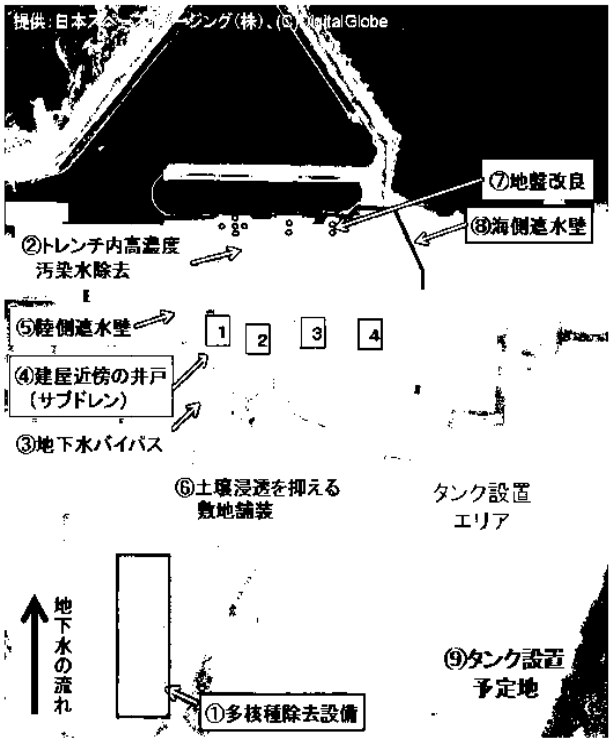
（注３）配管などが入った地下トンネル。

方針２．汚染源に水を近づけない

③地下水バイパスによる地下水汲み上げ
④建屋近傍の井戸での地下水汲み上げ
⑤凍土方式の陸側遮水壁の設置
⑥雨水の土壌浸透を抑える敷地舗装

方針３．汚染水を漏らさない

⑦水ガラスによる地盤改良
⑧海側遮水壁の設置
⑨タンクの増設（溶接型へのリプレイス等）



多核種除去設備（ALPS）等

- タンク内の汚染水から放射性物質を除去しリスクを低減させます。
- 汚染水に含まれる62核種を告示濃度限度以下まで低減することを目標としています（トリチウムは除去できない）。
- さらに、東京電力による多核種除去設備の増設（平成26年9月から処理開始）、国の補助事業としての高性能多核種除去設備の設置（平成26年10月から処理開始）等により、汚染水の処理を進めています。

（高性能多核種除去設備の設置状況）

凍土方式の陸側遮水壁

- 建屋を陸側遮水壁で囲み、建屋への地下水流入を抑制します。
- 平成25年８月から現場にて試験を実施しており、平成26年6月に着工しました。今年度中に遮水壁の造成に向けた凍結開始を目指します。

（延長：約1,500m）

海側遮水壁

- １～４号機海側に遮水壁を設置し、汚染された地下水の海洋流出を防ぎます。
- 遮水壁を構成する鋼管矢板の打設は一部を除き完了（９８%完了）。閉合時期については調整中です。

（設置状況）

東京電力（株）福島第一原子力発電所１～４号機の廃止措置等に向けた中長期ロードマップ進捗状況（概要版）

取り組みの状況

◆１～３号機の原子炉・格納容器の温度は、この１か月、約10℃～約40℃※1で推移しています。
また、原子炉建屋からの放射性物質の放出量等については有意な変動がなく※2、総合的に冷温停止状態を維持していると判断しています。

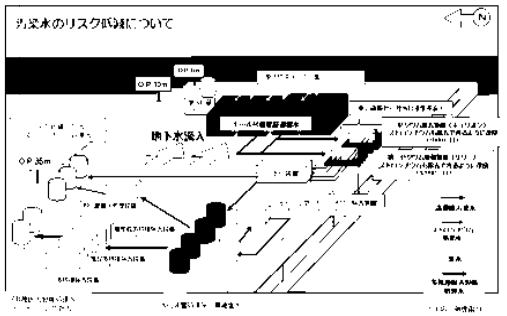
※１　号機や温度計の位置により多少異なります。

※２　１～４号機原子炉建屋からの現時点での放出による、敷地境界での被ばく線量は最大で年間0.03ミリシーベルトと評価しています。これは、自然放射線による被ばく線量(日本平均：年間約2.1ミリシーベルト)の約70分の1です。

セシウム吸着装置（KURION/SARRY）による ストロンチウム除去運転を開始

建屋より移送した汚染水からセシウムを取り除くセシウム除去装置（キュリオン（KURION）とサリー（SARRY））にて、ストロンチウムも除去できるよう改造し、12/26より運転を開始しました。

ストロンチウムの除去性能が目標を達成することを確認できたため、1/19以降は、新たにRO濃縮塩水（ストロンチウム処理の必要な汚染水でタンク内に貯蔵）が発生することはなくなりました。



＜水処理設備　全体イメージ＞

ＲＯ濃縮水処理設備の運転開始

多核種除去設備(ALPS)に加え、ストロンチウムを除去する複数の浄化設備の設置を行い、タンク内の汚染水の処理を進めています。

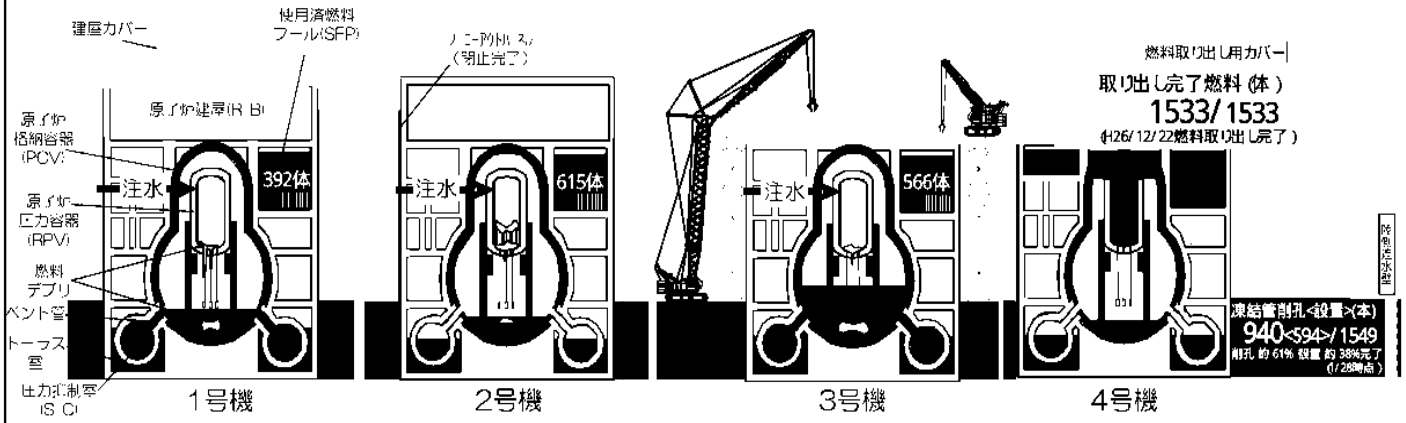
新たにRO濃縮水処理設備を設置し、1/10より汚染水の処理を開始しました。

引き続き、多重的な対策により汚染水のリスク低減を図ります。

汚染水処理の見通し

多核種除去設備(ALPS)等により汚染水の処理を進めていますが、現時点のペースで処理した場合、年度内の汚染水全量処理は難しく、処理完了は5月中になる見通しです。

具体的な全量処理完了時期は3月中旬までに明らかにします。



廃炉・汚染水対策 福島評議会の開催

1/7に第6回会合（福島市）を開催し、中長期ロードマップ改訂の考え方を紹介し、地元からご意見を頂きました。

頂いたご意見を踏まえて、ロードマップ改訂作業を進めてまいります。

１号機原子炉内 燃料デブリ調査開始

１号機原子炉内の燃料デブリの有無を調査するため、宇宙線由来のミュオン（素粒子の一種）を用いた測定を今後開始する予定です。

調査結果は燃料デブリ取り出し工法の検討に活かします。

２号機原子炉内 故障温度計の引き抜き完了

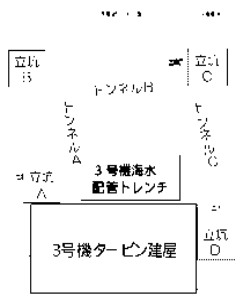
平成26年2月に故障した温度計の引き抜きのため、1/14より錆除去剤を注入し1/19に引き抜きが完了しました。

今後、今年度中に温度計を再設置予定です。

３号機海水配管トレンチ トンネル部の充填開始

３号機のタービン建屋から海側に伸びる海水配管トレンチ注について、２号機の海水配管トレンチと同様の方法で、トンネル部の充填を今後開始します。

注）トレンチ：配管やケーブルが通るトンネル



＜３号機海水配管トレンチ＞

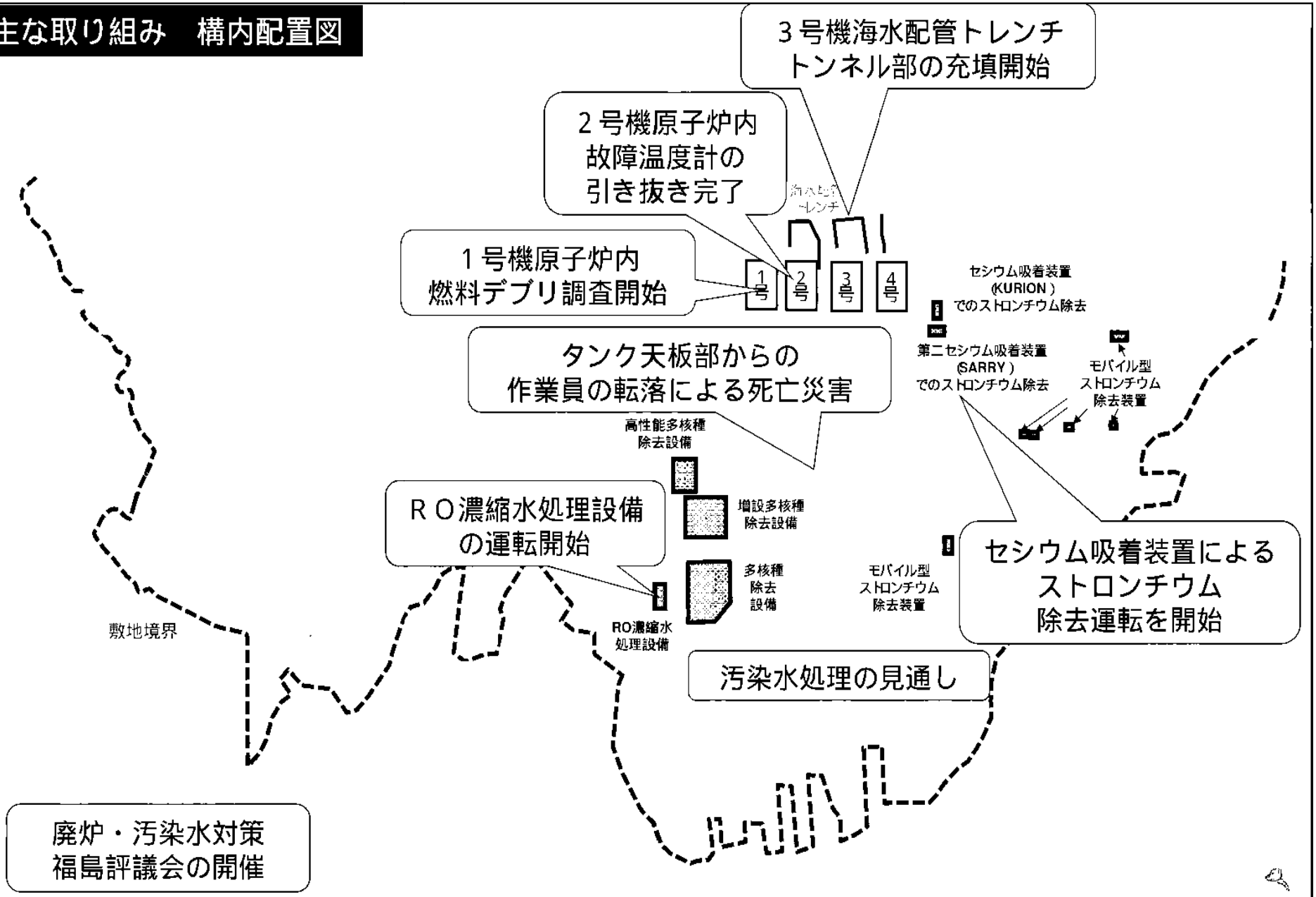
タンク天板部からの作業員の転落による死亡災害

雨水受けタンク設置工事において、1/19にタンク内面を検査するための準備作業を実施していた作業員が、当該タンク天板（高さ：約10m）から転落し、1/20に亡くなるという災害が発生しました。

1/21より全ての構内作業を中止し、安全点検を実施しています。

今回の災害の発生原因について詳細に調査するとともに、再発防止に努めることとしています。

主な取り組み　構内配置図



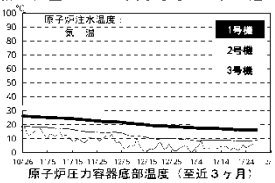
提供 :日本スペースイメージング (株) (C)DigitalGlobe

※モニタリングポスト（MP-1～MP-8）のデータ
敷地境界周辺の空間線量率を測定しているモニタリングポスト(MP)のデータ（10分値）は1.053μSv/h～3.963μSv/h（2014/12/24～2015/1/27）。
MP-2～MP-8については、空間線量率の変動をより正確に測定することを目的に、2012/2/10～4/18に、環境改善（森林の伐採、表土の除去、遮へい壁の設置）の工事を実施しました。
環境改善工事により、発電所敷地内と比較して、MP周辺の空間線量率だけが低くなっています。
MP-No.6については、さらなる森林伐採等を実施した結果、遮へい壁外側の空間線量率が大幅に低減したことから、2013/7/10～7/11にかけて遮へい壁を撤去しました。

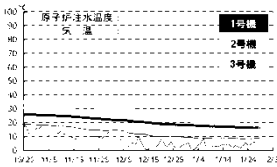
Ⅰ．原子炉の状態の確認

1．原子炉内の温度

注水冷却を継続することにより、原子炉圧力容器底部温度、格納容器気相部温度は、号機や温度計の位置によって異なるものの、至近１ヶ月において、約 10～40 度で推移。



原子炉圧力容器底部温度（至近３ヶ月）

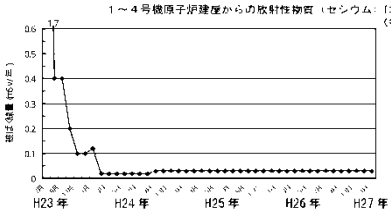


格納容器気相部温度（至近３ヶ月）

※トレンドグラフは複数点計測している温度データの内、一部のデータを例示

2．原子炉建屋からの放射性物質の放出

１～４号機原子炉建屋から新たに放出される放射性物質による、敷地境界における空気中放射性物質濃度は、Cs-134 及び Cs-137 ともに約 1.4×10^{-9} ベクレル/cm^3 と評価。放出された放射性物質による敷地境界上の被ばく線量は 0.03mSv/年（自然放射線による年間線量（日本平均約 2.1mSv/年）の約７０分の１に相当）と評価。



（注）線量評価については、施設運営計画と月例報告とで異なる計算式及び係数を使用していたことから、H24 年９月に評価方法の統一を図っている。
４号機については、使用済燃料プールからの燃料取り出し作業を踏まえ、H25 年 11 月より評価対象に追加している。

3．その他の指標

格納容器内圧力や、臨界監視のための格納容器放射性物質濃度（Xe-135）等のパラメータについても有意な変動はなく、冷却状態の異常や臨界等の兆候は確認されていない。

以上より、総合的に冷温停止状態を維持しており原子炉が安定状態にあることが確認されている。

Ⅱ．分野別の進捗状況

1．原子炉の冷却計画

～注水冷却を継続することにより低温での安定状態を維持するとともに状態監視を補完する取組を継続～

➢ ２号機原子炉圧力容器底部温度計の交換

・H26 年２月に故障した原子炉圧力容器底部温度計の交換のため、H26 年４月に引き抜き作業を行ったが引き抜けず作業を中断。錆の発生により固着または摩擦増加していた可能性が高い。

・実規模配管にて、水素の発生しない錆除去剤を用いワイヤガイドを引き抜けることを確認（H26/12/5）。現地にて 1/14 より錆除去剤を注入し、1/19 に故障した温度計を引き抜き完了。

今後、新規温度計挿入の工法検討、訓練等を行い、今年

2．滞留水処理計画

～地下水流入により増え続ける滞留水について、流入を抑制するための設の除染能力の向上、汚染水管理のための施設を整備～

➢ 地下水バイパスの運用状況

・H26/4/9 より 12 本ある地下水バイパス揚水井の各ポン
始。H26/5/21 より内閣府廃炉・汚染水対策現地事務所
までに 73,806m^3 を排水。汲み上げた地下水は、一時貯
足していることを東京電力及び第三者機関（日本分析セ

・地下水バイパスや高温焼却炉建屋の止水対策等により、
建屋への地下水流入量が約 100m^3/日減少していることを

・観測孔の地下水位が、地下水バイパスの汲み上げ開始前
ことを確認。

・流量の低下が確認されている揚水井 No.10,12 につい
（No.10：1/13～、No.12：H26/12/12～H27/1/6）。

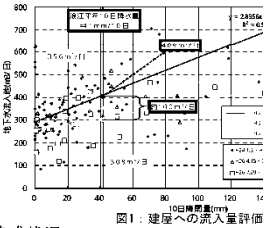


図1：建屋への流入量評価

➢ 陸側遮水壁の造成状況

・１～４号機を取り囲む陸側遮水壁（経済産業省の補助事
削孔工事を開始（H26/6/2～）。1/28 時点で 1,144 本削
測温管用：204 本／321 本）、凍結管 594 本／1,549 本建

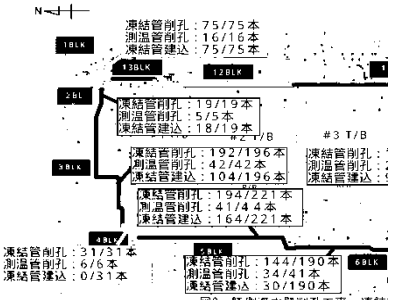


図2 陸側遮水壁削孔工事・凍結

➢ 多核種除去設備の運用状況

・多核種除去設備（既設・増設・高性能）は放射性物質を含む水を用いたホット試験を実施中（既設Ａ系：H25/3/30～、既設Ｂ系：H25/6/13～、既設Ｃ系：H25/9/27～、増設Ａ系：H26/9/17～、増設Ｂ系：H26/9/27～、増設Ｃ系：H26/10/9～、高性能：H26/10/18～）。これまでに多核種除去設備で約 196,000m³、増設多核種除去設備で約 64,000m³、高性能多核種除去設備で約 18,000m³を処理（1/22 時点、放射性物質濃度が高い既設Ｂ系出口水が貯蔵された J1(D)タンク貯蔵分約 9,500m³を含む）。

➢ タンク内にある汚染水のリスク低減に向けて

・RO 濃縮塩水からストロンチウムを取り除く RO 濃縮水処理設備の処理を開始（1/10）。1/22 時点で約 8,000m³を処理。

・タンクに貯留している RO 濃縮塩水を浄化するため、G4 南エリアにてモバイル型ストロンチウム除去装置の処理運転を実施中（G4 南エリア：H26/10/2～）。1/22 までに約 4,000m³の汚染水を処理。1/22 時点で約 4,000m³の汚染水を処理中。

・セシウム吸着装置（KURION）でのストロンチウム除去(1/6～)、第二セシウム吸着装置（SARRY）でのストロンチウム除去(H26/12/26～)を開始。処理済み水のストロンチウム濃度低下を確認(1/19)。以降、処理後の水をストロンチウム処理水としてタンクに貯蔵開始。RO 濃縮塩水の追加発生が無くなった。1/22 時点で約 1,000m³を処理。

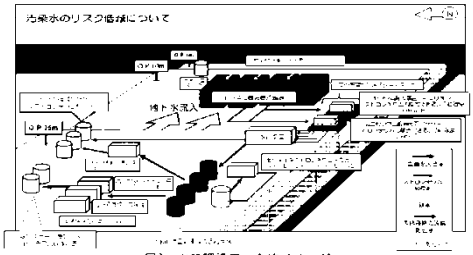


図3：水処理設備　全体イメージ

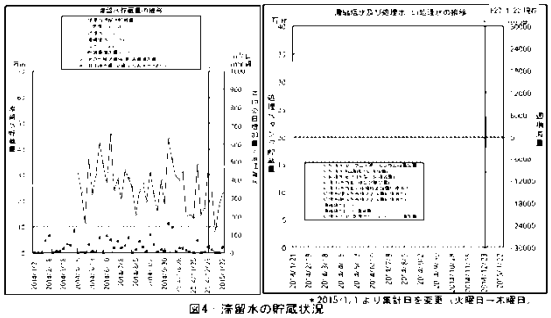


図4：滞留水の貯蔵状況

➢ 汚染水処理の見通し

・多核種除去設備等により汚染水の処理を進めているが、内の汚染水全量処理は難しく、処理完了は 5 月中になる

・具体的な全量処理完了時期は 3 月中旬までに明らかにす

➢ タンクエリアにおける対策

・汚染水タンクエリアに降雨し堰内に溜まった雨水のうち いて、H26/5/21 より雨水処理装置を用い放射性物質を 13,820m³)。

➢ 海水配管トレンチの汚染水除去

・２号機海水配管トレンチは、H26/12/18 にトンネル部の に立坑から揚水し、トンネル部における連通状況を確認 認しつつ進める。

・３号機海水配管トレンチは、今後トンネル部の充填を開

・４号機海水配管トレンチは、タービン建屋側に閉塞材料 連通の阻害を図り、その後内部充填を実施予定。

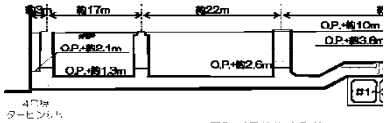


図5：4号機海水配管トレンチ部

3．放射線量低減・汚染拡大防止に向けた計画

～敷地外への放射線影響を可能な限り低くするため、敷地境界にお

➢ １～４号機タービン建屋東側における地下水・

・１号機取水口北側護岸付近において、地下水観測孔 No. 年 7 月から上昇傾向にあり、現在はそれぞれ 10,000 Bq/L より 1m³/日の汲み上げを継続。

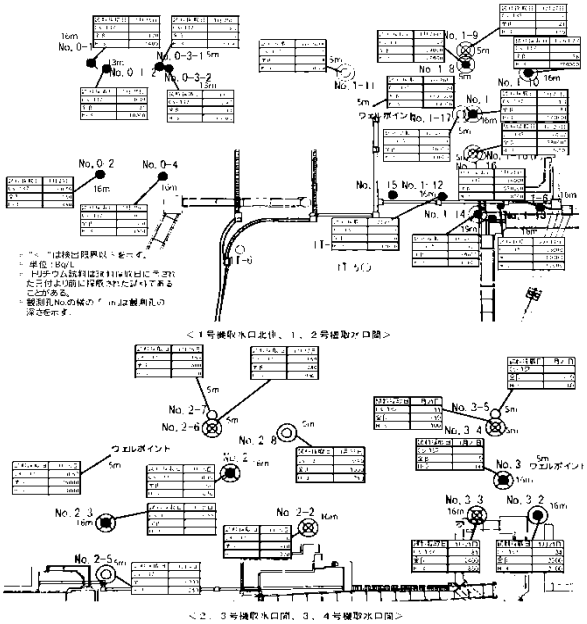
・１、２号機取水口間護岸付近において、地下水観測孔 N 万 Bq/L に上昇したが、現在は 50 万 Bq/L 程度で推移。 は 1 万 Bq/L 前後で推移していたが、H26 年 6 月以降大 水観測孔 No.1-17 のトリチウム濃度は 1 万 Bq/L 前後で Bq/L となったが、現在 4 万 Bq/L 前後で推移。全β濃度 までに 120 万 Bq/L まで上昇したが、現在は 20 万 Bq/L 上げ（10m³/日）、地下水観測孔 No.1-16 の傍に設置した （1m³/日）を継続。

・２、３号機取水口間護岸付近において、ウェルポイント 11 月より低下し、現在トリチウム濃度 3,000Bq/L 程度、 改良部のモルタルによるかさ上げのため、ウェルポ （H26/10/31～）。1/8 より地盤改良部のモルタル嵩上げ

・３、４号機取水口間護岸付近の地下水放射性物質濃度は も低いレベルで推移。

・１～４号機開渠内の海側遮水壁外側の放射性物質濃度は 側と同レベルの低い濃度で推移。

・港湾内海水の放射性物質濃度はH26年12月までと同様に緩やかな低下傾向が見られる。
・港湾口及び港湾外についてはこれまでの変動の範囲で推移。
・海底土舞い上がりによる汚染の拡散を防止するための港湾内海底土被覆工事を実施中（H26年度末完了予定）。H26/12/14よりエリア②を被覆中。1/27時点で約44%完了（図9参照）。なお、取水路開渠の海底についてはH24年までに被覆済み。
・セシウム吸着繊維とストロンチウム吸着繊維を取り付けたカーテン状ネットを海側遮水壁開口部に設置(1/15)。



＜1号機取水口北側、1、2号機取水口間＞

＜2、3号機取水口間、3、4号機取水口間＞

図6　タービン建屋東側の地下水濃度

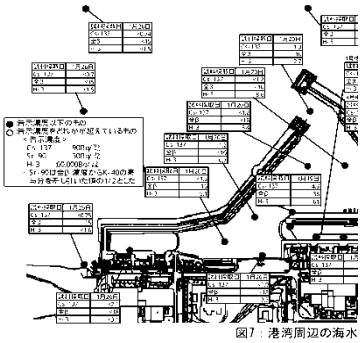


図7：港湾周辺の海水

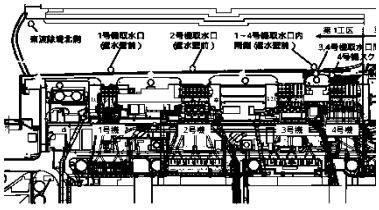


図8：海側遮水壁工事の進捗状況

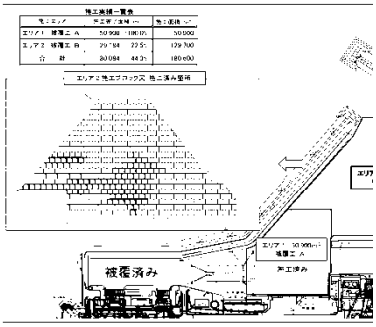


図9　港湾内海底土被覆の進捗状況

4．使用済燃料プールからの燃料取出計画

～耐震・安全性に万全を期しながらプール燃料取り出しに向けた作業を着実に推進。4号機プール燃料取り出しは平成25年11月18日に開始、平成26年12月22日に完了～

➢ 4号機使用済燃料プールからの燃料取り出し

・4号機使用済燃料プールから共用プールへ輸送された漏えい燃料2体について、輸送後の状態を確認するため、水中カメラによる外観点検及びファイバースコープによる漏えい燃料棒の調査を実施（H26/12/17, 18）。漏えい燃料を共用プールに保管するにあたって、被覆管の亀裂等によりペレットが散逸するといった事象の恐れがないと評価。

➢ 3号機使用済燃料取り出しに向けた主要工事

・使用済燃料プール内のガレキ撤去作業中に、撤去する予定であった燃料交換機の操作卓及び張出架台が落下（H26/8/29）したため作業を中断していたが、H26/12/17よりガレキ撤去作業を再開。万一の落下対策の一つとして追加養生板を敷設（1/14～20）。今後、燃料交換機トロリ2階部分を撤去予定（図10参照）。

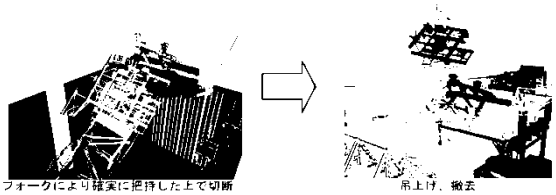


図10：燃料交換機トロリ2階部撤去イメージ

➢ 1号機使用済燃料取り出しに向けた主要工事

・原子炉建屋最上階への飛散防止剤散布、ガレキ状況調査やダスト濃度調査を実施し、取り外していた原子炉建屋カバーの屋根パネルをH26/12/4に戻した。

・3月以降、再度屋根パネルを取り外し建屋カバーの解体を進める計画。

5．燃料デブリ取出計画

～格納容器へのアクセス向上のための除染・遮へいに加え、格納容器漏えい箇所の調査・補修など燃料デブリ取り出し準備に必要となる技術開発・データ取得を推進～

➢ 原子炉内燃料デブリ検知技術の開発

・燃料デブリ取り出し工法の検討に必要な燃料デブリ位置、量を把握するため、宇宙線由来のミュオン（素粒子の一種）による透視技術によるデブリ位置測定を行う計画。1号機において、原子炉建屋外側の北西に検出器を設置し、ミュオン透過法による測定を今後開始する予定。

➢ 3号機原子炉建屋1階の除染作業

・今後の原子炉格納容器内部調査に向け、3号機原子炉建屋1階の線源特定調査を12月までに実施。1/5より中所除染装置による中所除染を実施中。

6．固体廃棄物の保管管理、処理・処分、原子炉施設の廃止措置に向けた計画

～廃棄物発生量低減・保管適正化の推進、適切かつ安全な保管と処理・処分に向けた研究開発～

➢ ガレキ・伐採木の管理状況

・H26年12月末時点でのコンクリート、金属ガレキの保管総量は約134,400m³（H26年11月末との比較：＋2,500m³）（エリア占有率：56%）。伐採木の保管総量は約3,300m³（H26年11月末との比較：±0m³）（エリア占有率：58%）。ガレキの主な変

➢ 水処理二次廃棄物の管理状況

・1/22時点での廃スラッジの保管状況は597m³（占有率：8
有率：45%）。使用済ベッセル・多核種除去設備の保管容
率：49%）。

7．要員計画・作業安全確保に向けた計画

～作業員の被ばく線量管理を確実に実施しながら長期に亘って要員
ら継続的に作業環境や労働条件を改善～

➢ 要員管理

・1ヶ月間のうち1日でも従事者登録されている人数（
年9月～11月の1ヶ月あたりの平均が約13,900人。
りの平均で約11,000人であり、ある程度余裕のある範

・2月の作業に想定される人数（協力企業作業員及び東電
度※と想定され、現時点で要員の不足が生じていないこ
以降の各月の平日1日あたりの平均作業員数（実績値）
11参照）。
※：契約

・福島県内・県外の作業員数ともに増加傾向にあるが、
ため、12月時点における地元雇用率（協力企業作業員

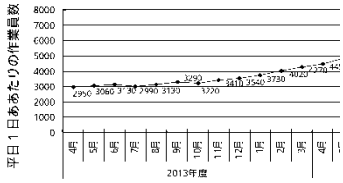


図11：H25年度以降各月の平日1日あたりの平均作

・H25年度、H26年度ともに月平均線量は約1mSv で安定
20mSv/年≒1.7mSv/月）

・大半の作業員の被ばく線量は線量限度に対し大きく余裕

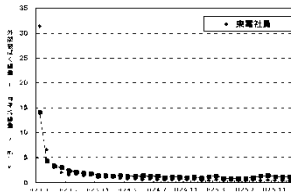


図12．作業員の月別個人被ばく線量の推移
（H23年3月以降の月別被ばく線量）

➢ インフルエンザ・ノロウイルス感染予防・拡大防止対策

・H26 年 10 月よりインフルエンザ・ノロウイルス対策を実施。対策の一環として、協力企業作業員の方を対象に 1F 新事務棟（H26/10/29～12/5）及び近隣医療機関（H26/11/4～H27/1/30）にて、インフルエンザ予防接種を無料（東京電力が費用負担）で実施中。H27/1/27 時点で合計 8,445 人が接種を受けている。その他、日々の感染予防・拡大防止策（検温・健康チェック、感染状況の把握）、感染疑い者発生後の対応（速やかな退所と入構管理、職場でのマスク着用徹底等）等、周知徹底し、対策を進めている。

➢ インフルエンザ・ノロウイルスの発生状況

・H26 第 47 週（H26/11/10～H26/11/17）～ H27 第 4 週（H27/1/19～H27/1/25）までに、インフルエンザ感染者 279 人、ノロウイルス感染者 5 人。なお、昨シーズン同時期の累計は、インフルエンザ感染者 39 人、ノロウイルス感染者 25 人。昨シーズン（H25/12-H26/5）の累計は、インフルエンザ感染者 254 人、ノロウイルス感染者 35 人。

➢ 新事務本館の進捗について

・周辺建物との連携性を高め、効率的な業務運営を図ること、および敷地の有効利用を図るため、建設敷地を変更。
・干渉物の撤去・移設作業が多数発生したため、工程の見直しを実施。
・H27 年 6 月に本体工事着工、H28 年 8 月に完成の予定。

8．その他

➢ 廃炉・汚染水対策福島評議会（第６回）の開催

・1/7 に第６回会合（福島市）を開催し、中長期ロードマップ改訂の考え方を紹介し、地元からご意見を頂いた。頂いたご意見を踏まえて、ロードマップ改訂作業を進めていく。

➢ 雨水受けタンク天板部からの作業員の転落による死亡災害

・雨水受けタンク設置工事において、1/19 にタンク水張り試験後にタンク内面を検査するための準備作業を実施していた作業員が、当該タンク天板（高さ：約 10m）から転落し、1/20 に亡くなるという災害が発生。
・1/21 より全ての構内作業を中止し、安全点検を実施している。
・今回の災害の発生原因について詳細に調査するとともに、再発防止に努めることとしている。

港湾内における海水モニタリングの状況（H25年の最高値と直近の比較）

海側遮水壁
シルトフェンス

「最高値」→「直近(1/19-1/26採取)」の順、単位（ベクレル／リットル）検出限界値未満以下の場合はND(検出限界値)と標記

出典：東京電力ホームページ福島第一原子力発電所周辺の放射性物質の分析結果
http://www.tepco.co.jp/nu/fukushima-np/f1/smp/index-j.html

セシウム-134 ：3.3 (H25/10/17) → ND(1.1) 1/3以下
セシウム-137 ：9.0 (H25/10/17) → ND(1.2) 1/7以下
全ベータ 74 (H25/ 8/19) → ND(16) 1/4以下
トリチウム 67 (H25/ 8/19) → 5.4 1/10以下

セシウム-134 ： ND(1.6)
セシウム-137 ： 4.3
全ベータ ： 36
トリチウム ： 61
（1月19日採取）

セシウム-134 ：3.3 (H25/12/24) → ND(1.2) 1/2以下
セシウム-137 ：7.3 (H25/10/11) → ND(1.3) 1/5以下
全ベータ 69 (H25/ 8/19) → ND(16) 1/4以下
トリチウム 68 (H25/ 8/19) → 2.7 1/20以下

セシウム-134 ：4.4 (H25/12/24) → ND(1.3) 1/3以下
セシウム-137 ：10 (H25/12/24) → 1.2 1/8以下
全ベータ 60 (H25/ 7/ 4) → ND(16) 1/3以下
トリチウム 59 (H25/ 8/19) → 6.7 1/8以下

セシウム-134 ：3.5 (H25/10/17) → ND(1.3) 1/2以下
セシウム-137 ：7.8 (H25/10/17) → ND(1.2) 1/6以下
全ベータ 79 (H25/ 8/19) → ND(16) 1/4以下
トリチウム 60 (H25/ 8/19) → 8.6 1/6以下

セシウム-134 ：5.0 (H25/12/2) → ND(1.0) 1/5以下
セシウム-137 ：8.4 (H25/12/2) → ND(1.3) 1/6以下
全ベータ 69 (H25/8/19) → 16 1/4以下
トリチウム 52 (H25/8/19) → 5.1 1/10以下

セシウム-134 ：32 (H25/10/11) → ND(2.3) 1/10以下
セシウム-137 ：73 (H25/10/11) → 7.2 1/10以下
全ベータ 320 (H25/ 8/12) → 40 1/8以下
トリチウム 510 (H25/ 9/ 2) → 460

セシウム-134 ：2.8 (H25/12/2) → ND(2.0)
セシウム-137 ：5.8 (H25/12/2) → ND(2.1) 1/2以下
全ベータ 46 (H25/8/19) → ND(18) 1/2以下
トリチウム 24 (H25/8/19) → ND(3.1) 1/7以下

セシウム-134 ：ND(2.2)
セシウム-137 ： 6.7
全ベータ ： 49
トリチウム ：360 ※

セシウム-134 ：ND(2.2)
セシウム-137 ： 4.8
全ベータ ： 53
トリチウム ：340 ※

セシウム-134 ： 2.0
セシウム-137 ： 5.9
全ベータ ： 53
トリチウム ：240 ※

※のモニタリングはH26年3月以降開始

	法令濃度限度	WHO飲料水ガイドライン
セシウム134	60	10
セシウム137	90	10
ストロンチウム90（全ベータ値と強い相関）	30	10
トリチウム	6万	1万

セシウム-134 ： 62(H25/ 9/16)→ 3.4 1/10以下
セシウム-137 ：140(H25/ 9/16)→ 1/10以下
全ベータ ：360(H25/ 8/12)→ 60 1/6以下
トリチウム ：400(H25/ 8/12)→ 660

セシウム-134 ： 5.3 (H25/8/ 5) → ND(1.2) 1/3以下
セシウム-137 ： 8.6 (H25/8/ 5) → ND(1.9) 1/4以下
全ベータ ：40 (H25/7/ 3) → ND(18) 1/2以下
トリチウム 340 (H25/6/26) → 3.3 1/100以下

セシウム-134 ： (H25/ 9/16)→ 2.4 1/10以下
セシウム-137 ： (H25/12/16)→ 9.1 1/5以下
全ベータ ：390(H25/ 8/12)→ 49 1/7以下
トリチウム ：650(H25/ 8/12)→ 700

注 海水の全ベータ測定値には、天然のカリウム40（12ベクレル/リットル程度）によるものが含まれている。

1月28日までの東電データまとめ

【港湾口】
【港湾内南側】
【港湾内東側】
【港湾内西側】
【港湾中央】
【港湾内北側】
【6号機取水口前】
【物揚場前】

港湾外近傍における海水モニタリングの状況
(H25年の最高値と直近の比較)

(直近値 1/19 - 1/26採取)

単位(ベクレル/リットル) 検出限界値未満の場合はNDと標記し、( )内は検出限界値、ND(H25)は25年中継続してND

	法令濃度限度	WHO飲料水ガイドライン
セシウム134	60	10
セシウム137	90	10
ストロンチウム90 (全ベータ値と強い相関)	30	10
トリチウム	6万	1万

【港湾口北東側(沖合1km)】

セシウム-134 : ND (H25) → ND(0.70)
セシウム-137 : ND (H25) → ND(0.74)
全ベータ : ND (H25) → ND(15)
トリチウム : ND (H25) → ND(1.5)

【港湾口東側(沖合1km)】

セシウム-134 : ND (H25) → ND(0.76)
セシウム-137 : 1.6 (H25/10/18) → ND(0.67) 1/2以下
全ベータ : ND (H25) → ND(15)
トリチウム : 6.4 (H25/10/18) → ND(1.5) 1/4以下

【港湾口南東側(沖合1km)】

セシウム-134 : ND (H25) → ND(0.87)
セシウム-137 : ND (H25) → ND(0.78)
全ベータ : ND (H25) → ND(15)
トリチウム : ND (H25) → ND(1.5)

セシウム-134 : ND (H25) → ND(0.44)
セシウム-137 : ND (H25) → ND(0.70)
全ベータ : ND (H25) → ND(15)
トリチウム : 4.7 (H25/8/18) → ND(1.5) 1/3以下

【北防波堤北側(沖合0.5km)】

【港湾口】

【南防波堤南側(沖合0.5km)】

セシウム-134 : ND (H25) → ND(0.77)
セシウム-137 : ND (H25) → ND(0.65)
全ベータ : ND (H25) → ND(15)
トリチウム : ND (H25) → ND(1.5)

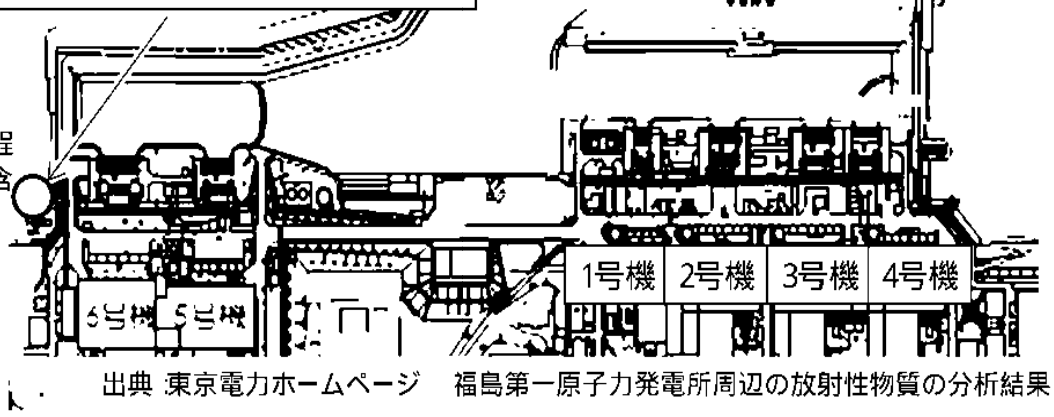
セシウム-134 : 3.3 (H25/12/24) → ND(1.2) 1/2以下
セシウム-137 : 7.3 (H25/10/11) → ND(1.3) 1/5以下
全ベータ 69 (H25/ 8/19) → ND(16) 1/4以下
トリチウム 68 (H25/ 8/19) → 2.7 1/20以下

【5,6号機放水口北側】

セシウム-134 : 1.8 (H25/ 6/21) → ND(0.73) 1/3以下
セシウム-137 : 4.5 (H25/ 3/17) → ND(0.75) 1/6以下
全ベータ : (H25/12/23) →
トリチウム : 8.6 (H25/ 6/26) → ND(1.6) 1/2以下

セシウム-134 : ND (H25) → ND(0.79)
セシウム-137 : 3.0 (H25/ 7/15) → ND(0.60) 1/5以下
全ベータ : (H25/12/23) →
トリチウム : 1.9 (H25/11/25) → ND(1.6)

注:海水の全ベータ測定値には、天然のカリウム40(12ベクレル/リットル程度)によるものが含まれている。



海側遮水壁
シルトフェンス

【南放水口付近】

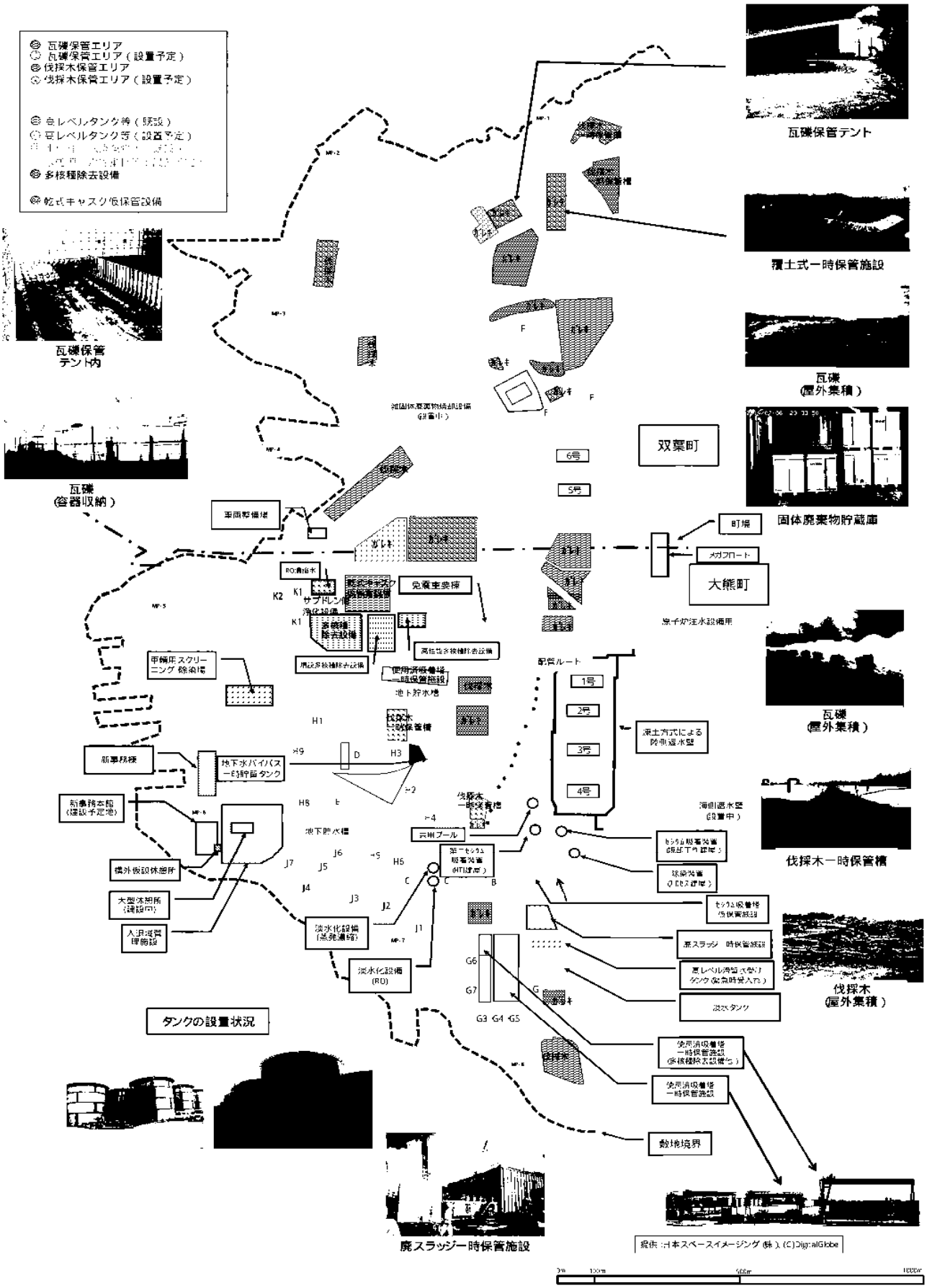
1月28日までの東電データまとめ

出典:東京電力ホームページ 福島第一原子力発電所周辺の放射性物質の分析結果 http://www.tepco.co.jp/nu/fukushima-np/f1/smp/index-j.html

添付資料２

平成27年1月29日

東京電力（株）　福島第一原子力発電所　構内配置図



添付資料3

諸計画の取り組み状況（その1）

諸計画の取り組み状況（その2）

諸計画の取り組み状況（その3）

諸計画の取り組み状況（その4）

廃止措置等に向けた進捗状況：使用済み燃料プールからの燃料取り出し作業

至近の目標　1～3号機使用済燃料プール内の燃料の取り出し開始

4号機

中長期ロードマップでは、ステップ2完了から2年以内（～2013/12）に初号機の使用済燃料プール内の燃料取り出し開始を第1期の目標としてきた。2013/11/18より初号機である4号機の使用済燃料プール内の燃料取り出しを開始し、第2期へ移行した。
燃料取り出し作業開始から1年以内となる2014/11/5に、プール内の使用済燃料1,331体の共用プールへの移送が完了した。
残りの新燃料の6号機使用済燃料プールへの移送は、2014/12/22に完了。
（新燃料2体については燃料調査のため2012/7に先行して取り出し済）
これにより、4号機原子炉建屋からの燃料取り出しが完了した。
今回の経験を活かし1～3号機のプール燃料取り出しに向けた作業を進める。

燃料取り出し状況

4号機使用済燃料プール内の状況

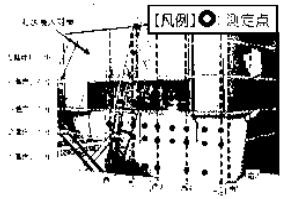
リスクに対してしっかり対策を打ち、
慎重に確認を行い、安全第一で作業を進める

燃料取り出しまでのステップ

2012/12完了 ／ 2012/4～2013/11完了 ／ 2013/11～2014/12完了

原子炉建屋の健全性確認
2012 5以降、年4回定期的な点検を実施。建屋の健全性は確保されていることを確認。

傾きの確認（水位測定）



傾きの確認（外壁面の測定）

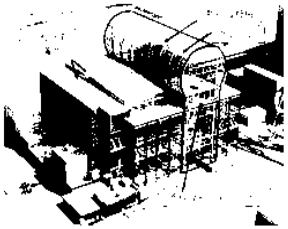
※写真の一部については、核物質防護などに関わる機微情報を含むことから掲載しております。

3号機

燃料取り出し用カバー設置に向けて、構台設置作業完了（2013/3/13）。
原子炉建屋上部ガレキ撤去作業を完了（2013/10/11）し、現在、燃料取り出し用カバーや燃料取扱設備のオペレーティングフロア（※1）上の設置作業に向け、線量低減対策（除染、遮へい）を実施中（2013/10/15～）。使用済燃料プール内のガレキ撤去を実施中（2013/12/17～）。

大型ガレキ撤去前

大型ガレキ撤去後


燃料取り出し用カバーイメージ

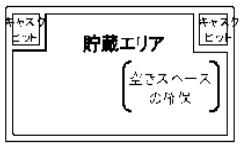
1、2号機

●1号機については、オペレーティングフロア上部のガレキ撤去を実施するため、原子炉建屋カバーの解体を計画。
建屋カバーの屋根パネル2枚を取り外し、原子炉建屋最上階のガレキ状況調査等を実施。ダスト飛散や使用済燃料プール内燃料に直ちに損傷を与えるような状況は確認されていない。
●2号機については、燃料デブリ取り出し計画の変動による手戻りのリスクを避けるため、取り出し開始時期に影響のない範囲で燃料取り出し計画を継続検討。

1号機建屋カバー解体
使用済燃料プール燃料・燃料デブリ取り出しの準備に向け、原子炉建屋カバーを解体し、オペフロ上のガレキ撤去を進める。建屋カバー解体後の敷地境界線量は、解体前に比べ増加するものの、放出抑制への取り組みにより、1～3号機からの放出による敷地境界線量0.03mSv/年への影響は小さい。

放出抑制への取り組み

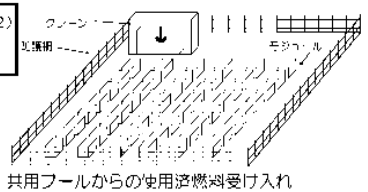
共用プール



共用フール内空き
スペースの確保
（乾式キャスク仮保管設備への移送）

現在までの作業状況
・燃料取扱いが可能な状態まで共用プールの復旧が完了（2012/11）
・共用プールに保管している使用済燃料の乾式キャスクへの装填を開始（2013/6）
・4号機使用済燃料プールから取り出した燃料を受入開始（2013/11）

乾式キャスク（※2）仮保管設備



共用プールからの使用済燃料受け入れ

2013/4/12より運用開始、キャスク保管建屋より既設乾式キャスク全9基の移送完了(2013/5/21)、共用プール保管中燃料を順次移送中。

<略語解説>
（※1）オペレーティングフロア（オペフロ）：定期検査時に、原子炉上蓋を開放し、炉内燃料取替や炉内構造物の点検等を行うフロア。
（※2）キャスク：放射性物質を含む試料・機器等の輸送容器の名称

廃止措置等に向けた進捗状況：プラントの状況把握と燃料デブリ取り出しに向けた作業

至近の目標　プラントの状況把握と燃料デブリ取り出しに向けた研究開発及び除染作業に着手

原子炉建屋地下階３Ｄスキャン

原子炉建屋の地下階（トーラス室）上部を遠隔操作ロボットを用いて、レーザスキャンで調査し、地下階の３次元データを得た。

３次元データは、実測に基づく検討ができるため、より詳細な装置のアクセス性や配置検討に利用できる。

原子炉建屋１階の３次元データと組み合せて、１階と地下階の干渉物を一度に確認することで原子炉格納容器／真空破壊ライン補修装置の設置位置等の検討を効率的に実施可能。

調査イメージ図

遠隔操作ロボット外観

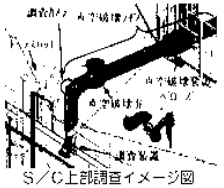
３次元データ　イメージ図

圧力抑制室（Ｓ／Ｃ(※１)）上部調査による漏えい箇所確認

１号機Ｓ／Ｃ上部の漏えい箇所を2014/5/27より調査し、上部にある配管の内１本の伸縮継手カバーより漏えいを確認。他の箇所からの漏えいは確認されず。

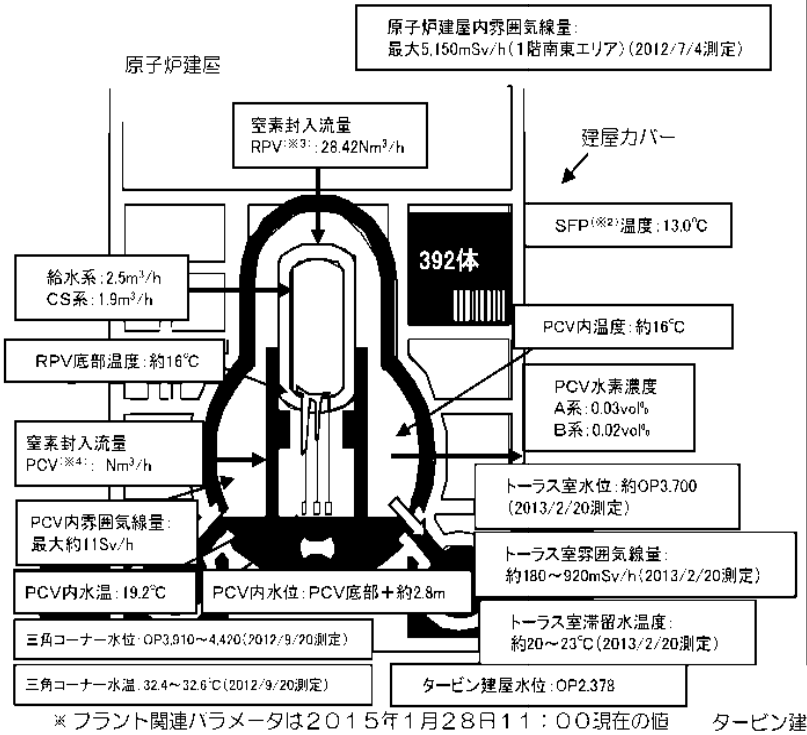
今後、格納容器の止水・補修に向けて、具体的な方法を検討していく。

漏えい箇所



Ｓ／Ｃ上部調査イメージ図

１号機



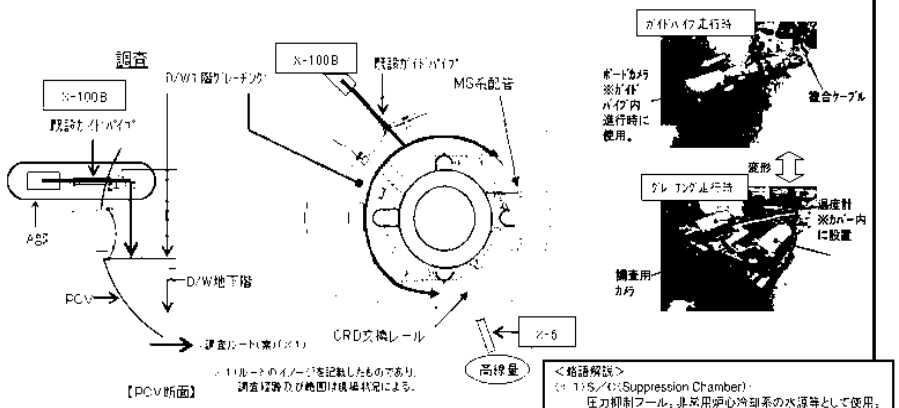
※フラント関連パラメータは２０１５年１月２８日１１：００現在の値

格納容器内部調査に向けた装置の開発状況

燃料デブリ取り出しに先立ち、燃料デブリの位置等格納容器内の状況把握のため、内部調査を実施予定。

【調査概要】
・１号機X-100Bペネ(※5)から装置を投入し、時計回りと反時計回りに調査を行う。

【調査装置の開発状況】
・狭隘なアクセス口（内径φ100mm）から格納容器内に進入し、グレーチング上を安定走行可能な形状変形機構を有するクローラ型装置を開発中であり、2015年度上期に現場での実証を計画。



格納容器内調査ルート（計画案）

＜略語解説＞
(※1) S/C(Suppression Chamber)：
圧力抑制プール。非常用炉心冷却系の水源等として使用。
(※2) SFP(Spent Fuel Pool)：
使用済燃料プール。
(※3) RPV(Reactor Pressure Vessel)：
原子炉圧力容器。
(※4) PCV(Primary Containment Vessel)：
原子炉格納容器。
(※5) ペネ：ペネトレーションの略。格納容器等にある貫通部。

廃止措置等に向けた進捗状況：プラントの状況把握と燃料デブリ取り出しに向けた作業

至近の目標	プラントの状況把握と燃料デブリ取り出しに向けた研究開発及び除染作業に着手

原子炉圧力容器温度計・原子炉格納容器常設監視計器の設置

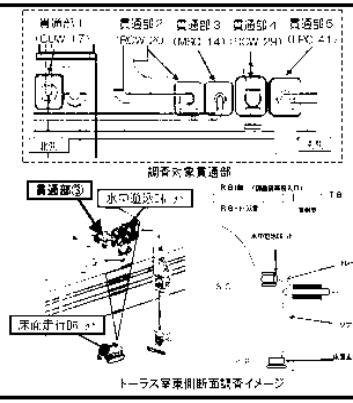
①原子炉圧力容器温度計再設置
- 震災後に２号機に設置した原子炉圧力容器底部温度計が故障したことから監視温度計より除外（2014/2/19）。
- 2014/4/17に温度計の引き抜き作業を行ったが、引き抜けなかったため作業を中断。錆除去剤を注入し、2015/1/19に引抜完了。
- 2014年度中に温度計を再設置する予定。

②原子炉格納容器温度計・水位計再設置
- 格納容器常設監視計器の設置を試みたが、既設グレーチングとの干渉により、計画の位置に設置することが出来なかった（2013/8/13）。
- 2014/5/27に当該計器を引き抜き、2014/6/5、6に再設置を実施。１ヶ月程度推移を確認し妥当性を確認。
- 再設置時に格納容器内の水位を測定し、底部より約300mmの高さまで水があることを確認。

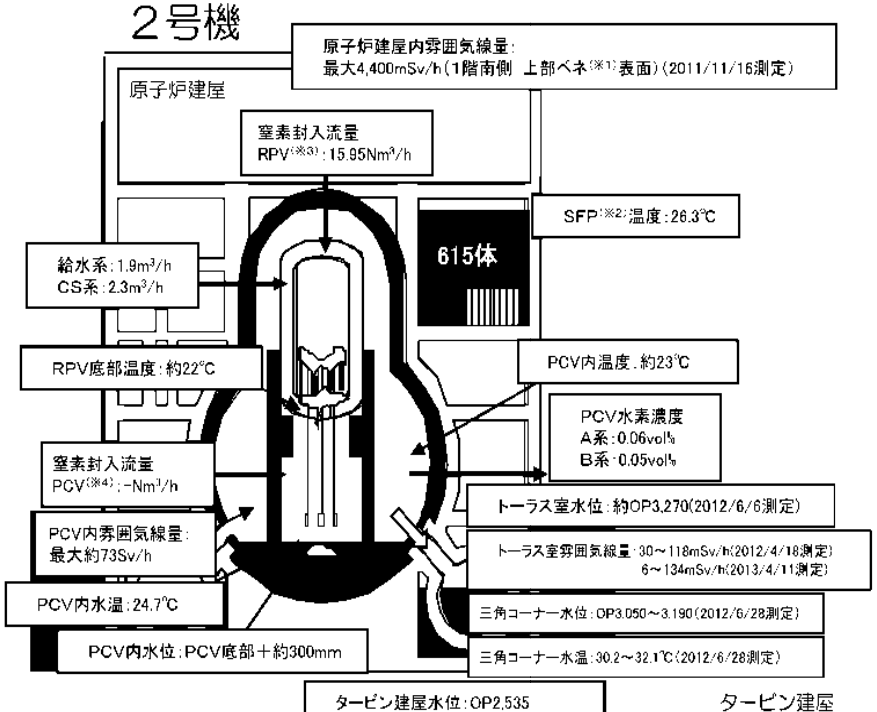
２号機原子炉圧力容器
故障温度計　引抜作業状況

トーラス室壁面調査結果

- トーラス室壁面調査装置（水中遊泳ロボット、床面走行ロボット）を用いて、トーラス室壁面の（東壁面北側）を対象に調査。
- 東側壁面配管貫通部（５箇所）の「状況確認」と「流れの有無」を確認する。
- 水中壁面調査装置（水中遊泳ロボット及び床面走行ロボット）により貫通部の状況確認ができることを実証。
- 貫通部1～5について、カメラにより、散布したトレーサ（※5）を確認した結果、貫通部周辺での流れは確認されず。（水中遊泳ロボット）
- 貫通部３について、ソナーによる確認の結果、貫通部周辺での流れは確認されず。（床面走行ロボット）



２号機



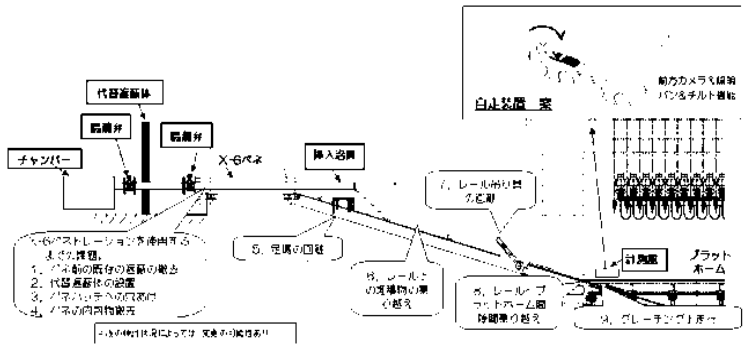
※ プラント関連パラメータは２０１５年１月２８日１１：００現在の値

格納容器内部調査に向けた装置の開発状況

燃料デブリ取り出しに先立ち、燃料デブリの位置等格納容器内の状況把握のため、内部調査を実施予定。

【調査概要】
- ２号機X-6ペネ(※1)貫通口から調査装置を投入し、ＣＲＤレールを利用しペデスタル内にアクセスして調査。

【調査装置の開発状況】
- 2013/8に実施したＣＲＤレール状況調査で確認された課題を踏まえ、調査工法および装置設計を進めており2015年度上期に現場実証を計画。



格納容器内調査の課題および装置構成（計画案）

＜略語解説＞
（※1）ペネ：ペネトレーションの略．格納容器等にある貫通部。（※2）SFP（Spent Fuel Pool）：使用済燃料プール。
（※3）RPV（Reactor Pressure Vessel）：原子炉圧力容器。（※4）PCV（Primary Containment Vessel）：原子炉格納容器。
（※5）トレーサ：流体の流れを追跡するために使用する物質。粘土系粒子。

廃止措置等に向けた進捗状況：プラントの状況把握と燃料デブリ取り出しに向けた作業

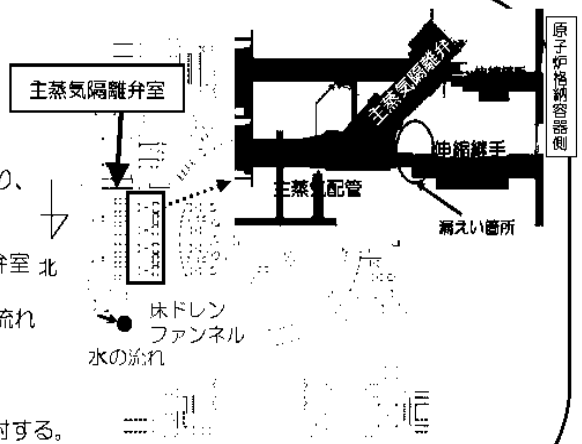
至近の目標　プラントの状況把握と燃料デブリ取り出しに向けた研究開発及び除染作業に着手

主蒸気隔離弁※室からの流水確認

3号機原子炉建屋1階北東エリアの主蒸気隔離弁室の扉付近から、近傍の床ドレンファンネル（排水口）に向かって水が流れていることを2014/1/18に確認。排水口は原子炉建屋地下階につながっており、建屋外への漏えいはない。

2014/4/23より、原子炉建屋2階の空調機械室から1階の主蒸気隔離弁室につながっている計器用配管から、カメラによる映像取得、線量測定を実施。2014/5/15に主蒸気配管のうち1本の伸縮継手周辺から水が流れていることを確認した。

3号機で、格納容器からの漏えい箇所が判明したのは初めてであり、今回の映像から、漏えい量の評価を行うとともに、追加調査の要否を検討する。また、本調査結果をPCV止水・補修方法の検討に活用する。



流水状況概略図

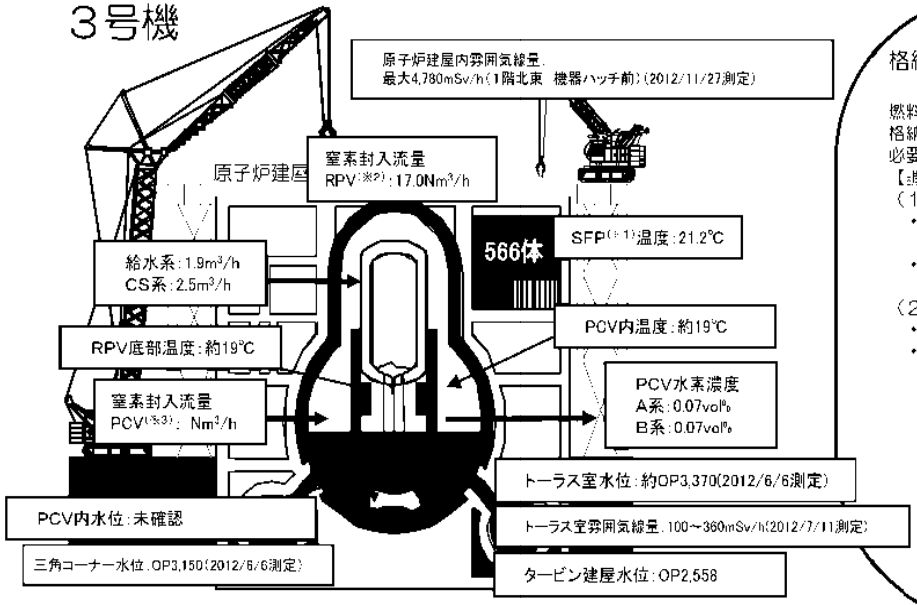
※主蒸気隔離弁：原子炉から発生した蒸気を緊急時に止める弁

建屋内の除染

・ロボットによる、原子炉建屋内の汚染状況調査を実施（2012/6/11～15）。
・最適な除染方法を選定するため除染サンプルの採取を実施（2012/6/29～7/3）。
・建屋内除染に向けて、原子炉建屋1階の干渉物移設作業を実施（2013/11/18～2014/3/20）。

汚染状況調査用ロボット（ガンマカメラ搭載）

3号機



※プラント関連パラメータは２０１５年１月２８日１１：００現在の値

格納容器内部調査に向けた装置の開発状況

燃料デブリ取り出しに先立ち、燃料デブリの位置等格納容器内の状況把握のため、内部調査を実施予定。格納容器内の水位が高く、1、2号機で使用予定のペネが水没している可能性があり、別方式を検討する必要がある。

【調査及び装置開発ステップ】
（1）X-53ペネ(※4)からの調査
・PCV内部調査用に予定しているX-53ペネの水没確認を遠隔超音波探傷装置を用いて調査を実施し、水没していないことを確認（2014/10/22～24）。
・2015年度上期目途にPCV内部調査を計画する。なお、ペネ周辺は高線量であることから、除染及び遮へい実施の状況を踏まえ、漏洩装置の導入も検討する。
（2）X-53ペネからの調査後の調査計画
・X-6ペネは格納容器内水頭圧測定値より推定すると水没の可能性がありアクセスが困難と想定。
・他のペネからアクセスする場合、「装置の更なる小型化」、「水中を移動してペデスタルにアクセス」等の対応が必要であり検討を行う。

<略語解説>
(※1)SFP(Spent Fuel Pool)：使用済燃料プール。
(※2)RPV(Reactor Pressure Vessel)：原子炉圧力容器。
(※3)PCV(Primary Containment Vessel)：原子炉格納容器。
(※4)ペネ：ペネトレーションの略。格納容器等にある貫通部。

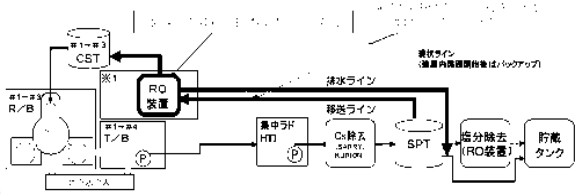
廃止措置等に向けた進捗状況：循環冷却と滞留水処理ライン等の作業

至近の目標　原子炉冷却、滞留水処理の安定的継続、信頼性向上

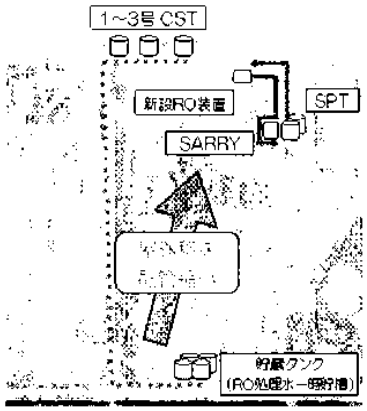
循環注水冷却設備・滞留水移送配管の信頼性向上

- ３号機ＣＳＴを水源とする原子炉注水系の運用を開始し(2013/7/5～)、従来に比べて、屋外に敷設しているライン長が縮小されることに加え、水源の保有水量の増加、耐震性向上等、原子炉注水系の信頼性が向上した。
- 2015年度上期までにRO装置を建屋内に新設することにより、炉注水のループ（循環ループ）は約3kmから約0.8km※に縮小

※：汚染水移送配管全体は、余剰水の高台への移送ライン（約1.3km）を含め、約2.1km

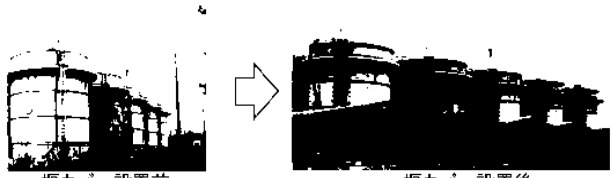


※1　4号T/Bオペフロは設置案の１つであり、作業環境等を考慮し、今後更に検討を進めて決定予定
※2　詳細なライン構成等は、今後更に検討を進めて決定予定



タンクエリアにおける台風対応の改善

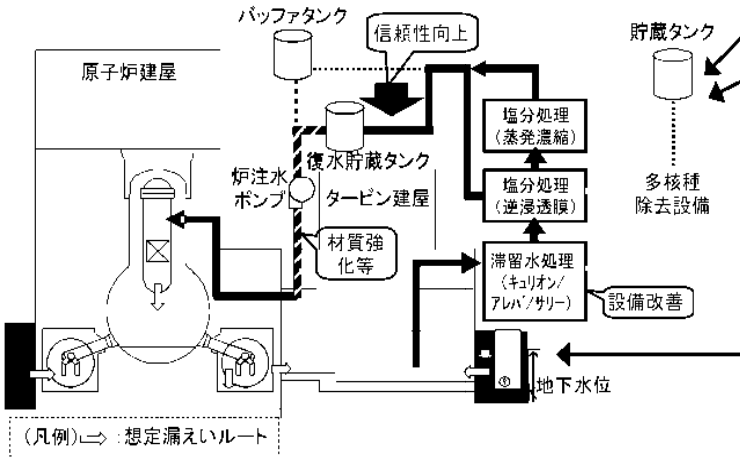
- これまで、堰のかさ上げによる雨水受け入れ量の増加、雨どいや堰カバーの設置による堰内へ流入する雨水の抑制などの設備対策を行ってきた。台風18・19号により合計約300mmの雨が降ったが、これらの改善対応により、堰内から汚染した雨水を漏らすことはなかった。

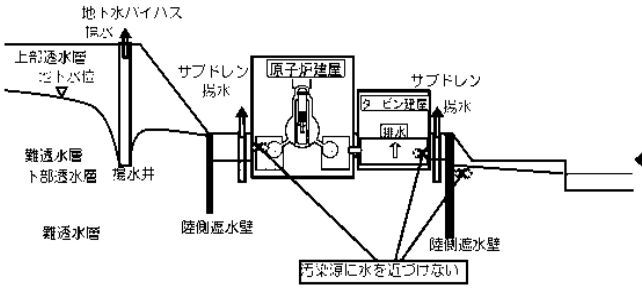


汚染水全量処理に向けて

多核種除去設備(ALPS)等により、汚染水の処理を進めているが、当初想定していた稼働率に到達することは技術的に難しく、現時点のペースで処理した場合、処理完了となるのは、2015/5中になる見通し。具体的な全量処理完了時期は、2015/3中旬までに明らかにする。

引き続き、更なる処理能力向上を図り、1日も早いリスク低減を目指す。

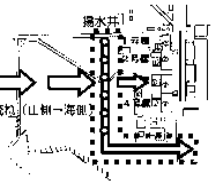




原子炉建屋への地下水流入抑制

サブドレン水汲み上げによる地下水位低下に向け、サブドレン他水処理施設の安定稼動の確認のための試験を実施。
浄化により地下水バイパスの運用目標を下回ること、その他γ核種が検出されないことを確認。

サブドレン水を汲み上げることによる地下水流入の抑制



山側から流れてきた地下水を建屋の上流で揚水し、建屋方への地下水流入量を抑制する取組（地下水バイパス）を実施。
くみ上げた地下水は一時的にタンクに貯留し、東京電力及び第三者機関により、運用目標未満であることを部度確認し、排水。
揚水井、タンクの水質について、定期的にモニタリングを行い、適切に運用。
建屋と同じ高さに設置した観測孔において地下水位の低下傾向を確認。
建屋への地下水流入をこれまでのデータから評価し、減少傾向を確認。

地下水バイパスにより、建屋付近の地下水位を低下させ、建屋への地下水流入を抑制

建屋への地下水流入を抑制するため、凍土壁で建屋を囲む陸側遮水壁の設置を計画。
2014年度末の凍結開始を目指し、2014/6/2から凍結管の設置工事中。

1～4号機建屋周りに凍土壁を設置し、建屋への地下水流入を抑制

<略語解説>
(※1)CST
(Condensate Storage Tank)：
復水貯蔵タンク。
プラントで使用する水を一時貯蔵しておくためのタンク。

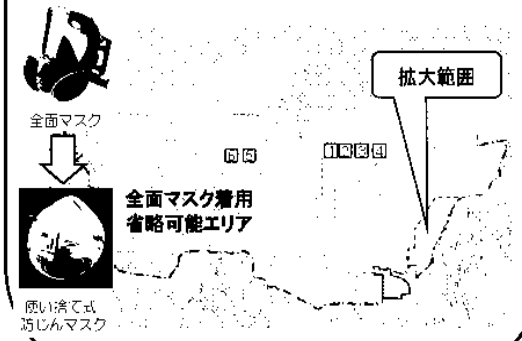
廃止措置等に向けた進捗状況：敷地内の環境改善等の作業

至近の目標	・発電所全体からの追加的放出及び事故後に発生した放射性廃棄物（水処理二次廃棄物、ガレキ等）による放射線の影響を低減し、これらによる敷地境界における実効線量1mSv/年未満とする。 ・海洋汚染拡大防止、敷地内の除染

全面マスク着用省略エリアの拡大

空気中放射性物質濃度のマスク着用基準に加え、除染電離則も参考にした運用を定め、エリアを順次拡大中。

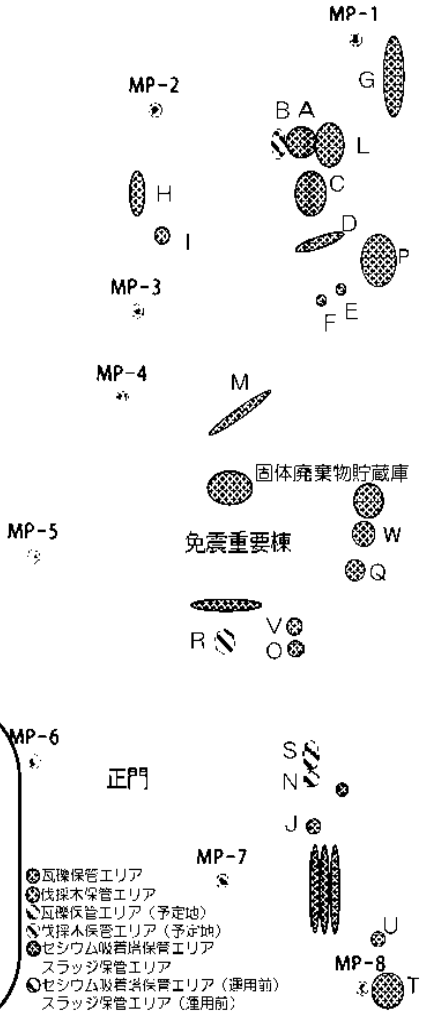
敷地南側のJタンク設置エリアにおいて除染作業が完了し、全面マスク着用省略可能エリアに設定。汚染水を取り扱わないタンク建設作業に限り、使い捨て式防じんマスクが着用可能（2014/5/30～）。



女性の就業エリアの拡大

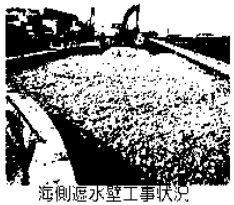
福島第一原子力発電所での女性放射線業務従事者については、東日本大震災以降、線量率上昇等により構内に就業エリアを設けていなかったが、作業環境の改善状況を踏まえ、2014/6より就業可能な場所を限定し作業を行っている。

敷地内の作業環境改善が進んできていること、内部被ばくのおそれが低くなっていることなどを踏まえ、特定高線量作業や1回で4mSvを超えるおそれのある作業を除き、女性従事者の就業エリアを構内全域に拡大する（2014/11/4～）。



海側遮水壁の設置工事

汚染水が地下水へ漏えいした場合に、海洋への汚染拡大を防ぐための遮水壁を設置中。
港湾内の鋼管矢板の打設は、9本を残して2013/12/4までに一旦完了。
引き続き、港湾外の鋼管矢板打設、港湾内の埋立、くみ上げ設備の設置等を実施し竣工前に閉塞する予定。


海側遮水壁工事状況
（1号機取水口側埋立状況）

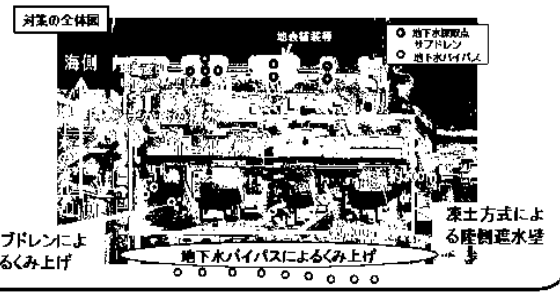
港湾内海水中の放射性物質低減

- 建屋東側（海側）の地下水の濃度、水位等のデータの分析結果から、汚染された地下水が海水に漏えいしていることが明らかになった。
- 港湾内の海水は至近1ヶ月で有意な変動はなく、沖合での測定結果については引き続き有意な変動は見られていない。
- 海洋への汚染拡大防止対策として下記の取り組みを実施している。

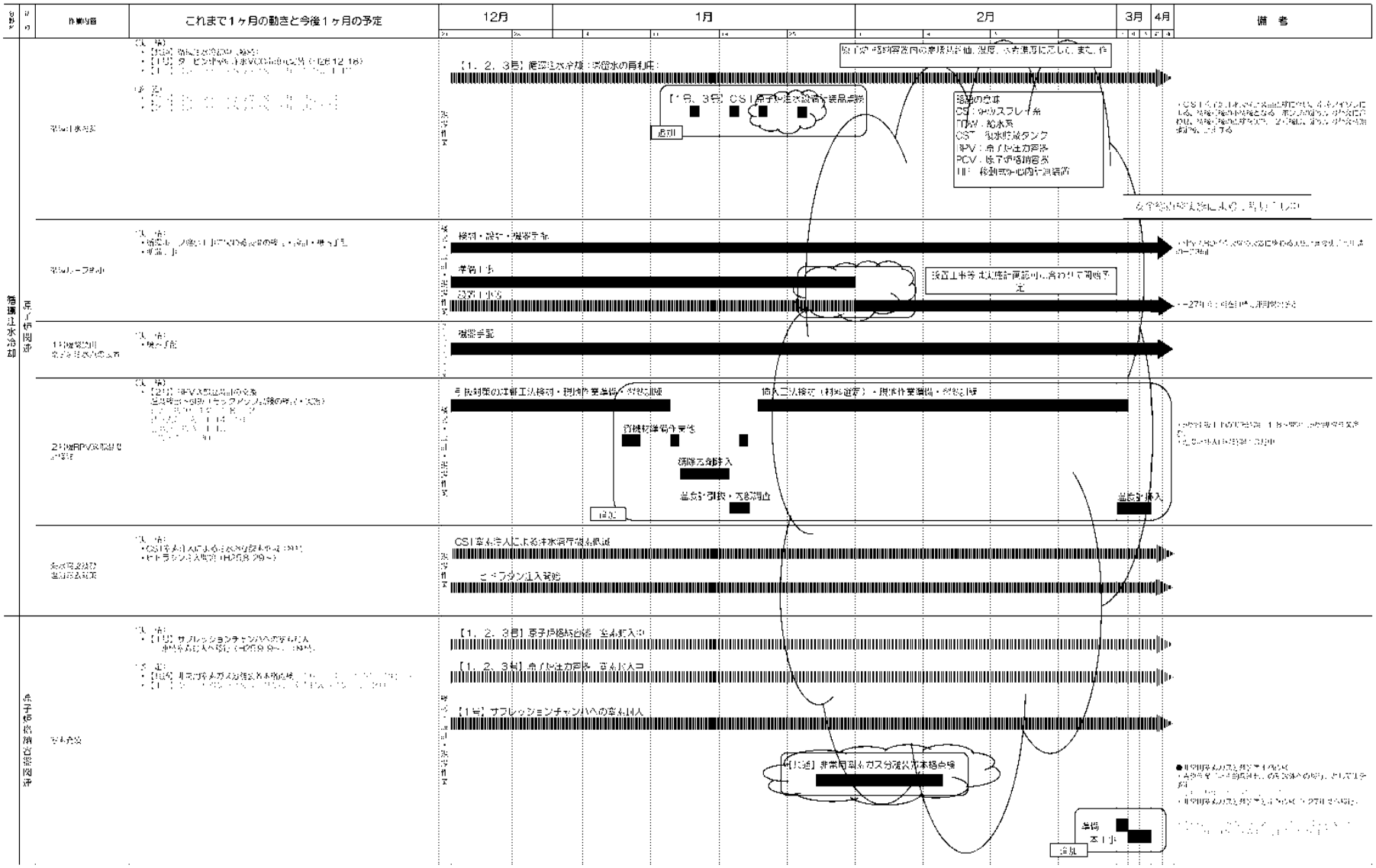
1 汚染水を漏らさない
- 護岸背面に地盤改良を実施し、放射性物質の拡散を抑制
  （1～2号機間：2013/8/9完了、2～3号機間：2013/8/29～12/12、3～4号機間：2013/8/23～1/23完了）
- 汚染エリアの地下水くみ上げ（2013/8/9～順次開始）

2 汚染源に地下水を近づけない
- 山側地盤改良による囲い込み
  （1～2号機間：2013/8/13～2014/3/25完了、2～3号機間：2013/10/1～2014/2/6完了、3～4号機間：2013/10/19～2014/3/5完了）
- 雨水等の侵入防止のため、コンクリート等の地表舗装を実施
  （2013/11/25～2014/5/2完了）

3 汚染源を取り除く
- 分岐トレンチ等の汚染水を除去し、閉塞（2013/9/19完了）
- 海水配管トレンチの汚染水の水抜き
  2号機：2014/11/25～12/18　トンネル部をセメント系材料により充填
  3号機：今後、トンネル部の充填を開始予定。



循環注水冷却スケジュール



循環注水冷却スケジュール

設備	号機	作業内容	これまで1ヶ月の動きと今後1ヶ月の予定	12月	1月	2月	3月	4月	備　考
原子炉建屋等滞留水処理				20 25	1 6 11 16 21 26	1 6 11 16 21	1 6 11 16 21 26	31 5 10 15	
		PCVガス管理	（入　荷） ・【1号】PCVガス管理システム予備品（1台）	【1、2、3号】現状運転中					・2015年PCVガス管理システム（ドライ・窒素コンセント）点検のため1台停止（1/19～1/23）
			（入　荷） ・【3号】PCV内圧、温度・可燃性ガス濃度 PCV内部調査の装置の予備品（1台）	【3号】PCV内部調査・堆積物状況計測機器 装置の全体検討					・堆積物がないと、D/Wへ落ちていないことを確認した ・なお、来月、堆積物とD/Wまでの距離を計測する。なお、ペデスタル内部に堆積物があることから、ロボットアームが入らない場合は、水位計測により堆積物の深さを確認する
		PCV水位計		調査装置設計・製作					
		使用済燃料プール冷却浄化	（入　荷） ・【共用】熱交換器（1台）	【1、2、3、4号】循環冷却中					
			（点　検） ・【3号】 燃料プール冷却ポンプ吸込弁（手動弁）　一式（24・23インチ） ※作業内容は、点検のため弁を手動で「全開→全閉→全開」操作 ※作業時間は、1台当たり約2時間程度 上記作業は、1月26日～2月25日のうち1台ずつ実施 上記作業は、1月26日～2月25日のうち1台ずつ実施	【3号】燃料プール内ガレキ撤去作業（系統全体）					・作業範囲は、点検口から燃料プール内ガレキ撤去装置を挿入し、燃料プール内のガレキを撤去する。なお、燃料プール内ガレキ撤去装置は、燃料プール内ガレキ撤去装置の下部に設置する。
		使用済燃料プール冷却浄化	（点　検） ・【1号】 [redacted]	【2～4号】S.F.P循環冷却設備出口弁地震対策工事					・SFPポンプ停止する場合、ポンプ入口ストレーナ閉塞防止のため、ポンプ入口弁を閉止する。
				実施時期調整中					
		使用済燃料プールへの注水		【1、2、3、4号】給水系ポンプ、予備注水系運転					
				【1、3、4号】コンクリートポンプ車等の設置準備					
		使用済燃料プール冷却浄化 使用済燃料プールへの注水 （使用済燃料プール冷却浄化ポンプ 注水ポンプ）	（入　荷） ・【共用】プール水処理装置（1台）	【1、2、3、4号】ヒドラジン等注入による防食					
				【1、2、3、4号】プール水処理装置					

２号ＲＰＶ底部温度計修理に伴う
温度計引き抜き結果について

2015年1月29日

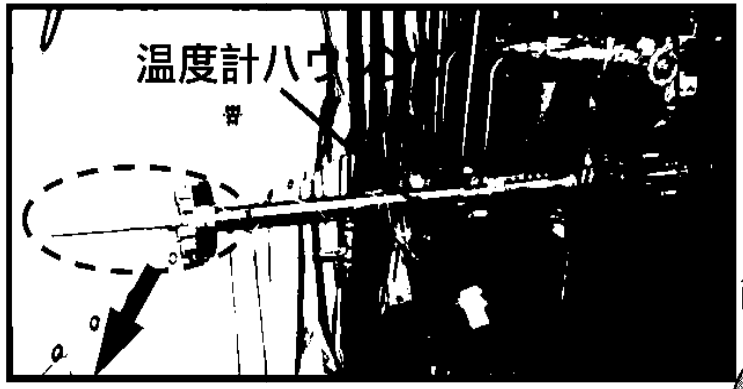
東京電力株式会社

東京電力
TEPCO

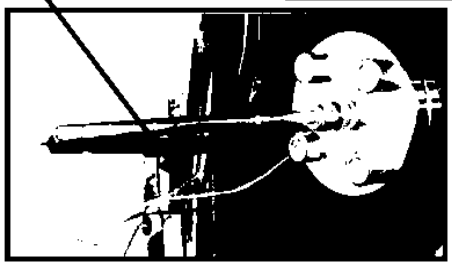
1．設備概要と作業内容

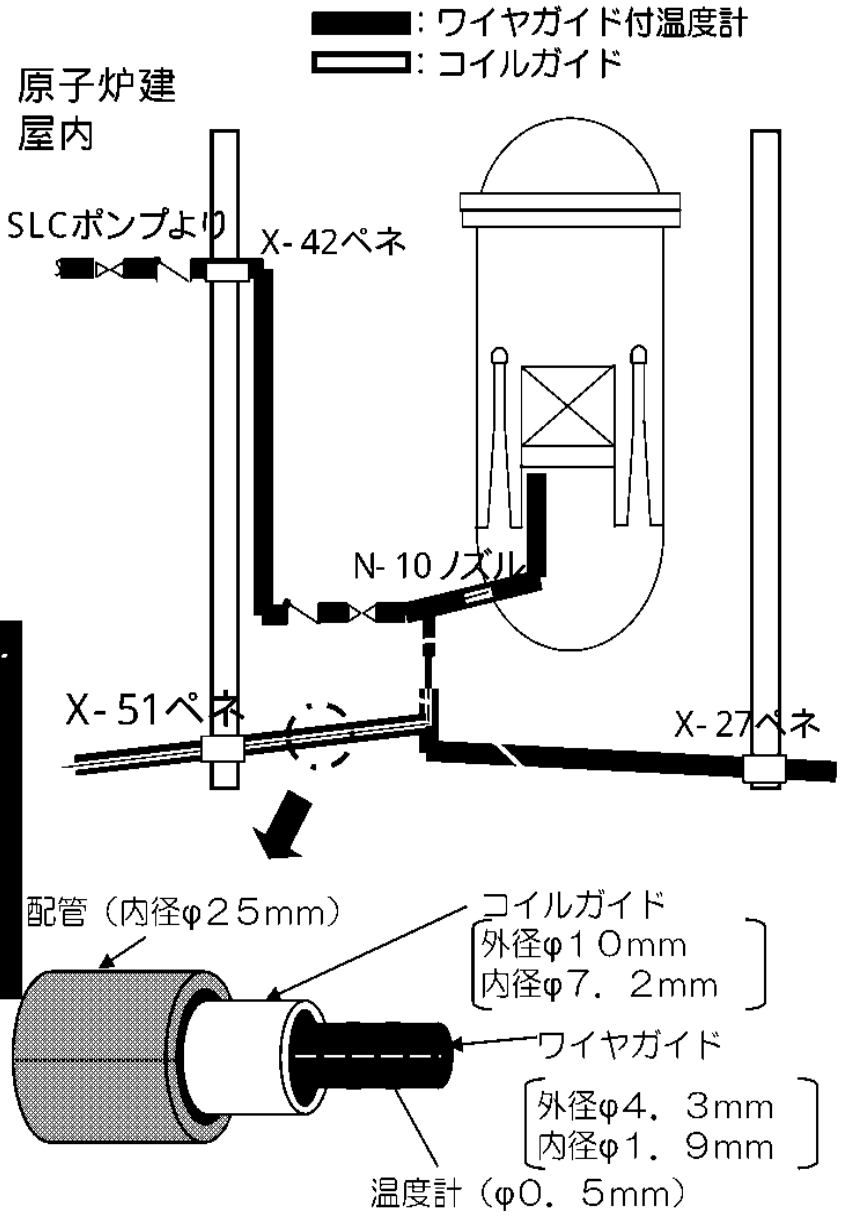
■設備概要
- 既設SLC計装配管を利用して，X-51ﾍﾟﾈ側からX-27ﾍﾟﾈ側に繋がるT分岐後のオリフィス部までコイルガイドを挿入し，以降ワイヤガイド(温度計付き)をN-10ノズル付近まで挿入されている。
- 当該温度計は，H26.2.19故障と判断したことから，H26.4.17に交換のための引き抜き作業を実施したが，引き抜きできなかったもの。

■作業内容
- 錆除去剤を約120h浸漬させ，錆の除去を行う。
- 錆除去剤排出後，X-51ﾍﾟﾈ側よりワイヤガイド，コイルガイドを150N以下の力で引抜く。



温度計信号線



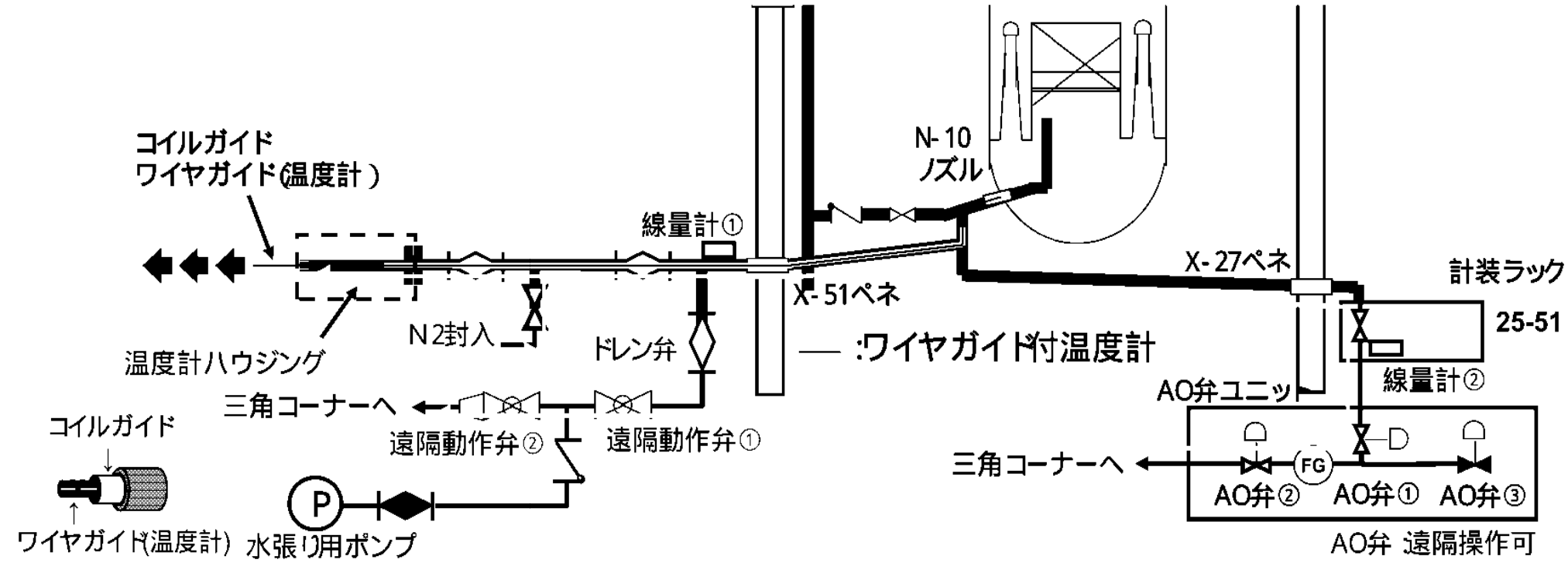


２号機　ＴＥ－２－３－６９Ｒ設置概略図

2．温度計引き抜き　作業結果

■ 作業結果（H27.1.14～1.19）

- 錆除去剤の注入による錆除去
  1/14～1/19の間（約120時間）錆除去剤を注入し,錆が除去されている状況が確認できた。
- コイルガイド・ワイヤガイドの引抜き
  1/19にワイヤガイド付温度計及びコイルガイドの引抜きを行い,規定引抜力１５０Nに対し,５０～７０Nにて引き抜きを完了した。その後,仮ハウジングによる閉止を実施した。（作業中プラントパラメータ及び線量計①②の変動もみられなかった）

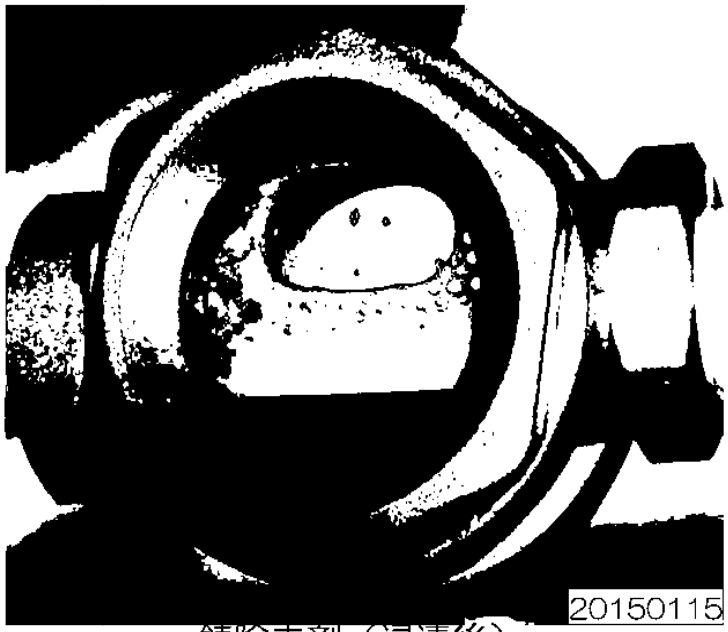


2．温度計引き抜き　作業結果

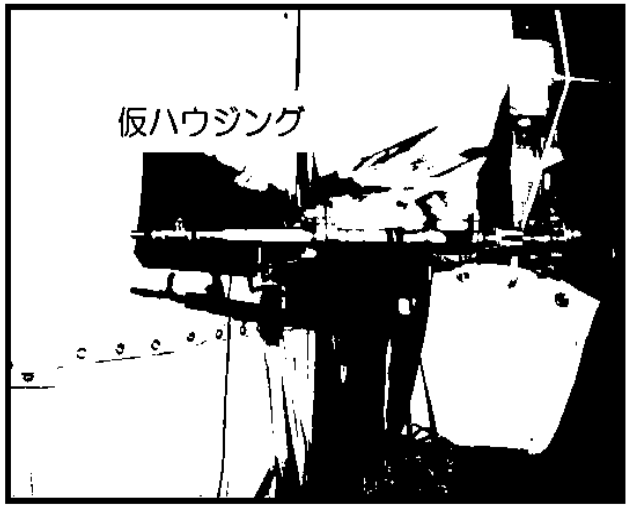
■実績線量（作業員数は1/14～1/19の延べ人数／線量は作業期間中の累積及び最大実績）

東電	１４人	累積線量：１０．３３ｍＳｖ	最大線量（日）：１．１９ｍＳｖ／ｄ
メーカー	１３５人	累積線量：２４．４７ｍＳｖ	最大線量（日）：０．７８ｍＳｖ／ｄ

錆除去剤（浸漬初期）



錆除去剤（浸漬後）

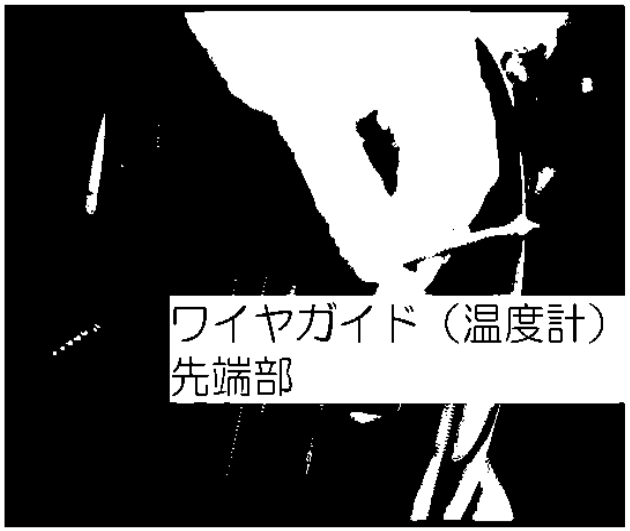


まとめ

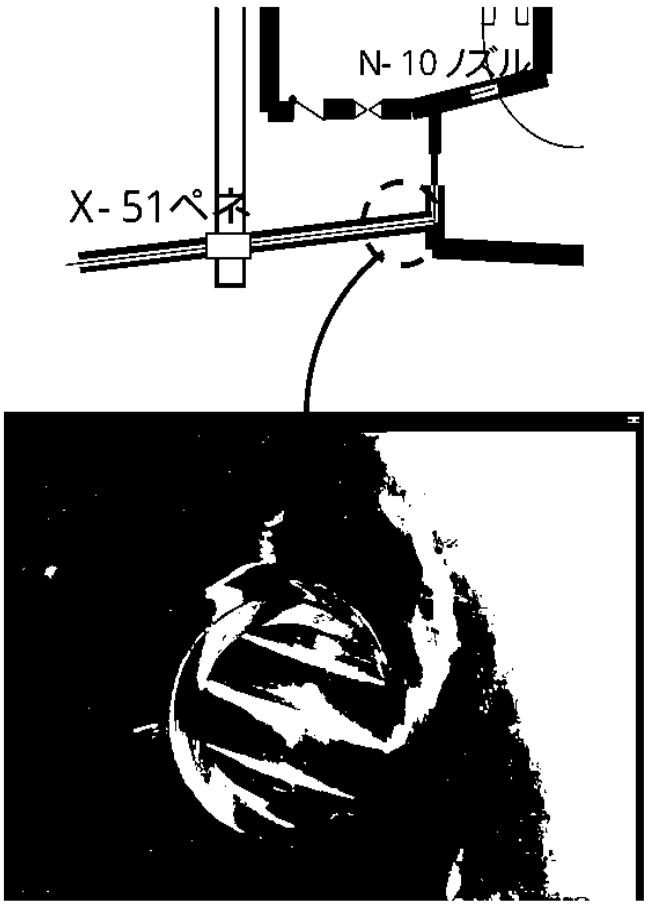
- ✓ワイヤガイド付温度計の引き抜きが完了。
- ✓新規温度計の挿入に向け,内視鏡による配管内部確認を実施。
- ✓新規温度計挿入工法の検討・計画・訓練等を行う予定

【参考】現場写真

ワイヤガイド引抜作業の状況



コイルガイド／ワイヤガイド



引抜後のSLC配管内部
（1/20撮影）

東京電力株式会社
福島第一原子力発電所
2015年1月29日現在

汚染水処理設備等　スケジュール

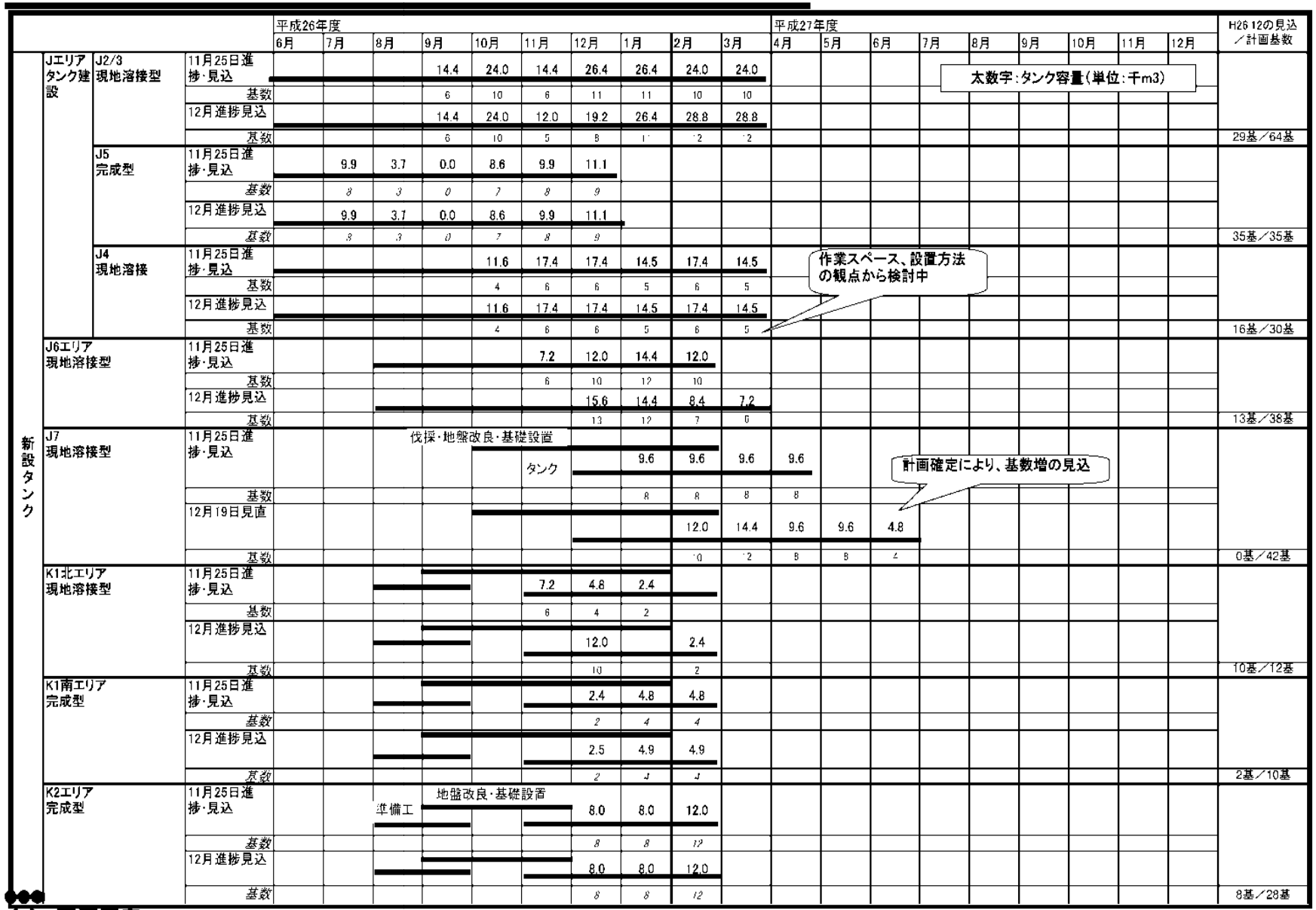
分類	作業内容	これまで一ヶ月の動きと今後一ヶ月の予定	備考
地下水バイパス	地下水バイパスの安定的な運用	（実　績） ・雨水汲み上対策（タンク型カバー設置） （予　定） ・雨水汲み上対策（タンク型カバー設置）	地下水バイパス：汲み上げ井戸（12本） ・雨水汲み上対策（タンク型カバー設置）：12本
多核種除去設備等	【多核種除去設備】	（実　績） ・処理運転：A・B・C系統） （予　定） ・処理運転：A・B・C系統）	・A系統：処理運転中 ・B系統：処理運転中 ・C系統：処理運転中 CTT底圧上昇後、循環洗浄実施　脱炭酸塔三上昇時、窒素洗浄実施
多核種除去設備等	【高性能多核種除去設備】	（実　績） ・建屋設備工事（山側敷地）、検証試験装置通水試験 ・処理運転 （予　定） ・検証試験装置通水試験 ・処理運転	処理運転中 試験の結果、建家干渉として問題ないため設備（ポンプ・弁等）取り外し
多核種除去設備等	【増設多核種除去設備】	（実　績） ・外装、建屋設備（北エ・山側敷地）、機器搬入 ・処理運転（A・B・C系統） （予　定） ・機器搬入 ・処理運転（A・B・C系統）	・A系統：処理運転中 ・B系統：処理運転中 ・C系統：処理運転中 CTT底圧上昇後、窒素洗浄実施　脱炭酸塔三上昇時、窒素洗浄実施 系統洗浄に伴い発生した廃スラリーの処理実施（H26.12.25）
多核種除去設備等	【モバイル型Sr除去装置】 （実　績・予　定） ・モバイル型Sr除去装置　A系列　運転 ・モバイル型Sr除去装置　B系列　設置工事 ・モバイル型Sr除去装置　増設工事	モバイル型Sr除去装置（A）　連続運転（12.22 G4南A群からSB群小型A実施）	平成26年9月30日付 実施計画 （原規規発第1409301号）
フランジタンク	【RO濃縮水処理設備】 （実　績） ・RO濃縮水処理設備　設置 （予　定） ・RO濃縮水処理設備　設置・運転 （実　績） ・1～4号サブドレン他移送設備　設置工事 （予　定） ・1～4号サブドレン他移送設備　設置工事	機器・配管設置 機器据付 処理運転 1～4号サブドレン他移送設備　設置工事 検査・是正措置 リンフォタンク基礎設置	平成26年12月22日 実施計画変更 （原規規発第1412221号） 平成26年9月3日付 一部補正承認 （原規規発第1409033号） 平成26年10月17日付　5号機申請承認 （原規規発第1410172号） 平成26年10月24日付 一5号機申請承認 （原規規発第1410245号）
港湾内海水浄化	（実　績） ・遮水壁　構造設計（平面位置・深度等） ・現地調査、測量 ・護岸工事（サブドレン等設置掘削工、盛土、水位・水質観測、試験・試験装置設置）	実施設計（水位管理計画・施工計画等）	準備が整った箇所から順次護岸工事を開始予定 （ブライン冷凍・機械設備：（H26.9.15～）
港湾内海水浄化	（予　定） ・遮水壁　詳細設計・水位管理計画・施工計画等） ・護岸工事（サブドレン等設置掘削工、水位・水質観測、試験・試験装置設置） ・本体工事（鋼矢板打設、海底地盤改良）	実施設計 鋼矢板打設 護岸構造物施工 ブライン冷凍・機械設備設置	工事完了時期
建家周辺瓦礫移送設備増強工事	（実　績） ・現地調査（試掘ルート及び干渉物調査）、干渉物撤去 （予　定） ・現地調査（試掘ルート及び干渉物調査）、干渉物撤去、掘削作業・機器・配管設置	実施設計（施工計画等） 干渉物撤去 掘削作業、機器・配管設置	掘削作業 1～4号機：掘削実施中

東京電力株式会社
福島第一原子力発電所
2015年1月29日現在

汚染水処理等 スケジュール

作業内容	これまで一ヶ月の動きと今後一ヶ月の予定	備考
処理水受タンク増設	（実 績） ・追加設備検討（Jエリア監視・排水路暗渠、タンク設計） ・敷地図典（Hエリア・Jエリア）準備工事 ・J2、J3-Iエリアタンク設置工事（溶接型タンク） ・J4エリアタンク設置工事（溶接型タンク） ・J5エリアタンク設置工事（溶接型タンク） ・J6-Iエリアタンク設置工事（溶接型タンク） ・H1-Iエリアタンクリプレース準備工事（残水処理、タンク撤去、基礎工事） ・H1エリアタンク設置工事（溶接型タンク） ・H2ブルーエリアタンクリプレース準備工事（水移送、残水処理） ・H2フランジタンクリプレース準備工事（残水処理） ・H4フランジタンクリプレース準備工事（残水処理） ・K1北エリアタンク設置工事（溶接型タンク） ・K1南エリアタンク設置工事（溶接型タンク） ・K2-Iエリアタンク設置工事（溶接型タンク） （予 定） ・追加設備検討（Jエリア監視・排水路暗渠、タンク設計） ・敷地図典（Hエリア・Jエリア）準備工事 ・J2、J3-Iエリアタンク設置工事（溶接型タンク） ・J4エリアタンク設置工事（溶接型タンク） ・J6エリアタンク設置工事（溶接型タンク） ・H1-Iエリアタンクリプレース準備工事（残水処理、タンク撤去、基礎工事） ・H1-Iエリアタンク設置工事（溶接型タンク） ・H2ブルーエリアタンクリプレース準備工事（水移送、残水処理、タンク撤去、基礎工事） ・H2フランジタンクリプレース準備工事（残水処理、タンク解体） ・H4フランジタンクリプレース準備工事（残水処理） ・K1北エリアタンク設置工事（溶接型タンク） ・K1南エリアタンク設置工事（溶接型タンク） ・K2-Iエリアタンク設置工事（溶接型タンク）	平成26年9月5日付　部分使用承認（42基） 申請受発文：409054号 【半減ノ7年1月29日時点進捗】 ・使用前検査終了（29／42基） 平成26年10月10日付　一部使用承認（32基） 申請受発文：410101号 【平成27年1月29日時点進捗】 ・使用前検査終了（16／32基） 平成26年11月1日付　一部使用承認（8基） 申請受発文：408012号 平成26年8月25日付　部分使用承認（27基） 申請受発文：408252号 【半減ノ7年1月29日時点進捗】 ・使用前検査終了（35／35基） 平成26年12月9日付　部分使用承認（38基） 申請受発文：412091号 【半減ノ7年1月29日時点進捗】 ・使用前検査終了（16／38基） 平成26年12月26日付　部分使用承認（12基） 申請受発文：412261号 【半減ノ7年1月29日時点進捗】 ・使用前検査終了（10／12基） 平成26年12月26日付　部分使用承認（28基） 申請受発文：412263号 【半減ノ7年1月29日時点進捗】 ・使用前検査終了（4／28基）
ミーレンチ（滞水処理ーレンチ）他の汚染水処理	（実 績） ・海側トレンチ点検孔・蓋体（2、3号） ・主ーレンチ（滞水貯留トレンチ）浄化・設計・検討（2、3号） ・上ーレンチ（海水配管トレンチ）止水・充填・設計・検討（2、3号） ・上ーレンチ（海水配管トレンチ）閉塞確認（2号） ・海側トレンチ（非常ケーブルーレンチ（滞水貯留設備）止水・充填工事（2号） ・地下水移送（1－2号取水口間） （予 定） ・主ーレンチ（滞水貯留トレンチ）浄化、設計・検討（2、3号） ・主ーレンチ（滞水配管トレンチ）止水・充填、設計・検討（2、3号） ・上ーレンチ（滞水配管トレンチ）閉塞区間点検削孔（2号）、カメラ確認（3号） ・地下水移送（1　2号取水口間） ・地下水移送（3　4号取水口間） ・地下水移送（2－3号取水口間）	【H27.1.27時点進捗】 ◎2号炉建屋 ・2号機H26.11.26～12.18・充填完了：充填体積　2.51m3 ・2号機海側開閉水抜栓　H26.12.24 H27.1.20 ◎3号炉建屋 ・3号機海側開閉口閉塞中 ◎4号炉建屋 ・4号機滞水抜栓 H26.12.19 【H27.1.27時点進捗】 ・4号ーレンチ開閉部内滞留水
地下貯水槽からの漏えい対策	（実 績） ・高濃度汚染水循環ライン対策（No.1、2、3地下貯水槽） ・地下貯水槽周辺に降った雨水の吸上（No.1地下貯水槽） （予 定） ・高濃度汚染水循環ライン対策（No.1、2、3地下貯水槽） ・地下貯水槽周辺に降った雨水の吸上（No.1地下貯水槽）	平成26年6月16日～雨水吸上作業なし。 平成27年2月末日まで予定。
ー4エリア他からタンクからの漏えい対策	（実 績） ・タンク漏えい個別対策・拡大防止対策の検討 ・海水の汚染水流出抑制・海洋への影響評価 ・ウェルポイントからの地下水吸上 （予 定） ・タンク漏えい個別対策・拡大防止対策の検討 ・ウェルポイントからの地下水吸上 ・海水の汚染水流出抑制・海洋への影響評価	Eエリアのフランジタンクの追加点検検討中

2－1．タンク工程（新設分）


平成26年度
6月 7月 8月 9月 10月 11月 12月 1月 2月 3月
平成27年度
4月 5月 6月 7月 8月 9月 10月 11月 12月
H26 12の見込／計画基数
新設タンク
Jエリア タンク建設
J2/3 現地溶接型
J5 完成型
J4 現地溶接
J6エリア 現地溶接型
J7 現地溶接型
K1北エリア 現地溶接型
K1南エリア 完成型
K2エリア 完成型
11月25日進捗・見込
基数
12月進捗見込
12月19日見直
太数字：タンク容量（単位：千m3）
作業スペース、設置方法の観点から検討中
計画確定により、基数増の見込
伐採・地盤改良・基礎設置
タンク
地盤改良・基礎設置
準備工
29基／64基
35基／35基
16基／30基
13基／38基
0基／42基
10基／12基
2基／10基
8基／28基

2－2．タンク工程（リプレース分）

			平成26年度										平成27年度									H26.12の見込／計画基数
			6月	7月	8月	9月	10月	11月	12月	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	
リプレースタンク	Dエリアノッチタンクリプレース完成型	実績			16.0	4.0	12.0	9.0														
		基数			16	4	12	9														41基／41基
	H1エリア完成型	11月25日進捗・見込	残水・撤去						地盤改良・基礎設置 12.5	16.3	12.5	21.3	12.5	3.8								
		基数			▲20				▲12 10	13	10	17	10	3								
		12月進捗見込							10.0	18.8	16.3	17.5	16.3	10.0	10.0							
		基数			▲20				8	▲12 15	13	14	13	8	8							8基／79基
	H2ブルータンク現地溶接型	12月19日見直							地盤改良・基礎設置						9.6	9.6	9.6	9.6	9.6	9.6	19.2	
									残水・撤去													
	撤去(千m3)	基数								▲10					4	4	4	4	4	4	8	
	H2フランジタンク(type1;23基)現地溶接型	12月19日見直							地盤改良・基礎設置													
									残水・撤去													
	撤去(千m3)									▲28												
	H4フランジタンク(Type1;22基)完成型	12月19日見直								残水・撤去			地盤改良・基礎設置						20.0	20.0	20.0	
																	タンク					
	基数																		20	20	20	
	撤去(千m3)										▲26	▲22										

計画変更により、基数増の見込

タンク設置に係る現状分析及び対策（1月22日現在）

エリア	現状分析	対策・水平展開
J2/3	・災害防止対策として、同一エリアの同時作業を禁止した。そのため、タンク工事作業時間が当初想定より短縮となっているため、生産減が発生 ・1/29　使用前検査済み（累計29基）（使用承認済み）	→他工事との時間割の見直しを検討
J4	・1/29　使用前検査済み（累計16基）（使用承認済み）	
J5	・J5エリアタンク設置完了（全35基）	
D	・Dエリアタンク設置完了（全41基）	-
J6	・1/29　使用前検査済み（累計16基）（使用承認済み） ・災害に伴い作業停止中	-
K1北	・1/29　使用前検査済み（累計10基）（使用承認済み） ・災害に伴い作業停止中	-
K1南	・工場製作中 ・タンク現地設置中（2基設置済み、荒天による輸送遅れあり） ・実施計画申請中（未認可）	-
K2	**・1/29　使用前検査済み（累計4基）（使用承認済み）**	-
H1	・工場製作中 ・タンク現地設置中（14基設置済み、荒天による輸送遅れあり） ・実施計画申請中（未認可）	-

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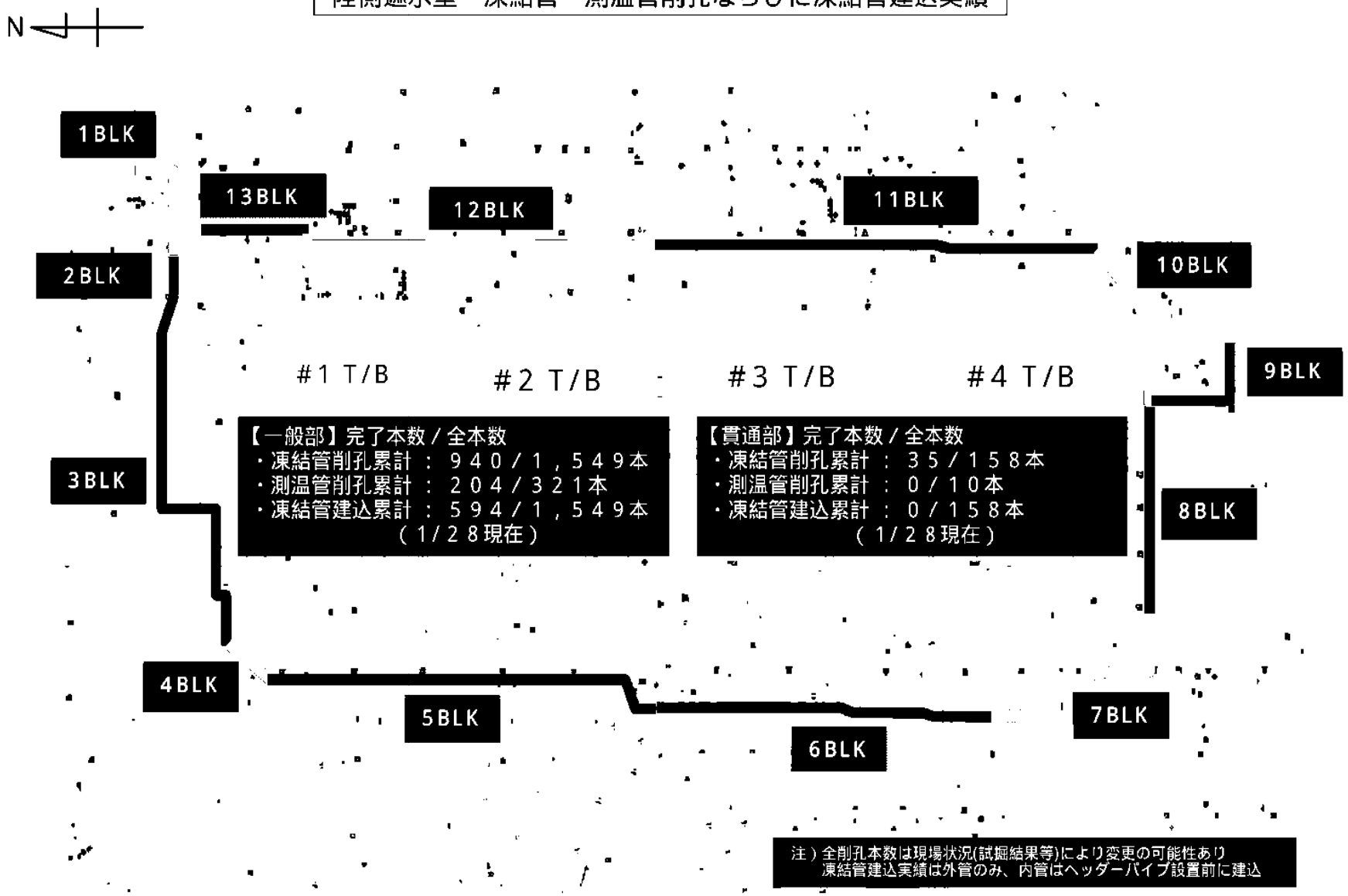
陸側遮水壁　4週間工程表　(平成27年1月18日～平成27年2月14日)

施工ブロック (削孔完了本数゛/全削孔本数゛) ※ ()内数字は貫通本数再掲	2015年1月													2015年2月											
	先週							今週							来週							再来週				
	18日	19日	20日	21日	22日	23日	24日	25日	26日	27日	28日	29日	30日	31日	1日	2日	3日	4日	5日	6日	7日	8日	9日	10日	11日	12日	13日	14日
凡例　準備工 削孔工 建込工	⇒ 安全総点検 作業休止 ※ 安全総点検実施により工程見直し中																											
1BLK (凍結 :75 / 75本) (測温 :16 / 16本) (建込 :75 / 75本)	配管架台設置							配管架台設置、潮汐対策工							配管架台設置、潮汐対策工							ブライン配管工						
2BLK (凍結 :19 / 19本) (測温 :5 / 5本) (建込 :18 / 19本)												ブライン配管工			ブライン配管工													
3BLK (凍結 :192 / 196本) (測温 :42 / 42本) (建込 :104 / 196本)	凍結管 測温管削孔、凍結管建込							凍結管 測温管削孔、凍結管建込							凍結管 測温管削孔、凍結管建込							凍結管 測温管削孔、凍結管建込						
4BLK (凍結 :31(6) / 31(7)本) (測温 :6 / 6本) (建込 :0(0) / 31(7)本)	凍結管 測温管削孔、ダクト貫通施工							凍結管 測温管削孔、ダクト貫通施工							凍結管 測温管削孔、ダクト貫通施工							凍結管 測温管削孔、凍結管建込、貫通施工						
5BLK (凍結 :194(8) / 221(23)本) (測温 :41(0) / 44(3)本) (建込 :164(0) / 221(23)本)	凍結管 測温管削孔、建込、貫通施工、配管工							凍結管 測温管削孔、貫通施工、配管工							凍結管 測温管削孔、貫通施工、配管工							凍結管 測温管削孔、貫通施工、配管工						
6BLK (凍結 :144(7) / 190(19)本) (測温 :34 / 41本) (建込 :30(0) / 190(19)本)	凍結管 測温管削孔、貫通施工							凍結管 測温管削孔、凍結管建込、貫通施工							凍結管 測温管削孔、凍結管建込、貫通施工							凍結管 測温管削孔、凍結管建込、貫通施工						
7BLK (凍結 :115(11) / 125(14)本) (測温 :26(0) / 27(1)本) (建込 :74(0) / 125(14)本)	凍結管 測温管削孔、凍結管建込、貫通施工							凍結管 測温管削孔、凍結管建込、貫通施工							凍結管 測温管削孔、建込、貫通施工、配管工							凍結管 測温管削孔、建込、貫通施工、配管工						
8BLK (凍結 :100 / 104本) (測温 :21 / 21本) (建込 :93 / 104本)	ブライン配管工 (仕上げ)							ブライン配管工 (仕上げ、漏気試験)																				
9BLK (凍結 :67(3) / 73(7)本) (測温 :13(0) / 14(1)本) (建込 :36(0) / 73(7)本)	凍結管 測温管削孔、凍結管建込、貫通施工							凍結管 測温管削孔、凍結管建込、貫通施工							凍結管 測温管削孔、凍結管建込							凍結管 測温管削孔、凍結管建込						
10BLK (凍結 :3(0) / 75(10)本) (測温 :0 / 15本) (建込 :0(0) / 75(10)本)	4号 CW上部改良、トレンチ設置							スタンドパイプ削孔、トレンチ設置							スタンドパイプ削孔、トレンチ設置							スタンドパイプ削孔						
11BLK (凍結 :0(0) / 225(40)本) (測温 :0(0) / 45(2)本) (建込 :0(0) / 225(40)本)	トレンチ設置、プラント設置							トレンチ設置、プラント設置							トレンチ設置、プラント設置							スタンドパイプ削孔						
12BLK (凍結 :0(0) / 159(29)本) (測温 :0(0) / 32(2)本) (建込 :0(0) / 159(29)本)	トレンチ設置							トレンチ設置							トレンチ設置、2号海水配管探査							トレンチ設置、2号海水配管探査						
13BLK (凍結 :0(0) / 56(9)本) (測温 :0(0) / 13(1)本) (建込 :0(0) / 56(9)本)	支障物撤去、1号海水配管探査							1号海水配管探査、支障物撤去							ケーブル移設							1号逆洗弁雨水対策						

陸側遮水壁　凍結管・測温管削孔ならびに凍結管建込実績



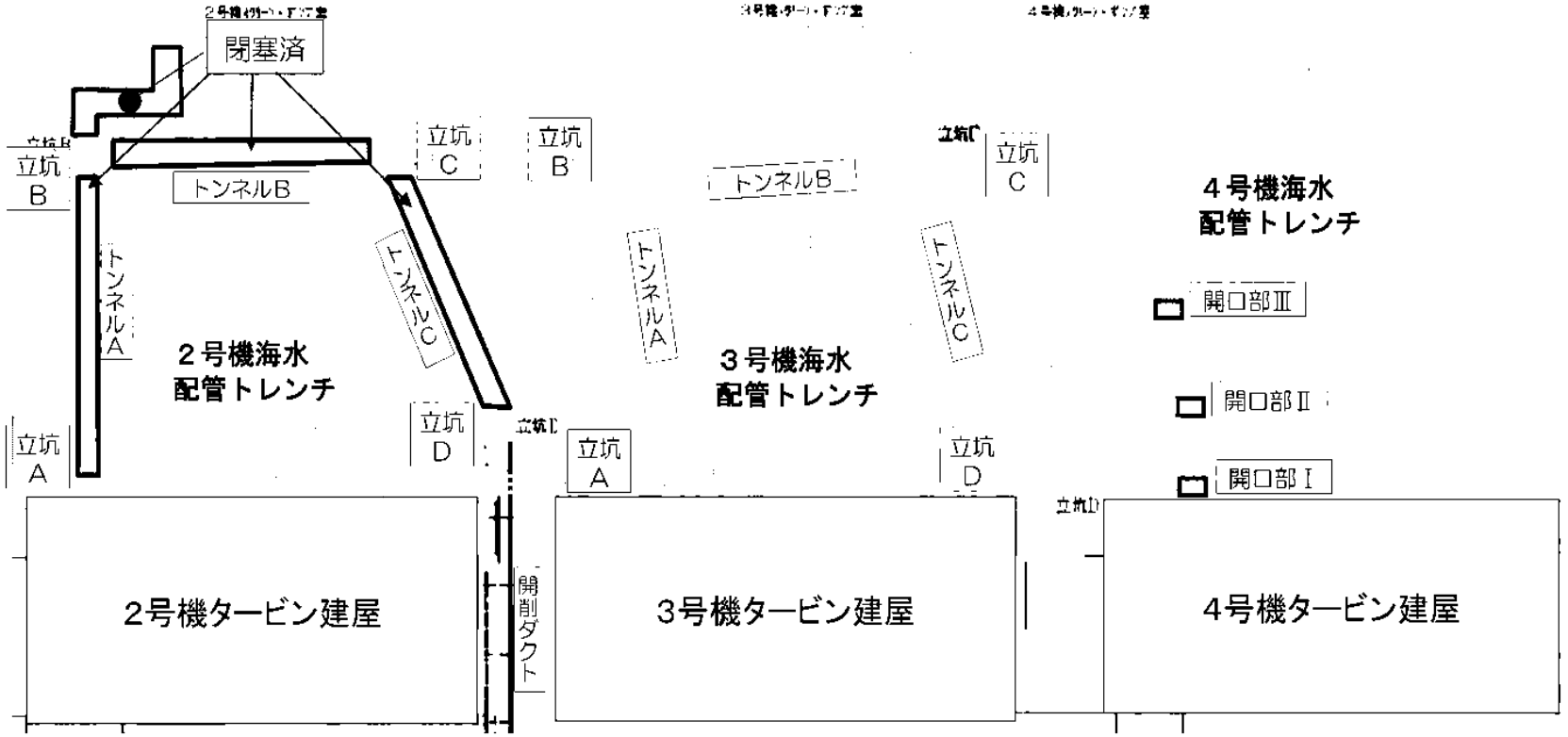
2、3、4号機海水配管トレンチ閉塞工事の進捗状況について

平成27年1月29日

東京電力 TEPCO

1．海水配管トレンチ閉塞工事の進捗状況

■位置図



■進捗状況（平成27年1月29日現在）

号機	2号機	3号機	4号機
状況	・12/18 トンネル部閉塞充填完了 ・1/20 揚水試験（2回目） ・立坑閉塞検討中	・トンネル部充填準備完了 ・充填開始日調整中	・T／B接続部及び開口部Ⅰ調査中 ・開口部Ⅱ充填準備中

2.（1） 2号機：海水配管トレンチ・トンネル閉塞の施工手順

充填孔・ポンプ設置孔の削孔、水位計の設置

※一部の孔の削孔はトンネルA天井部充填までに実施

トンネルA、B、C一般部充填　※トンネルの中・下部を一般部とする

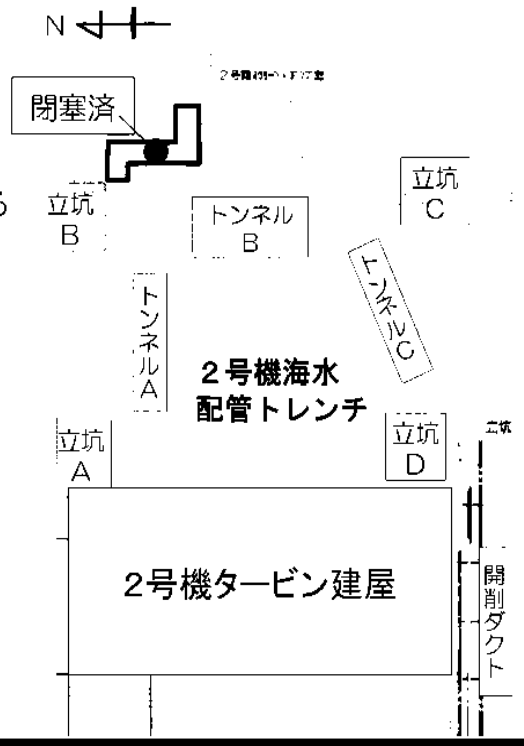
数回にわけて水抜きと充填を繰り返し

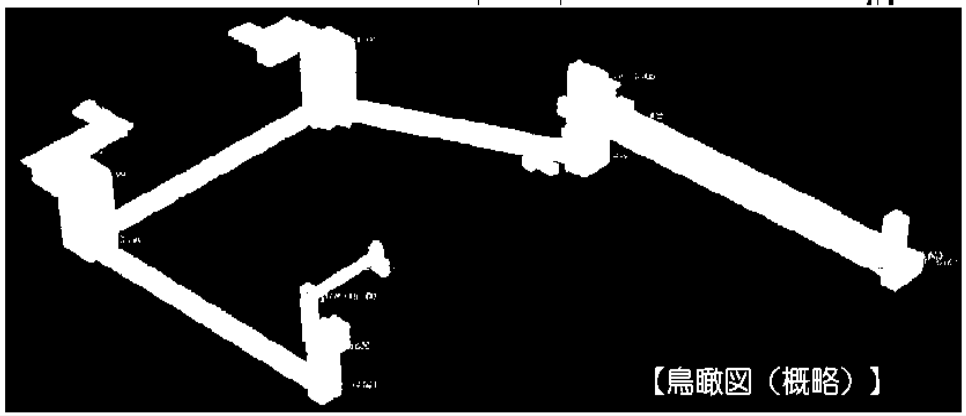
トンネルA、B、C天井部充填　12/18完了

揚水試験による充填状況の確認　12/24、1/20実施

立坑A、D、開削ダクトの閉塞

立坑B、Cの閉塞




【鳥瞰図（概略）】

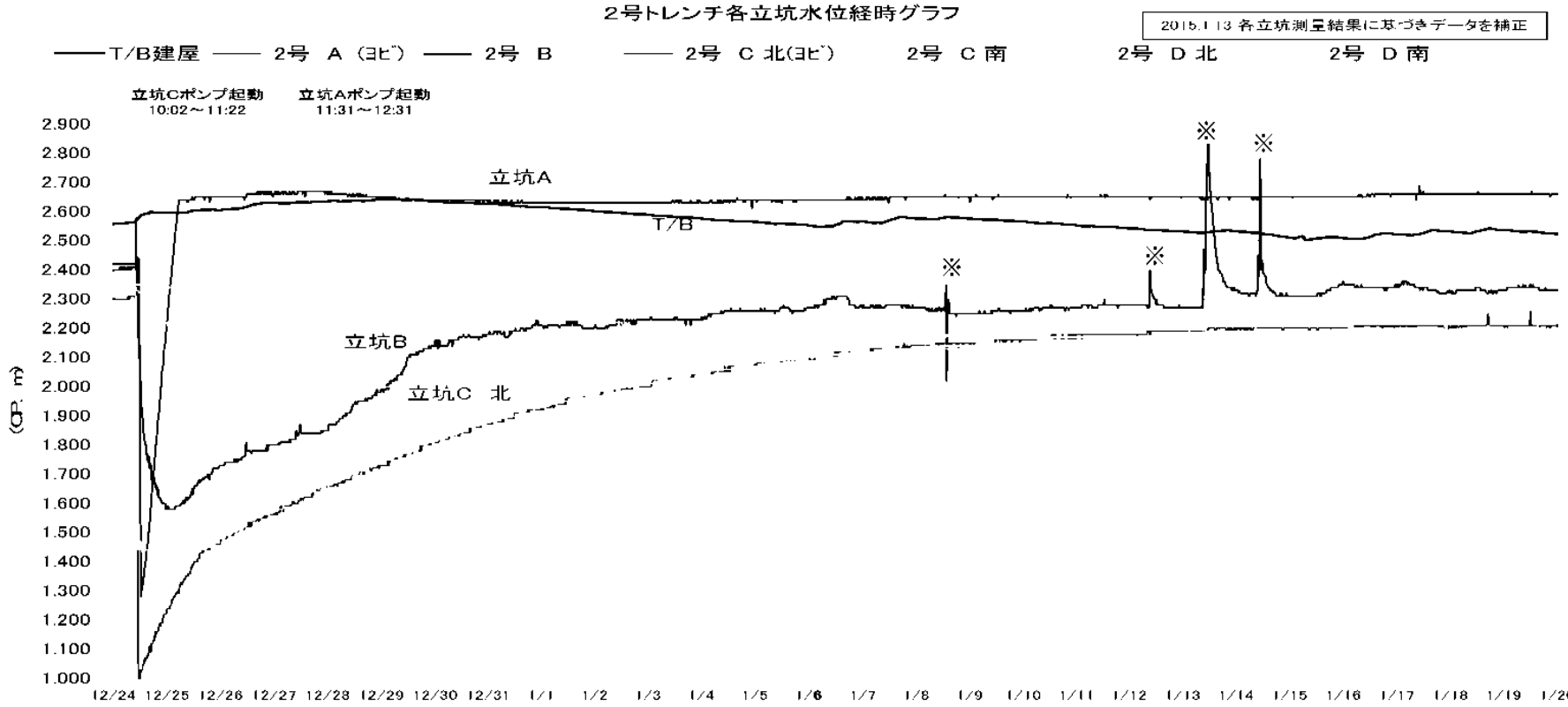
2.（2） 2号機：揚水試験（1回目）における水位変化

12/18にトンネル部の充填が完了。12/24に揚水試験（１回目）を実施。トレンチ内水位計の水準測量は完了。

揚水試験（１回目）後、現在の水位は立坑B、C、DがO.P.+2.1～2.2mに収束。

立坑A－B間（トンネルA）の連通量は、ごくわずかと推定。

立坑B－C間（トンネルB）及び立坑C－D間（トンネルC北・南）については、連通の可能性が高い。



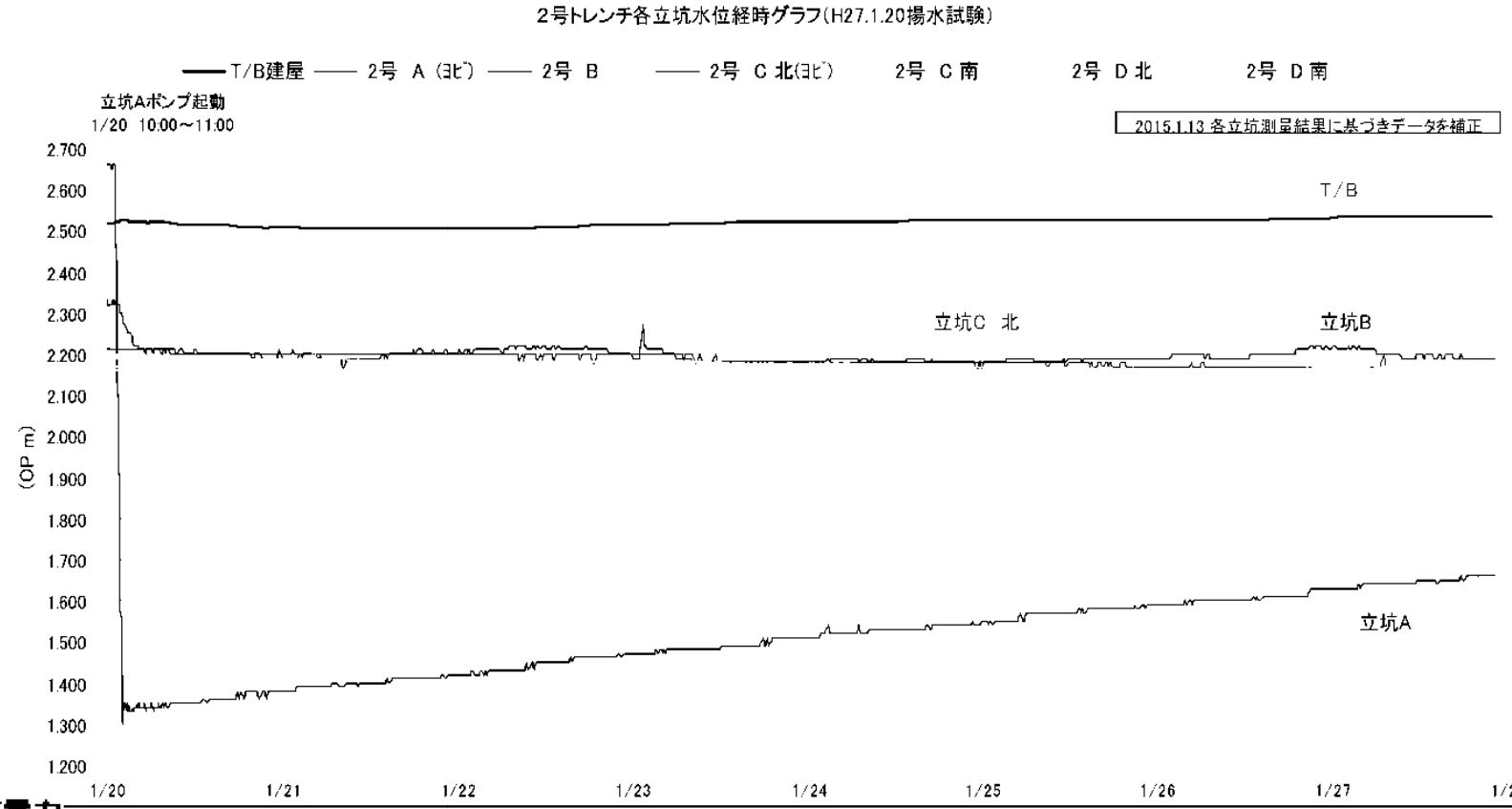
※削孔に伴う注水及びコア回収のため、一時的に水位が変化

2.（3） 2号機：揚水試験（2回目）における水位変化

1/20に揚水試験（２回目）を実施。

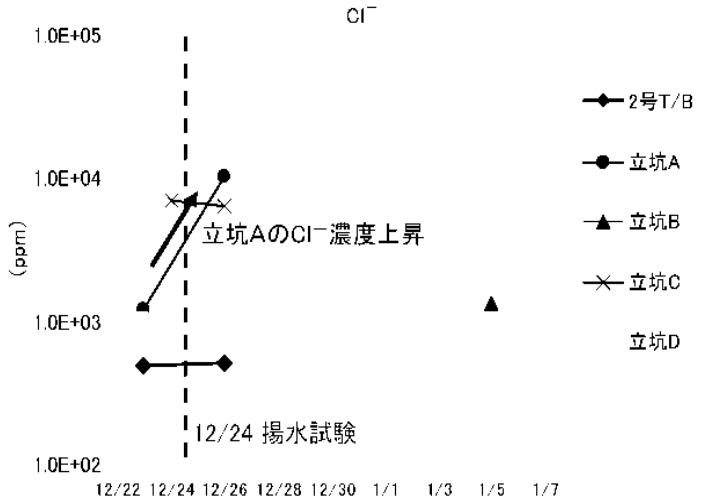
立坑Ａの水位を低下させた後、立坑Ｂの水位も低下（２時間で▲約７cm）。水位変化や各立坑の位置関係から、トンネルＡの連通量は、１回目と同様、ごくわずかと推定。

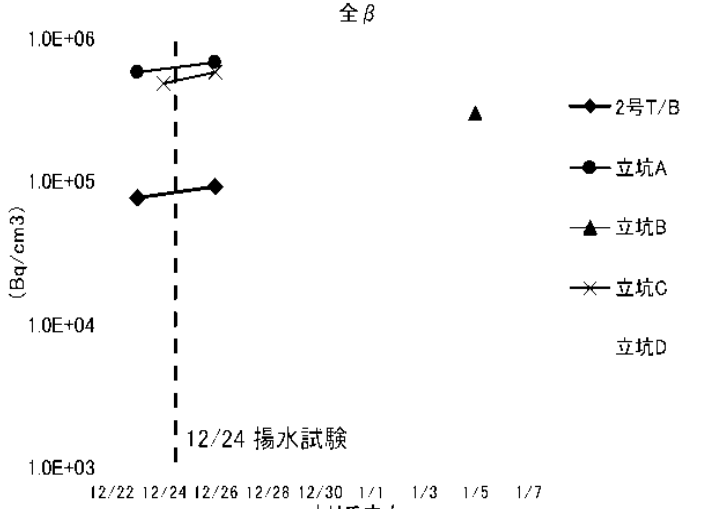
揚水試験（２回目）後、立坑Ａの水位が戻っていないことから、Ｔ／Ｂ建屋と立坑Ａの連通部の凍結が進行したものと想定。（同様に、T/B建屋と立坑Dの水位から、Ｔ／Ｂ建屋と開削ダクトの連通部も凍結が進んでいると想定）

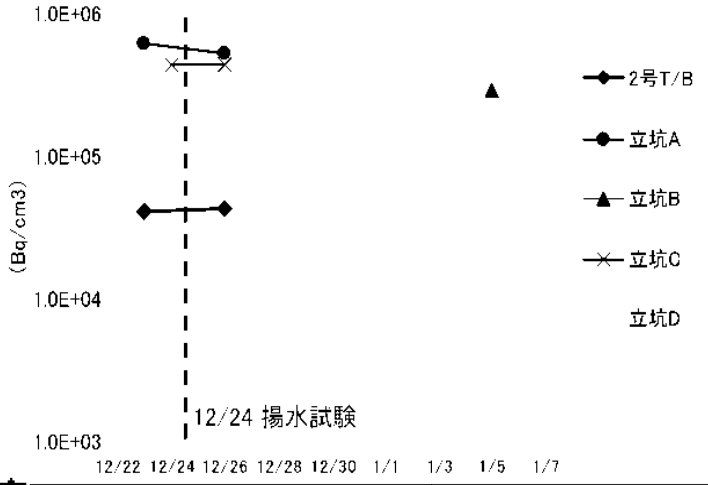


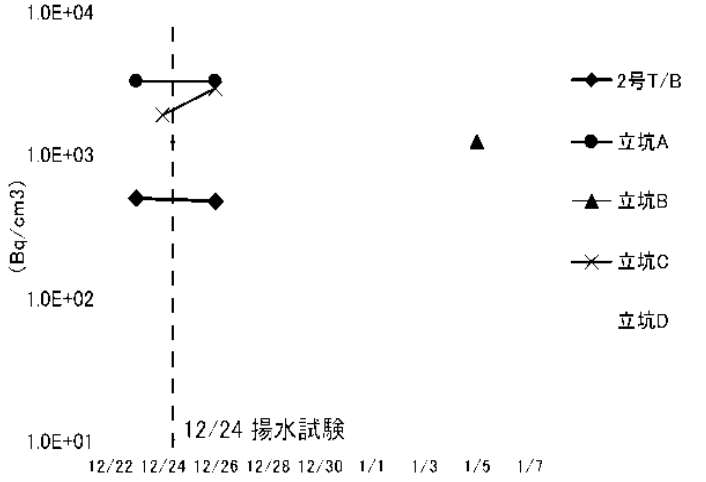
2.（4） 2号機：揚水試験（1回目）における各立坑の水質

揚水試験前後の水質を比較した結果、立坑A、C、Dはほぼ同等。よって、地下水流入の可能性は低いと考えられる。
なお、立坑Aにおいて塩化物イオンが上昇した理由は、閉塞材料の打設時に立坑Aからアルカリ中和剤を投入しており、その影響と推察。



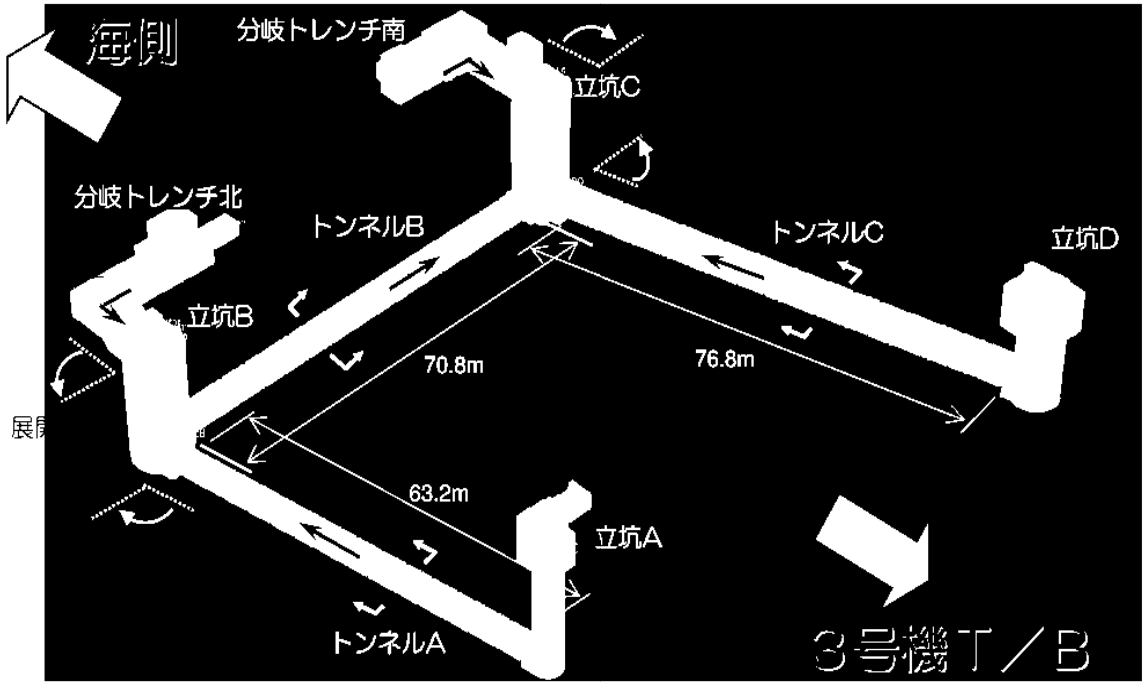






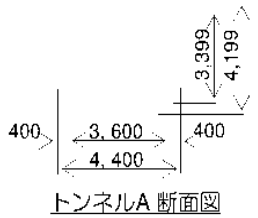
※試験前の立坑Cには採水専用のポンプが無かったため、揚水試験開始時に採水。
※立坑B：12/27のデータは、上澄み水を採取した可能性あり。

3.（1） 3号機：海水配管トレンチの概要

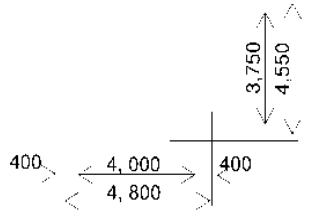


鳥瞰図

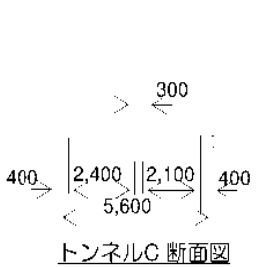
２号機海水配管トレンチとの相違点
・立坑内の砕石は無し
・Ｔ／Ｂとの連通は立坑Ｄ側のみ
（立坑Ａ側は、配管貫通部の下端がO.P.約＋4mであり、Ｔ／Ｂの水位より高い）



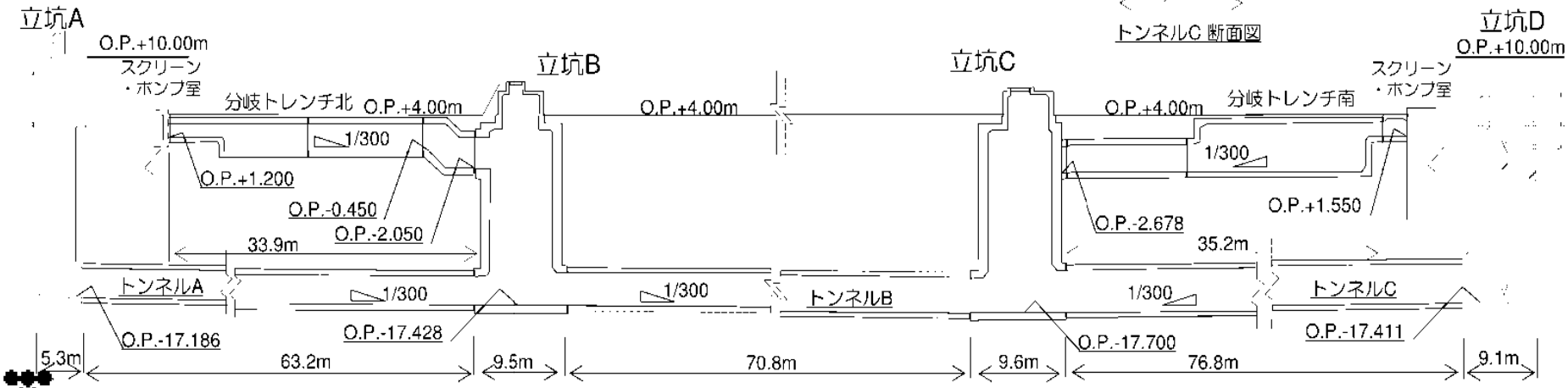
トンネルA 断面図



トンネルB 断面図



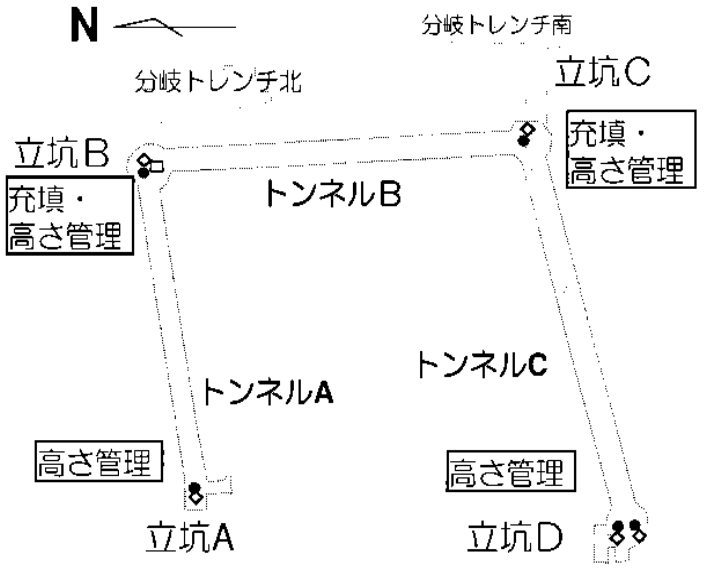
トンネルC 断面図



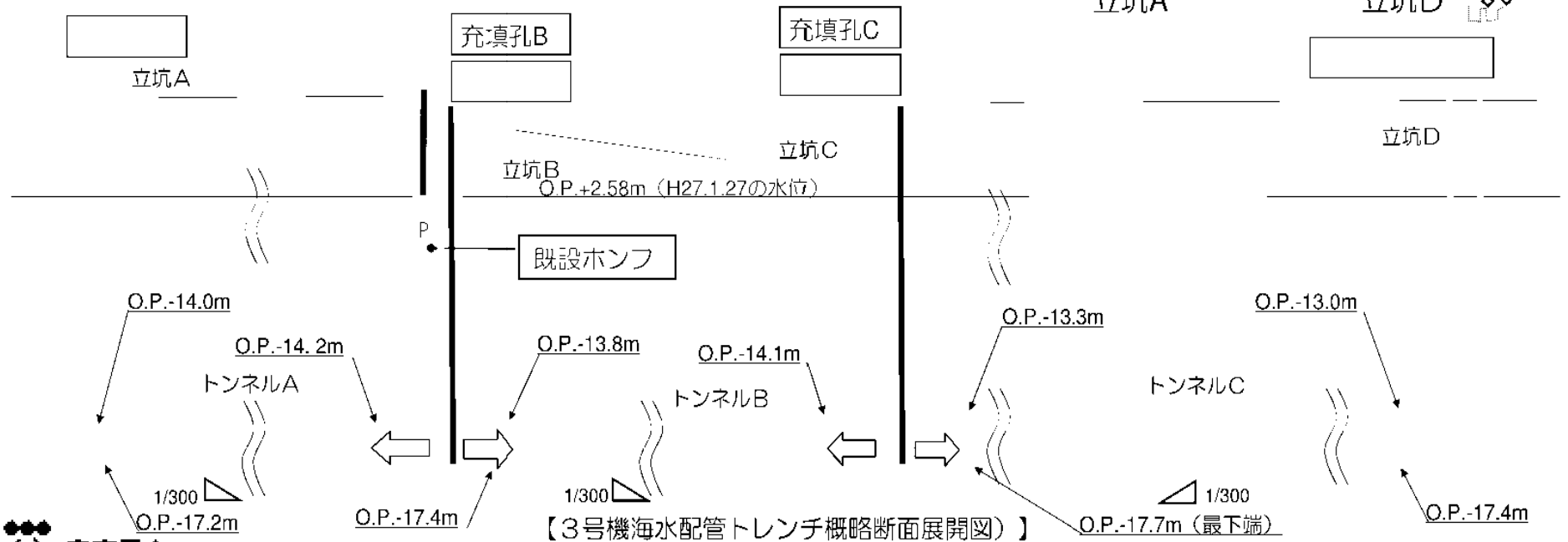
３号機海水配管トレンチ及び立坑展開図

3.(2) 3号機:海水配管トレンチ(トンネル一般部)の充填方法

トンネル一般部は、充填孔B及び充填孔Cに投入管を設置（底版または既打設面から約10cm上）し、閉塞材料を投入。これを繰り返し、天井部手前まで充填。



※図に記載の充填孔･観測孔･ポンプは設置が完了しているもの。
※図中の各充填孔･観測孔･ポンプにおいて枠で囲まれているものは、本ステップにおいて使用するもの。



【3号機海水配管トレンチ概略断面展開図）】

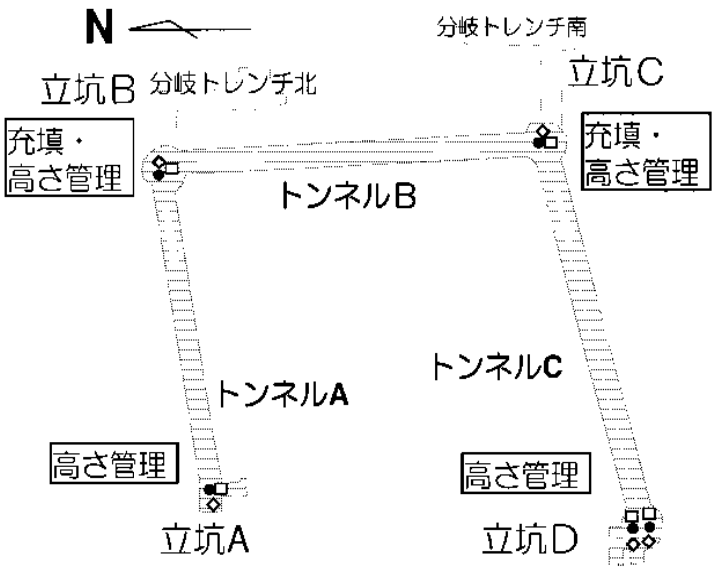
3.(3) 3号機:海水配管トレンチ(トンネル天井部①)の充填方法

充填孔Bおよび充填孔Cに投入管を設置（筒先を既打設面から約10cm上）し、閉塞材料を投入。

■充填高さは、観測孔A、B、Cにおいて、O.P.－13.8m～－13.3mとなるよう打設量を調整。

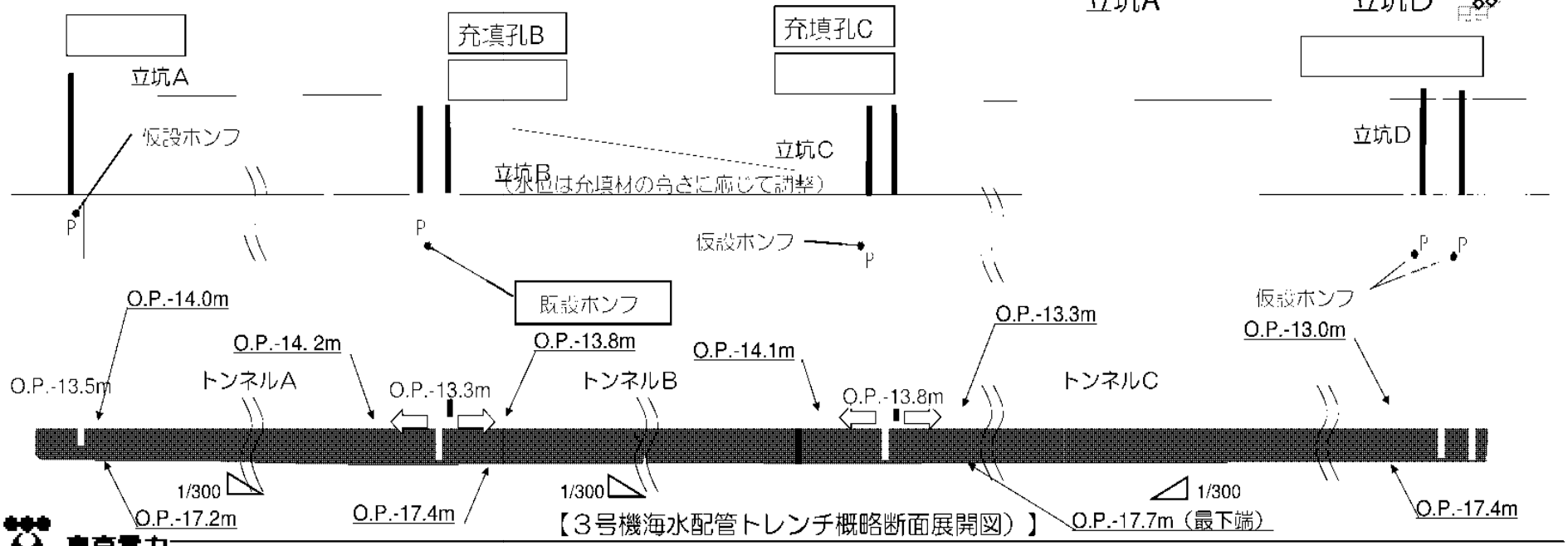
■併せて、投入側及び到達側の水位が同程度となるように管理。

（■の項目は、２号機の充填における知見を反映）



※図に記載の充填孔･観測孔･ポンプは設置が完了しているもの。

※図中の各充填孔･観測孔･ポンプにおいて枠で囲まれているものは、本ステップにおいて使用するもの



【３号機海水配管トレンチ概略断面展開図）】

充填済み

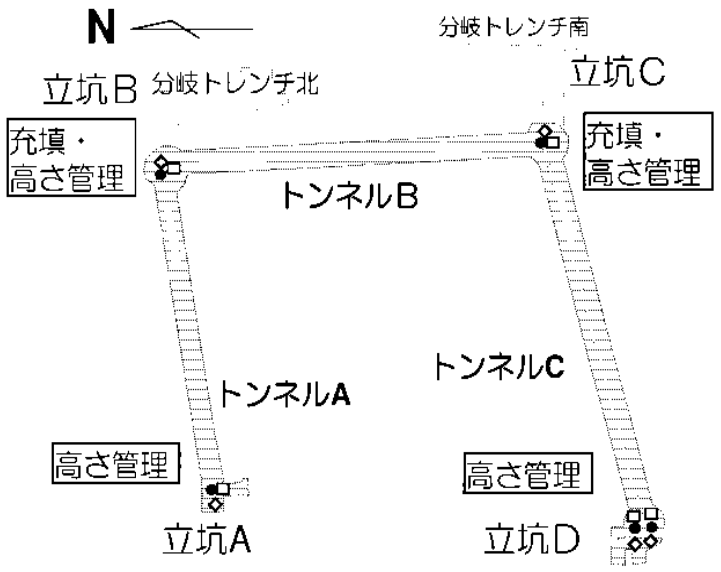
3.（4） 3号機：海水配管トレンチ（トンネル天井部②）の充填方法

充填孔Cに投入管を設置（筒先を既打設面から約10cm上）し、閉塞材料を投入。

■充填高さは、観測孔C、DにおいてO.P.－12.8m～－12.5mとなるよう打設量を調整。

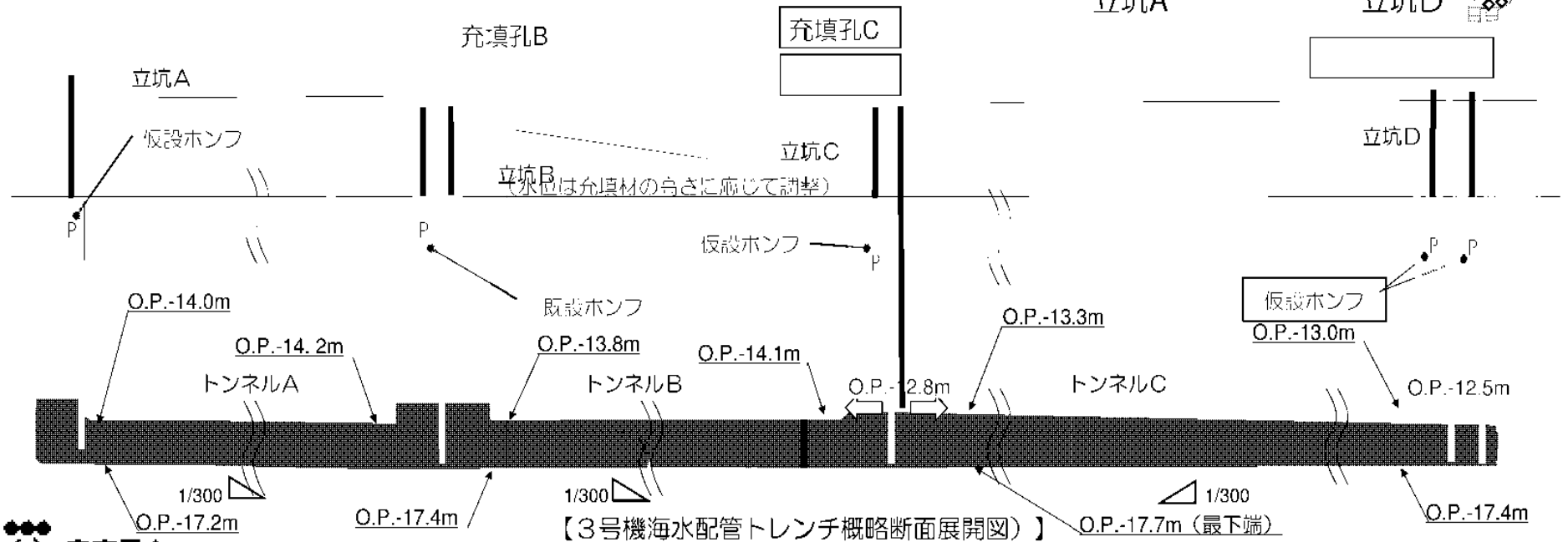
■併せて、投入側及び到達側の水位を同程度となるように管理。

（■の項目は、２号機の充填における知見を反映）



※図に記載の充填孔･観測孔･ポンプは設置が完了しているもの。

※図中の各充填孔･観測孔･ポンプにおいて枠で囲まれているものは、本ステップにおいて使用するもの



【３号機海水配管トレンチ概略断面展開図）】

充填済み

3.(5) 3号機:海水配管トレンチ(トンネル部)の充填計画、水位管理

【充填計画】

トンネル部充填にかかる準備作業は完了。充填開始日については、調整中。

トレンチ内滞留水の塩化物イオン濃度が18,000ppmと高いことから、１週間あたりの充填量を上限350m^{3}とする。

上記充填量の場合、天井部充填は３月下旬予定であるが、随時、水質確認をしながら、充填量を確定させる。

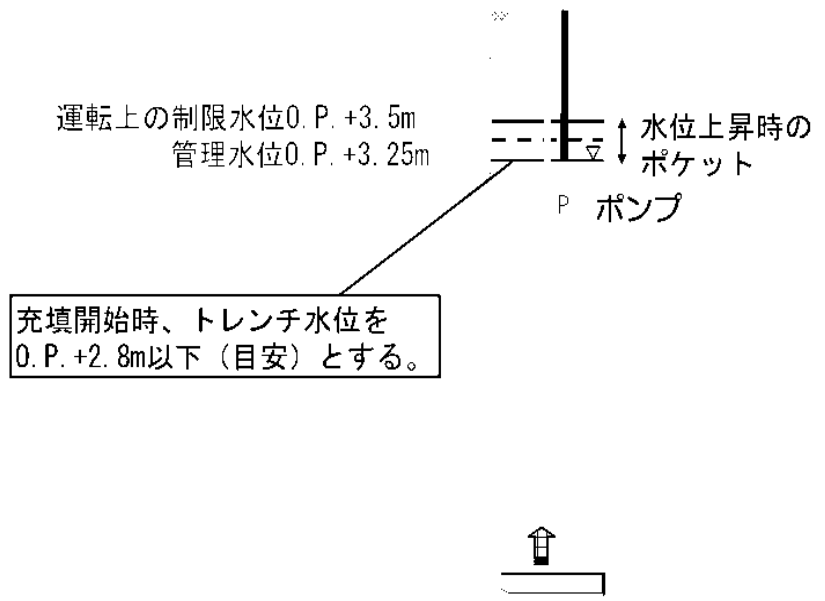
【水位管理】

運転上の制限（保安規定）であるO.P.+3.5mを超えないように下記の通りの施工サイクル及び水位管理を行う。

① 充填開始前までにトレンチ水位を、O.P.+2.8m以下を目安に低下させる。

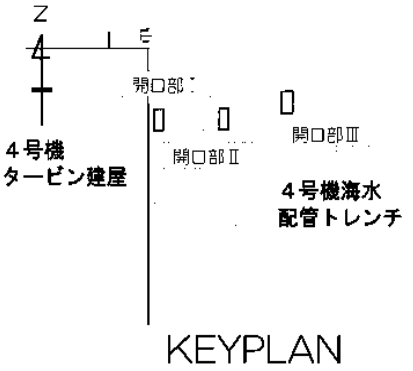
② 充填中（8:00～12:00予定）は、トレンチ水位を監視（30分毎）し、O.P.+3.0mを超え、その後、水位上昇が継続し、O.P.+3.25m を超える恐れのある場合、トレンチ移送ポンプを起動させ、トレンチ水位の低下を図る。

③ ②に引き続きトレンチ水位が上昇し、O.P.+3.25mに達した場合は、即時、充填を中断する。

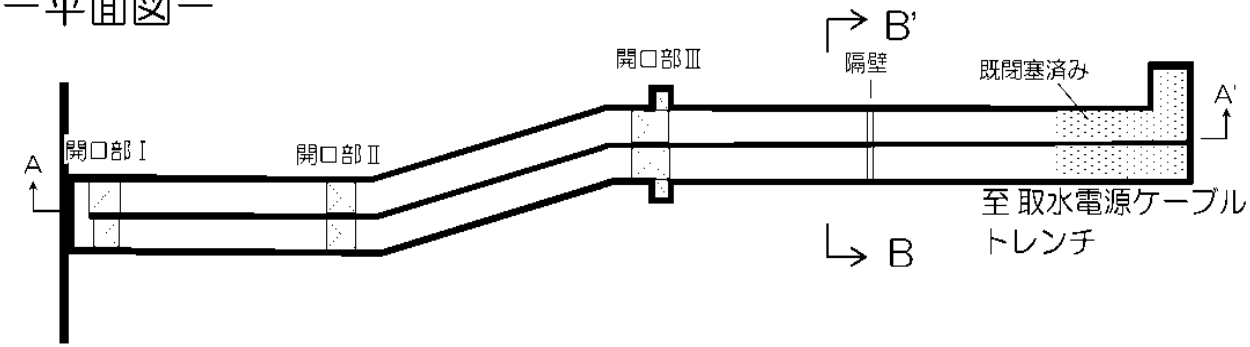


4.（1） 4号機：海水配管トレンチの構造

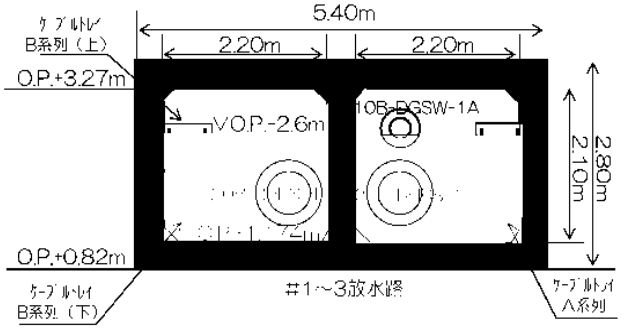
４号機海水配管トレンチの全長は約80m。トンネル部分は2.2m×2.1m×２連のボックスカルバート構造であり、開口部Ⅲの位置が最底部。
開口部Ⅰ・Ⅱ・Ⅲともに、２連ダクト部分より上はひとつの断面になっている。
＃１～３放水路を跨ぐ部分には隔壁があり、東西で仕切られている。
隔壁より東側の箇所（取水電源ケーブルトレンチ部分含む）は既に一部閉塞済み。
なお、トレンチ内の滞留水は約700m³と推定。



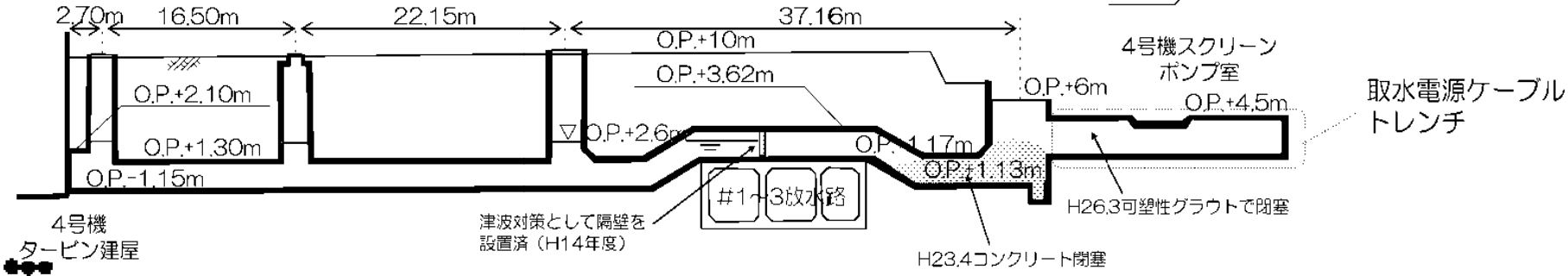
－平面図－



－B-B'断面図－

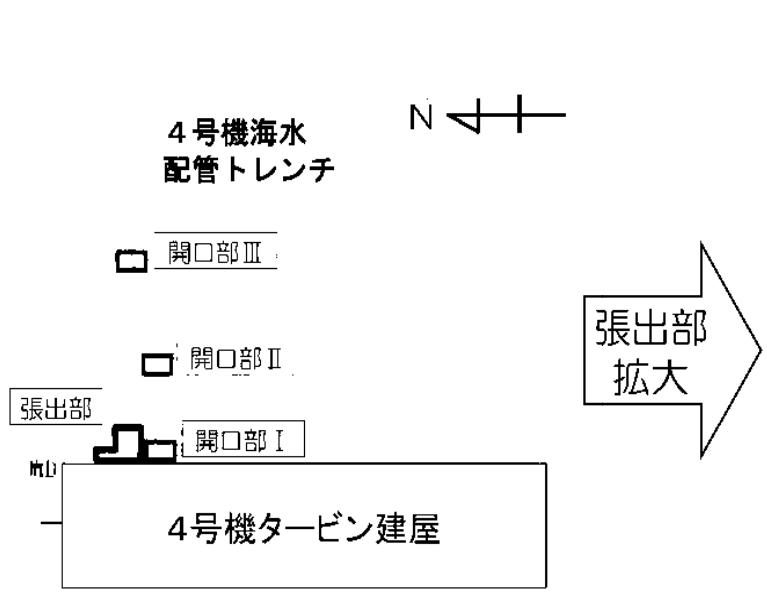


－A-A'断面図－

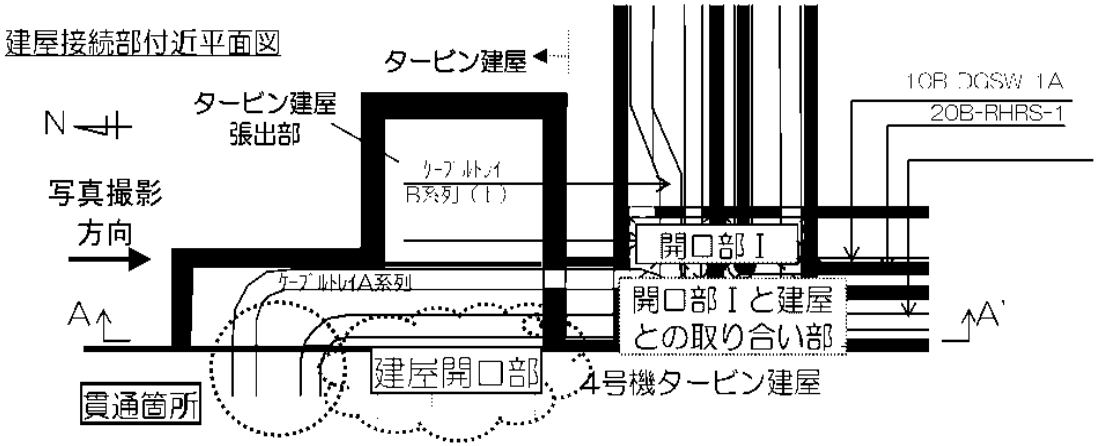


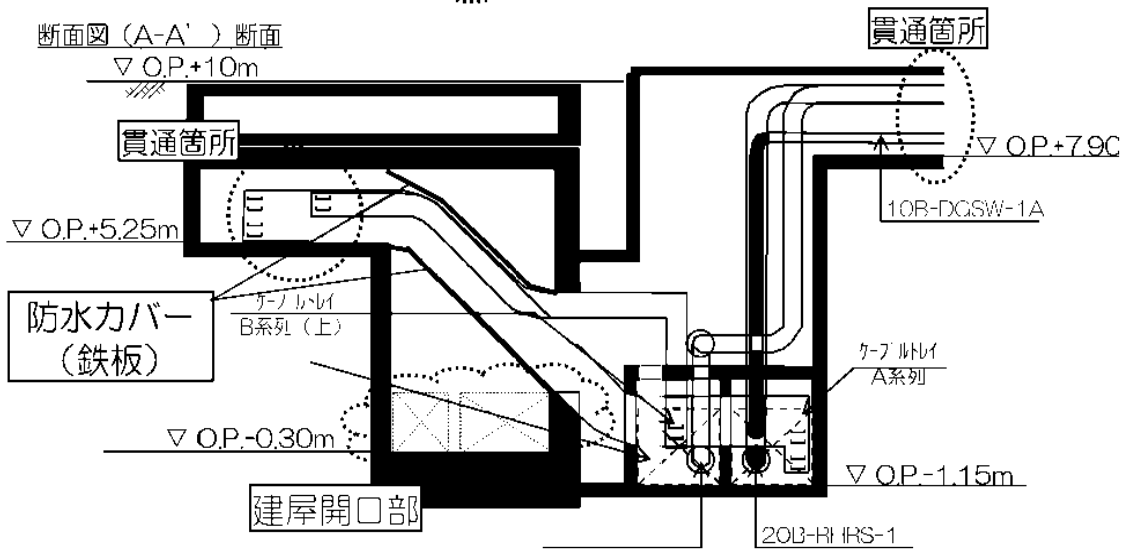
4.(2) 4号機:建屋・トレンチ接続部の状況

■赤枠で示す箇所（T／B地下）に開口があり、トレンチに収納されていないSW配管等が設置されていることを確認。



張出部
拡大

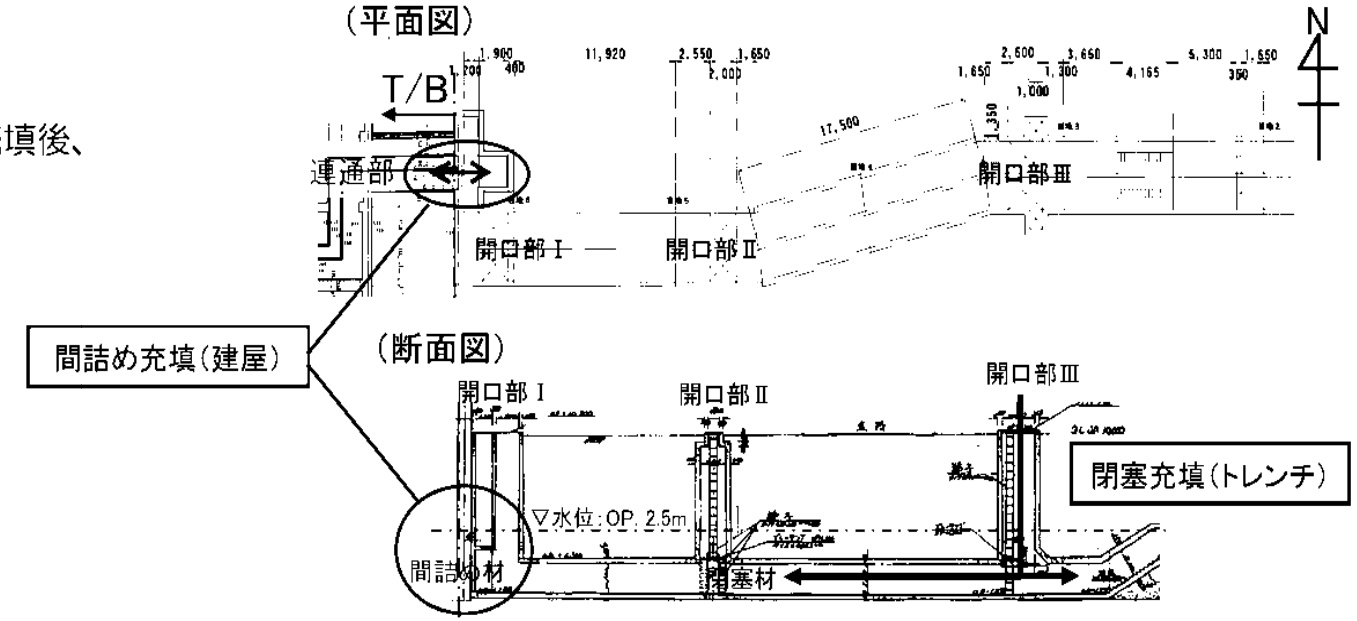




4.(3) 4号機:建屋・トレンチの間詰め・閉塞(案)

■建屋側遮水
&開口部Ⅰ－Ⅲ間閉塞案

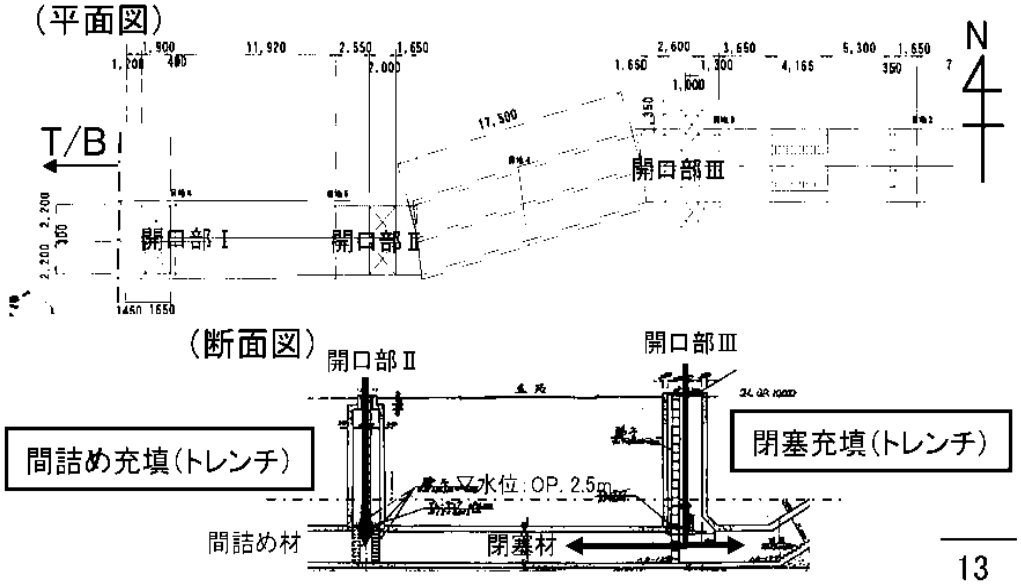
T/B張出部付近にて間詰め充填後、開口部Ⅰ－Ⅲ間を閉塞する。



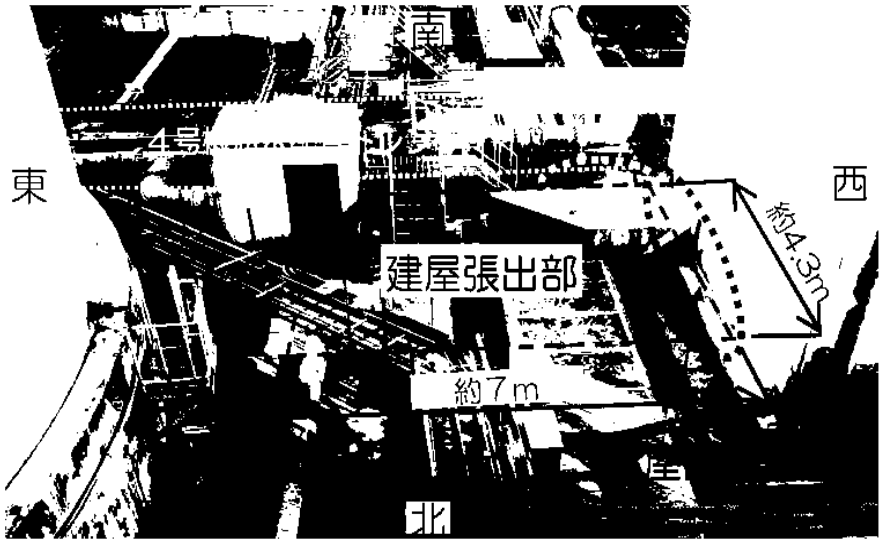
■開口部Ⅱ－Ⅲ間閉塞案

開口部Ⅱにおいて間詰め充填後、開口部Ⅱ－Ⅲ間を閉塞する。

開口部Ⅱ－Ⅲ間の閉塞後、Ⅰ－Ⅱ間の閉塞を行うが、その成立性も併せて確認する必要あり。



4.(4) 4号機:建屋・トレンチ接続部の調査内容(1/2)



事前調査①

建屋外壁部・床スラブにコア削孔等、または外壁部のガラリを撤去し水中カメラ等により、建屋開口部の内部確認を行う

(東から撮影)

(北東から撮影)

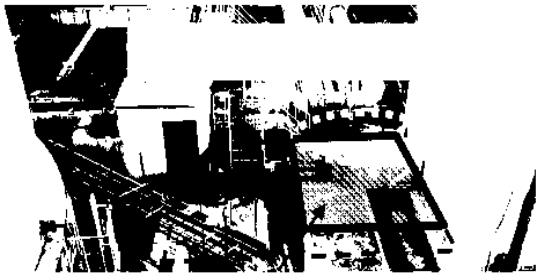
事前調査②

既設設備と干渉しない箇所において、張出部のコンクリート天端にコア削孔を行い水中カメラ等により、張出部の内部確認を行う

(北から撮影)

事前調査③

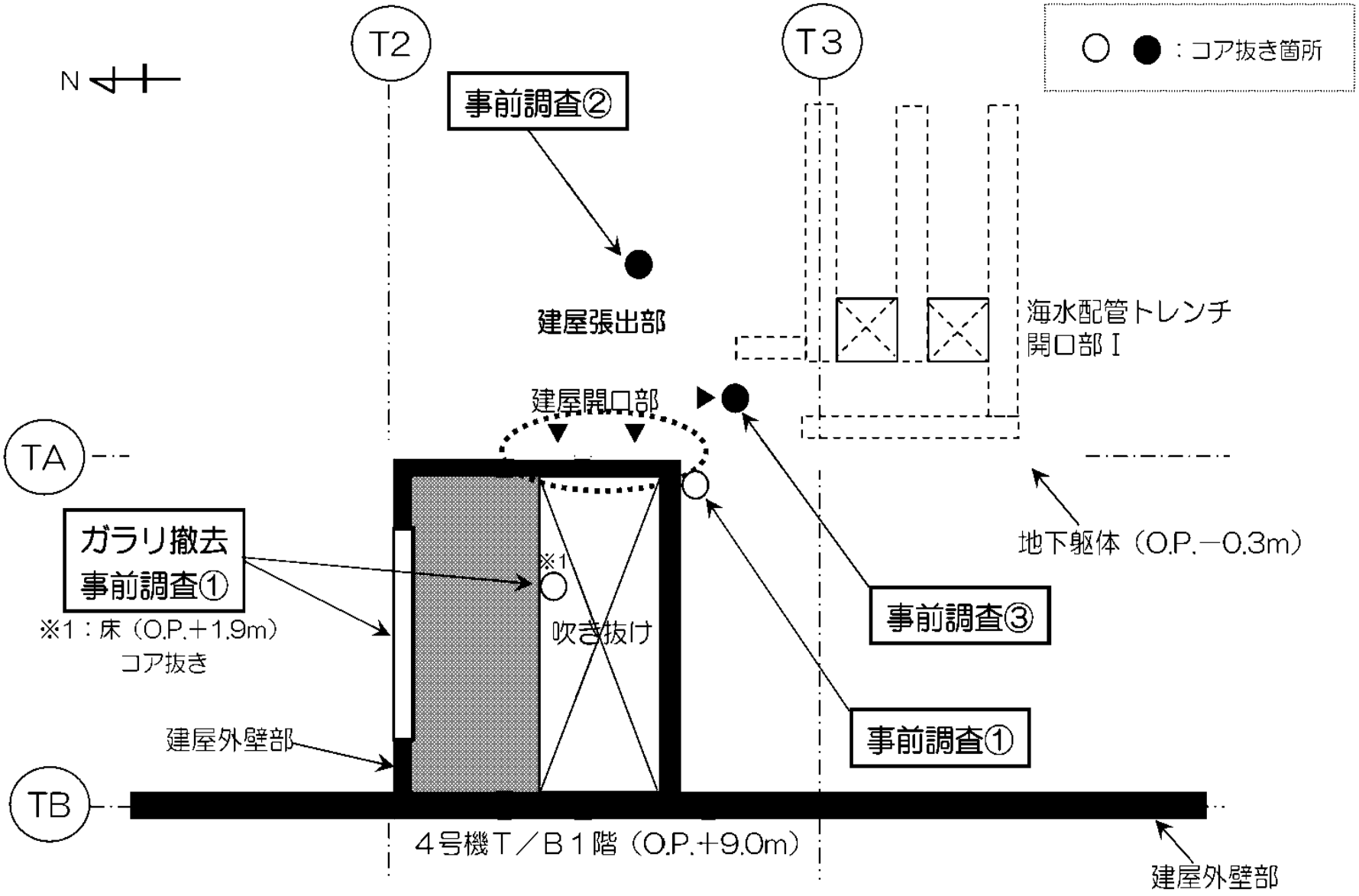
張出部のコンクリート天端にコア削孔を行い水中カメラ等により、建屋・トレンチ接続部の内部確認を行う



設備撤去後、張出部・コア削孔

(北から撮影)

4.(5) 4号機:建屋・トレンチ接続部の調査内容(2/2)

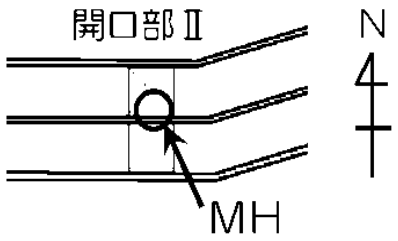


4号機T／B平面図

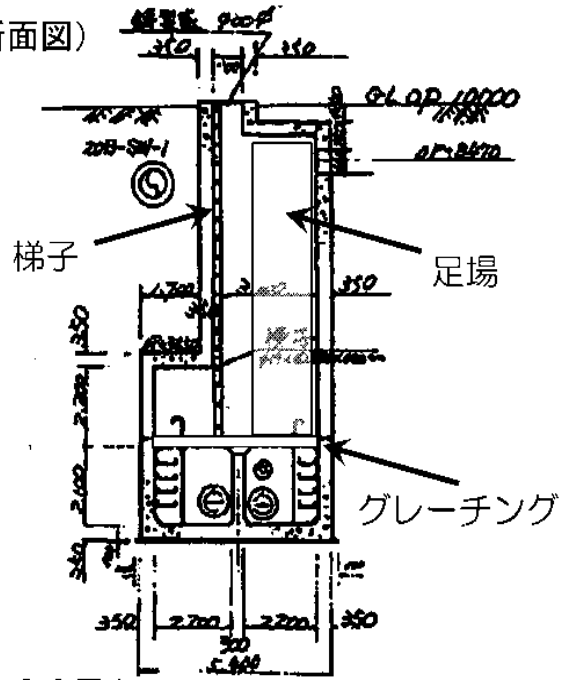
4.（6） 4号機:トレンチ開口部の調査状況

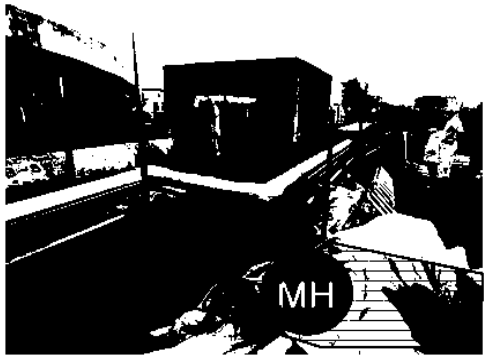
開口部Ⅰは、カメラ調査を継続中。
開口部Ⅱは、支障物のうち一部グレーチングの撤去完了。空間線量率は、開口部ⅡのMH直上で約0.35mSv/h。
開口部Ⅱ及びⅢは、材料投入管を底部まで降ろすことができるか確認中。

（平面図）



（断面図）





開口部Ⅱ　地上部状況
（着手前）

開口部Ⅱ　MH開口状況

MH内部の状況

カメラ調査状況

汚染水全量処理について

平成２７年１月２９日
東京電力株式会社

東京電力
TEPCO

1-１.汚染水処理状況

平成26年12月（12/19現地調整会議）の水処理設備の想定処理量（H27.1～）

多核種除去設備（既設＋増設＋高性能）：約1,960m³/日

その他浄化処理設備：約1,800m³/日

平成27年１月の水処理設備の想定処理量（実績に基づく見通し）

多核種除去設備（既設＋増設＋高性能）：約1,260m³/日

今後、装置改造や運用方法の見直しを行い、稼働率の向上および増容量を目指す。

その他浄化処理設備：約800m³/日

約800 m³/日は1月の平均であり、１月途中から導入されたRO濃縮水処理設備や第二セシウム吸着装置が1月当初から導入されたと仮定すると約1,260m³/日と想定できる。

また、モバイル型ストロンチウム除去装置やセシウム吸着装置の余剰能力の有効活用など、今後追加対策による更なる処理能力の向上が見込める。

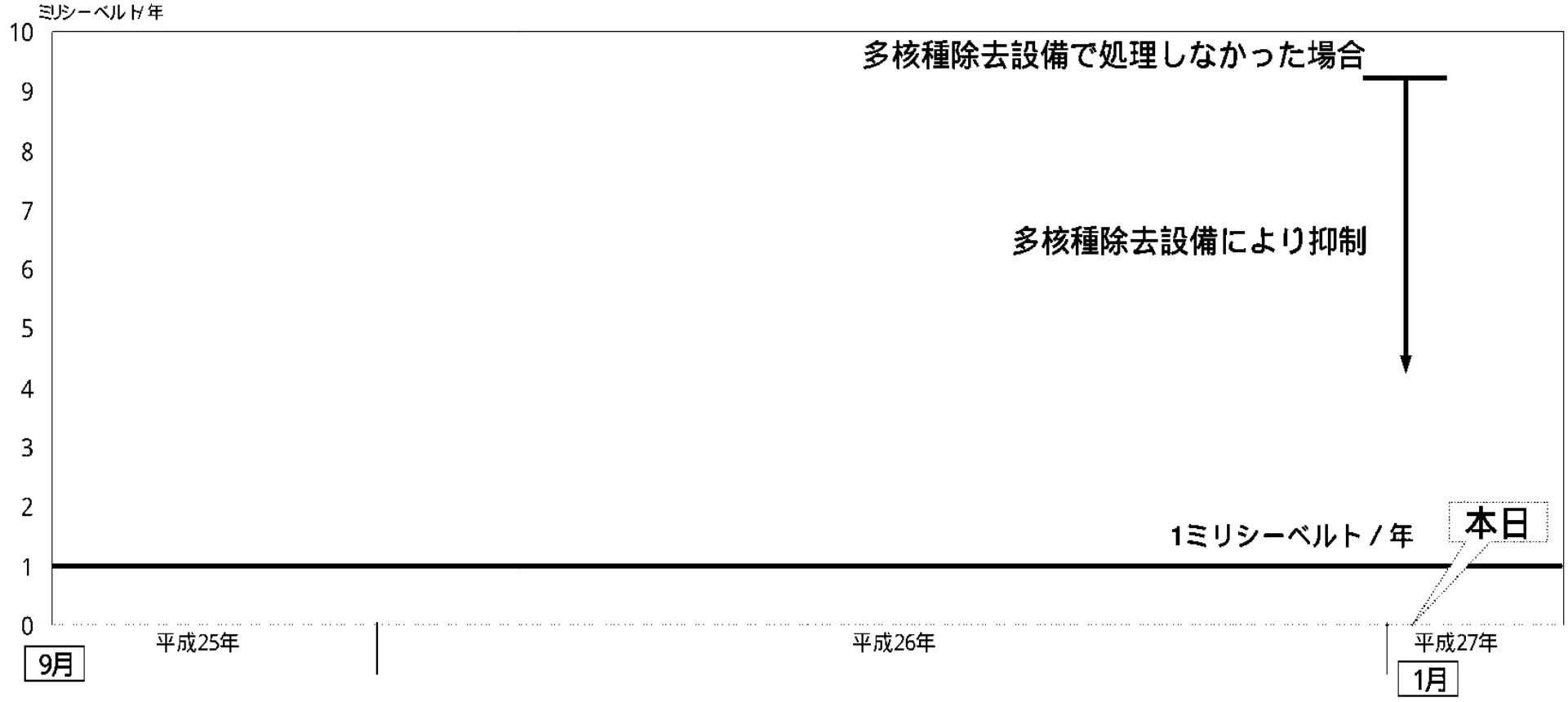
1 - 2 .汚染水処理状況

- 年度内の汚染水全量処理は難しい見通し。
- 多核種除去設備は当初想定していた稼働率到達が技術的に困難。現時点のペースで処理した場合、処理完了は5月中になる見通し。具体的な完了時期は3月中旬までに明らかにする。
- 引き続き、更なる処理能力の向上を図り、一日も早いリスク低減を目指す。

東京電力

2.タンク由来の敷地境界実効線量について(規制庁指示事項)

- 多核種除去設備で汚染水を処理しなかった場合、タンクに起因する敷地境界実効線量は約9ミリシーベルト/年のところ、多核種除去設備の稼働により、約3.5ミリシーベルト以下に抑制してきた。
- 今後、多核種除去設備(既設・増設・高性能)や重層的なリスク低減策(モバイル型ストロンチウム除去設備等)による汚染水の処理により、3月末の1ミリシーベルト/年の達成に向けて全力を尽くす。



地下水バイパスの運用状況について

平成27年１月29日

東京電力株式会社

東京電力
TEPCO

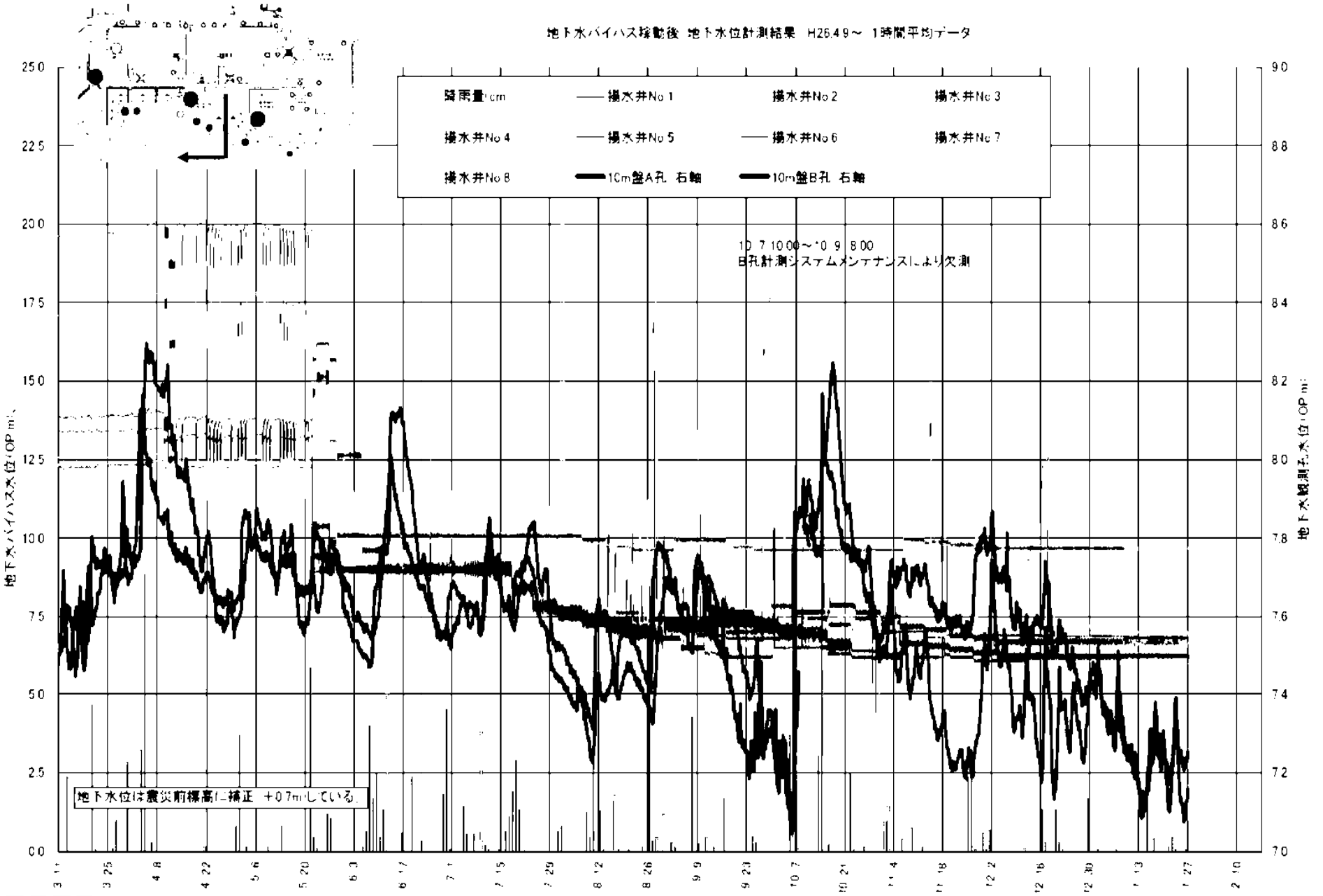
地下水バイパスの運用状況について

地下水バイパスは、5月21日に排水を開始し、45回目の排水を完了
排水量は、合計 73,806m^3

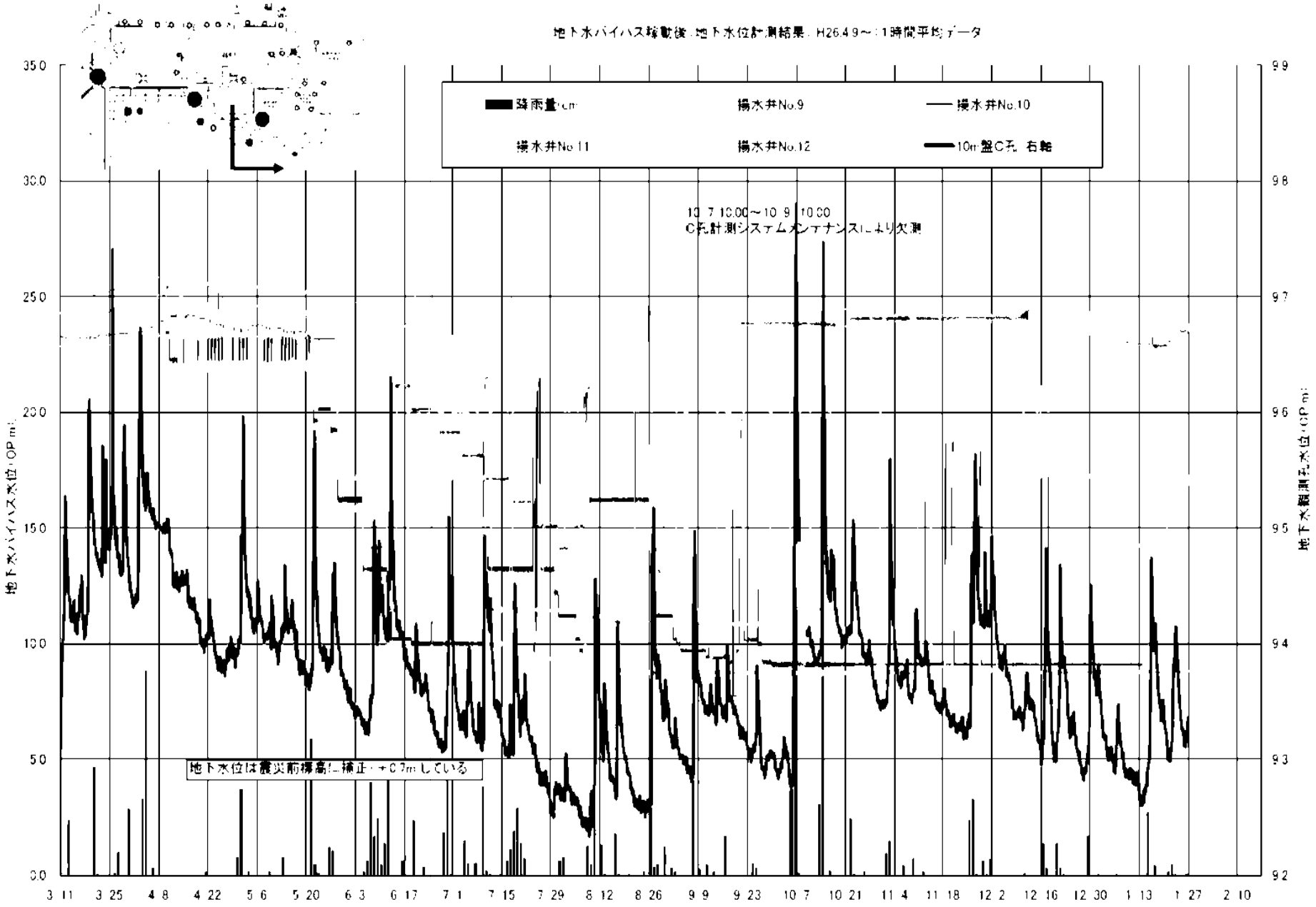
採水日	12月17日		12月23日		12月30日		1月6日		1月12日		運用目標	※1 告示濃度限度	WHO飲料水水質ガイドライン
分析機関	東京電力	第三者機関	東京電力	第三者機関	東京電力	第三者機関	東京電力	第三者機関	東京電力	第三者機関			
セシウム134 (単位 :Bq/L)	ND(0.67)	ND(0.67)	ND(0.63)	ND(0.86)	ND(0.70)	ND(0.76)	ND(0.56)	ND(0.71)	ND(0.76)	ND(0.63)	1	60	10
セシウム137 (単位 :Bq/L)	ND(0.50)	ND(0.67)	ND(0.64)	ND(0.76)	ND(0.59)	ND(0.61)	ND(0.78)	ND(0.69)	ND(0.59)	ND(0.65)	1	90	10
その他ガンマ核種 (単位 :Bq/L)	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	※2 検出されないこと		
全ベータ (単位 :Bq/L)	ND(0.78)	ND(0.52)	ND(0.85)	ND(0.51)	ND(0.88)	ND(0.53)	ND(0.90)	ND(0.58)	ND(0.83)	ND(0.49)	5 (1)(注)		
トリチウム (単位 :Bq/L)	110	110	130	120	140	140	140	150	170	160	1,500	60,000	10,000
排水日	12月29日		1月5日		1月11日		1月17日		1月23日				
排水量 (単位 :m3)	1,789		1,879		2,120		2,120		1,850				

＊第三者機関 :日本分析センター
＊NDは検出限界値未満を表し、( )内に検出限界値を示す。
(注) 運用目標の全ベータについては、10日に1回程度の分析では、検出限界値を 1 Bq/Lに下げて実施。
※1 東京電力株式会社福島第一原子力発電所原子炉施設の保安及び特定核燃料物質の防護に関する規則に定める告示濃度限度 (別表第 2第六欄 :周辺監視区域外の水中の濃度限度 [本表では、Bq/cm^{3}の表記をBq/Lに換算した値を記載])
※2 セシウム134,セシウム137の検出限界値 「1Bq/L未満」を確認する測定にて検出されないこと(天然核種を除く)。

揚水井稼働実績（揚水井Ｎｏ．１～８）

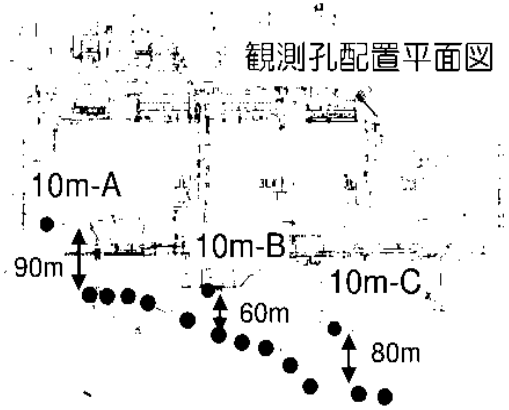


揚水井稼働実績（揚水井Ｎｏ．９～１２）



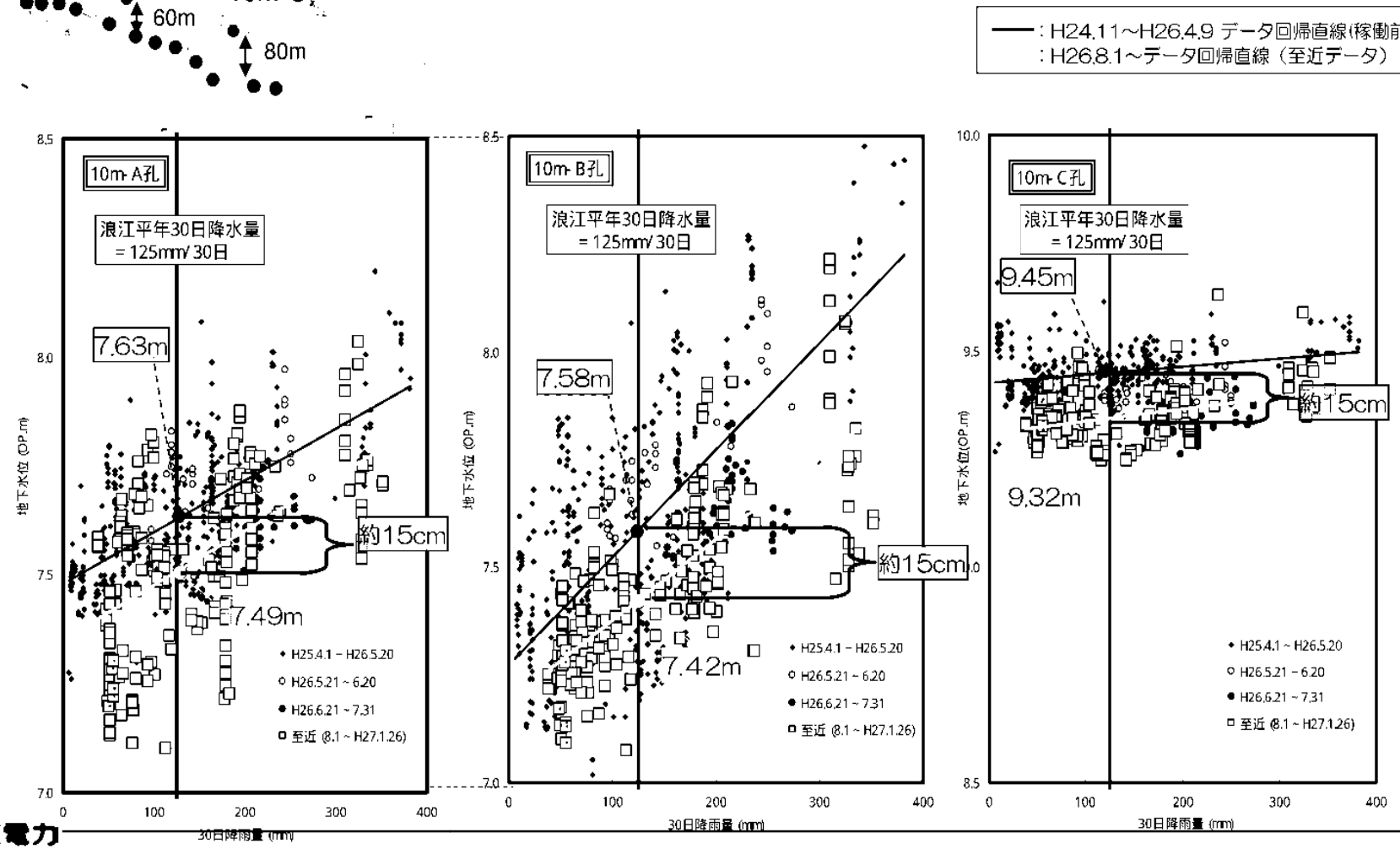
地下水バイパス稼働後における10m盤観測孔単回帰分析結果（累計雨量30日）

H27. 1.26現在



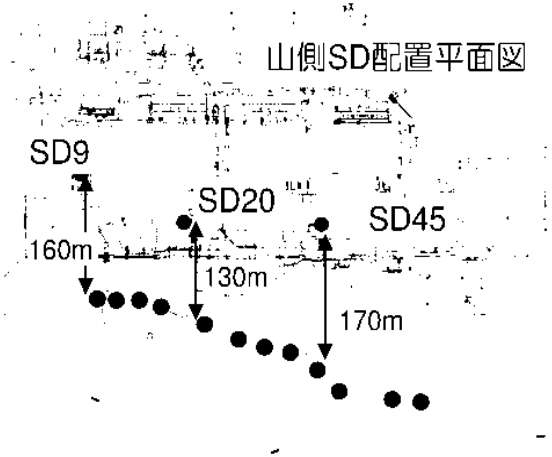
10m盤観測孔は１～２ヶ月累計雨量との相関が高いことから、30日累計雨量で地下水バイパス稼働の影響を評価した。

地下水バイパス稼働後のA～C孔全ての観測孔の地下水位において平均して10～１５cm程度の地下水位の低下が認められる。



地下水バイパス稼働後における山側SD地下水位評価結果（累計雨量60日）

H27. 1.26現在

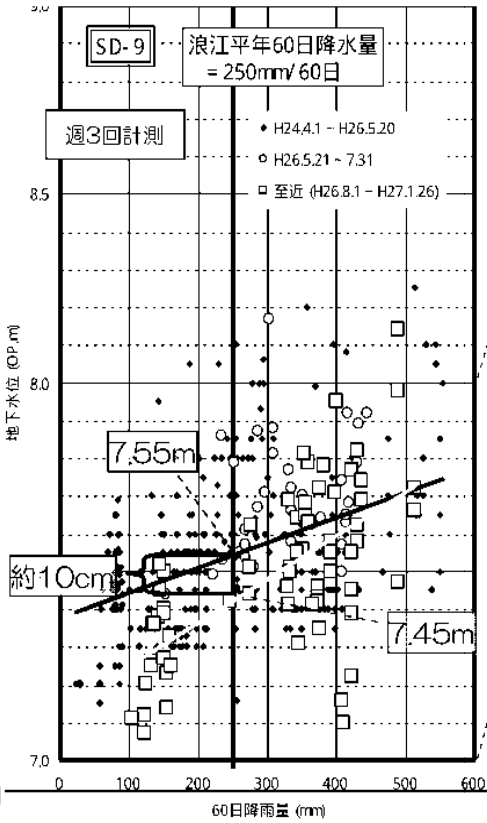


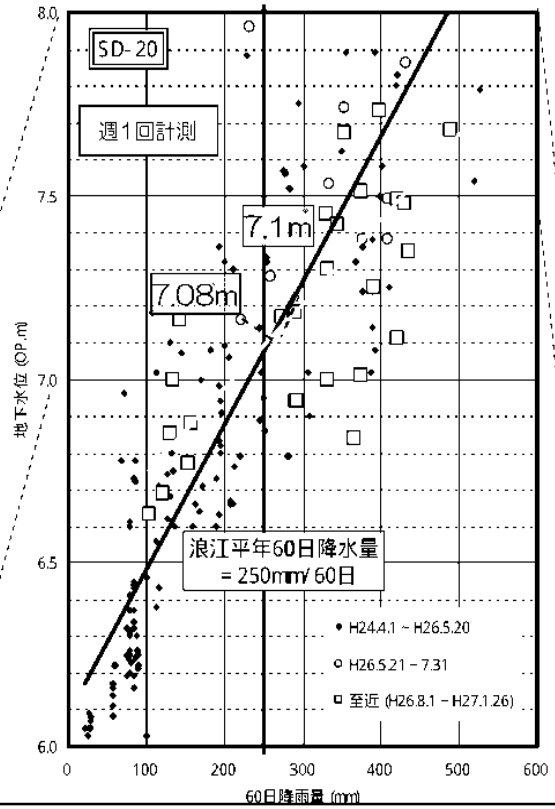
SDの地下水位は２ヶ月累計雨量との相関が高いことから、60日累計雨量で地下水バイパス稼働の影響を評価した。

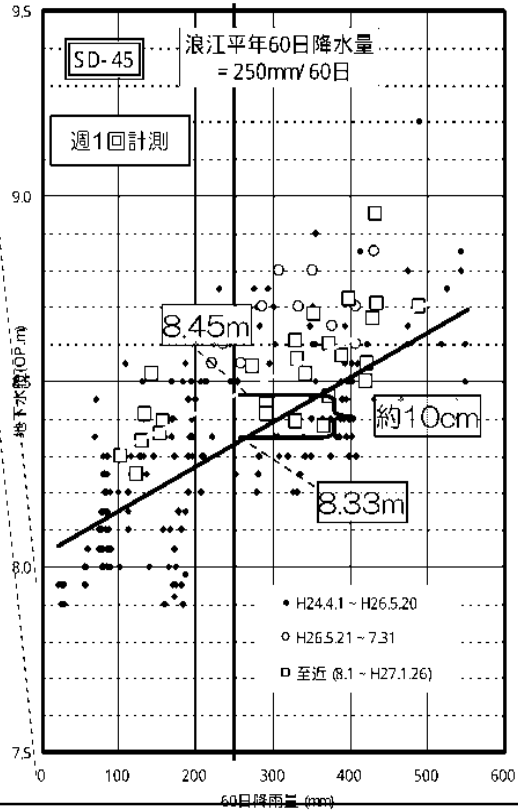
H26.8.1以降のデータが蓄積されてきたことから、回帰直線による比較を行った。

その結果、SD9においては約10cmの水位低下と評価され、SD20では同程度、SD45では、約10cm上昇していると評価された。

：H24.4～H26.4.9 データ回帰直線(稼働前)
：H26.8.1～データ回帰直線（至近データ）







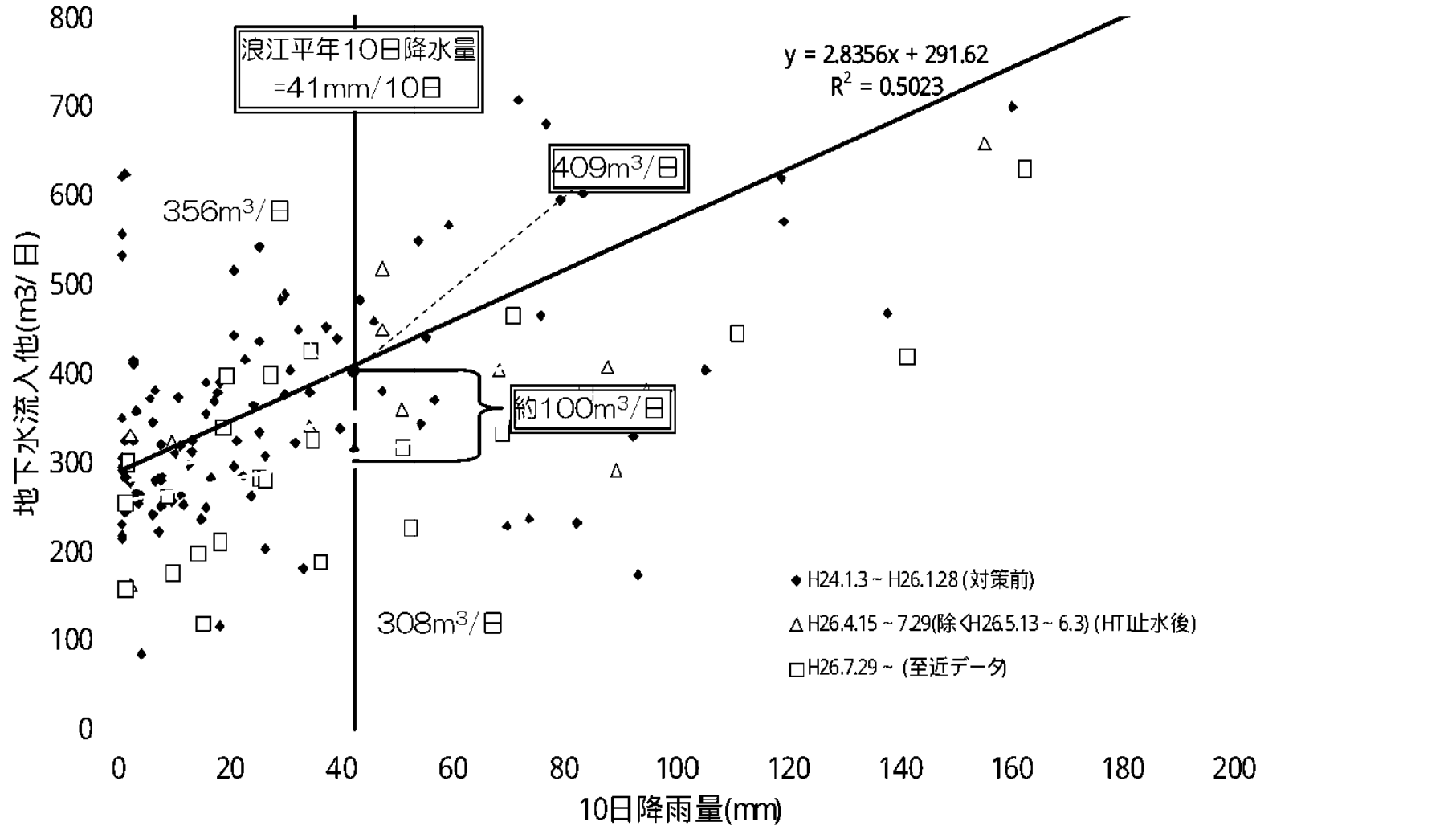
地下水バイパス稼働後における建屋流入量評価結果（累計雨量10日）

H27. 1. 22現在

雨量累計期間　集計日7:00迄の10日間

建屋への地下水流入量は１０日累計雨量との相関が高いことから、10日累計雨量で地下水バイパス稼働の影響を評価した。

高温焼却炉建屋（以下、HTI建屋）止水に加え、地下水バイパスの稼動により合計100m³/日程度の建屋流入量の抑制が認められる。

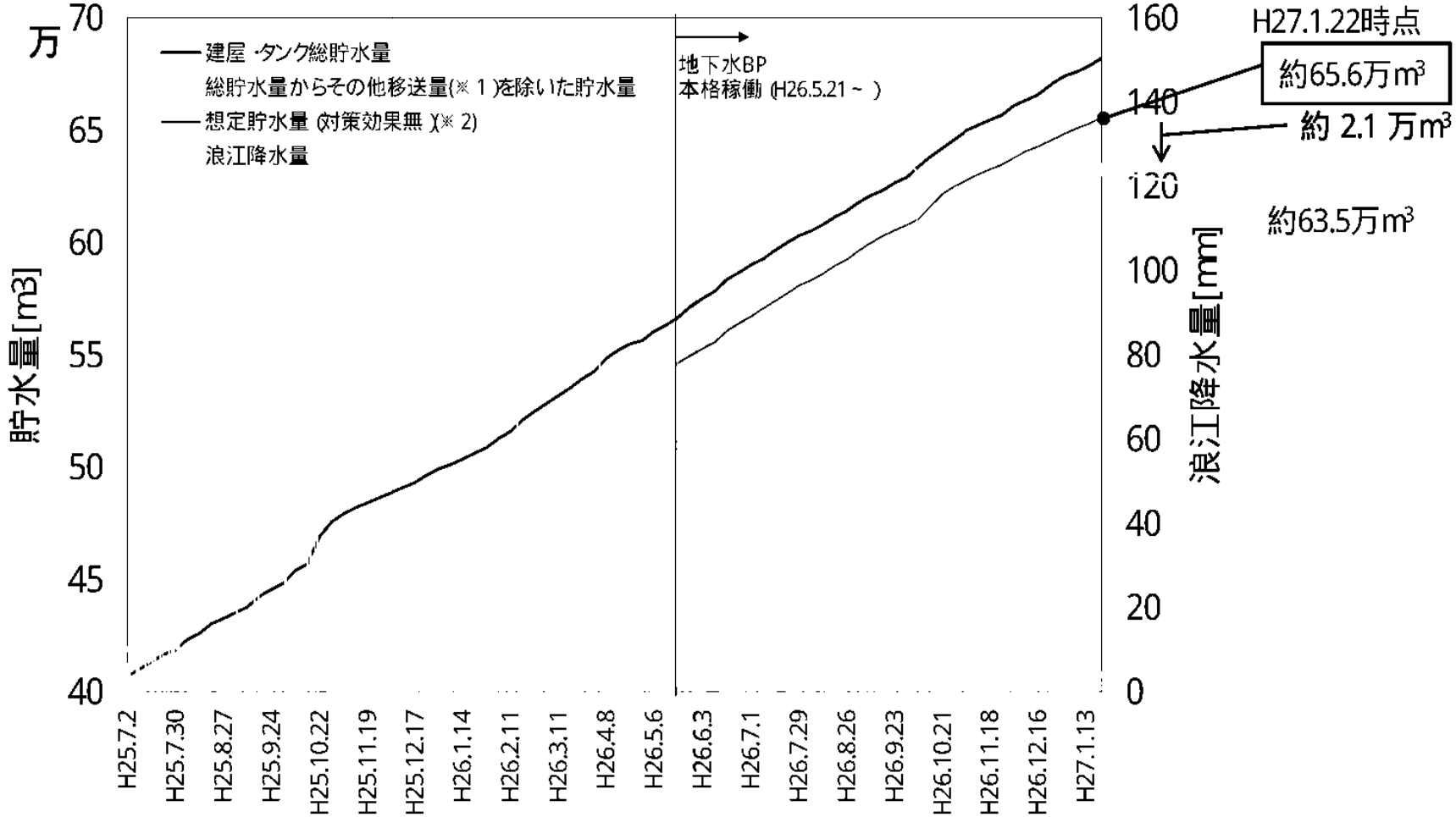


地下水バイパス稼働等による流入量抑制効果

地下水BP本格稼働(H26.5.21以降)も対策前（H24.1～H26.1）と同様の流入が継続した場合の貯水量を想定。

H26年7月頃より想定貯水量と実績貯水量に乖離が確認され始めている。

想定貯水量と実績貯水量の比較から、HTI建屋止水に加え地下水バイパスの稼動により、これまでの累計で約2.1万m^3（1,000m^3タンク21基分）の流入抑制効果があったと評価。



※１：ウェルポイントからの汲み上げ、多核種除去設備薬液注入、トレンチへの氷投入

※２：H26.5.21以降の流入量を対策前の回帰式（下記）にて日々流入したと仮定。

[流入量]＝2.8356×[10日累計雨量]＋291.62

平成27年1月29日

東京電力株式会社

Ｈ４・Ｈ６エリアタンク漏えいによる汚染の影響調査

①追加ボーリング観測孔の放射性物質濃度推移

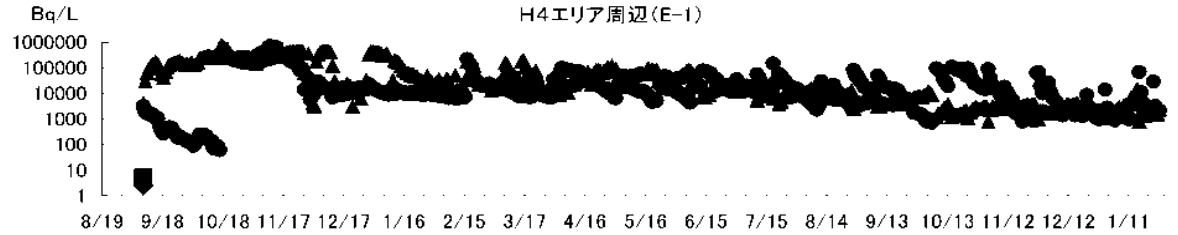
②地下水バイパス調査孔・揚水井の放射性物質濃度推移

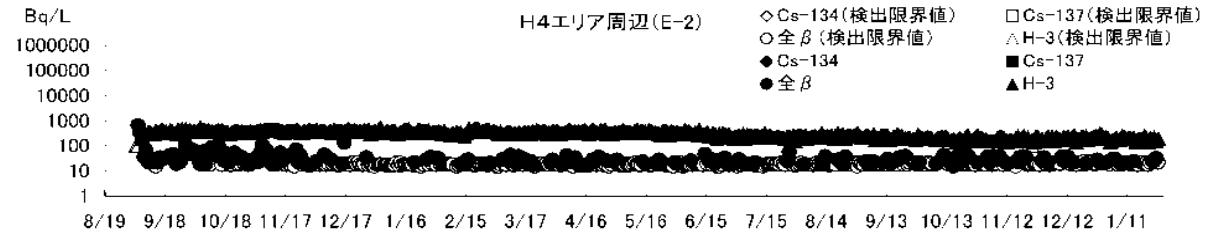
③排水路の放射性物質濃度推移

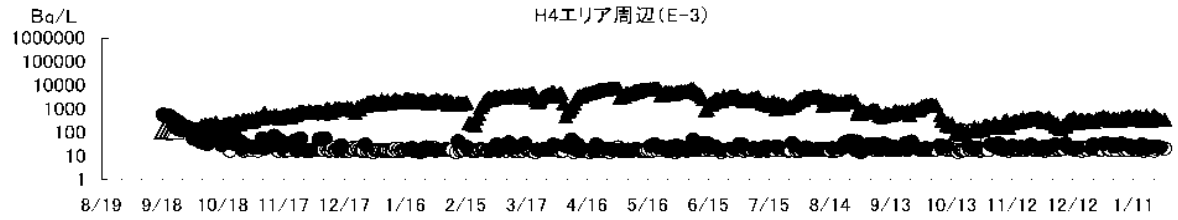
④海水の放射性物質濃度推移

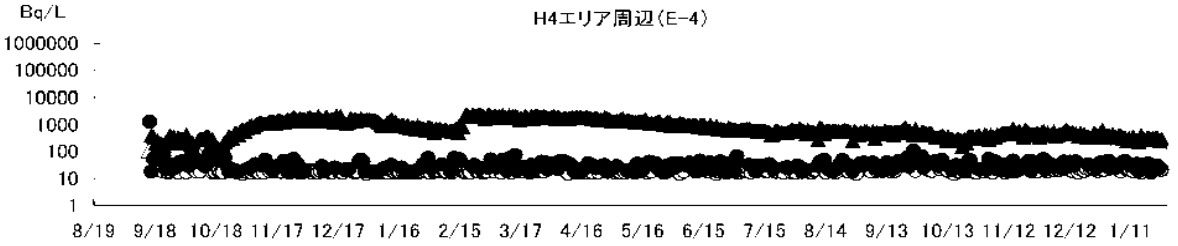
サンプリング箇所

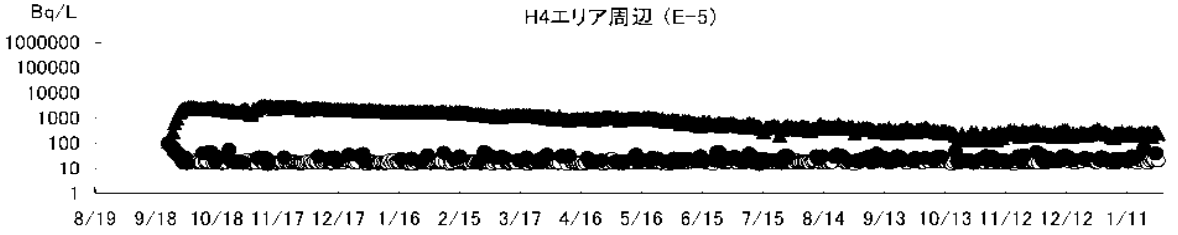
①追加ボーリング観測孔の放射性物質濃度推移（1／3）

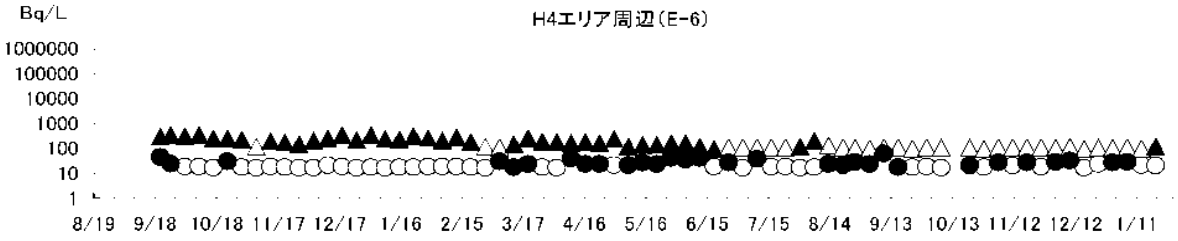


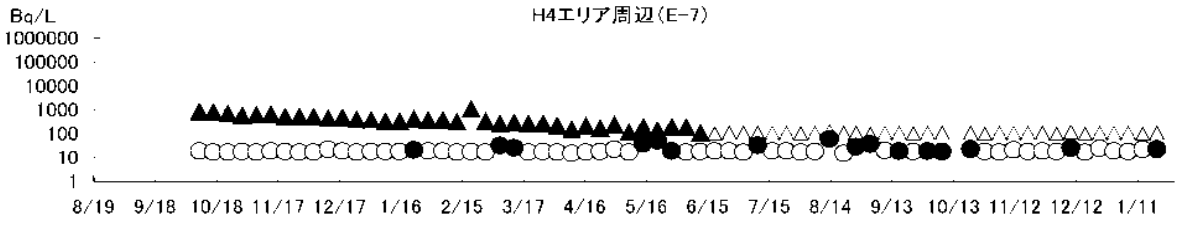




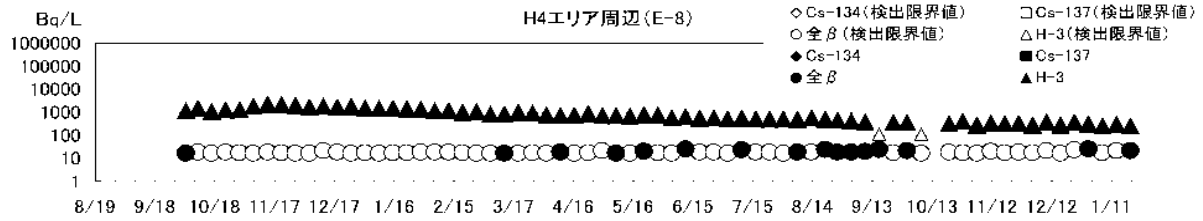


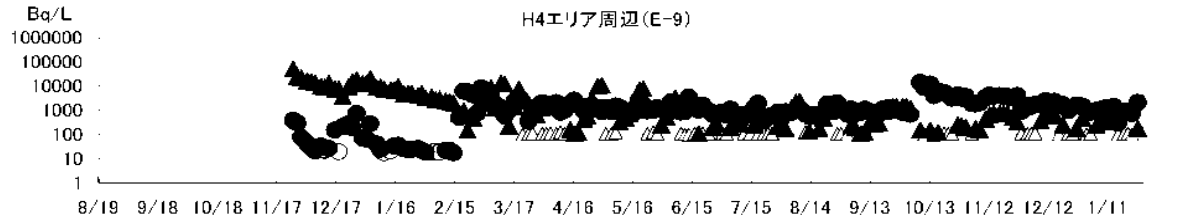


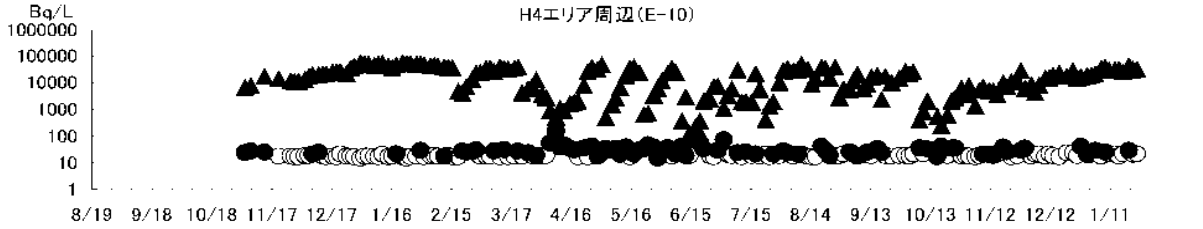


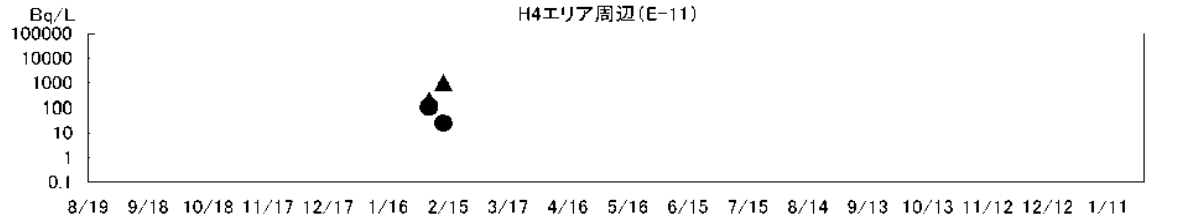


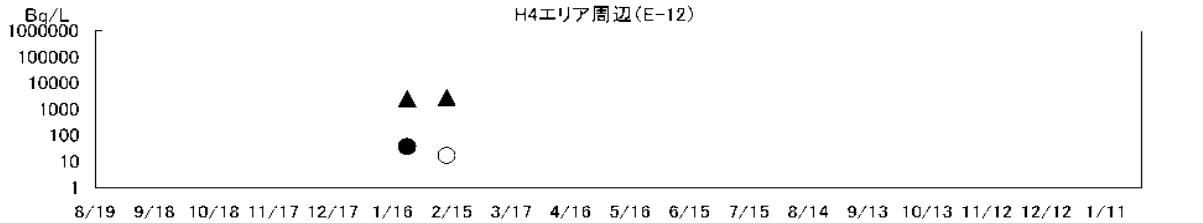
①追加ボーリング調査孔の放射性物質濃度推移（2／3）

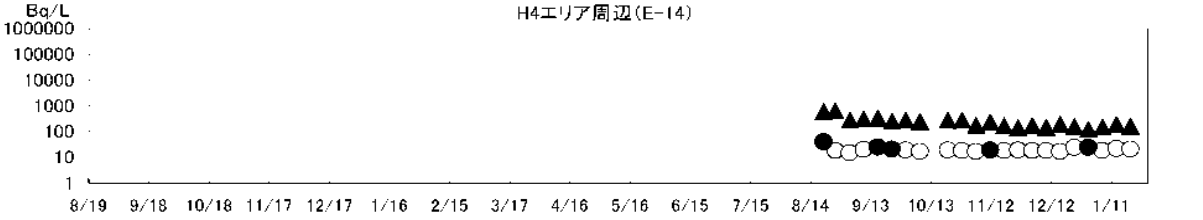




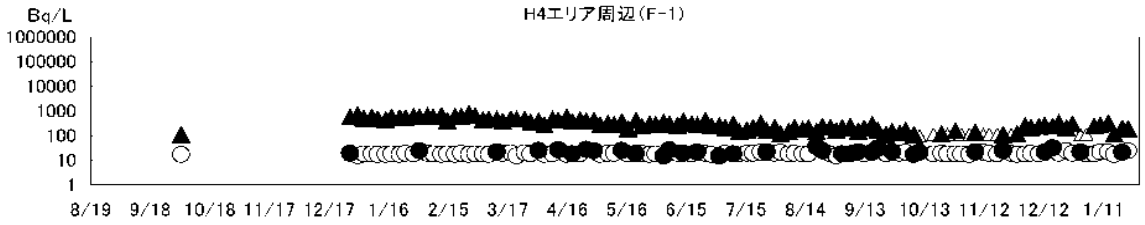


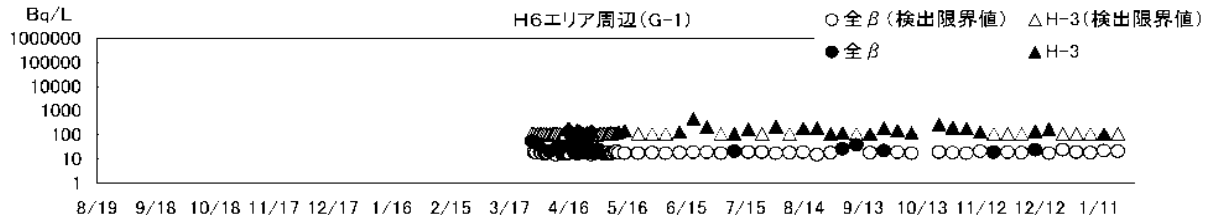


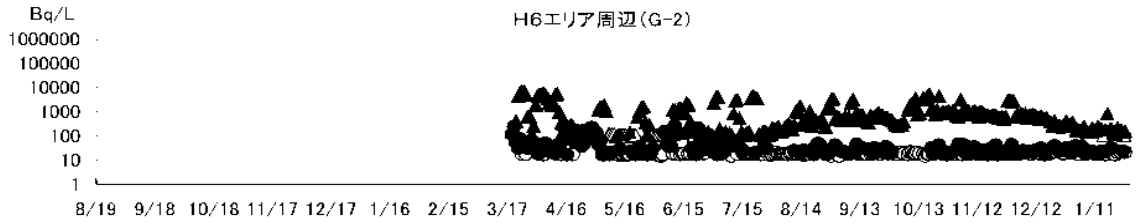


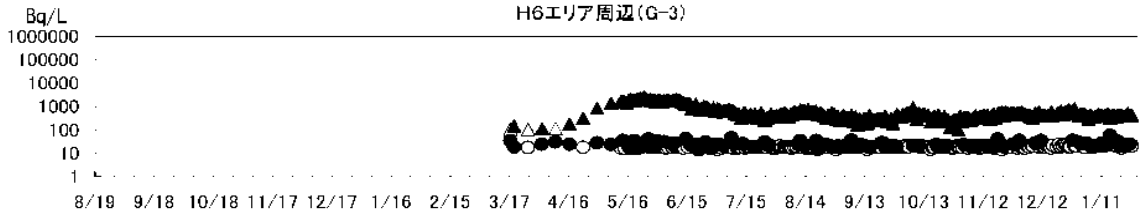


①追加ボーリング観測孔の放射性物質濃度推移（3／3）



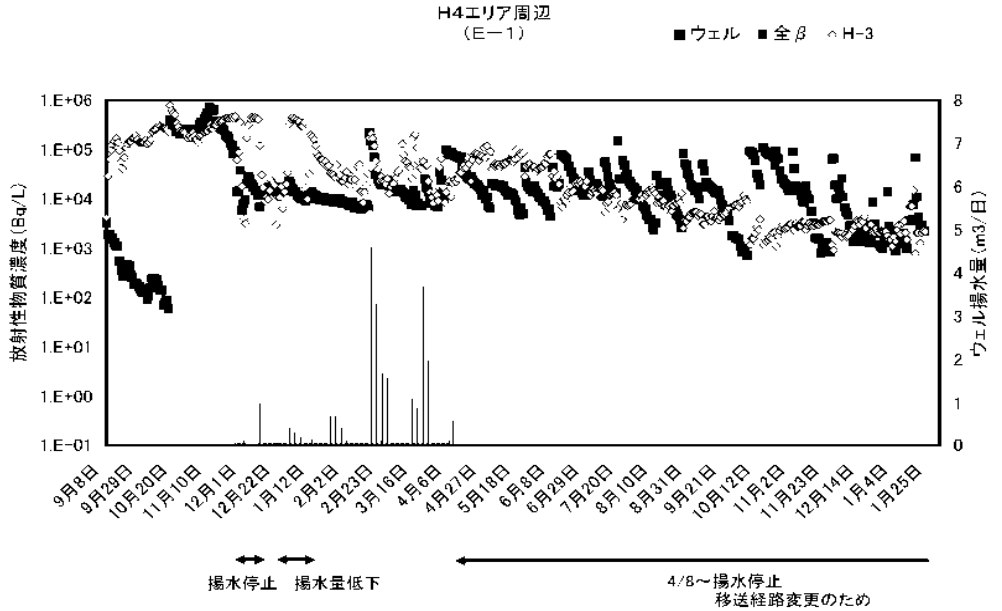


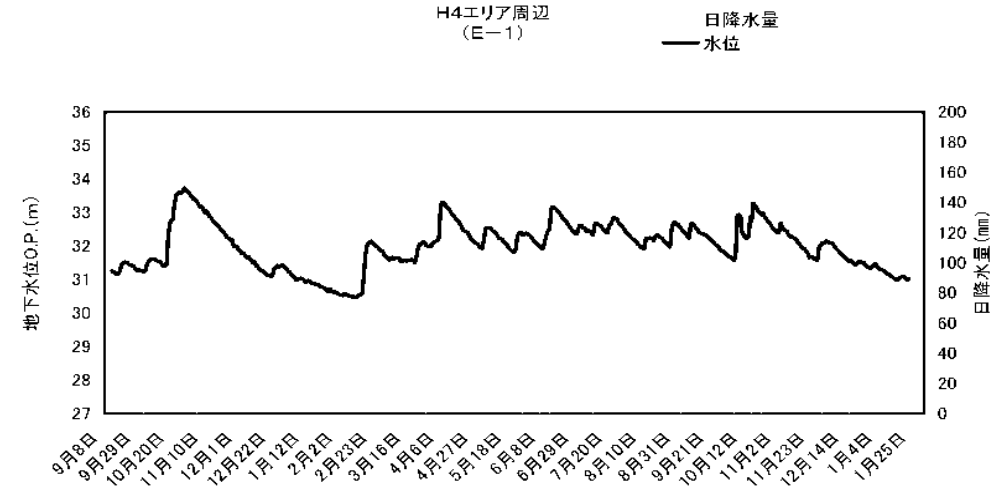




＜H26.5.12より採取頻度変更＞
G-1：毎日→1回/週
　　検出限界値未満で安定していることから頻度減
G-3：1回/週→毎日
　　H-3が上昇傾向にあることから頻度増

観測孔Ｅ－１の放射性物質濃度と降水量、地下水位との関係

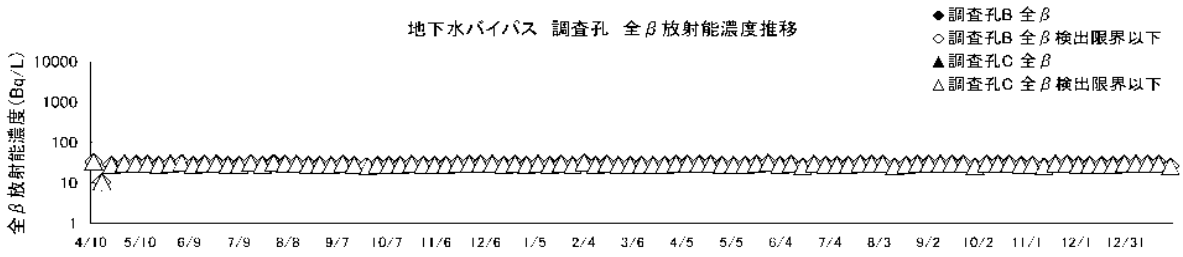




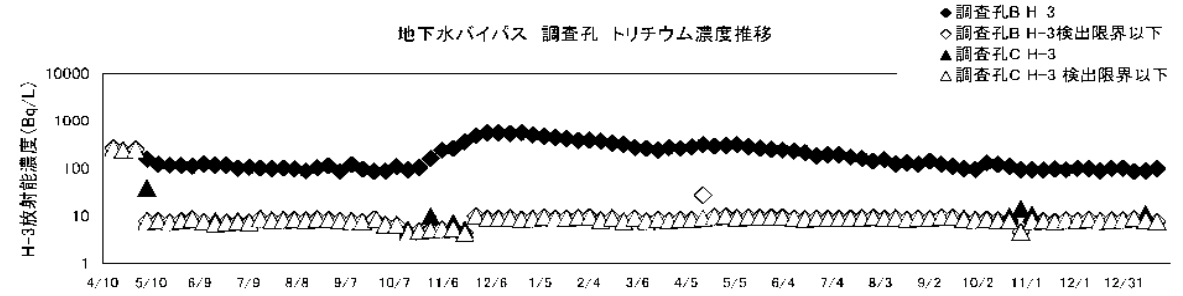
②地下水バイパス調査孔・揚水井の放射性物質濃度推移（1／2）

地下水バイパス調査孔

【全β】



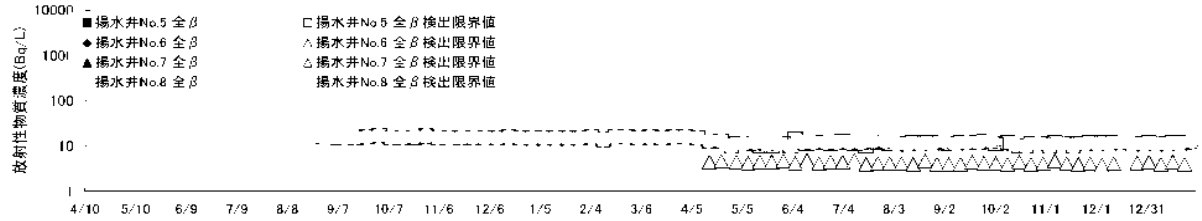
【トリチウム】

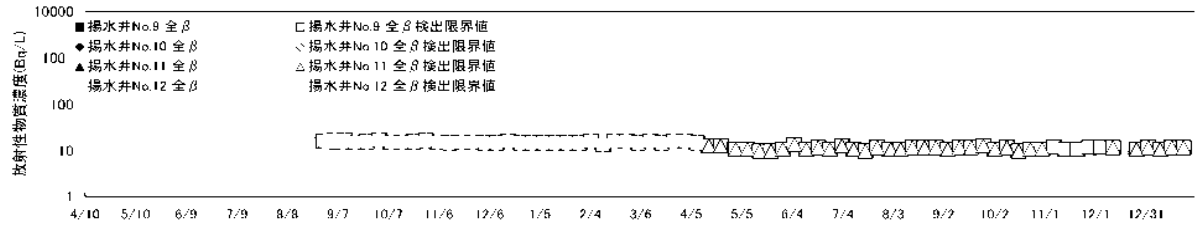


②地下水バイパス調査孔・揚水井の放射性物質濃度推移（2／2）

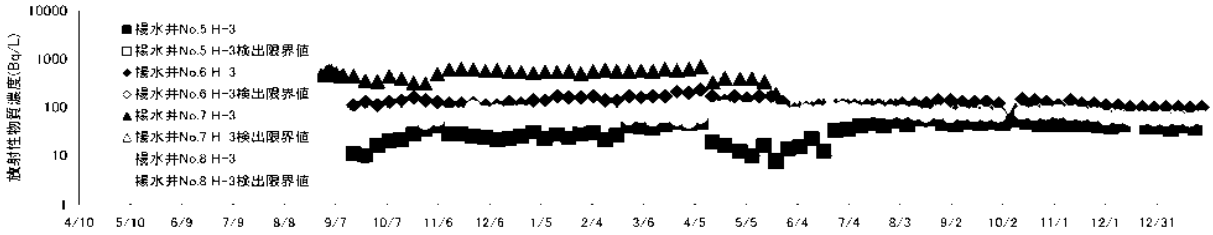
地下水バイパス揚水井

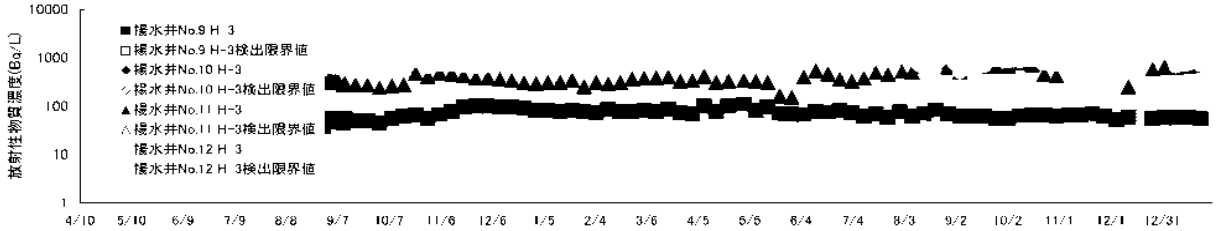
【全β】

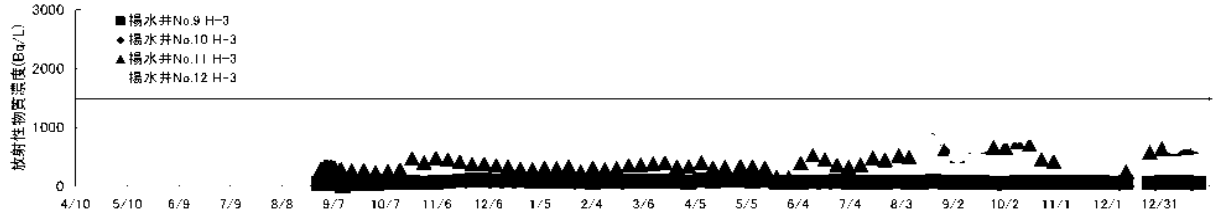




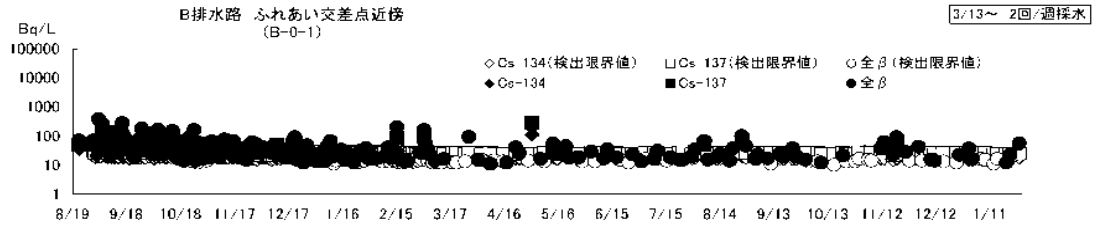
【トリチウム】

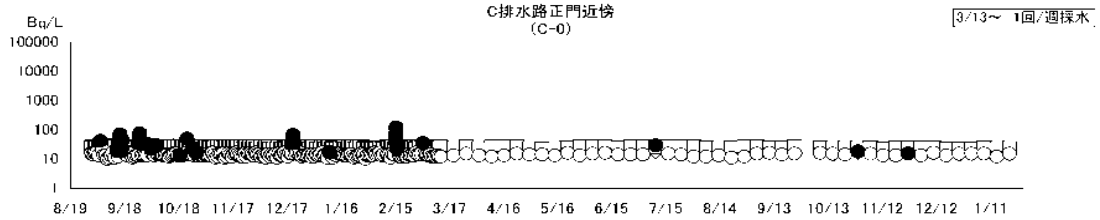


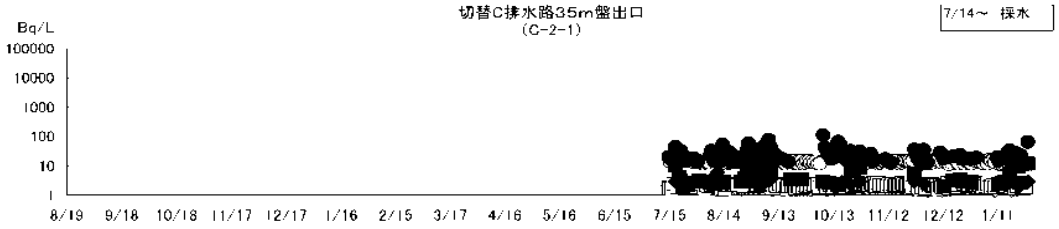




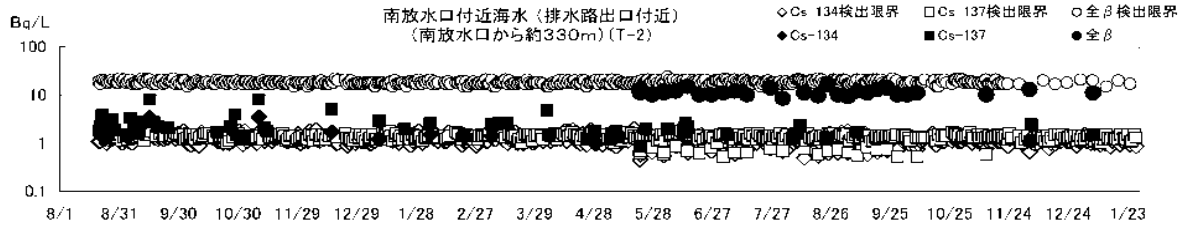
③排水路の放射性物質濃度推移

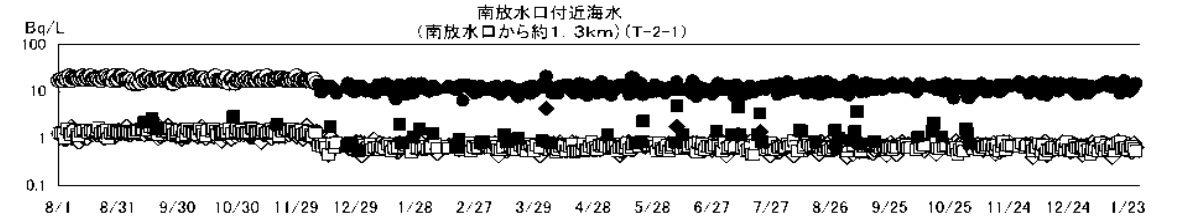


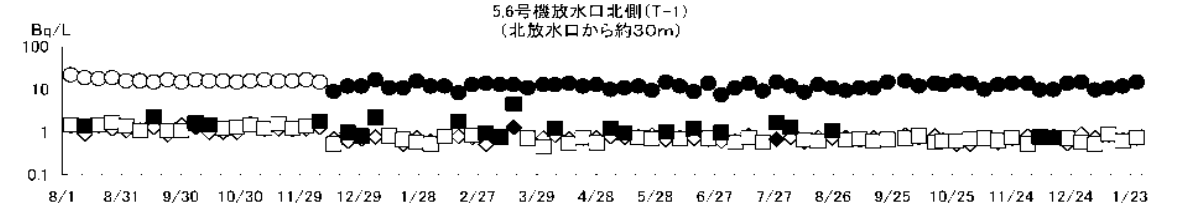


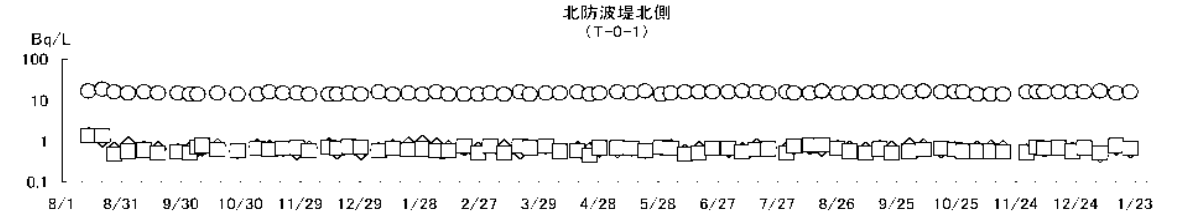


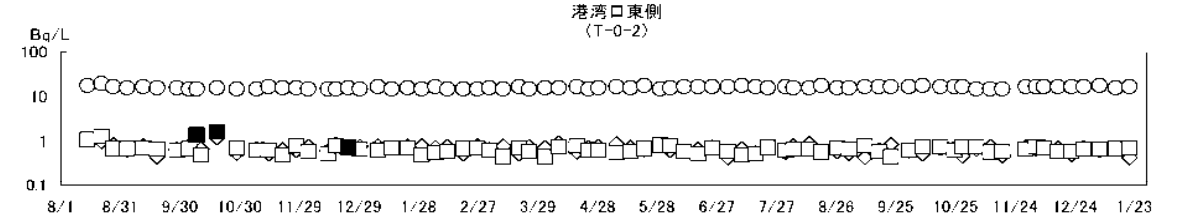
④海水の放射性物質濃度推移

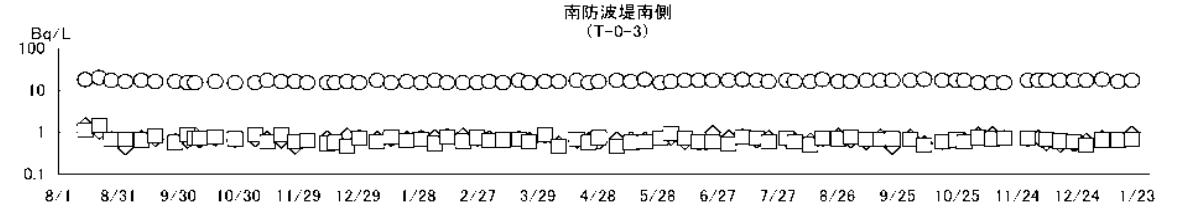






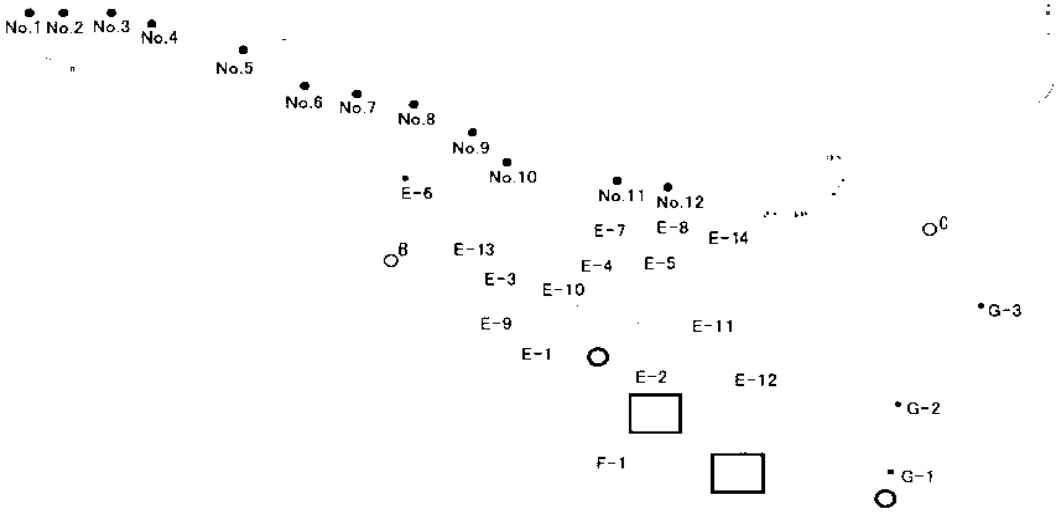




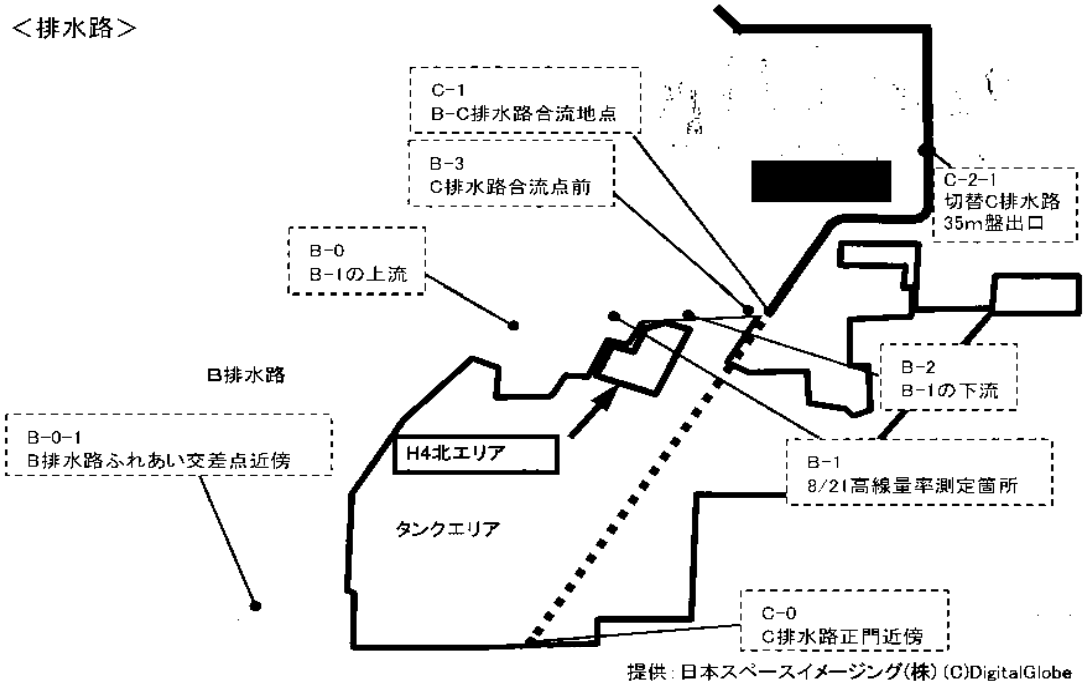


サンプリング箇所

＜追加ボーリング観測孔、地下水バイパス揚水井＞

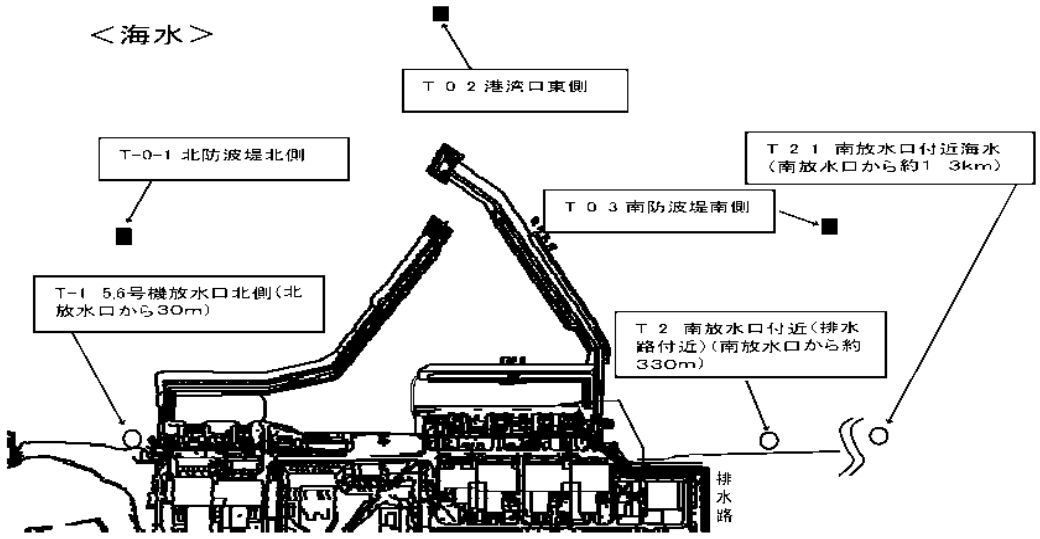


＜排水路＞



提供：日本スペースイメージング(株) (C)DigitalGlobe

＜海水＞



セシウム吸着装置 / 第二セシウム吸着装置
におけるストロンチウム除去
運転状況について

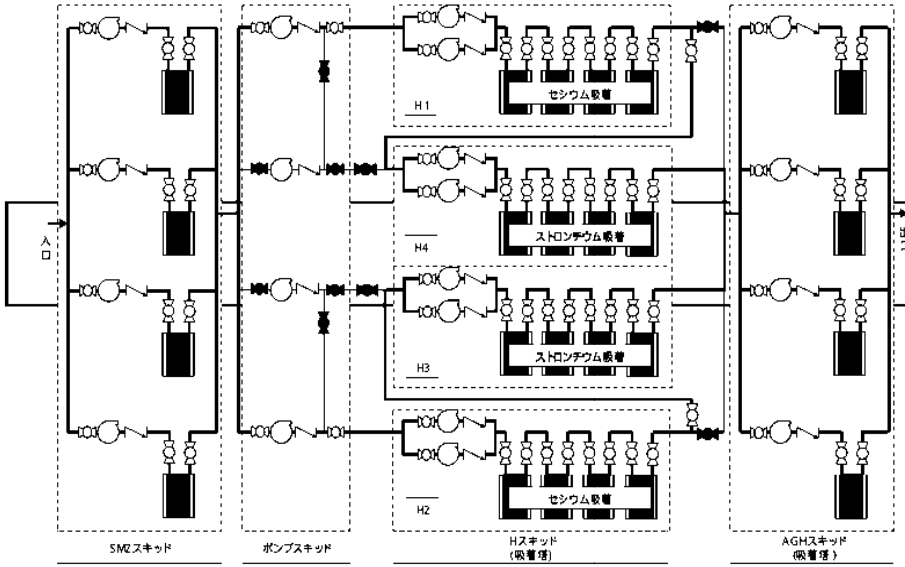
平成27年1月29日

東京電力株式会社

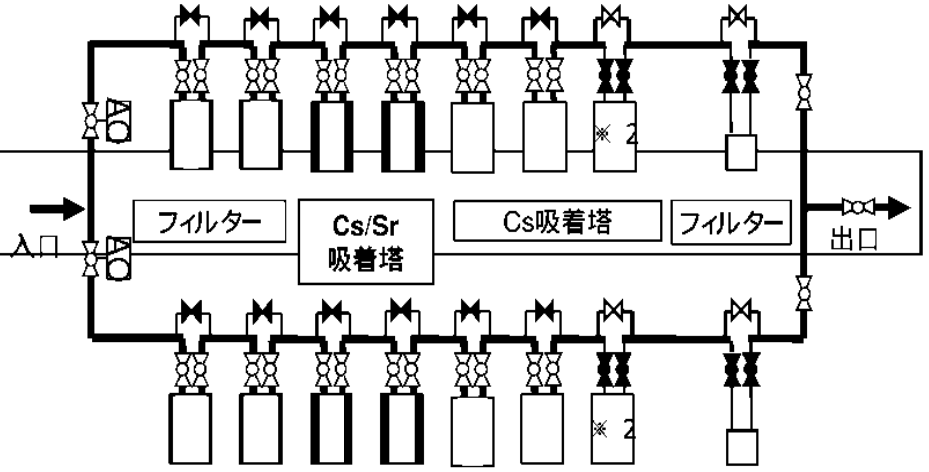
東京電力
TEPCO

セシウム吸着装置 / 第二セシウム吸着装置のSr除去運転状況

≪セシウム吸着装置≫



≪第二セシウム吸着装置≫



※ 2 水質の変動に備えてCs吸着塔 1塔をスタンバイとする。

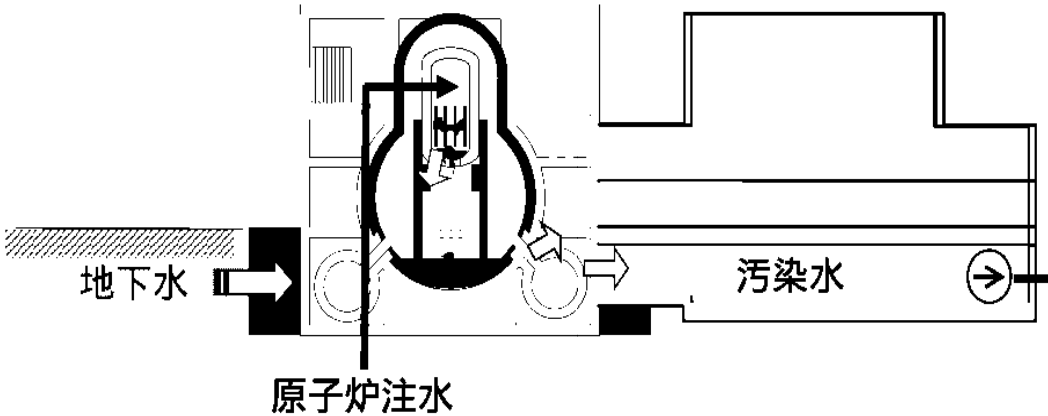
■Sr処理運転の実績
- セシウム吸着装置：平成27年1月6日~1月10日 [現在待機中]
- 第二セシウム吸着装置：平成26年12月26日より運転継続中

■Srの除去状況
- 入口Sr濃度：10^4Bq/cm^{3}オーダ，出口Sr濃度：10^2Bq/cm^{3}オーダであり，Srの濃度が低減されていることを確認済。

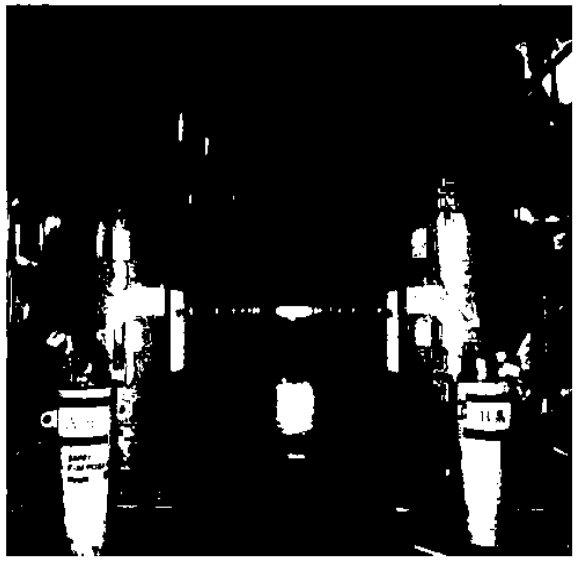
■Sr処理水の貯蔵について
- セシウム吸着装置，第二セシウム吸着装置による処理済水は，1/19よりSr処理水として貯蔵を開始

セシウム吸着装置 / 第二セシウム吸着装置におけるストロンチウム除去について

≪循環注水冷却システム≫



セシウム吸着装置（KURION）/
第二セシウム吸着装置（SARRY）



貯蔵タンク
（Sr処理水※1）

循環注水冷却システムを構成するセシウム吸着装置 / 第二セシウム吸着装置でセシウムの他にストロンチウム（Sr）を除去することで，タンク貯留水のリスクを低減

※1 セシウム吸着装置・第二セシウム吸着装置でのS除去、RO濃縮水処理設備およびモバイル型S除去装置の処理済水を総称したもの。

ＲＯ濃縮水処理設備の運転状況について

平成２７年1月２９日

東京電力株式会社

東京電力
TEPCO

RO濃縮水処理設備の運転状況について

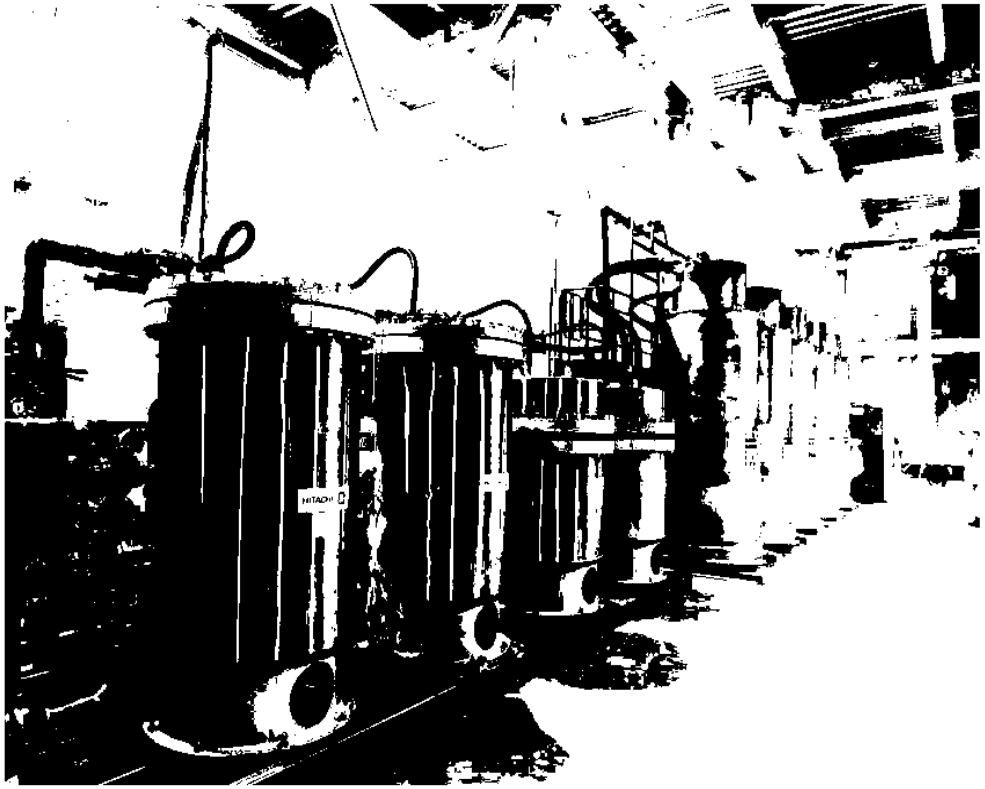
RO濃縮水処理設備については，1/10（土）より運転を開始。

1/20（火）7:00現在の運転状況は以下の通り。

・処理量：約800m^3/日，累積処理量：約6,800m^3

・処理対象水のストロンチウム濃度：約4×10^{4}Bq/cm^3

・設備出口のストロンチウム濃度　：10$^{0\sim3}$Bq/cm^{3}程度



前処理装置

セシウム・ストロンチウム同時吸着塔

モバイル型ストロンチウム除去装置（Ａ系統）の運転状況について

平成２７年０１月２９日

東京電力株式会社

東京電力
TEPCO

モバイル式ストロンチウム除去装置（A系統）運転状況

モバイル型ストロンチウム除去装置「A系統」の運転状況

・10月2日から運転を開始し、G4南エリアA群タンク（約4,000m^3）のストロンチウム処理を実施。

・12/22にG4南エリアB群タンクに切替を実施し、B群の処理を実施中。

＜運転状況等＞（H27.01.28現在）

浄化処理量：約4,000m^3（A群タンク）（G4南エリアA群～C群タンク合計：約14,000m^3）
約4,000m^3（B群タンク）

廃棄物発生量：合計27基（フィルター16基、吸着塔11基）

装置のストロンチウム除去性能（装置出口/入口放射能量）1／100～1／100,000オーダー

＜G4南エリアA群タンクの浄化状況（ストロンチウム90濃度）＞

	A群タンク（ Bq/cc ）
浄化前	3.9× 10^4
浄化後	1.1× 10^3 以下

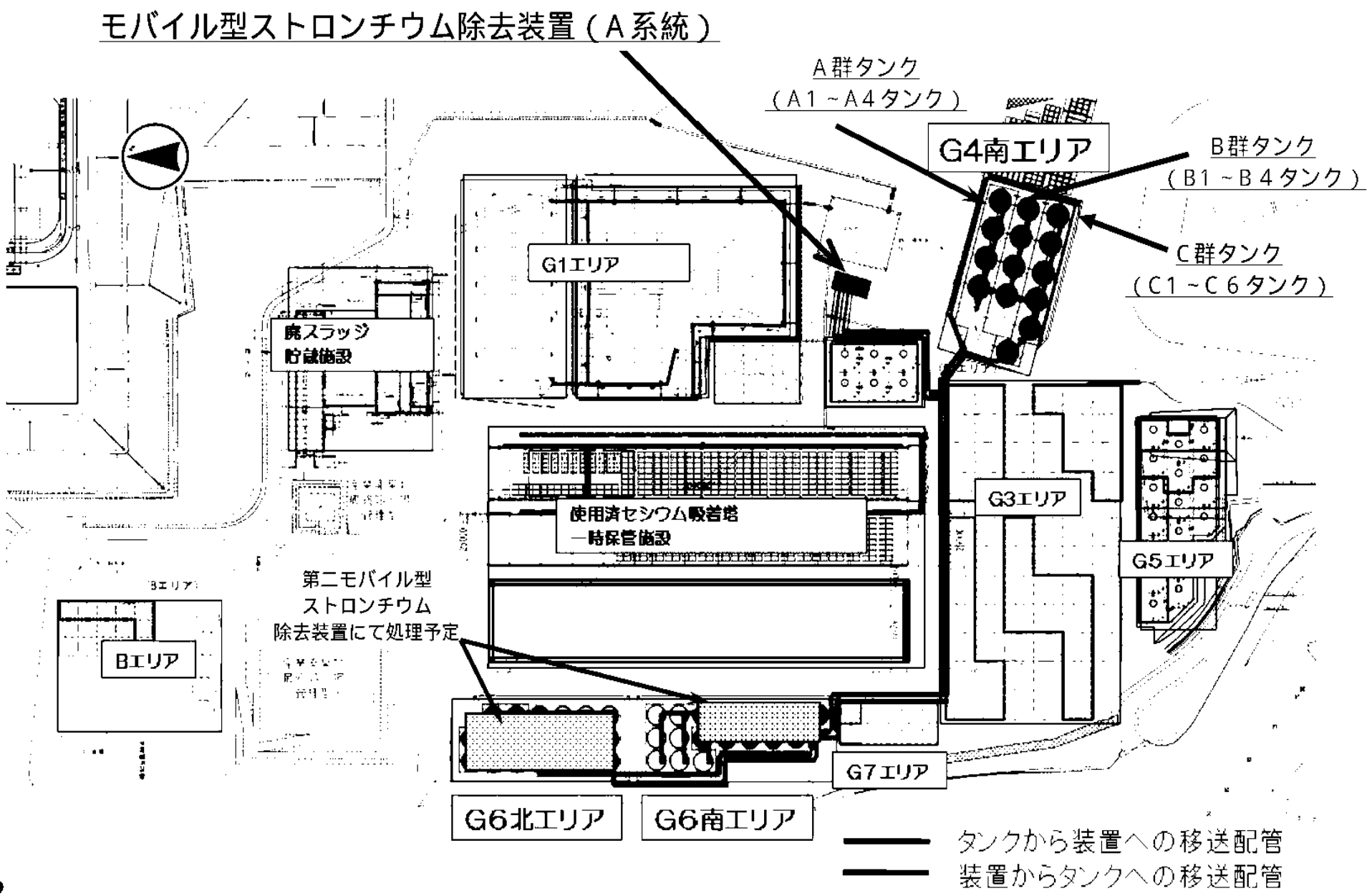
今後の方針等

・G4南エリアA群タンクについては、各タンクとも浄化効果が得られていることを確認。

・今後は、G4南エリアC群まで終了後、G6南エリア一部（※）（約4,000m^3）の浄化を計画。

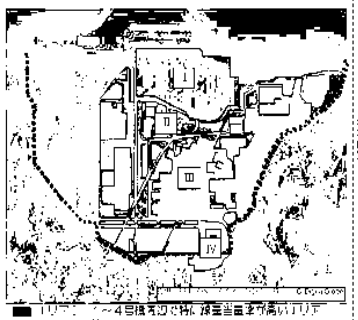
（※）G6南エリアは、本装置で約4,000m^3、
第二モバイル型ストロンチウム除去装置で約6,000m^{3}の処理を計画

モバイル式ストロンチウム除去装置（A系統）配置概要図



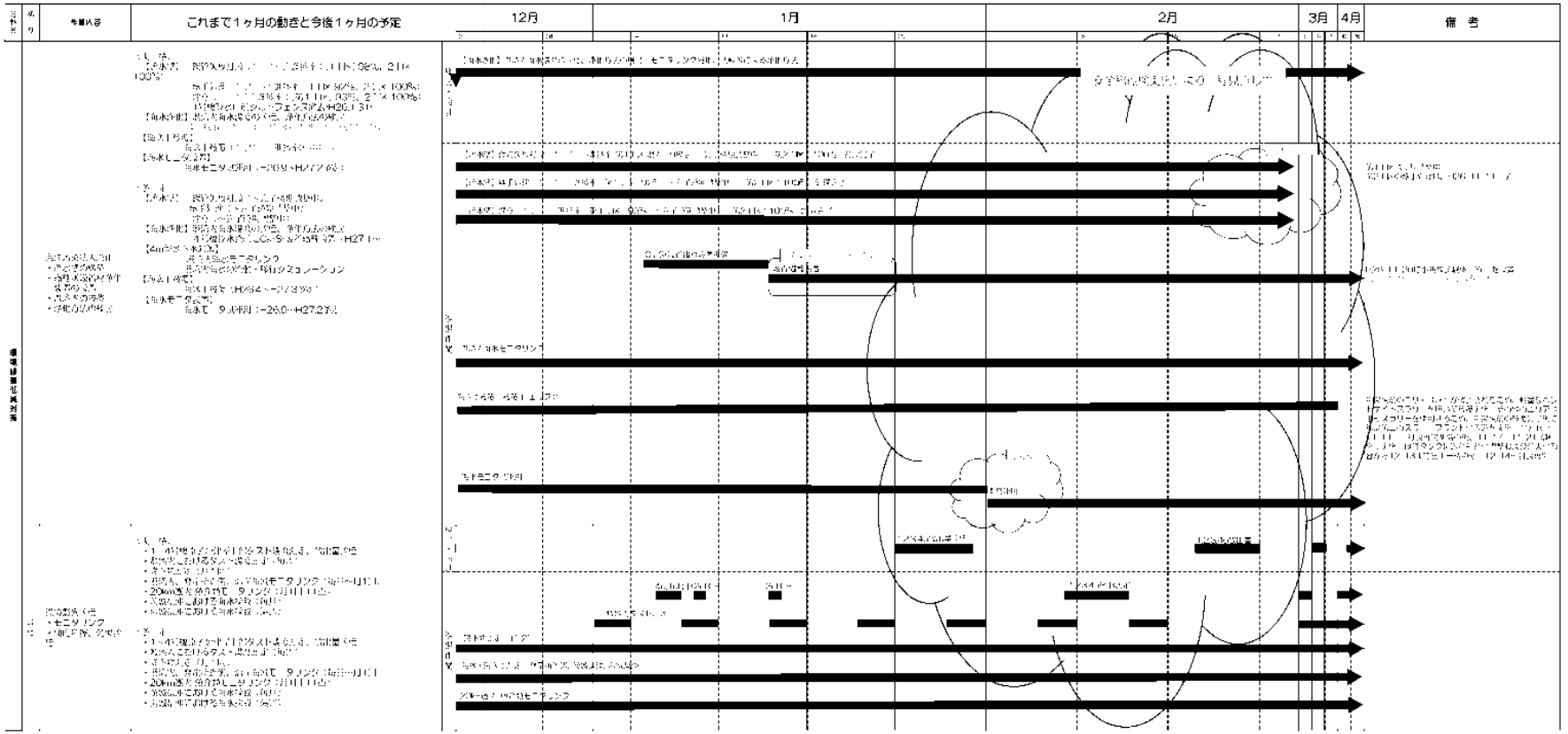
職場環境整備対策 スケジュール

これまで1ヶ月の動きと今後1ヶ月の予定	12月	1月	2月	3月	4月	備考
作業内容						



■ I エリア ～4号機周辺で特に線量当量率が高いエリア
■ II エリア 建物の解体が残るエリア
III エリア 設備設置または一時設置が予定されているエリア
IV エリア 道路・仮中間等が既に舗装されているエリア
■■■ 敷地内線量低減に係る実施方針範囲

環境被害軽減対策 スケジュール



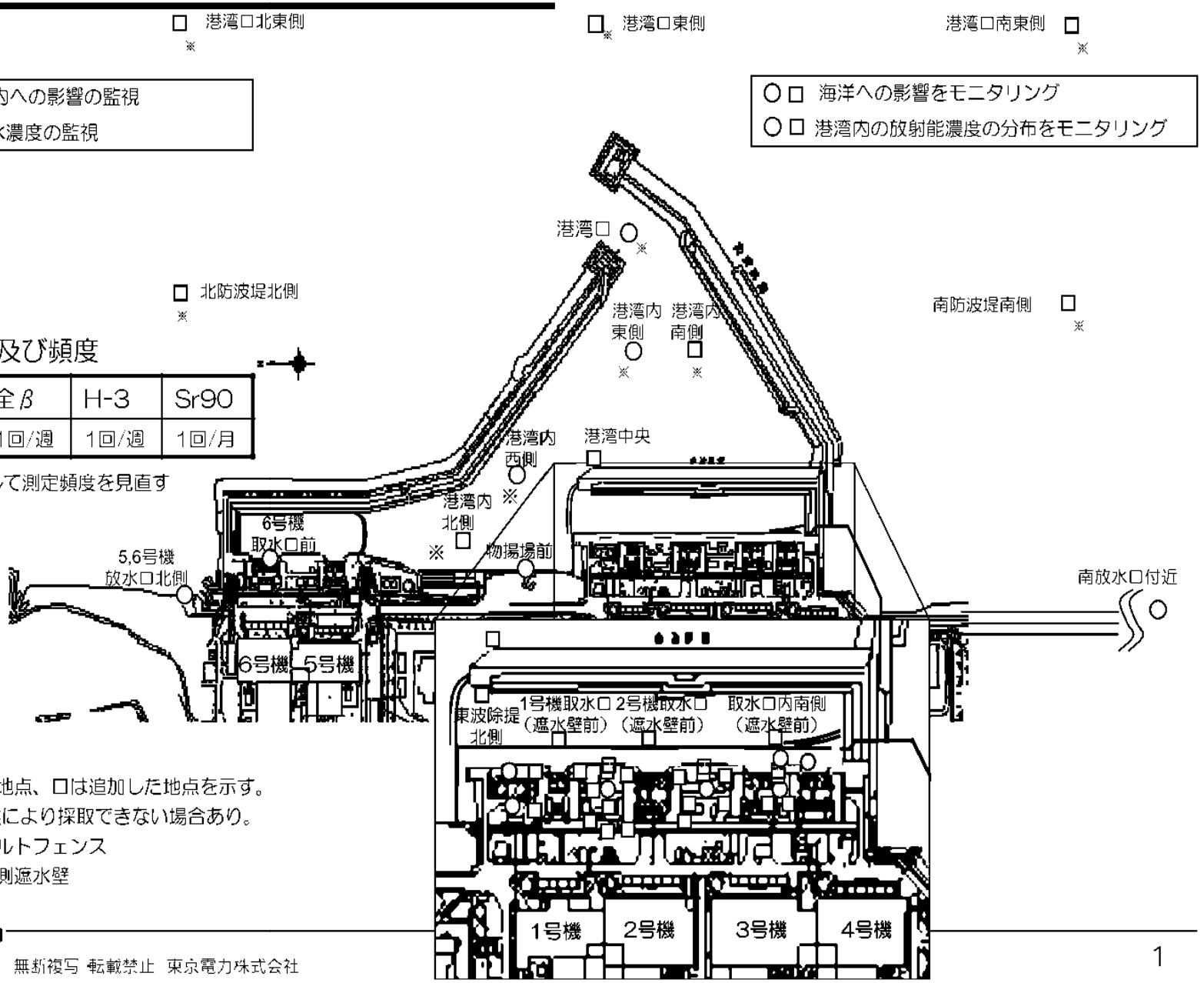
タービン建屋東側における
地下水及び海水中の放射性物質濃度の状況について

平成27年1月29日

東京電力株式会社

東京電力
TEPCO

モニタリング計画（サンプリング箇所）



測定項目及び頻度

γ線	全β	H-3	Sr90
1回/週	1回/週	1回/週	1回/月

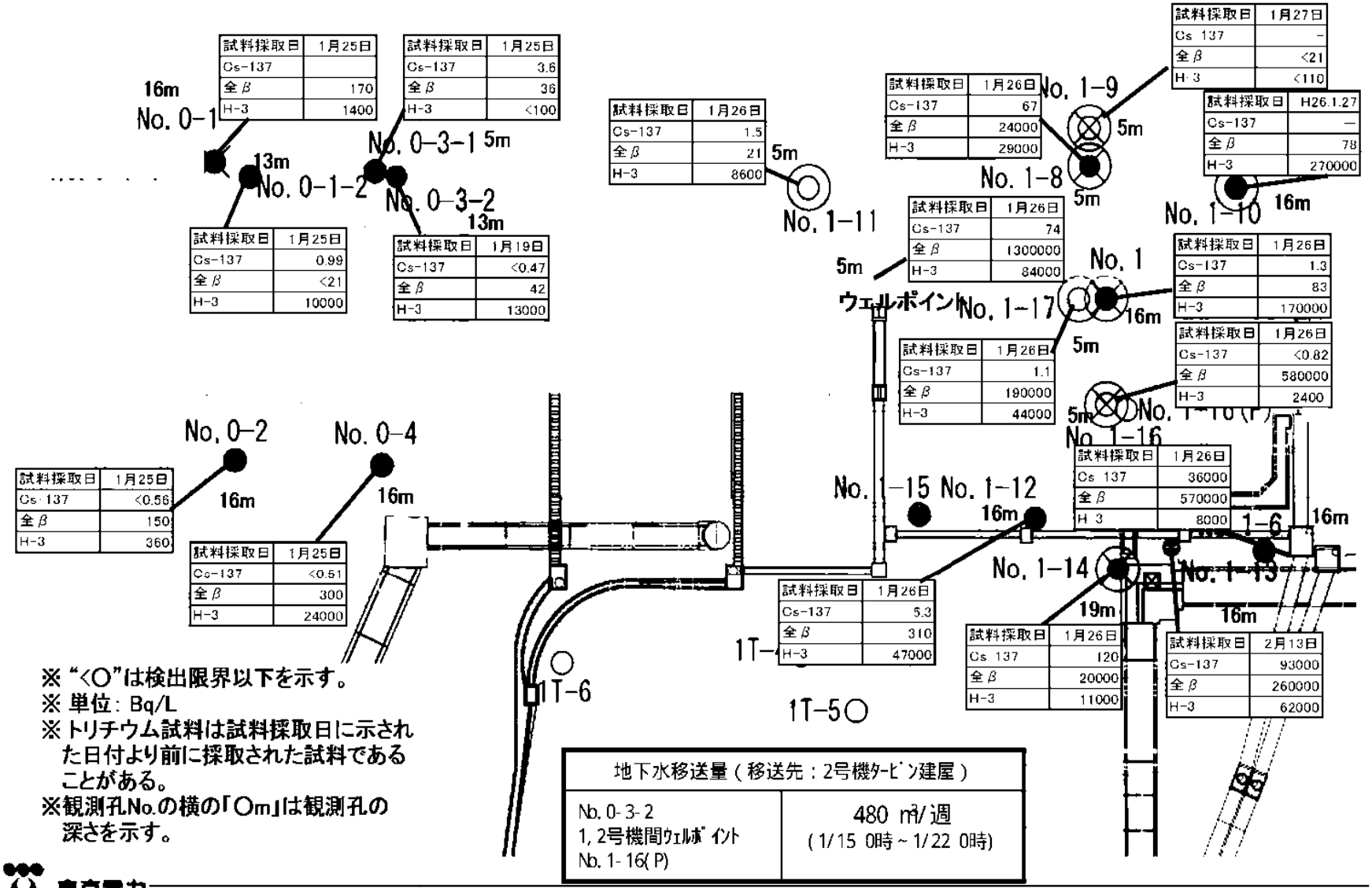
※必要に応じて測定頻度を見直す

○は継続地点、□は追加した地点を示す。
※： 天候により採取できない場合あり。
—— シルトフェンス
—— 海側遮水壁

無断複写 転載禁止 東京電力株式会社

タービン建屋東側の地下水濃度（1/2）

＜1号機北側、1,2号機取水口間＞



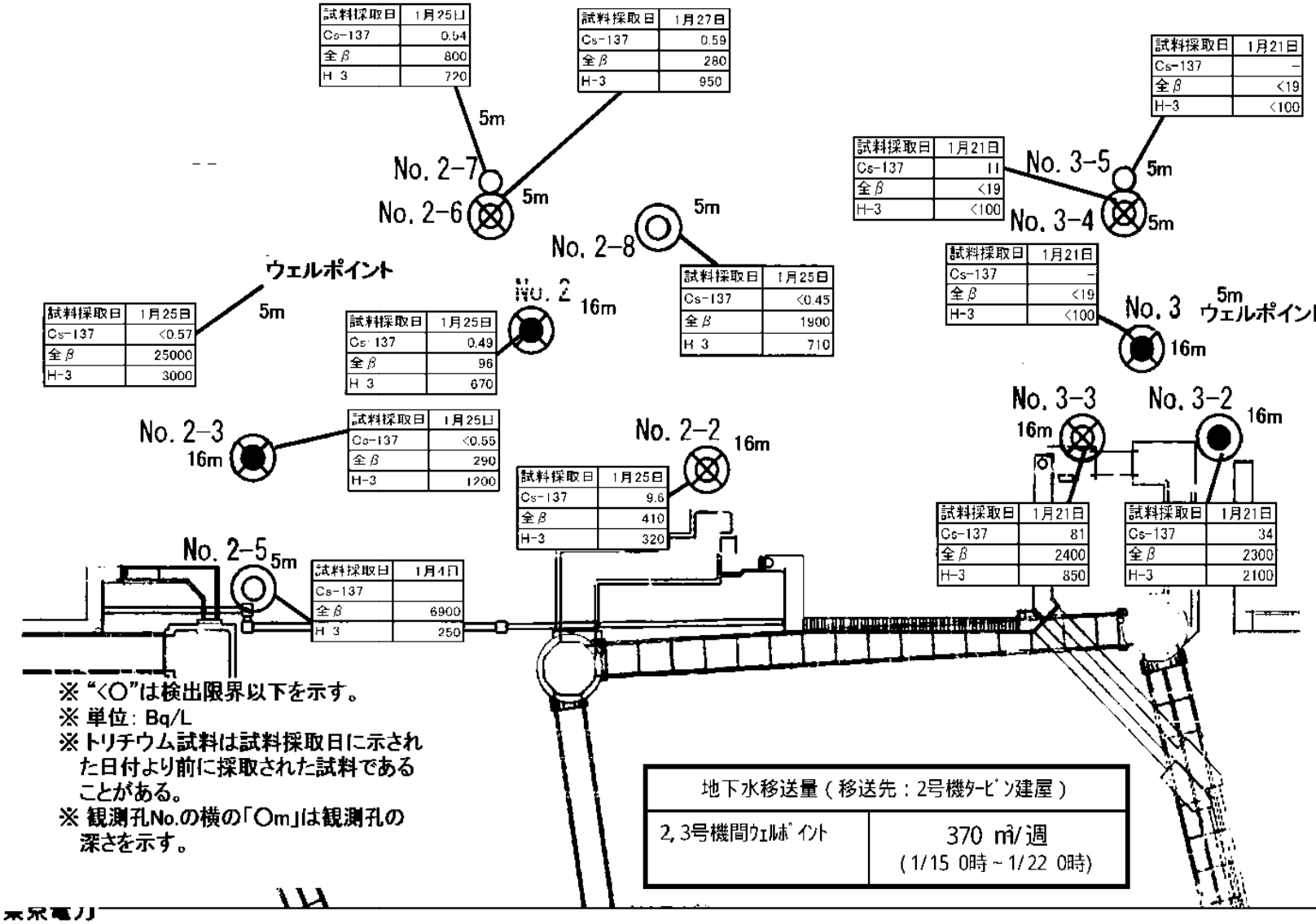
※ "<○"は検出限界以下を示す。
※ 単位：Bq/L
※ トリチウム試料は試料採取日に示された日付より前に採取された試料であることがある。
※観測孔No.の横の「○m」は観測孔の深さを示す。

地下水移送量（移送先：2号機ﾀｰﾋﾞﾝ建屋）	
No. 0-3-2 1, 2号機間ｳｪﾙﾎﾟｲﾝﾄ No. 1-16(P)	480 m³/週 (1/15 0時～1/22 0時)

無断複写 転載禁止 東京電力株式会社

タービン建屋東側の地下水濃度（2/2）

＜2,3号機取水口間、3,4号機取水口間＞



※ "<○"は検出限界以下を示す。
※ 単位：Bq/L
※ トリチウム試料は試料採取日に示された日付より前に採取された試料であることがある。
※ 観測孔No.の横の「○m」は観測孔の深さを示す。

地下水移送量（移送先：2号機ﾀｰﾋﾞﾝ建屋）	
2,3号機間ｳｪﾙﾎﾟｲﾝﾄ	370 m³/週 (1/15 0時～1/22 0時)

無断複写 転載禁止 東京電力株式会社

タービン建屋東側の地下水濃度の状況(1/2)

＜1号機北側エリア＞

○ H-3濃度が高い海側のNo.0-3-2 で、平成25年12/11より開始した地下水汲み上げによる効果を継続監視（1m^3/日）。H-3濃度は最大で 76,000Bq/L（2/6）だったが、その後低下傾向になり、現在は 14,000Bq/L程度で推移している。

○ No.0-1-2、No.0-4で7月からH-3濃度が上昇傾向にあり、現在は、それぞれ１万Bq/L程度、23,000Bq/L程度で推移している。

＜1,2号機取水口間エリア＞

○ No.1-6で全β濃度が100万Bq/L前後で推移していたが、10月に780万Bq/Lまで上昇後低下し、現在50万Bq/L程度で推移している。

○ No.1-8でH-3濃度が10,000Bq/L程度で推移していたが、6月以降大きく上下し、現在30,000Bq/L程度となっている。

○ No.1-17でH-3濃度は10,000Bq/L前後で推移していたが、10月より上昇し16万Bq/Lとなり、現在は４万Bq/L前後となっている。全β濃度は３月より上昇傾向にあり10月に120万Bq/Lまで上昇後低下し、現在２0万Bq/L前後となっている。

○ 1,2号機間ウェルポイントで全β濃度は3月以降30万Bq/l前後で推移していたが、11月に入って一時300万Bq/L前後まで上昇し、現在は１００万Bq/L程度で推移している。（2,3号機取水口間エリアの地盤改良部の地表処理のため、揚水量を10月31日より50m^3/日から10m^3/日に変更）

無断複写 転載禁止 東京電力株式会社

タービン建屋東側の地下水濃度の状況(2/2)

＜2,3号機取水口間エリア＞

- 2,3号機取水口間ウェルポイントのH-3濃度は4月から上昇し13,000Bq/L程度となったが、11月より低下し、現在3,000Bq/L前後となっている。全β濃度は10万Bq/L程度で推移していたが、11月より低下し、現在４万Bq/L程度となっている。
- No.2、No.2-2、No.2-3では、全β、H-3濃度とも横ばいで推移し、上昇は見られていない。
- No.2-6で全β濃度が2,000Bq/L程度で推移していたが、11月以降低下し、現状４00Bq/L程度となっている。
- 地盤改良の外側のNo.2-7は昨年11月からモニタリングを開始し、全β濃度は20Bq/L前後であったが、徐々に上昇し、８00Bq/L前後で推移。
- No.2-8は今年2月よりモニタリングを開始し、全β濃度は1,000Bq/L前後だったが、徐々に上昇し、現在は3,000Bq/L前後で推移している。
- ウェルポイントの揚水量を地盤改良壁の地表処理のため10月31日より4m^3/日から50m^3/日に変更。（12/8～：2m^3/日、2/14～：4m^3/日、10/31～：50m^3/日）。

＜3,4号機取水口間エリア＞

- 各観測孔とも放射性物質濃度は低いレベルで推移。

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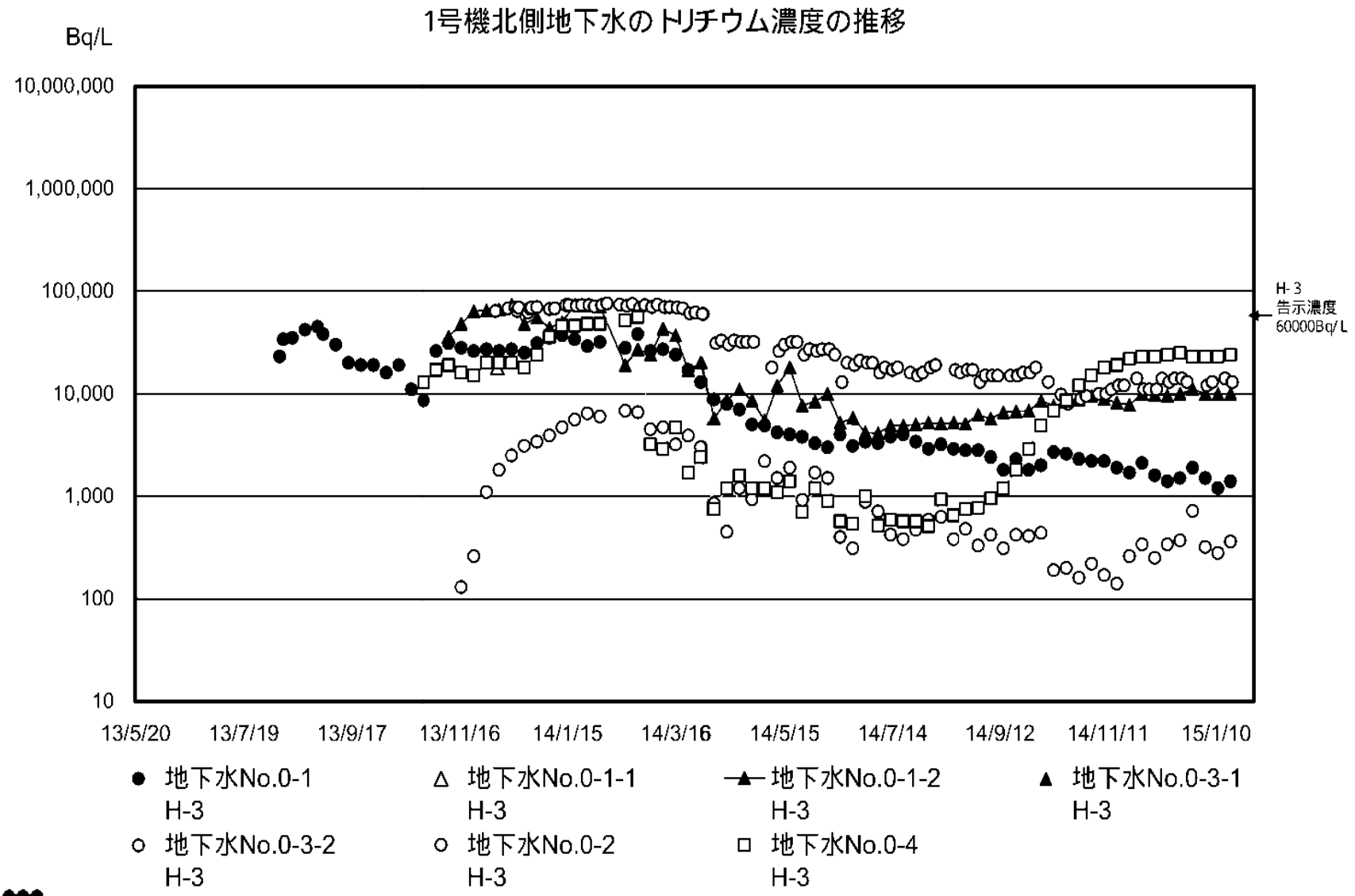
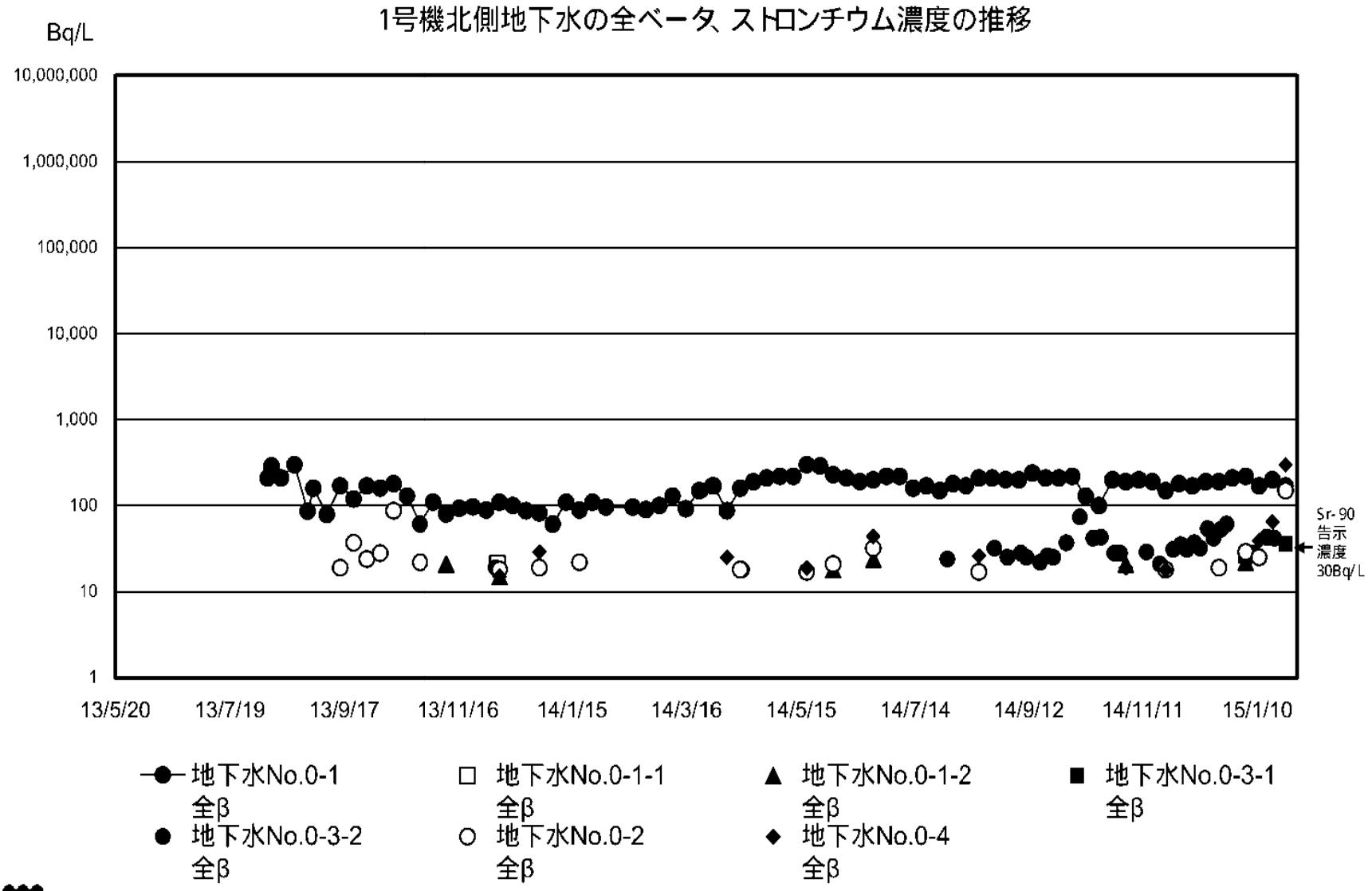
1号機北側の地下水の濃度推移(1/2)



無断複写 転載禁止 東京電力株式会社

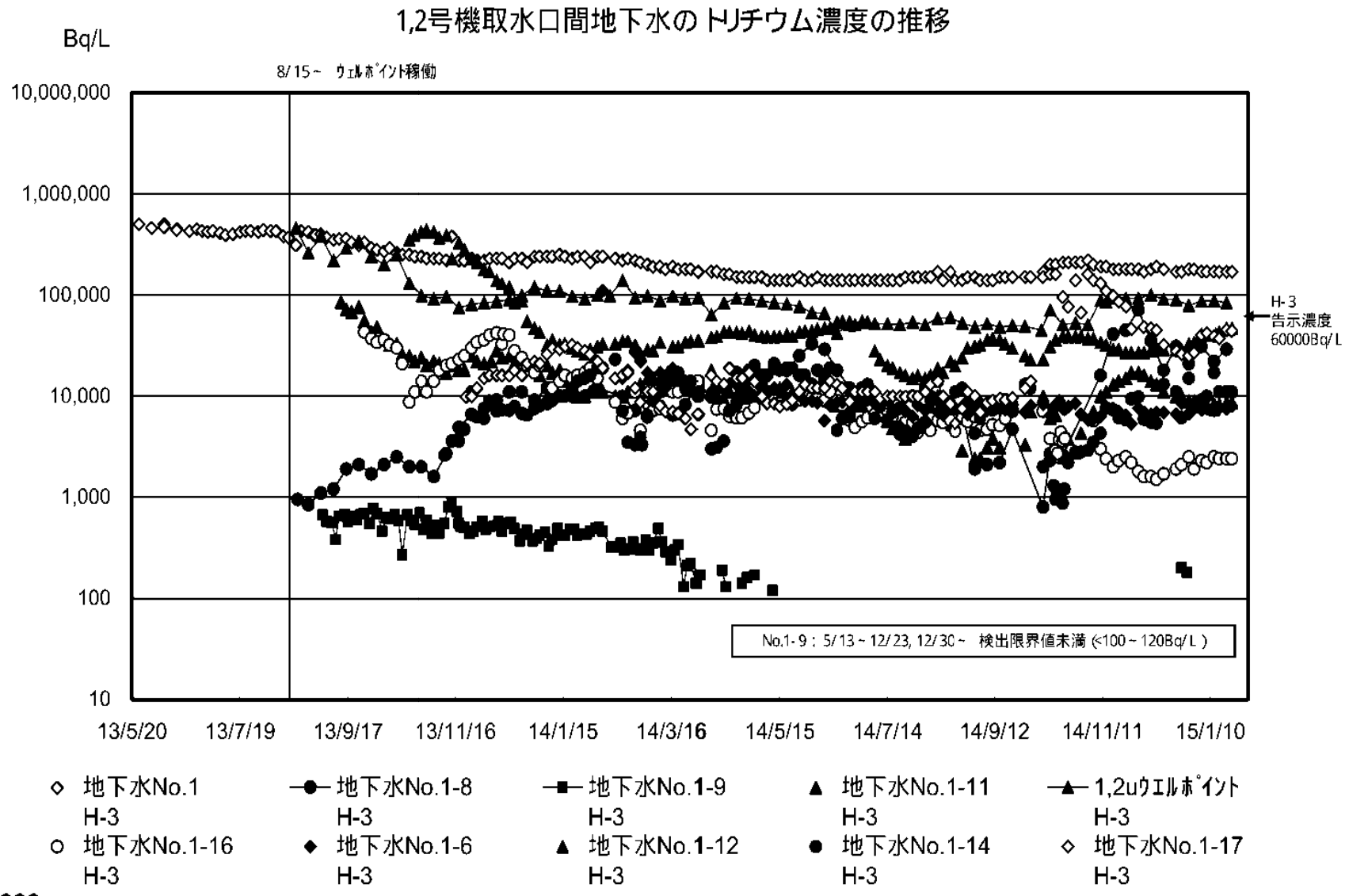
1号機北側の地下水の濃度推移(2/2)



東京電力

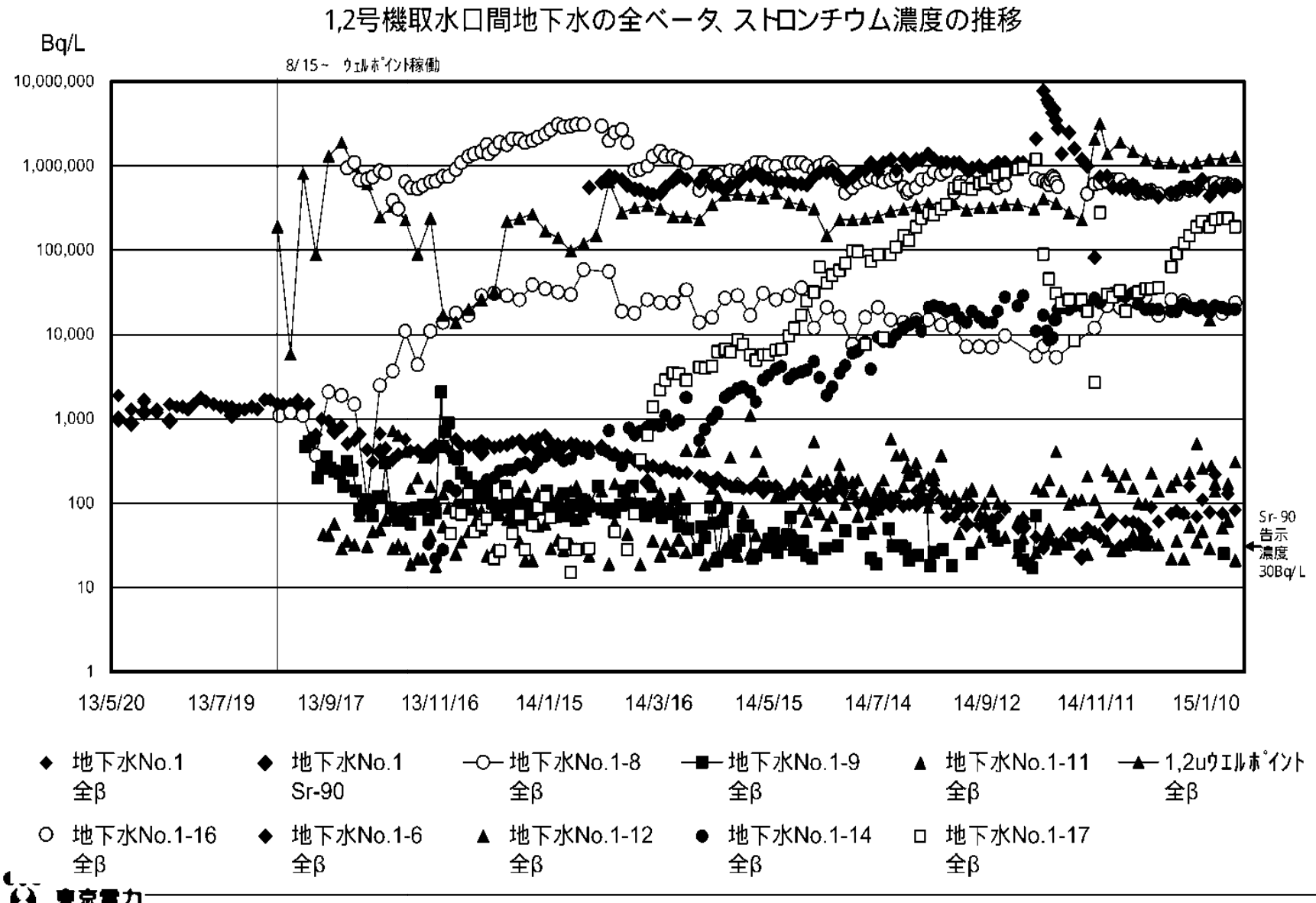
無断複写 転載禁止 東京電力株式会社

1,2号機取水口間の地下水の濃度推移(1/2)



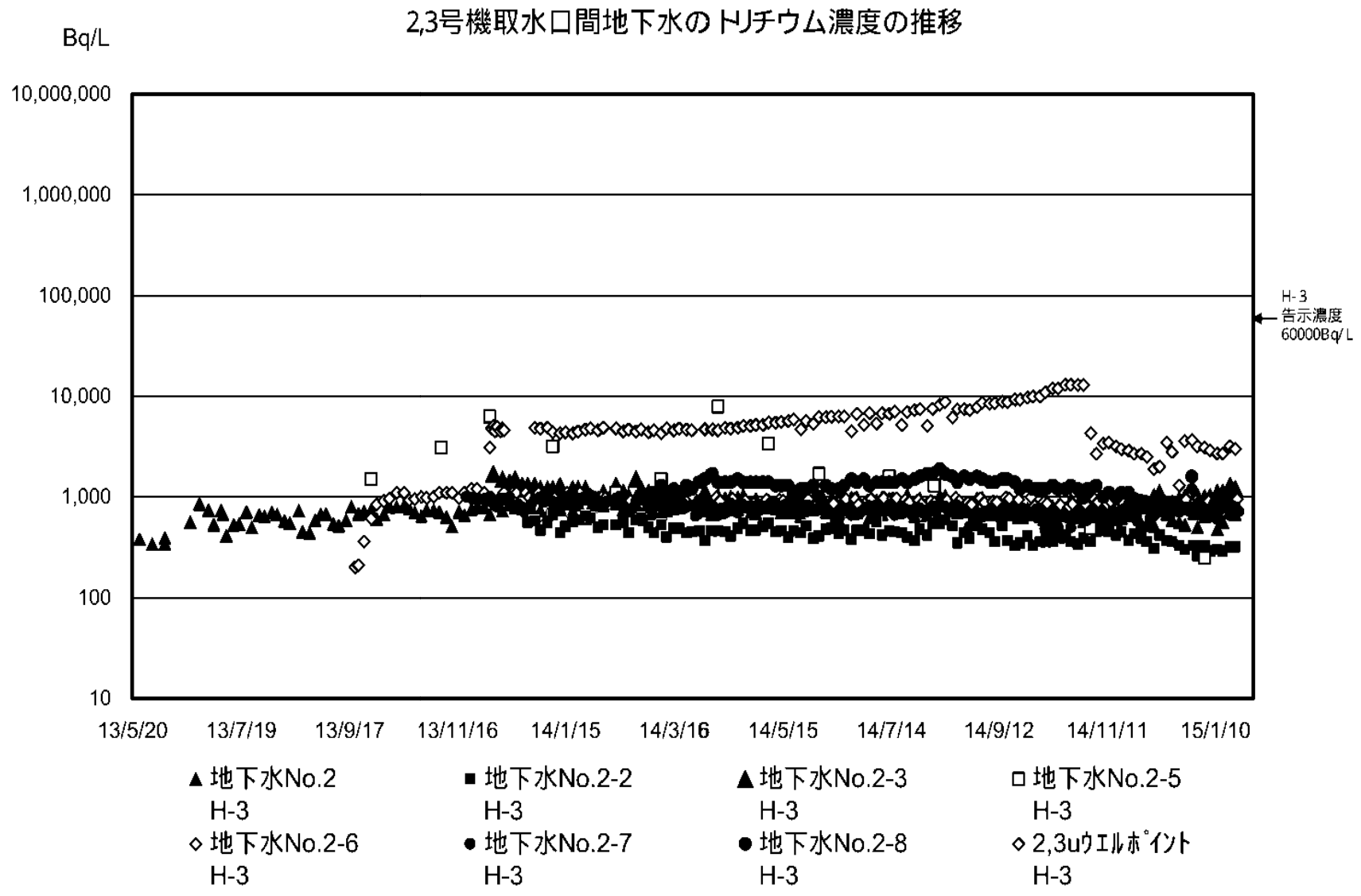
無断複写 転載禁止 東京電力株式会社

1,2号機取水口間の地下水の濃度推移(2/2)



無断複写 転載禁止 東京電力株式会社

2,3号機取水口間の地下水の濃度推移(1/2)



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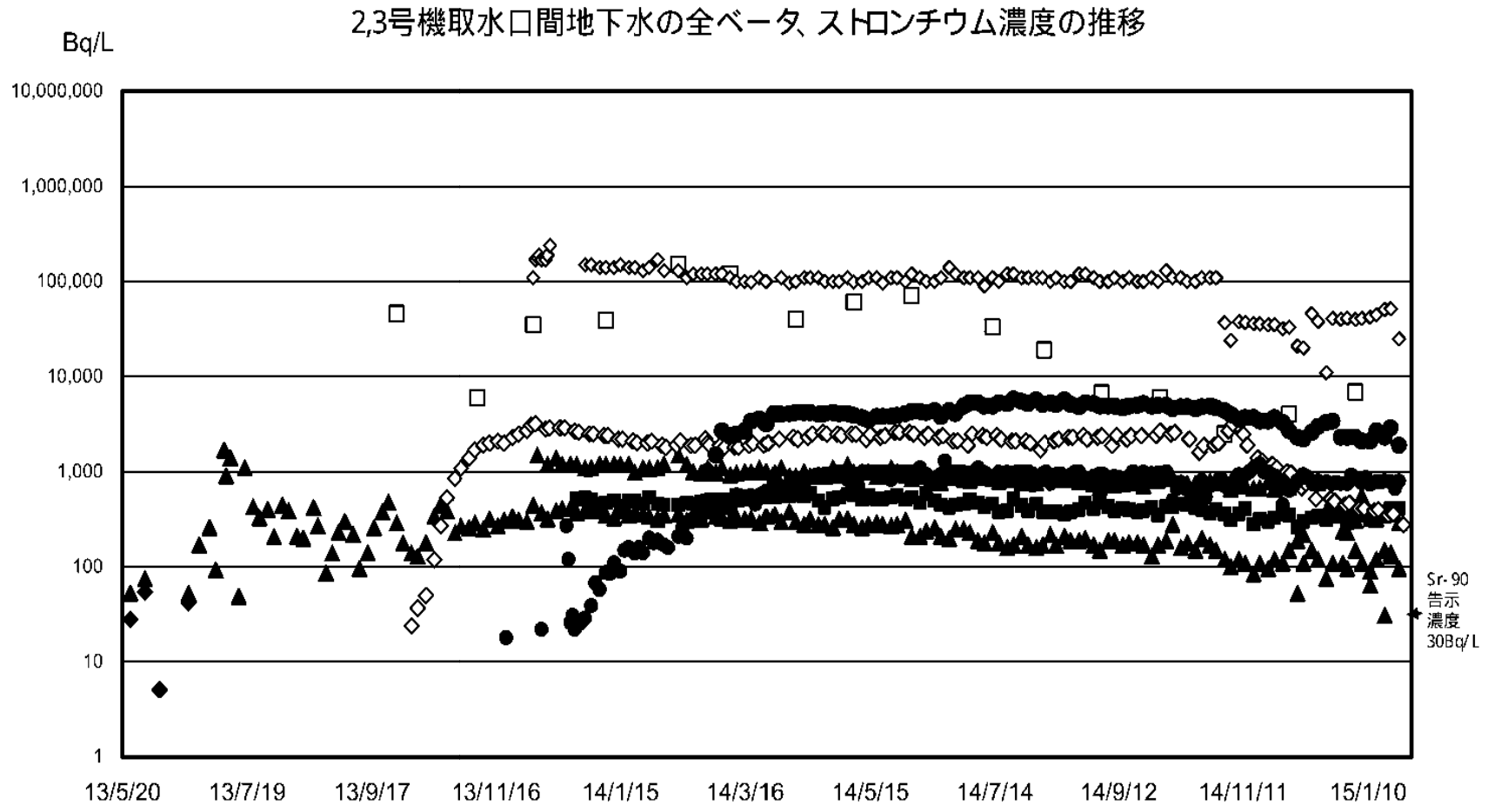
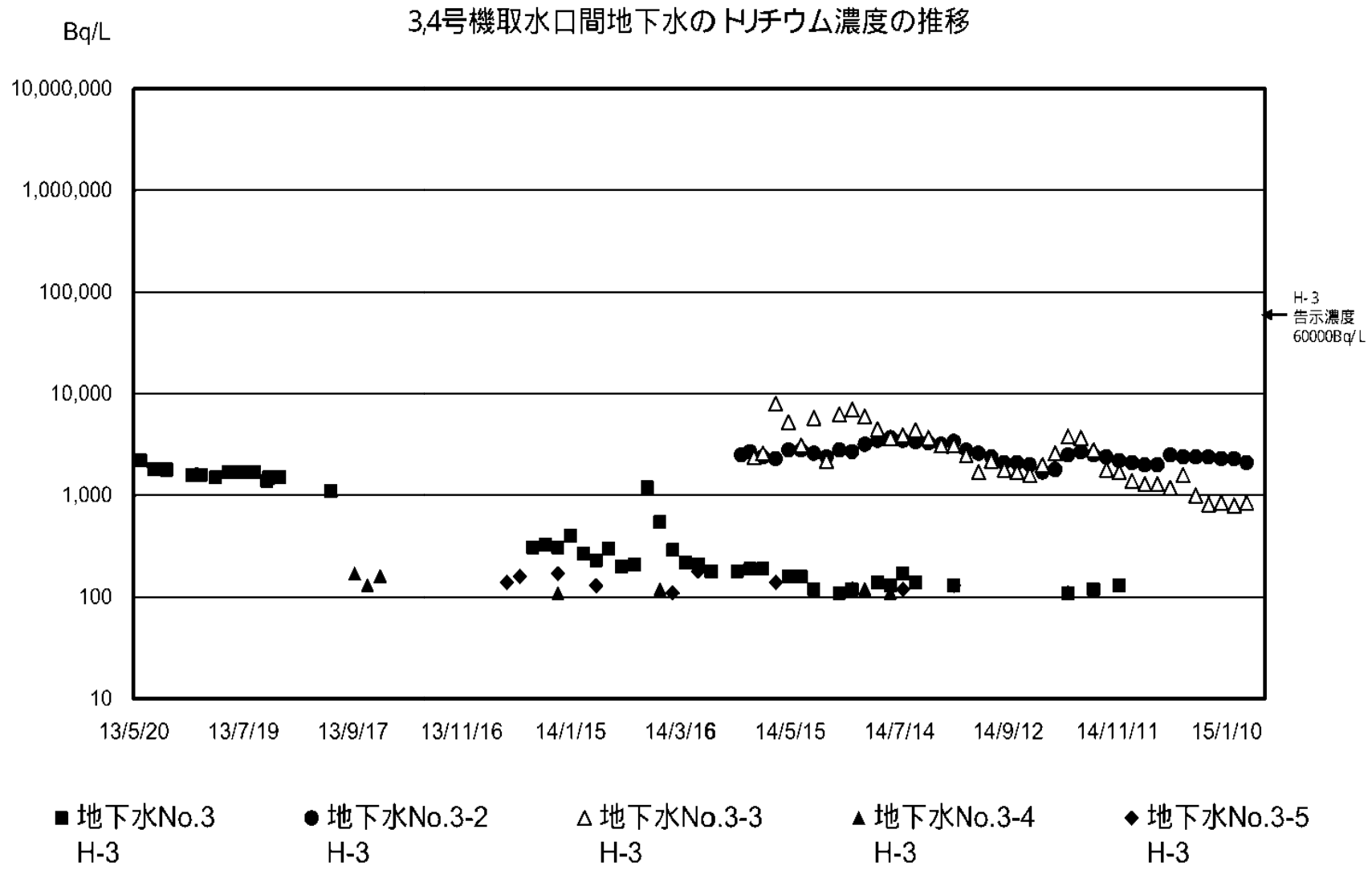
無断複写 転載禁止 東京電力株式会社

2,3号機取水口間の地下水の濃度推移(2/2)



東京電力
無断複写 転載禁止 東京電力株式会社

3,4号機取水口間の地下水の濃度推移(1/2)



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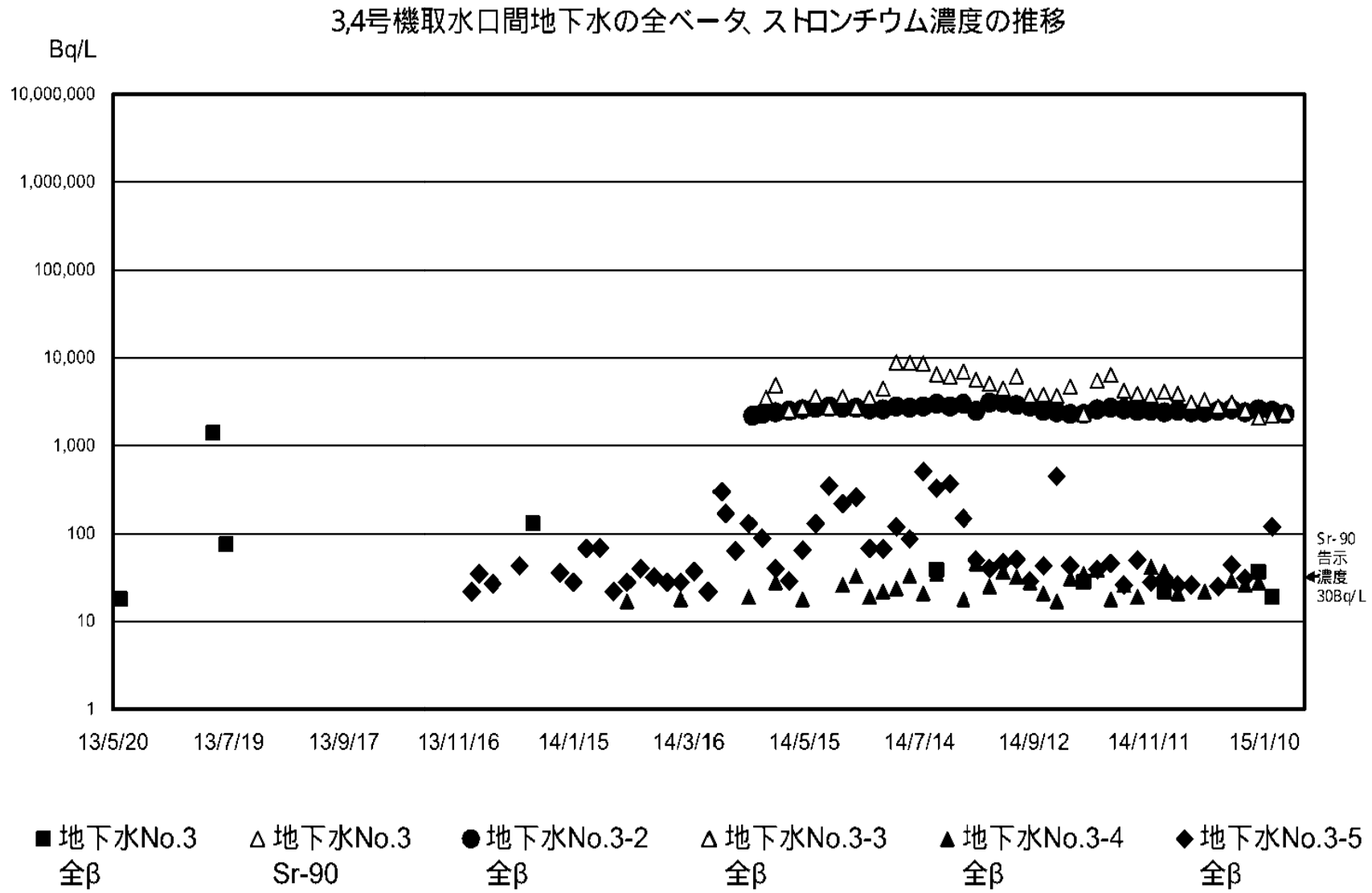
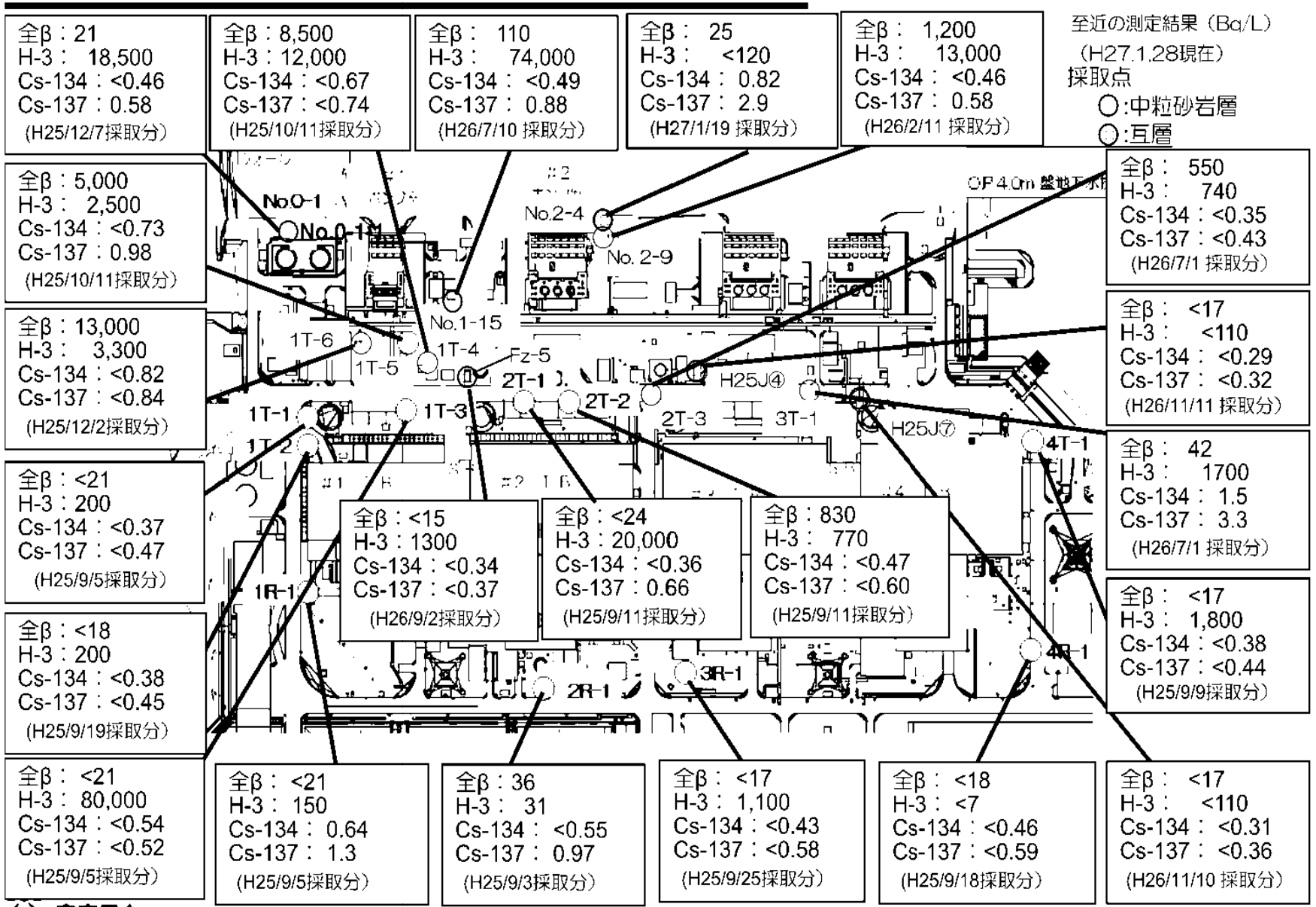
無断複写 転載禁止 東京電力株式会社

3,4号機取水口間の地下水の濃度推移(2/2)



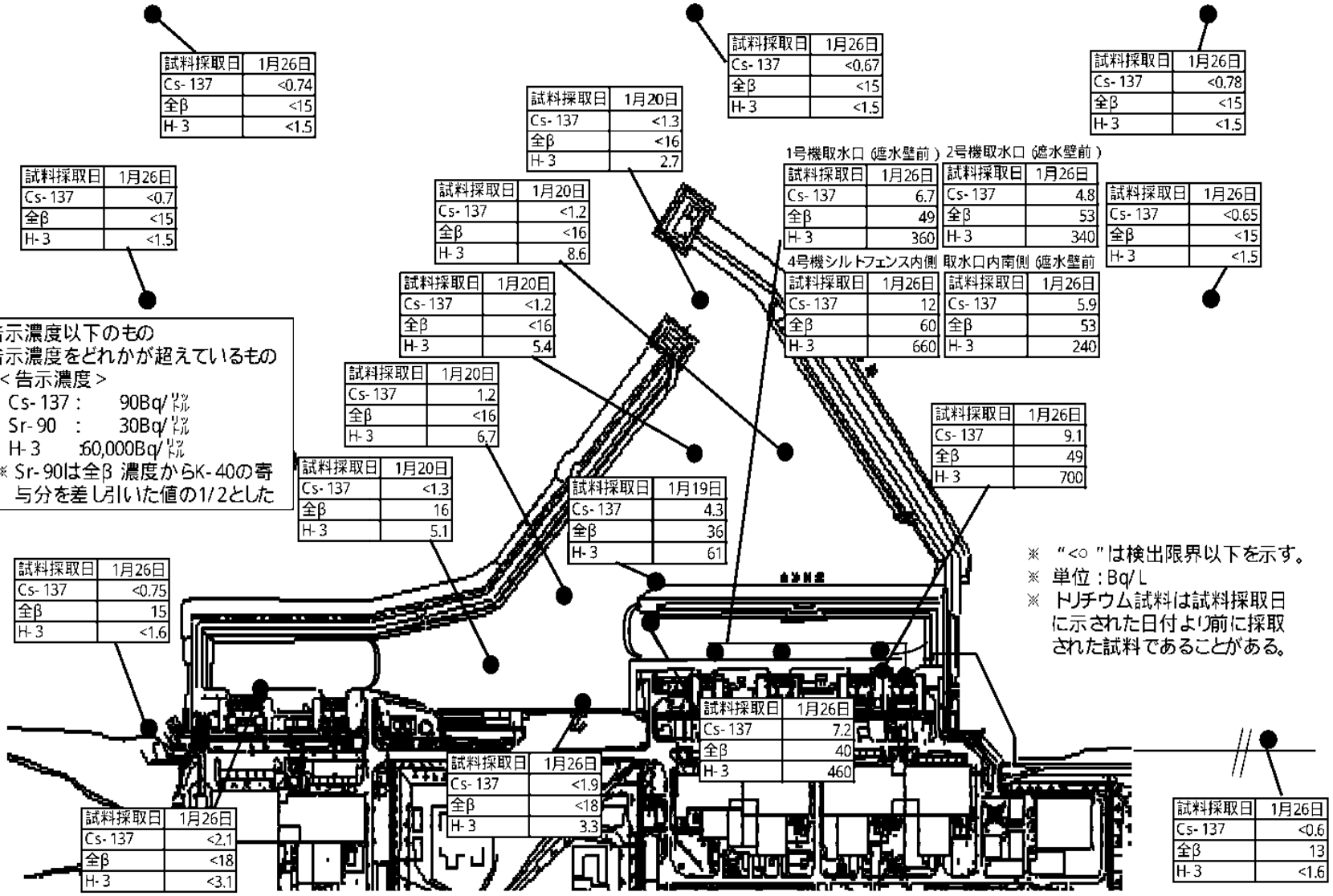
無断複写 転載禁止 東京電力株式会社

建屋周辺の地下水濃度測定結果



無断複写 転載禁止 東京電力株式会社

港湾内外の海水濃度



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港湾内外の海水濃度の状況

＜１～４号機取水口エリア＞

- 遮水壁内側の埋立工事の進捗に伴い、海側遮水壁の内側では3月以降、H-3、全β濃度の上昇が見られ、現在は高めの濃度で推移している。
- 遮水壁の外側についてはCs-137、H-3、全β濃度とも東波除堤北側と同レベルで低い濃度で推移している。

＜港湾内エリア＞

- 緩やかな低下が見られる。

＜港湾口、港湾外エリア＞

- これまでの変動の範囲で推移。

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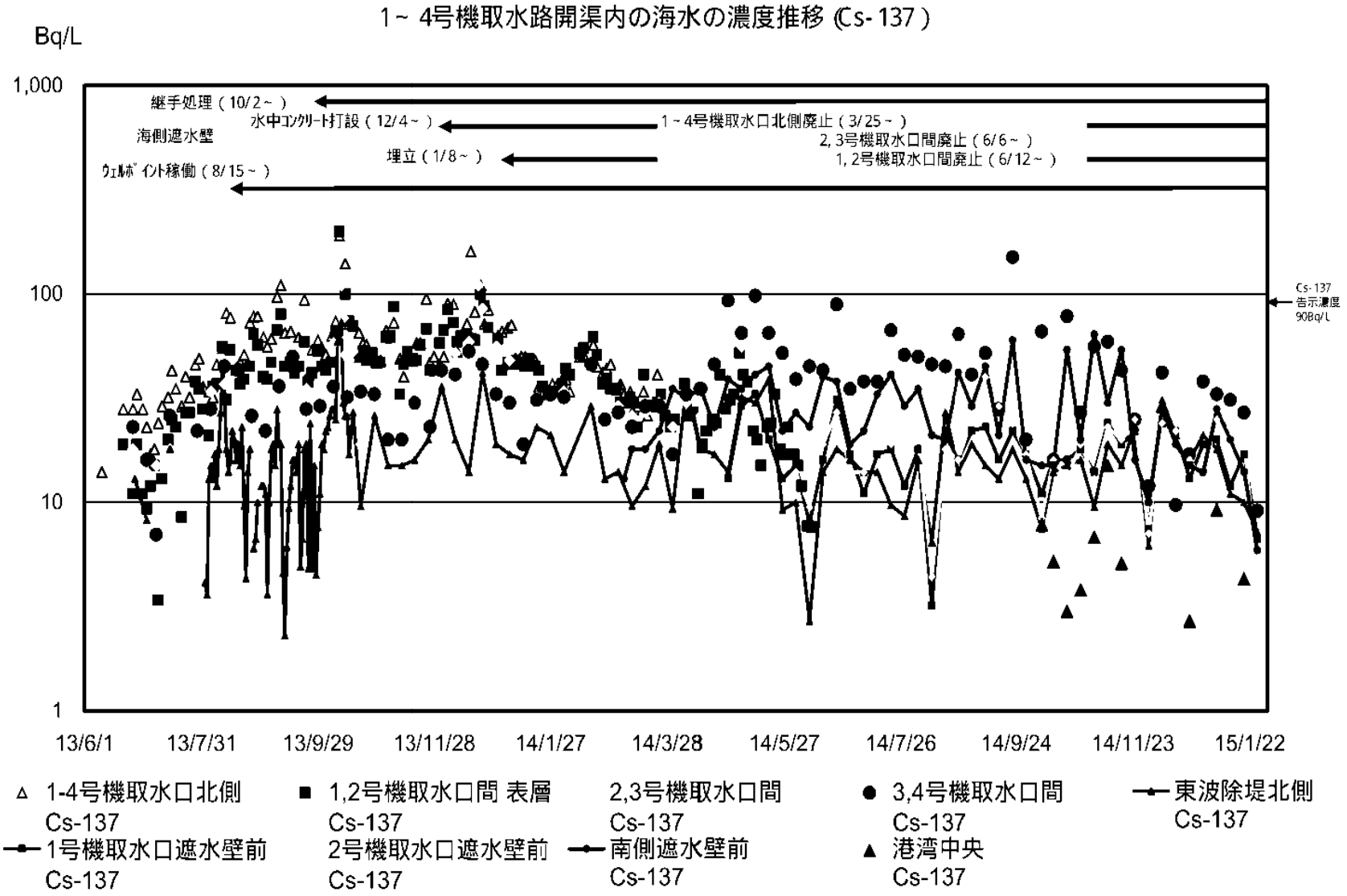
1～4号機取水路開渠内の海水の濃度推移(1/3)



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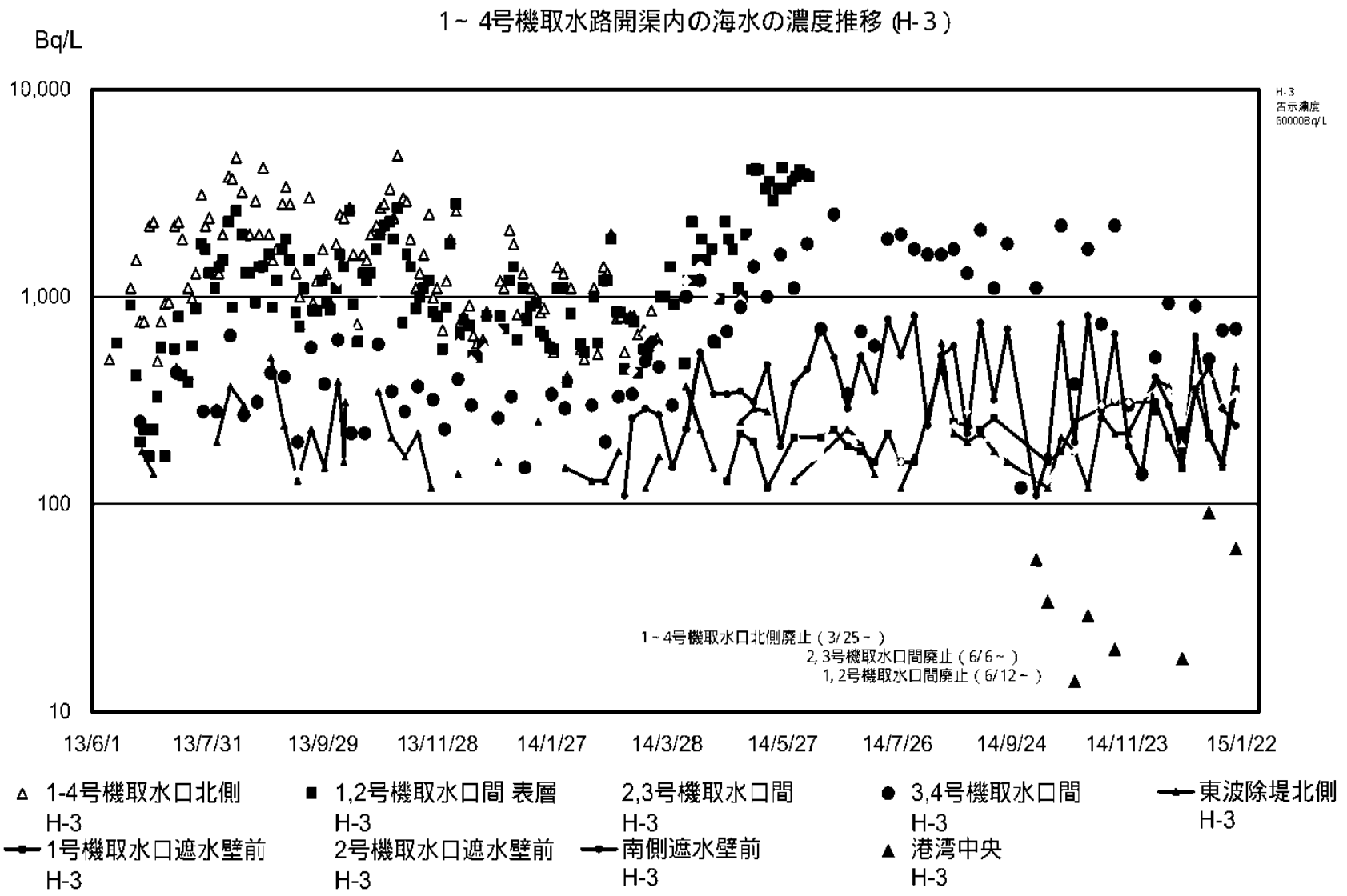
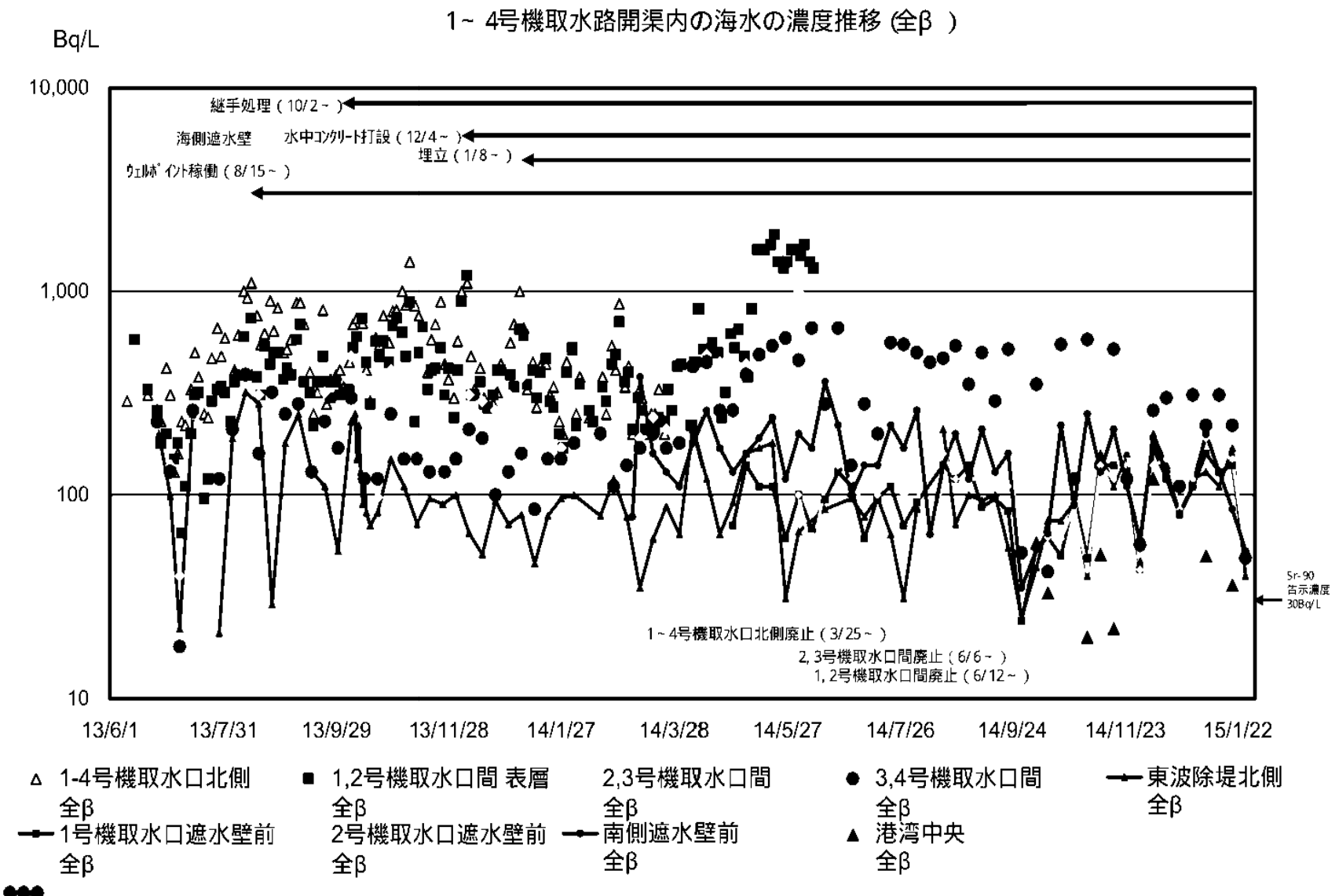
無断複写 転載禁止 東京電力株式会社

1～4号機取水路開渠内の海水の濃度推移(2/3)



無断複写 転載禁止 東京電力株式会社

1～4号機取水路開渠内の海水の濃度推移(3/3)



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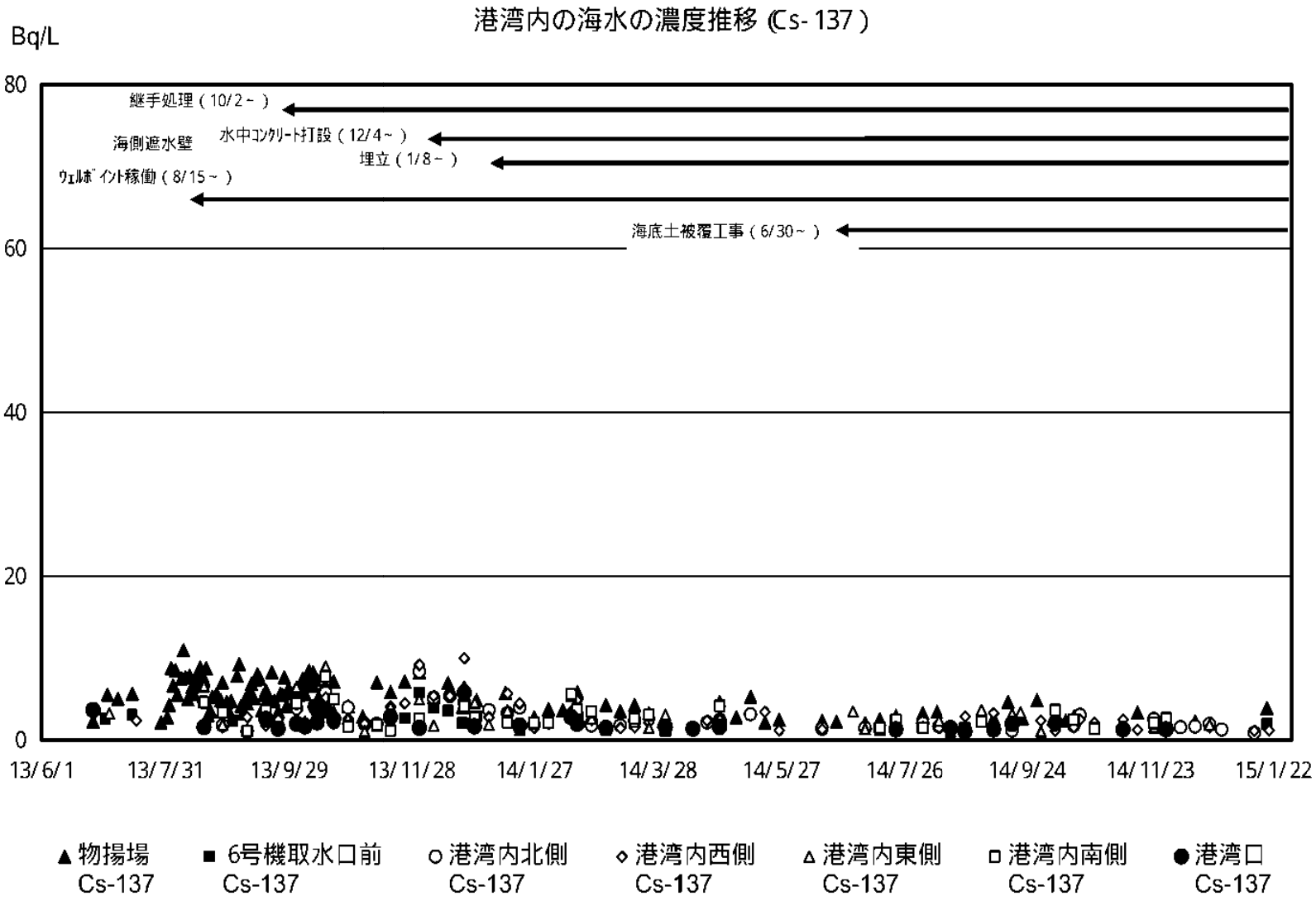
港湾内の海水の濃度推移(1/3)



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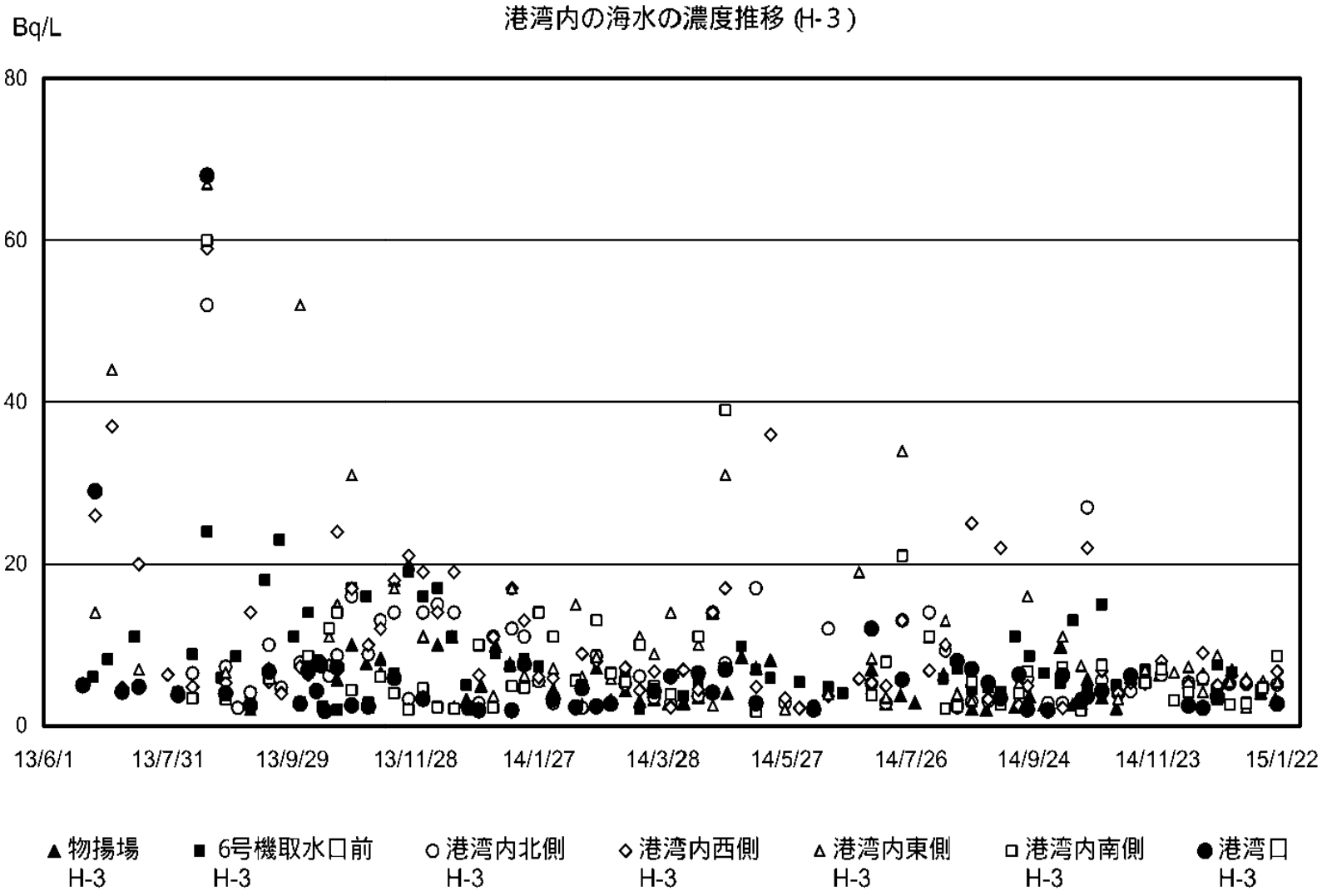
港湾内の海水の濃度推移(2/3)



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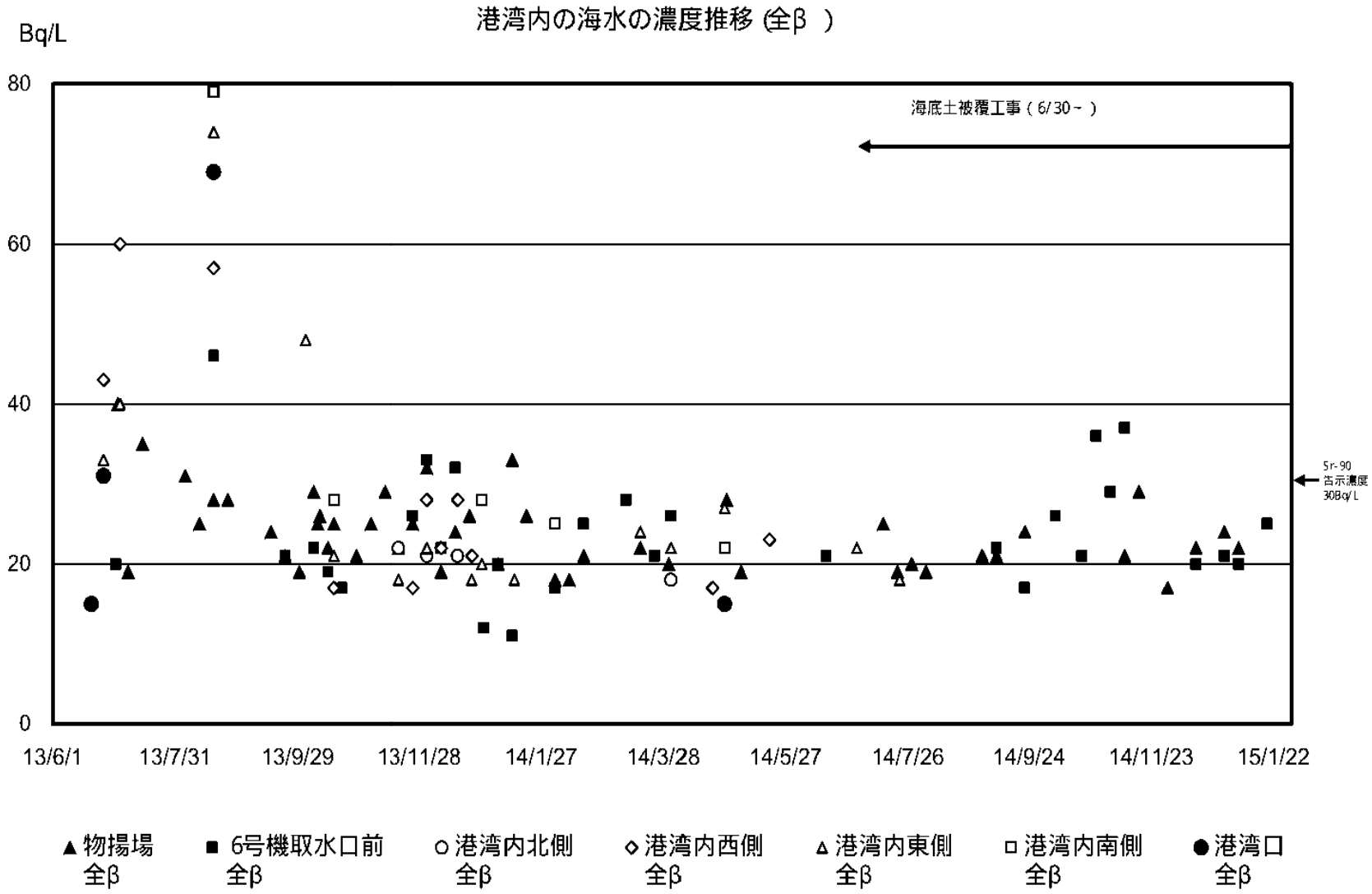
港湾内の海水の濃度推移(3/3)



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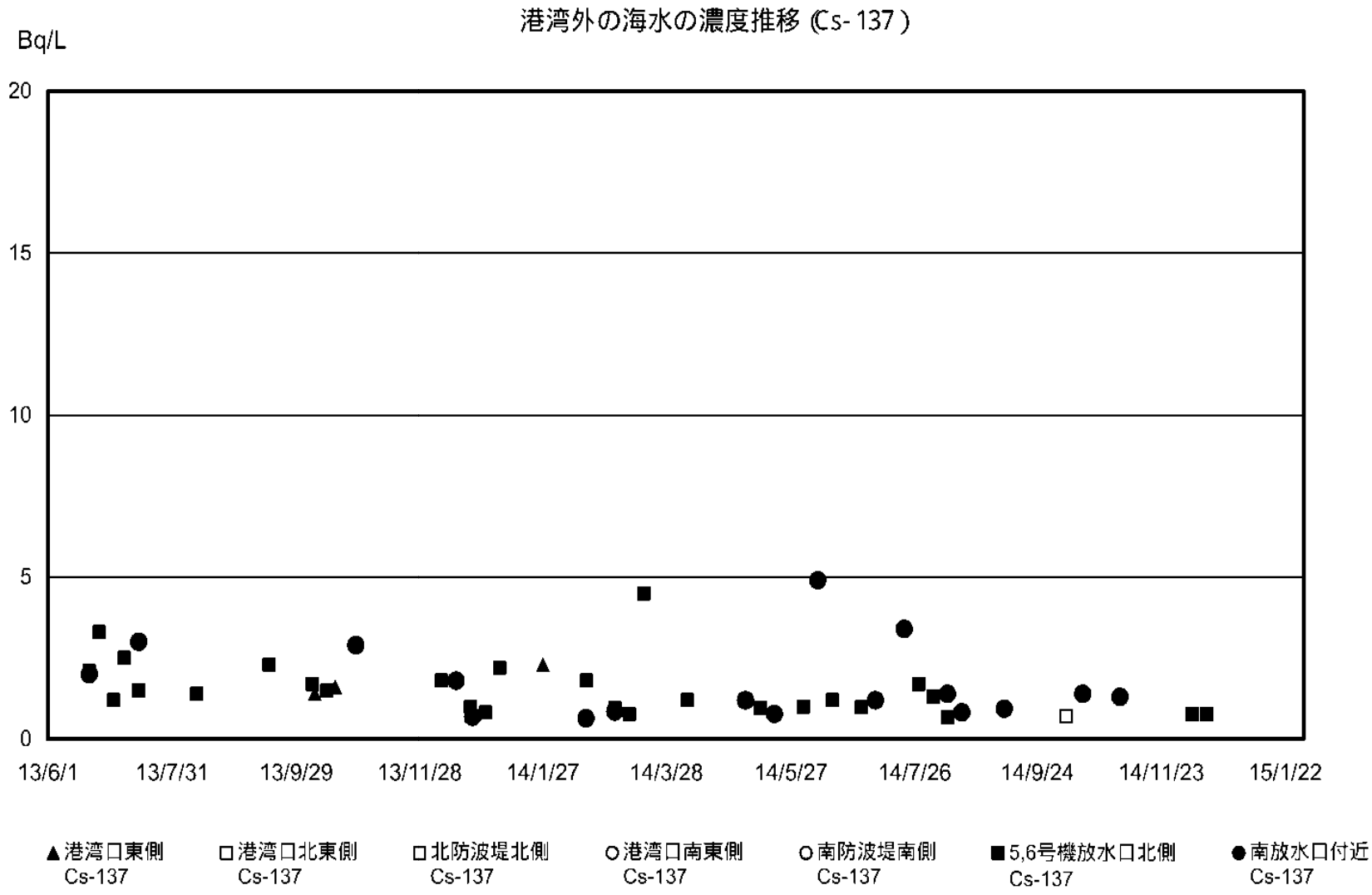
港湾外の海水の濃度推移(1/3)



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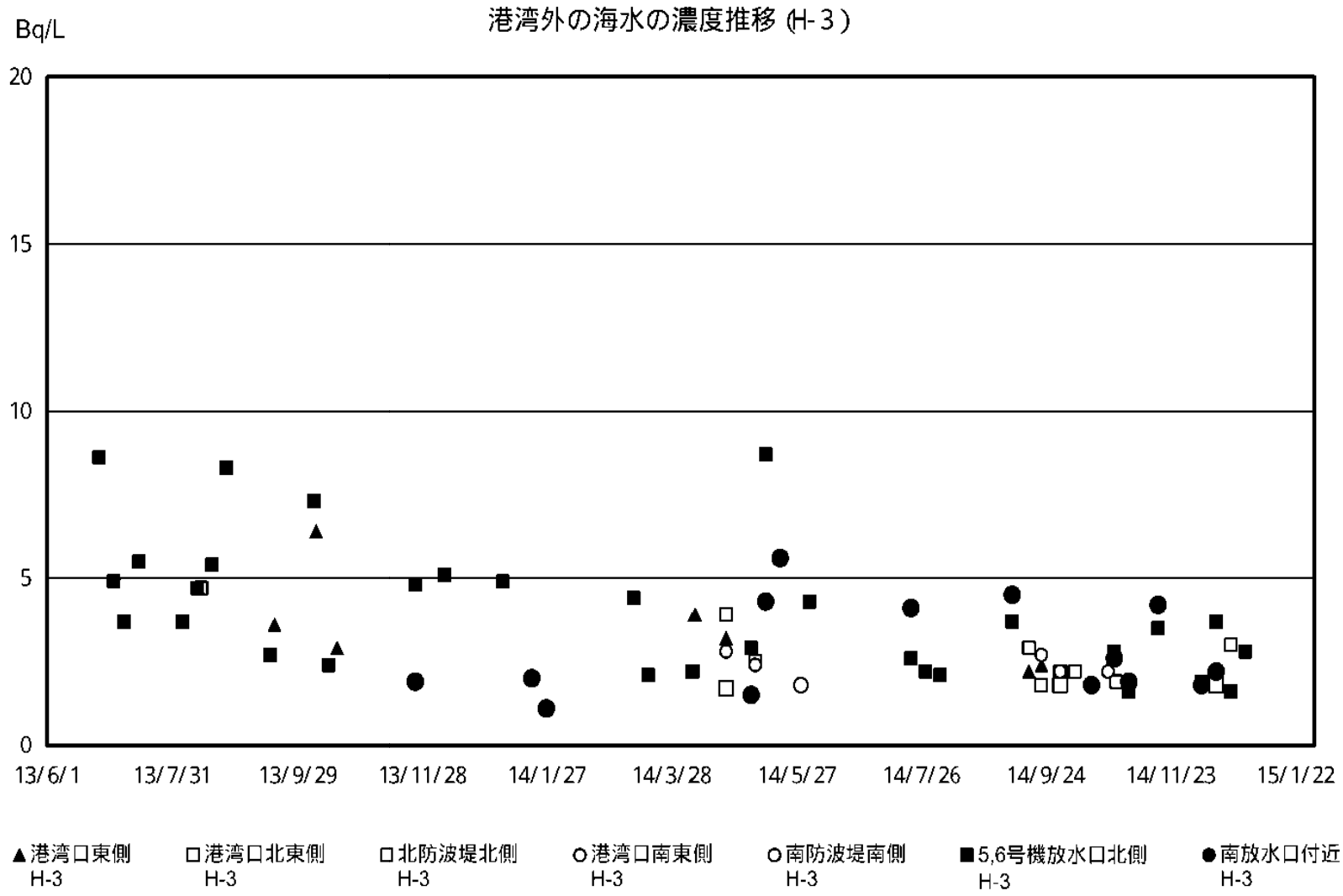
港湾外の海水の濃度推移(2/3)



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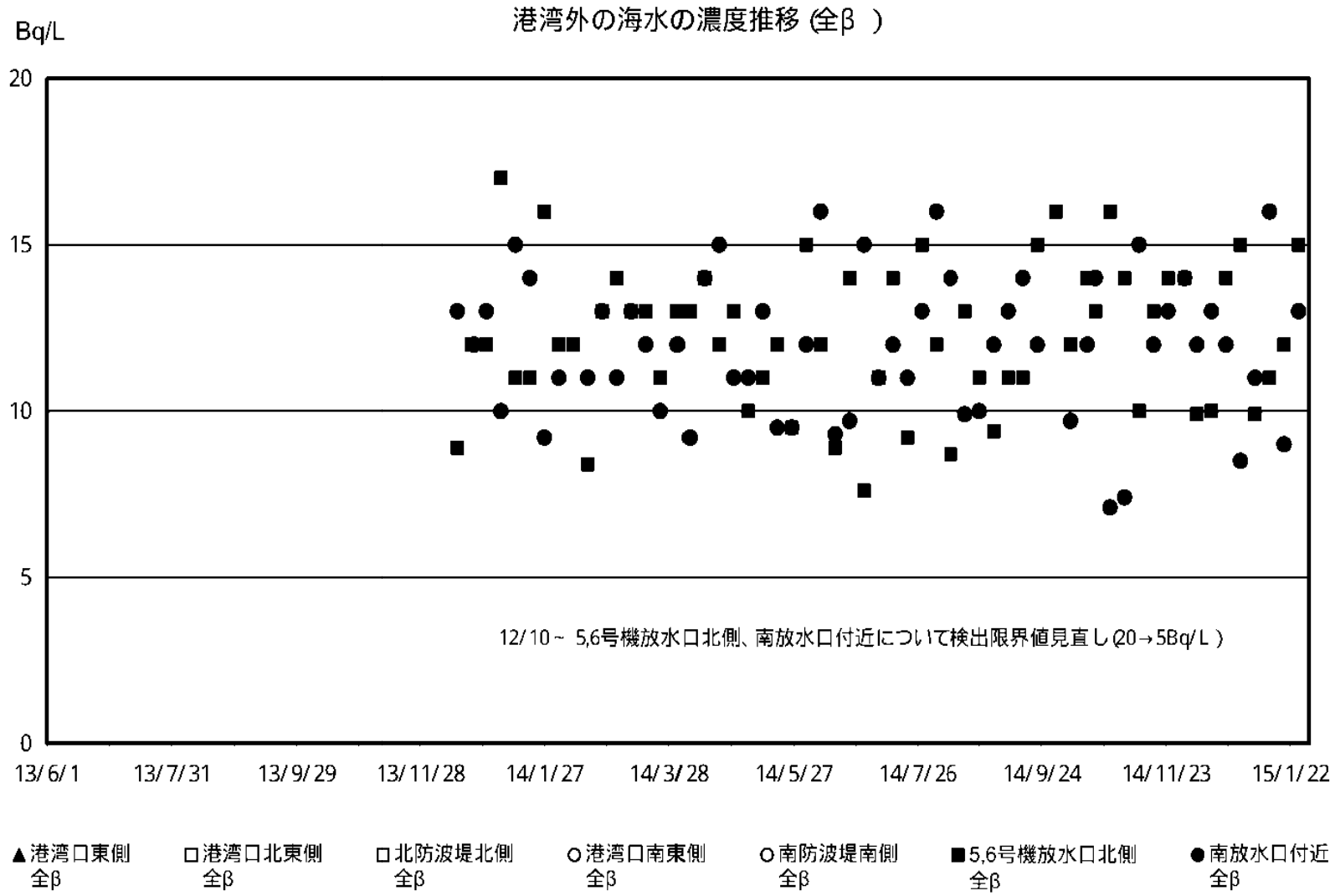
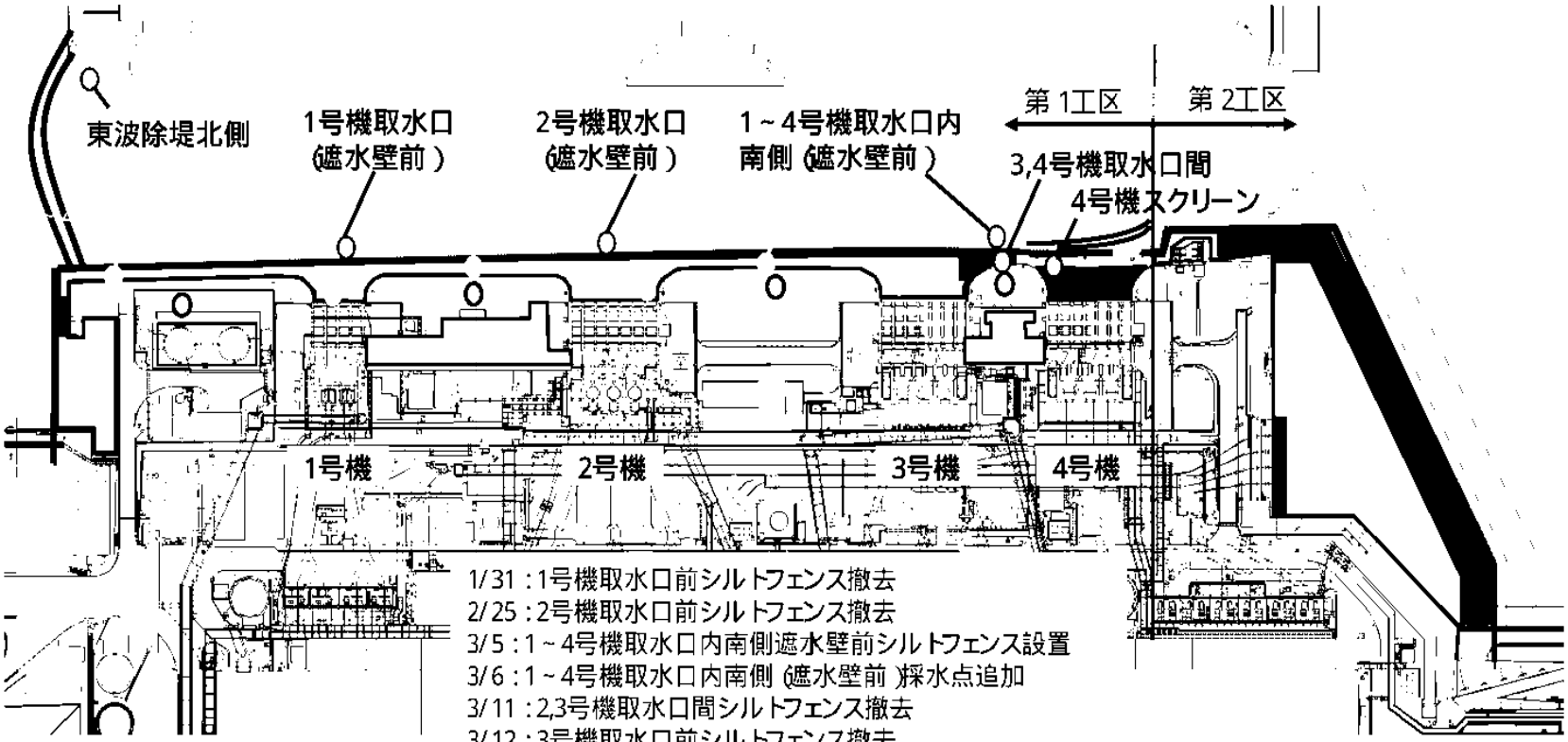
港湾外の海水の濃度推移(3/3)



無断複写 転載禁止 東京電力株式会社

海側遮水壁設置工事の進捗と海水採取点の見直し



1/31 : 1号機取水口前シルトフェンス撤去
2/25 : 2号機取水口前シルトフェンス撤去
3/5 : 1~4号機取水口内南側遮水壁前シルトフェンス設置
3/6 : 1~4号機取水口内南側 (遮水壁前)採水点追加
3/11 : 2,3号機取水口間シルトフェンス撤去
3/12 : 3号機取水口前シルトフェンス撤去
3/25 : 1~4号機取水口北側採取点廃止
3/27 : 1号機取水口前シルトフェンス内側採取点廃止
4/19 : 2号機取水口前シルトフェンス内側採取点廃止
4/28 : 1号機取水口 (遮水壁前)採水点追加
5/18 : 3号機取水口前シルトフェンス内側採取点廃止
6/2 : 2号機取水口 (遮水壁前)採水点追加
6/6 : 2,3号機取水口間採取点廃止
6/12 : 1,2号機取水口間採取点廃止
6/23 : 4号機取水口前シルトフェンス撤去

	施工中	施工済
埋立 水中コン		
埋立 割栗石		
舗装		

(1月28日時点)

シルトフェンス
鋼管矢板打設完了
継手処理完了
(1月28日時点)

海水採取点
地下水採取点
(1月28日時点)

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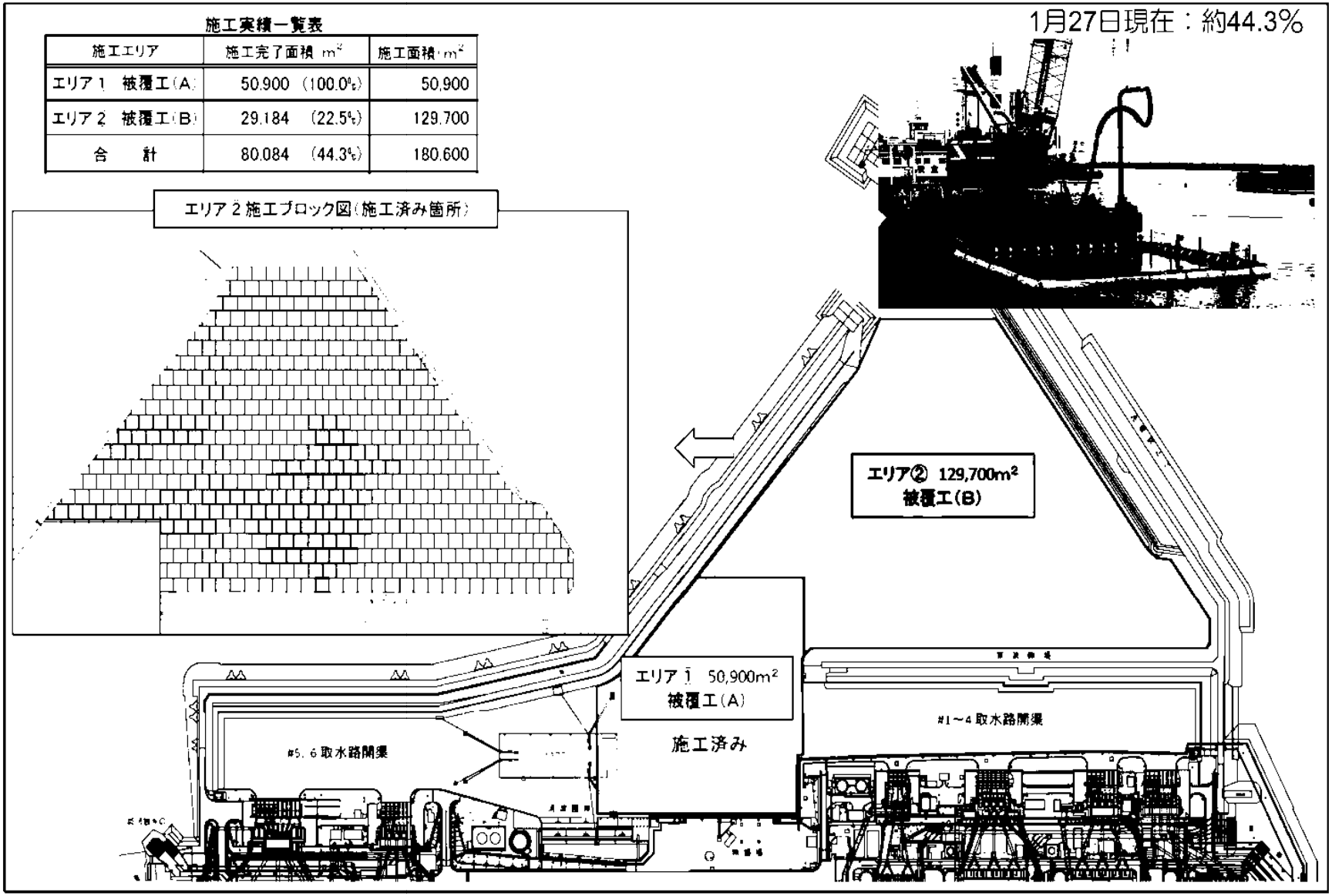
港湾内海底土被覆工事進捗状況

施工実績一覧表

施工エリア	施工完了面積 m^2	施工面積 m^2
エリア１　被覆工(A)	50,900　(100.0%)	50,900
エリア２　被覆工(B)	29,184　(22.5%)	129,700
合　　計	80,084　(44.3%)	180,600

1月27日現在：約44.3%

エリア２施工ブロック図（施工済み箇所）



無断複写 転載禁止 東京電力株式会社

Cs・Sr吸着繊維による海水浄化について

平成27年1月22日

東京電力株式会社

東京電力
TEPCO

セシウム・ストロンチウム吸着繊維による海水浄化について

目的

１～４号機取水口付近は、現在もセシウム、ストロンチウム濃度が高いレベル。

昨年度、３号機取水口前に繊維状セシウム吸着材を設置して浄化試験を実施したが、現在はストロンチウムの濃度がセシウムより高い状況。

今年度は、セシウム吸着材に加えてストロンチウム吸着材を併せて、海水中放射能濃度の高い４号機取水口付近に設置し、性能を評価。

評価結果に応じて、設置範囲の拡大等を検討。

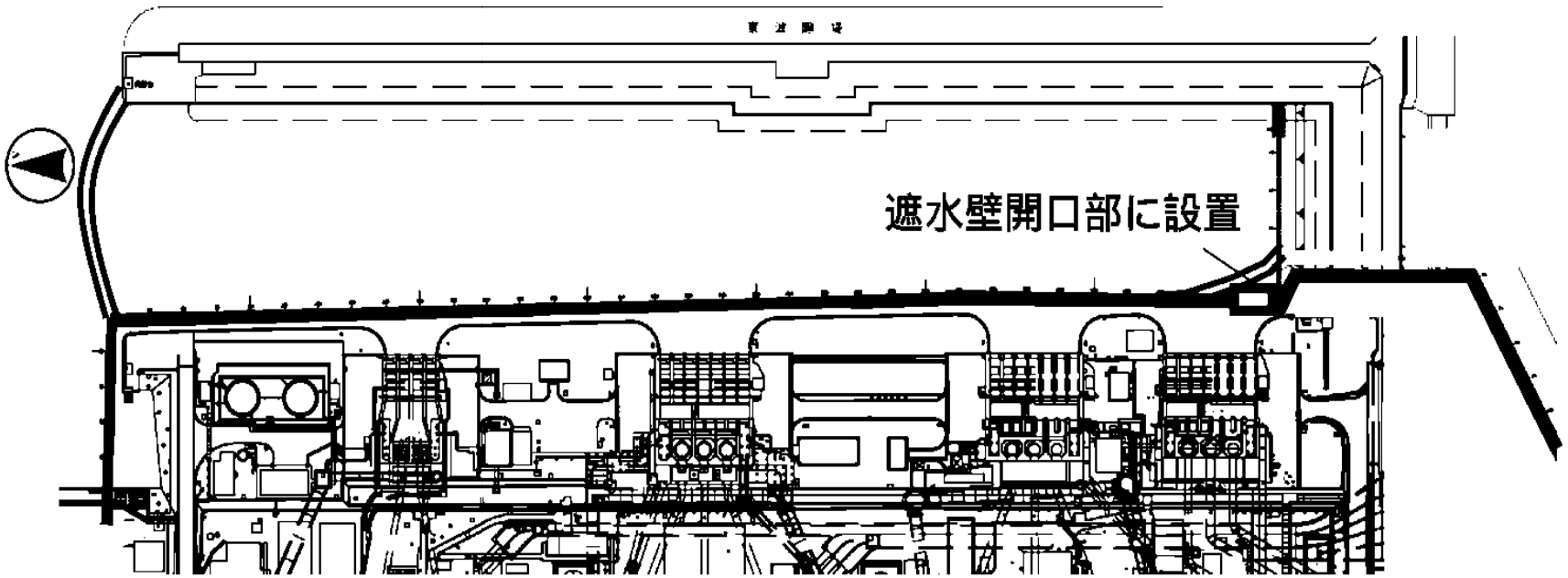
■期待される効果

セシウムに加え、ストロンチウムの除去能力について評価し、取水路のセシウム、ストロンチウムの濃度低減につなげる。

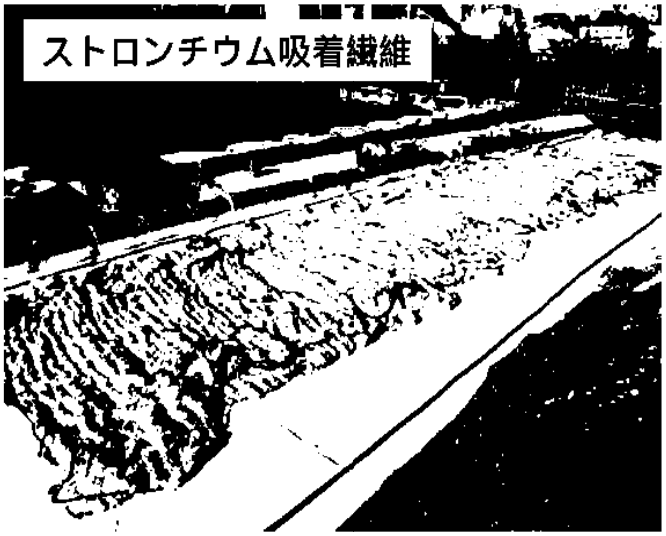
海水中の安定化ストロンチウムと放射性ストロンチウムの吸着割合を評価

設置場所について(1/2)

・海水中放射能濃度が高く、潮汐による海水の流動が大きい、
遮水壁開口部 (4 号機取水路前) 付近に設置
(分析・性能評価用のサンプルも併せて設置)

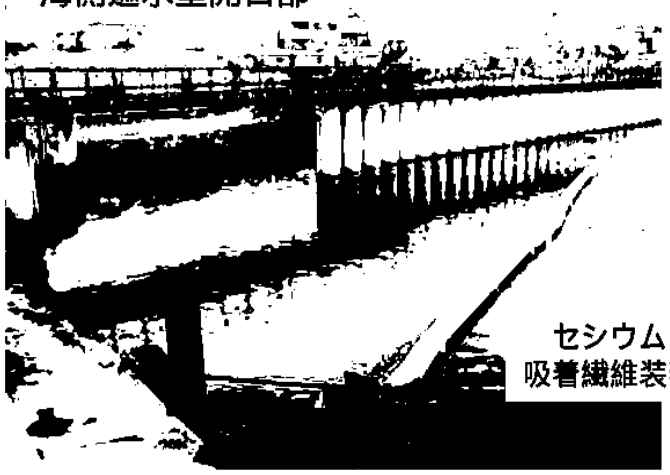


設置場所について(2/2)



ストロンチウム吸着繊維と
重ね合わせて固定化

海側遮水壁開口部



海側遮水壁開口部

分析・性能評価用のサンプル

セシウム・ストロンチウム
吸着繊維装着カーテン状ネット

海水浄化の実施スケジュール

■実施概要

H26年11月20日

・ストロンチウム吸着繊維 (簡易型、1 m× 1 m) を4号機取水路前の遮水壁開口部近傍に設置

(ストロンチウム吸着繊維は実海水中への投入実績がないため先行して実施)

H26年12月~H27年1月

・セシウム・ストロンチウム吸着繊維を取り付けたカーテン状ネット (20 m× 5 m) を遮水壁開口部に設置 (H26年12月: 準備、H27年1月15日: 浸漬)

・分析用として、セシウム・ストロンチウム吸着繊維単体 (5m) も設置

H27年1月~7月

・2週間~1ヶ月に1回引き揚げ、分析・性能評価を実施

・繊維への核種吸着量の測定等の性能評価を実施 (約 6ヶ月)

平成２７年１月２９日
環境線量低減対策

原子炉建屋からの追加的放出量の評価結果（平成２７年１月）

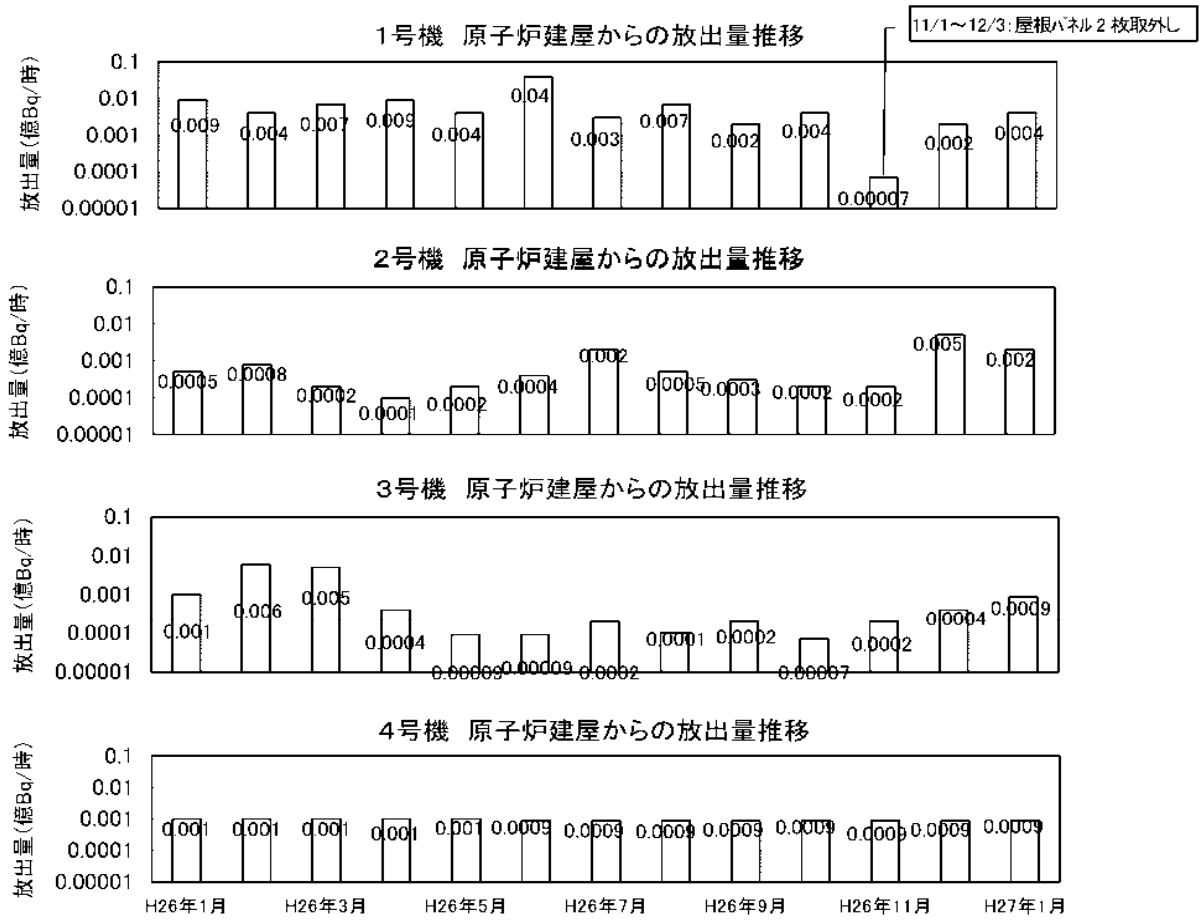
○ １～４号機原子炉建屋からの現時点の放出量（セシウム）を、原子炉建屋上部等の空気中放射性物質濃度（ダスト濃度）を基に評価。（各号機の採取地点は別紙参照）

○ １～４号機の大物搬入口は閉塞の状態で測定。

○ １～４号機建屋からの現時点の放出による敷地境界における被ばく線量は 0.03mSv/年以下と評価。

○ 被ばく線量は、原子炉建屋上部等の空気中放射性物質濃度を基に算出した１～４号機の放出量の合計値は0.008億ベクレル/時であり、原子炉の状態が安定していることから、0.１億ベクレル/時以下と評価している。

○ 号機毎の推移については下記のグラフの通り。



○ 本放出による敷地境界の空気中の濃度は、Cs-134及びCs-137ともに1.4×10^{-9}（Bq/cm^3）と評価。

（※ 周辺監視区域外の空気中の濃度限度：Cs-134・・・2×10^{-5}、Cs-137・・・3×10^{-5}（Bq/cm^3）
※ １F敷地境界周辺のダスト濃度「実測値」：
Cs-134・・・ND（検出限界値：約1×10^{-7}）、Cs-137・・・ND（検出限界値：約2×10^{-7}）（Bq/cm^3））

（備考）

- 希ガスについては、格納容器ガス管理設備における分析結果から放出量を評価しているが、放出されるガンマ線実効エネルギーがセシウムに比べて小さく、被ばく経路も放射性雲の通過による外部被ばくのみとなるため、これによる被ばく線量は、セシウムによる線量に比べて極めて小さいと評価している。
- 1 号機の放出量の増加は、建屋カバー屋根パネル２枚復旧に伴う、ダスト採取点及び評価方法の変更によるものである。
  （1 月は、評価期間全体（12/13～1/7）について建屋カバーが有る状態として建屋カバー内でのダスト測定値と評価期間の平均風速から求めた建屋カバーの漏えい量から放出量を求めた（10 月と同じ評価）。12 月は、建屋カバーが無いと仮定した状態（11/21～12/3）と建屋カバーが有る状態（12/4～12/12）の放出量を日数に応じて平均して求めた。）
- 2 号機の放出量の変動については、風速の増減により建屋内のダスト濃度及びブローアウトパネル隙間の漏洩率が影響を受けたことによるものと評価している。
- 3号機の放出量の増加については、機器ハッチにおけるダスト濃度のバラつきによる影響が大きかったものと評価している。

別紙

1～4号機原子炉建屋からの
追加的放出量評価結果　平成27年1月評価分
（詳細データ）

東京電力
TEPCO

1. 放出量評価について

放出量評価値（1月評価分）

単位：億Bq/時

	原子炉建屋上部		PCVガス管理sys	公表予定値
	原子炉直上部	機器ハッチ部		
1号機	0.0032		9.9E-7以下（希ガス0.24）	**0.004**
2号機	0.0011以下		8.7E-7以下（希ガス11以下）	**0.002**
3号機	0.000016以下	0.00080	1.0E-6以下（希ガス12以下）	**0.0009**
4号機	0.00085以下		-	**0.0009**
合計				約0.1以下(0.008)

放出量評価値（12月評価分）

単位：億Bq/時

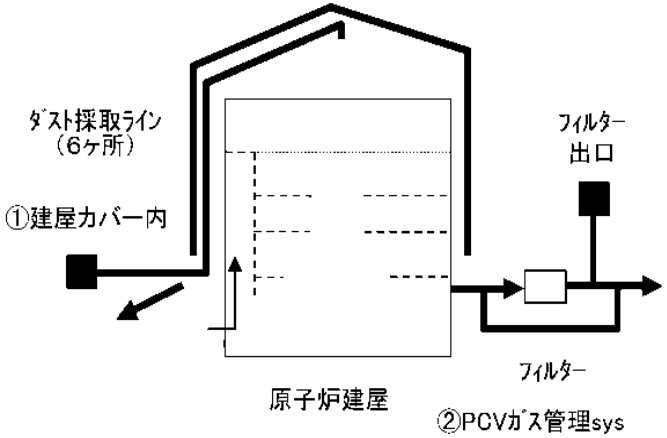
	原子炉建屋上部		PCVガス管理sys	公表予定値
	原子炉直上部	機器ハッチ部		
1号機	0.0014以下		9.0E-7以下（希ガス0.19）	**0.002**
2号機	0.0049以下		9.2E-7以下（希ガス11以下）	**0.005**
3号機	0.000059	0.00025以下	1.3E-6（希ガス13以下）	**0.0004**
4号機	0.00083以下		-	**0.0009**
合計				約0.1以下(0.009)

2.1　1号機の放出量評価

1.ダスト等測定結果

①建屋カバー内（単位Bq/cm^3）

採取日	核種	北東 コーナー	北西 コーナー	南西 コーナー	南側 上部	機器 ハッチ上	北側上部 フィルター入口
前回	Cs-134	3.8E-6	4.2E-6	3.0E-6	6.8E-6	5.4E-6	ND(8.8E-7)
	Cs-137	1.6E-5	1.3E-5	1.0E-5	2.5E-5	2.1E-5	ND(1.3E-6)
1/7	Cs-134	4.8E-6	5.7E-6	4.2E-6	**6.1E-6**	6.7E-6	ND(8.6E-7)
	Cs-137	1.8E-5	2.2E-5	1.5E-5	**2.7E-5**	2.3E-5	ND(1.2E-6)



②PCVガス管理sys

採取日	核種	PCVｶﾞｽ管理sys 出口 (Bq/cm^3)	流量 (m^3/h)
前回	Cs-134	ND(1.6E-6)	21
	Cs-137	ND(2.7E-6)	
1/7	Cs-134	**ND(1.7E-6)**	22
	Cs-137	**ND(2.8E-6)**	

採取日	核種	PCVｶﾞｽ管理sys 出口 (Bq/cm^3)	流量 (m^3/h)
前回	Kr-85	9.1E-1	21
1/7	Kr-85	**1.1E0**	**22**

赤字の数値を放出量評価に使用
（複数の測定結果がある場合は、Cs134+Cs137合計値が一番高い箇所を採用）

2.建屋カバー漏洩率評価

9,706m^3/h （12/13～1/7）

3.放出量評価

建屋カバーからの放出量	＝(6.1E-6+2.7E-5) ×9706 ×1E6 ×1E-8	＝3.2E-3億Bq/時
PCVガス出口(Cs)	＝(1.7E-6+2.8E-6) ×22E6 ×1E-8	＝9.9E-7億Bq/時以下
PCVガス出口(Kr)	＝1.1E0 ×22E6 ×1E-8	＝2.4E-1億Bq/時
PCVガス出口(Kr被ばく線量)	＝2.4E+7 ×24 ×365 ×2.5E-19 ×0.0022 /0.5 ×1E3	＝2.3E-7mSv/年

（参考）1号機の放出量評価　12月と1月評価の相違点

○1号機については、12月と1月の測定でダスト測定箇所、放出流量評価方法を変更している。

12月評価：　評価期間のうち、11/21～12/3については建屋カバーが無い状態（屋根パネル2枚取り外し）として、原子炉直上部でダスト採取を行い蒸気発生量により原子炉直上部からの放出量を算出し、機器ハッチ上部のダスト測定値と評価期間の平均風速による建屋（機器ハッチ）からの漏洩量により機器ハッチからの放出量を算出。12/4～12/12については建屋カバーが有る状態として、建屋カバー内の連続ダストモニタの採取場所のダスト測定値と評価期間の平均風速による建屋カバーからの漏洩量により建屋カバーからの放出量を算出。

1月評価：　建屋カバーが有る状態として、建屋カバー内の連続ダストモニタの採取場所のダスト測定値と評価期間の平均風速による建屋カバーからの漏洩量により建屋カバーからの放出量を算出。

各月（10月～1月）の評価において使用したデータ

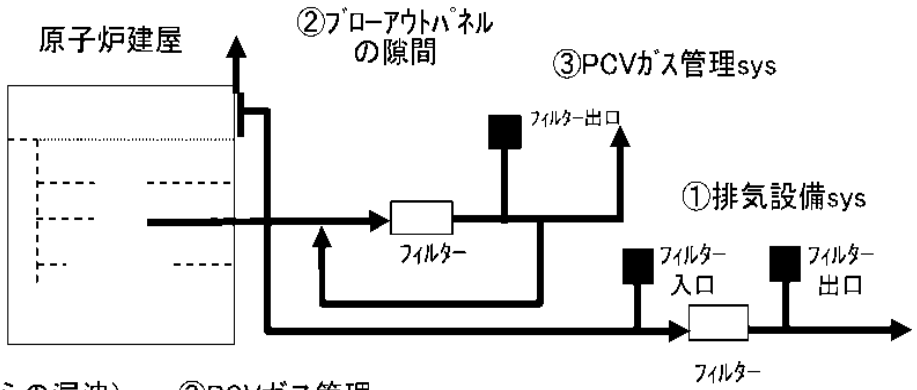
	10月評価	11月評価		12月評価			1月評価
評価期間	10/1～10/31	11/1～11/20		11/21～12/3		12/4～12/12	12/13～1/7
ダスト濃度 [Bq/cm3] (Cs-134 +Cs-137)	建屋カバー内連続ダストモニタ採取口	原子炉直上部	機器ハッチ	原子炉直上部	機器ハッチ	建屋カバー内連続ダストモニタ採取口	建屋カバー内連続ダストモニタ採取口
	3.9E-5	1.6E-5	2.4E-6	4.6E-6	1.8E-6	3.2E-5	3.3E-5
放出流量 [m3/h]	建屋カバーからの漏洩量	蒸気発生量	機器ハッチからの漏洩量	蒸気発生量	機器ハッチからの漏洩量	建屋カバーからの漏洩量	建屋カバーからの漏洩量
	9,527	252	969	252	1,130	10,604	9,706

2.2 2号機の放出量評価

1.ダスト等測定結果

①排気設備sys出口ダスト測定結果

採取日	核種	(Bq/cm³)	流量m³/h)
前回	Cs-134	ND(3.1E-7)	10,000
	Cs-137	ND(5.4E-7)	
1/9	Cs-134	ND(3.5E-7)	10,000
	Cs-137	ND(5.7E-7)	



②排気設備sys入口ダスト測定結果(ﾌﾞﾛｰｱｳﾄﾊﾟﾈﾙの隙間からの漏洩)

採取日	核種	(Bq/cm³)	採取日	核種	(Bq/cm³)
前回	Cs-134	7.3E-6	1/9	Cs-134	**7.4E-6**
	Cs-137	2.1E-5		Cs-137	**2.2E-5**

③PCVガス管理sys

採取日	核種	(Bq/cm³)	流量(m³/h)
前回	Cs-134	ND(1.8E-6)	20
	Cs-137	ND(2.8E-6)	
1/9	Cs-134	ND(1.8E-6)	19
	Cs-137	**ND(2.8E-6)**	

採取日	核種	(Bq/cm³)	流量(m³/h)
前回	Kr-85	ND(5.7E1)	20
1/9	Kr-85	**ND(5.7E1)**	19

2.ﾌﾞﾛｰｱｳﾄﾊﾟﾈﾙの隙間の漏洩率評価

測定日	R/B1FL開口部の流入量(m³/h)	漏洩率評価(m³/h) (排気設備の流量10,000m³/h)
前回	26,817	16,817
1/9	13,297	**3,297**

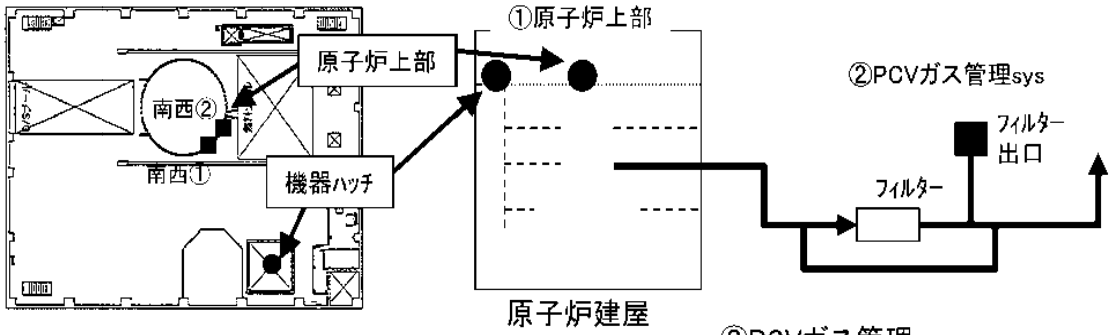
赤字の数値を放出量評価に使用

3.放出量評価

排気設備出口	=(3.5E-7+5.7E-7) × 10000 × 1E6 ×1E-8	= 9.2E-5億Bq/時以下
BOP隙間等	=(7.4E-6+2.2E-5) × 3297 ×1E6 ×1E-8	= 9.7E-4億Bq/時
PCVガス出口(Cs)	=(1.8E-6+2.8E-6) × 19E6 × 1E-8	= 8.7E-7億Bq/時以下
PCVガス出口(Kr)	= 5.7E1 ×19E6 ×1E-8	= 1.1E+1億Bq/時以下
PCVガス出口(Kr被ばく線量)	= 1.1E9 ×24 ×365 ×2.4E-19 ×0.0022 /0.5 ×1E3	= 1.0E-5mSv/年以下

2.3 3号機の放出量評価

1.ダスト等測定結果



①原子炉上部(単位Bq/cm³)

採取日	核種	原子炉直上部		機器ハッチ	
		南西①	南西②	上部	流量(m/s)
前回	Cs-134	3.6E-6	4.3E-6	ND(1.9E-6)	0.06
	Cs-137	1.3E-5	1.4E-5	1.8E-6	
1/15	Cs-134	ND(1.8E-6)	**ND(1.9E-6)**	**4.8E-6**	**0.04**
	Cs-137	ND(2.8E-6)	**ND(3.0E-6)**	**1.3E-5**	

赤字の数値を放出量評価に使用
(複数の測定結果がある場合は、Cs134+Cs137合計値が一番高い箇所を採用)

②PCVガス管理sys

採取日	核種	PCVガス管理sys出口 (Bq/cm³)	流量 (m³/h)
前回	Cs-134	1.9E-6	21
	Cs-137	4.4E-6	
1/15	Cs-134	**ND(1.7E-6)**	**20**
	Cs-137	**3.4E-6**	

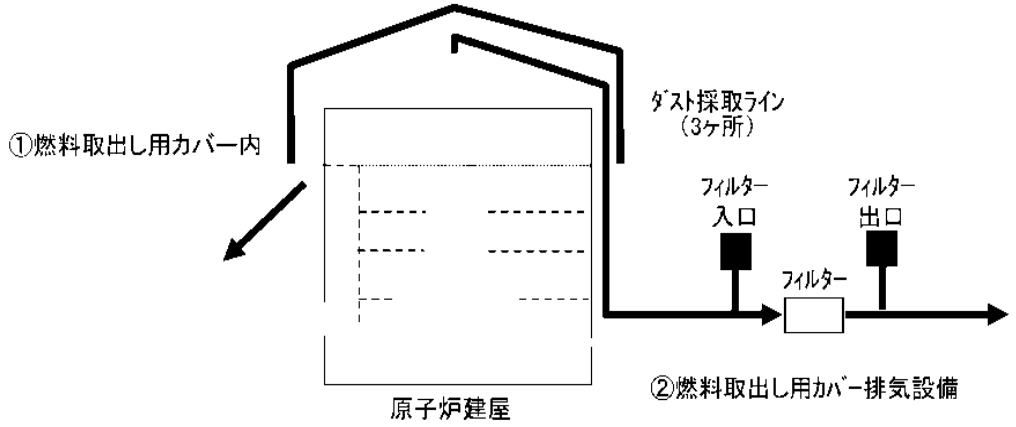
採取日	核種	PCVガス管理sys出口 (Bq/cm³)	流量 (m³/h)
前回	Kr-85	ND(6.3E1)	21
1/15	Kr-85	**ND(6.2E1)**	**20**

※原子炉直上部から放出流量は，H27.1.1現在の蒸気発生量(m³/s)を適用

2.放出量評価

放出量(原子炉直上部)	=(1.9E-6+3.0E-6) × 0.09 ※ ×1E6 ×3600 ×1E-8	= 1.6E-5億Bq/時以下
放出量(機器ハッチ)	=(4.8E-6+1.3E-5) ×(0.04×5.6 ×5.6)E6 × 3600 ×1E-8	= 8.0E-4億Bq/時
PCVガス出口(Cs)	=(1.7E-6+3.4E-6) ×20E6 ×1E-8	= 1.0E-6億Bq/時以下
PCVガス出口(Kr)	= 6.2E1 ×20E6 ×1E-8	= 1.2E1億Bq/時以下
PCVガス出口(Kr被ばく線量)	= 1.2E9 ×24 ×365 ×3.0E-19 ×0.0022 /0.5 ×1E3	= 1.4E-5mSv/年以下

2.4 4号機の放出量評価



1.ダスト等測定結果

①燃料取出し用カバー内
（燃料取出し用カバー排気設備入口）（単位Bq/cm³）

採取日	核種	SFP近傍	チェンジングプレイス近傍	カバー上部
前回	Cs-134	ND(5.9E-7)	ND(5.7E-7)	ND(5.6E-7)
	Cs-137	ND(9.4E-7)	ND(8.7E-7)	ND(8.8E-7)
1/6	Cs-134	**ND(5.7E-7)**	ND(5.5E-7)	ND(5.5E-7)
	Cs-137	**ND(9.4E-7)**	ND(8.7E-7)	ND(8.9E-7)

②燃料取出し用カバー排気設備出口

採取日	核種	燃料取出し用カバー排気設備出口 (Bq/cm³)	流量 (m³/h)
前回	Cs-134	ND(5.6E-7)	50,000
	Cs-137	ND(9.4E-7)	
1/6	Cs-134	**ND(5.7E-7)**	50,000
	Cs-137	**ND(9.4E-7)**	

赤字の数値を放出量評価に使用
（複数の測定結果がある場合は、Cs134+Cs137合計値が一番高い箇所を採用）

2.建屋カバー漏洩率評価

5,923m³/h （12/2～1/6）

3.放出量評価

燃料取出し用カバーからの漏洩量　＝ (5.7E-7+9.4E-7) ×5923 ×1E6×1E-8　＝ 8.9E-5億Bq/時以下

燃料取出し用カバー排気設備　＝ (5.7E-7+9.4E-7) ×50000 ×1E6 ×1E-8　＝ 7.6E-4億Bq/時以下

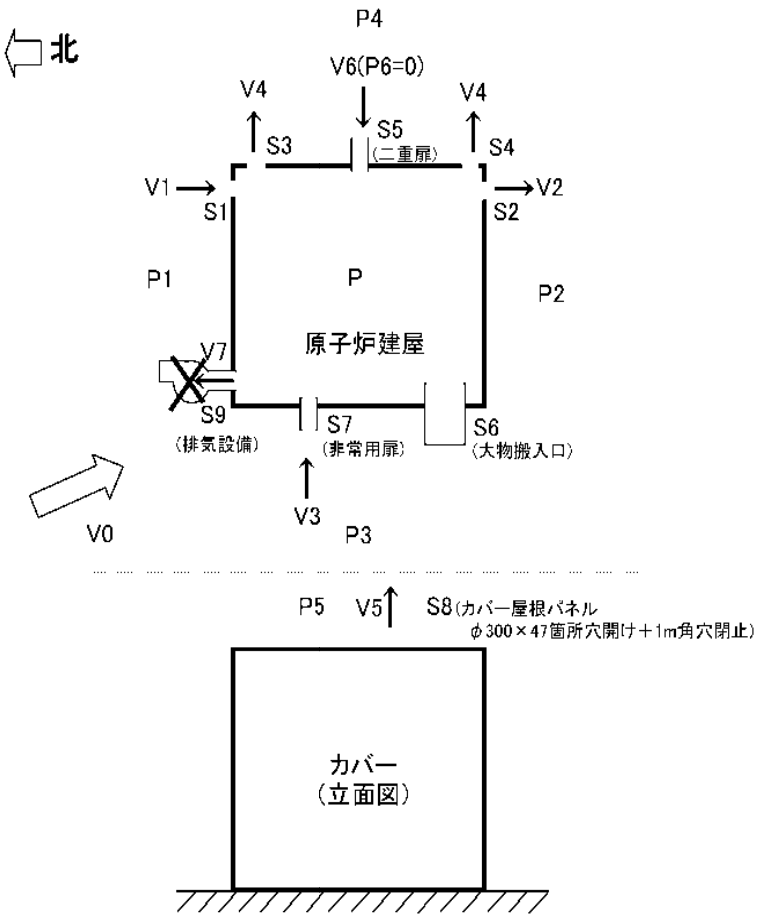
参考1　1号機建屋カバーの漏洩率評価

評価方法

空気漏洩量は外部風速、建屋内外圧差、隙間面積などから計算で求める。

計算例

1月7日　北北西　1.5m/s



V0:外気風速(m/s)
V1:カバー流出入風速(m/s)
V2:カバー流出入風速(m/s)
V3:カバー流出入風速(m/s)
V4:カバー流出入風速(m/s)
V5:カバー流出入風速(m/s)
V6:カバー流出入風速(m/s)
V7:排気風速(m/s)
P1:上流側圧力(北風)(Pa)
P2:下流側圧力(北風)(Pa)
P3:上流側圧力(西風)(Pa)
P4:下流側圧力(西風)(Pa)
P5:上部圧力(Pa)
P6:R/B内圧力(0Pa)
P:カバー内圧力(Pa)
S1:カバー隙間面積(m^2)
S2:カバー隙間面積(m^2)
S3:カバー隙間面積(m^2)
S4:カバー隙間面積(m^2)
S5:R/B二重扉開口面積(m^2)
S6:R/B大物搬入口開口面積(m^2)
S7:R/B非常用扉開口面積(m^2)
S8:カバー屋根開口面積(m^2)
S9:排気ダクト吸込面積(m^2)
ρ:空気密度(kg/m^3)
C1:風圧係数(北風上側)
C2:風圧係数(北風下側)
C3:風圧係数(西風上側)
C4:風圧係数(西風下側)
C5:風圧係数(上部)
ζ:形状抵抗係数

参考1　1号機建屋カバーの漏洩率評価

風速をVとすると、上流側、下流側の圧力は次のとおりとなる。

上流側(北風):P1=C1×ρ×V0^2/(2g) ・・・(1)
下流側(北風):P2=C2×ρ×V0^2/(2g) ・・・(2)
上流側(西風):P3=C3×ρ×V0^2/(2g) ・・・(3)
下流側(西風):P4=C4×ρ×V0^2/(2g) ・・・(4)
上部　　:P5=C5×ρ×V0^2/(2g) ・・・(5)

内圧をP、隙間部の抵抗係数をζとすると

P1−P=ζ×ρ×V1^2/(2g) ・・・(6)
P−P2=ζ×ρ×V2^2/(2g) ・・・(7)
P3−P=ζ×ρ×V3^2/(2g) ・・・(8)
P−P4=ζ×ρ×V4^2/(2g) ・・・(9)
P−P5=ζ×ρ×V5^2/(2g) ・・・(10)
P6−P=ζ×ρ×V6^2/(2g) ・・・(11)

空気流出入量のマスバランス式は

(V1×S1+V3×(S6+S7)+V6×S5)×3600=(V2×S2+V4×(S3+S4)+V5×S8)×3600

左辺と右辺の差を「Y」とすると

Y=(V1×S1+V3×(S6+S7)+V6×S5)×3600−(V2×S2+V4×(S3+S4)+V5×S8)×3600

V1、V2、V3、V4、V5、V6は(6)、(7)、(8)、(9)、(10)、(11)式により、Pの関数なので、「Y」がゼロになるようにPの値を調整する

V0 (m/s)	C1	C2	C3	C4	C5	ζ	ρ (kg/m^3)
1.51	0.80	-0.50	0.10	-0.50	-0.40	1.00	1.20

S1 (m^2)	S2 (m^2)	S3 (m^2)	S4 (m^2)	S5 (m^2)	S6 (m^2)	S7 (m^2)	S8 (m^2)	S9 (m^2)
1.20	1.20	1.20	1.10	0.29	0.00	0.00	3.32	2.88

P1 (Pa)	P2 (Pa)	P3 (Pa)	P4 (Pa)	P5 (Pa)	P6 (Pa)	P (Pa)
0.112313	-0.0702	0.014039	-0.0702	-0.05616	0	-0.05476

V1 (m/s)	V2 (m/s)	V3 (m/s)	V4 (m/s)	V5 (m/s)	V6 (m/s)	V7 (m/s)	Y (m^3/h)
1.652	0.502	1.060	0.502	0.151	0.946	0.000	0.00
IN	OUT	IN	OUT	OUT	IN	OUT(排気)	OK

※IN　:流入
OUT:流出

給気風量　8,130 m^3/h
排気ファン風量　0 m^3/h
漏洩量　8,130 m^3/h

参考1　1号機建屋カバーの漏洩率評価

週ごとの漏洩量評価（一例）

	1月3日			1月4日			1月5日			1月6日			1月7日			1月8日			1月9日		
	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)
西風	2.7	7.8	1,807	1.8	3.3	1,215	1.6	5.0	1,029	3.9	1.3	2,599	4.3	11.2	2,870	0.0	0.0		0.0	0.0	
西北西風	3.5	6.8	13,914	1.8	0.5	7,023	1.5	3.5	6,058	6.6	1.5	26,150	3.8	3.2	15,295	0.0	0.0		0.0	0.0	
北西風	3.4	3.7	15,563	1.2	1.7	5,428	1.2	2.3	5,700	3.3	0.5	15,464	1.8	1.5	8,351	0.0	0.0		0.0	0.0	
北北西風	1.4	0.7	7,651	1.6	5.0	8,805	1.6	2.3	8,667	3.3	1.3	17,852	1.5	1.2	8,130	0.0	0.0		0.0	0.0	
北風	0.0	0.0	0	2.1	2.5	11,164	1.5	1.0	8,075	2.3	1.3	11,980	1.5	1.5	7,841	0.0	0.0		0.0	0.0	
北北東風	0.0	0.0	0	2.1	2.8	18,239	2.5	0.7	21,869	4.3	0.2	37,242	1.6	0.5	13,569	0.0	0.0		0.0	0.0	
北東風	0.8	0.5	7,926	1.5	0.7	13,791	2.8	3.2	26,581	0.0	0.0	0	1.9	0.3	17,595	0.0	0.0		0.0	0.0	
東北東風	0.0	0.0	0	0.5	0.2	4,873	3.1	0.7	30,456	0.0	0.0	0	0.6	0.2	5,848	0.0	0.0		0.0	0.0	
東風	0.0	0.0	0	0.0	0.0	0	1.9	0.3	16,344	0.0	0.0	0	1.1	0.2	9,718	0.0	0.0		0.0	0.0	
東南東風	1.7	0.2	16,568	0.0	0.0	0	1.6	0.2	15,593	0.0	0.0	0	1.5	0.2	14,619	0.0	0.0		0.0	0.0	
南東風	1.1	0.2	10,462	0.0	0.0	0	1.8	0.5	17,120	2.5	0.2	23,777	2.0	0.2	19,022	0.0	0.0		0.0	0.0	
南南東風	0.0	0.0	0	0.0	0.0	0	1.5	0.2	12,992	3.1	1.7	27,109	1.9	0.3	16,456	0.0	0.0		0.0	0.0	
南風	1.3	0.2	6,846	0.0	0.0	0	1.3	0.5	7,021	2.8	1.5	14,979	1.3	0.7	6,977	0.0	0.0		0.0	0.0	
南南西風	1.7	0.3	8,859	0.0	0.0	0	1.2	0.5	6,264	4.4	10.7	23,750	1.1	0.3	5,906	0.0	0.0		0.0	0.0	
南西風	1.3	0.8	5,938	1.8	3.2	8,546	2.1	0.8	9,557	4.4	2.3	20,446	2.3	0.8	10,485	0.0	0.0		0.0	0.0	
西南西風	1.4	1.2	5,395	1.8	4.0	7,255	1.6	2.3	6,219	2.1	1.2	8,462	2.5	1.7	9,740	0.0	0.0		0.0	0.0	

漏洩日量 (m3)			195,207			206,313			234,892			478,927			172,180			0			0

16方位毎の平均風速から漏洩率を前頁のように評価する。

漏洩量合計

評価期間	12/13 ～ 12/19	12/20 ～ 12/26	12/27 ～ 1/2	1/3 ～ 1/7			漏洩量合計(m3)	評価対象期間(h)	漏洩率(m3/h)
週間漏洩量 (m3)	1,686,875	1,715,631	1,366,610	1,287,518			6,056,634	624	9.706

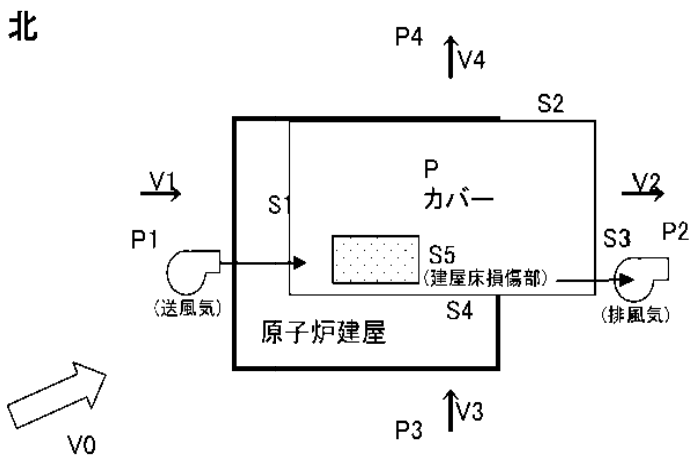
参考2　4号機燃料取出し用カバーの漏洩率評価

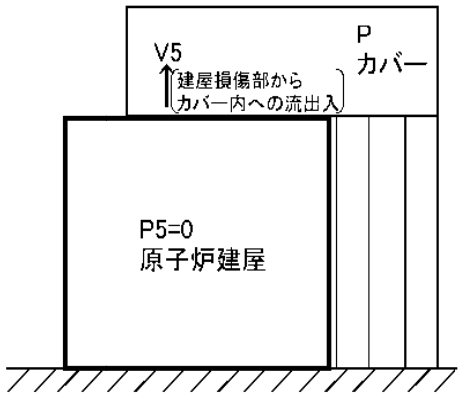
評価方法

空気漏洩量は外部風速、建屋内外圧差、隙間面積などから計算で求める。

計算例

1月6日　北北西　3.3m/s





V0:外気風速(m/s)
V1:カバー内流出入風速(m/s)
V2:カバー内流出入風速(m/s)
V3:カバー内流出入風速(m/s)
V4:カバー内流出入風速(m/s)
V5:カバー内流出入風速(m/s)
P:カバー内圧力(Pa)
P1:上流側圧力(北風)(Pa)
P2:下流側圧力(北風)(Pa)
P3:上流側圧力(西風)(Pa)
P4:下流側圧力(西風)(Pa)
P5:R/B内圧力(0Pa)
S1:カバー隙間面積(m^2)
S2:カバー隙間面積($m^{3)}$
S3:カバー隙間面積($m^{4)}$
S4:カバー隙間面積($m^{5)}$
S5:建屋床損傷部隙間面積(m^2)
ρ:空気密度(kg/m^3)
C1:風圧係数(北風上側)
C2:風圧係数(北風下側)
C3:風圧係数(西風上側)
C4:風圧係数(西風下側)
ζ:形状抵抗係数

参考2　4号機燃料取出し用カバーの漏洩率評価

風速をVとすると、上流側、下流側の圧力は次のとおりとなる。

上流側(北風):P1=C1×ρ×V0^2/(2g)　・・・(1)
下流側(北風):P2=C2×ρ×V0^2/(2g)　・・・(2)
上流側(西風):P3=C3×ρ×V0^2/(2g)　・・・(3)
下流側(西風):P4=C4×ρ×V0^2/(2g)　・・・(4)

内圧をP、隙間部の抵抗係数をζとすると

P1-P=ζ×ρ×V1^2/(2g)　・・・(5)
P-P2=ζ×ρ×V2^2/(2g)　・・・(6)
P3-P=ζ×ρ×V3^2/(2g)　・・・(7)
P-P4=ζ×ρ×V4^2/(2g)　・・・(8)
P5-P=ζ×ρ×V5^2/(2g)　・・・(9)

空気流出入量のマスバランス式は

(V1×S1+V3×S4+V5×S5)×3600=(V2×S3+V4×S2)×3600

左辺と右辺の差を「Y」とすると

Y=(V1×S1+V3×S4+V5×S5)×3600-(V2×S3+V4×S2)×3600

V1, V2, V3, V4, V5は(5), (6), (7), (8), (9)式により、Pの関数なので、「Y」がゼロになるように
Pの値を調整する

V0 (m/s)	C1	C2	C3	C4	ζ	ρ (kg/m^3)
3.33	0.80	-0.50	0.10	-0.50	2.00	1.20
S1 (m^2)	S2 (m^2)	S3 (m^2)	S4 (m^2)	S5 (m^2)		
0.44	0.81	0.46	0.81	4.00		

P1 (Pa)	P2 (Pa)	P3 (Pa)	P4 (Pa)	P5 (Pa)	P (Pa)
0.5415	-0.33844	0.067688	-0.33844	0	-0.00232

V1 (m/s)	V2 (m/s)	V3 (m/s)	V4 (m/s)	V5 (m/s)	Y (m^3/h)
2.11	1.66	0.76	1.66	0.14	0.00
IN	OUT	IN	OUT	IN	OK

※IN　:流入
OUT:流出

漏洩率　　7,527 m^3/h

参考2　4号機燃料取出し用カバーの漏洩率評価

週ごとの漏洩量評価（一例）

	1月6日			1月7日			1月8日			1月9日			1月10日			1月11日			1月12日		
	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)	風速 (m/s)	時間 (hr)	漏洩率 (m3/h)
西風	3.9	1.3	10,634	0.0	0.0		0.0	0.0		1.3	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
西北西風	6.6	1.5	14,941	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北西風	3.3	0.5	7,571	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北北西風	3.3	1.3	7,527	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北風	2.3	1.3	7,152	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北北東風	4.3	0.2	9,734	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
北東風	0.0	0.0	0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
東北東風	0.0	0.0	0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
東風	0.0	0.0	0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
東南東風	0.0	0.0	0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南東風	2.5	0.2	5,611	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南南東風	3.1	1.7	7,006	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南風	2.8	1.5	8,902	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南南西風	4.4	10.7	9,901	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
南西風	4.4	2.3	9,892	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
西南西風	2.1	1.2	4,778	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

漏洩日量 (m3)	221,800	0	0	0	0	0

16方位毎の平均風速から漏洩率を前頁のように評価する。

漏洩量合計

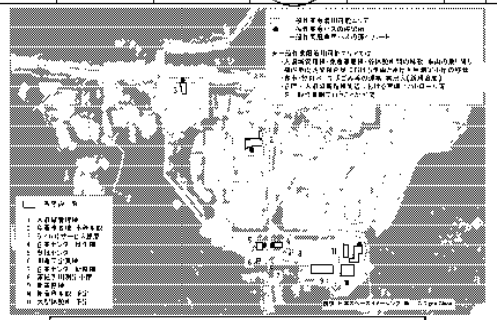
評価期間	12/2 ～ 12/8	12/9 ～ 12/15	12/16 ～ 12/22	12/23 ～ 12/29	12/30 ～ 1/5	1/6	漏洩量合計(m3)	評価対象期間(h)	漏洩率(m3/h)
週間漏洩量 (m3)	1,045,817	967,121	1,158,139	842,980	881,452	221,800	5,117,308	864	5,923

東京電力株式会社
労働環境改善
2015/1/29現在

労働環境改善スケジュール

分野	No.	作業内容	これまで1ヶ月の動きと今後1ヶ月の予定	備考
健康管理	1	防護装備の適正化検討	（実　績） ・「敷地内線量低減にかかる実施方針」を踏まえた敷地南側エリアの全面マスク着用省略化の検討 ・全面マスク着用省略エリア拡大に向けた連続ダストモニタの設置検討 （予　定） ・「敷地内線量低減にかかる実施方針」を踏まえた敷地南側エリアの全面マスク着用省略化の検討（平成25、27年度） ・全面マスク着用省略エリア拡大に向けた連続ダストモニタの設置検討（平成26年度末設置予定） ・ニアリアⅡ及びⅢへのダストモニタ設置及びダスト確認（平成27年5月全面マスク着用省略エリア設定予定） ・ダストフィルタ化：空気中よう素131濃度が全面マスク着用基準を下回ることを確認した上で、ダストフィルタを装着した全面マスクで作業できるエリアを設定し、作業員の負荷軽減、作業性向上を図る。 ・全面マスク着用省略化：空気中放射性物質濃度が全面マスク着用基準を下回ることを確認した上で、全面マスクを着用省略できるエリアを設定し、作業員の負荷軽減、作業性向上を図る。 ・一般作業服化：シート養生を行い、定期的な汚染確認を行う車両に乗車する場合は、一般作業服で移動できるエリアを設定し、作業員の負荷軽減を図る。	敷地内線量低減にかかる実施方針」を踏まえたタンク群を含む敷地南側エリアの全面マスク着用省略化の検討 全面マスク着用省略エリア拡大に向けた連続ダストモニタの設置検討 ダストフィルタ化 （実施済みエリア）H24.3.1：1～4号機及びその周辺建屋内を除く全域、H24.12.19 1～4号機及びその周辺建屋内 全面マスク着用省略化 （実施済みエリア）H23.11.8：正門・免震重要棟前、5,6号サービス建屋前、H24.6.1 企業センター厚生棟前、H24.8.9 車両汚染検査場・降車しない見学者、H24.11.19 入退域管理施設建屋、H25.1.28：構内企業棟の一部エリア（東電構内企業棟周辺）、H25.4.8 多核種除去設備、キャスク仮保管設備、H25.4.15：構内企業棟の一部エリア（登録センター周辺）、H25.5.30：1～4号機周辺・タンクエリア・瓦礫保管エリアを除くエリア、H25.10.7：5,6号機建屋内、H25.11.11：がれき保管エリア、H26.4.10：共用プール建屋内の一部エリア エリアⅡ及びⅢへの連続ダストモニタ設置工事 エリアⅡ及びⅢのダスト確認 一般作業服化 （実施済みエリア）H24.3.1：正門・免震重要棟前・5,6号サービス建屋前、H24.8.9：降車しない見学者、H25.6.30：入退域管理施設周辺、企業センター厚生棟周辺、運転予用汚染測定小屋周辺、H25.8.5：研修棟休憩所周辺、H26.3.17：構内駐車場及び構内企業棟一部エリア（関電工企業棟周辺）、H26.12.1：免震重要棟前駐車場及び搬出入口周辺、【エリア解除】構内駐車場一部エリア	防護装備
健康管理	2	重傷災害撲滅、全災害等件数低減対策の実施	（実　績） ・協力企業との情報共有 1/22安全推進協議会開催：災害事例等の再発防止対策の周知等 ・作業毎の安全所策の実施（ＴＢＭ・ＫＹ等） （予　定） ・1/29安全推進協議会の開催 ・作業毎の安全所策の実施（継続実施）	安全総点検実施により工程見直し中 情報共有、安全所策の検討・評価	情報共有
健康管理	3	長期健康管理の実施	（実　績） ・Ｈ２６年度対象者（協力企業作業員）への「がん検査」「甲状腺超音波検査」案内に対する、対象者・医療機関等からの問い合わせ対応、及び検査費用の精算手続き（継続） ・Ｈ２６年度対象者（社員）への「白内障検査」案内、及び検査実施 （ＫＫ：11月に検査実施済、本店：12月に検査実施済） ・インフルエンザ・ノロウイルス感染予防・拡大防止対策（～H26年度末） インフルエンザ予防接種 （10/29 ～ 来年1/30　１Ｆ新事務棟，近場医療機関）（継続） （予　定） ・Ｈ２６年度対象者（社員）への「甲状腺超音波検査」案内 （福島：2月予定、本店：3月予定）	健康相談受付 対象者・医療機関等からの問い合わせ対応、及び検査費用の精算手続き 社員・白内障検査及び甲状腺超音波検査 インフルエンザ予防接種（10/29～1/30）	健康相談
健康管理	4	継続的な医師確保と患者搬送の迅速化	（実　績） ・１Ｆ救急医療室のH27年3月末までの医師確保完了 （固定要員1名＋ローテーション支援医師） （予　定） ・１Ｆ救急医療室の恒常的な医師の確保に向けた調整	各医療拠点の体制検討 常駐医師の雇用に向けた関係者との調整	救急医療

全面マスク着用省略可能エリア

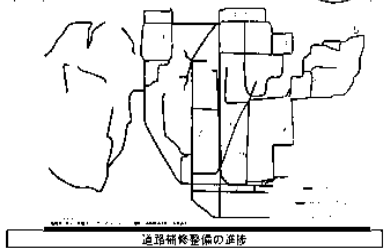


一般作業服着用可能エリア

東京電力株式会社
労働環境改善
2015/1/29現在

労働環境改善スケジュール

分類	No.	作業内容	これまで1ヶ月の動きと今後1ヶ月の予定	備考
労働環境改善	5	作業員の確保状況と地元雇用率の実態把握	（実　績） ・作業員の確保状況と地元雇用率の実態把握（継続的に実施） ・作業員の確保状況（12月実績／2月の予定）と地元雇用率（12月実績）についての調査・集計 （予　定） ・作業員の確保状況（1月実績／3月の予定）と地元雇用率（1月実績）についての調査・集計	
	6	労働環境・生活環境・就労実態に関する企業との取り組み	（実　績） ・労働環境・生活環境・就労実態に関する意見交換及び実態把握 ・意見交換及び実態把握に基づく解決策の検討・実施・結果のフィードバック ・作業員へのアンケートによる実態把握（実施中） ・相談窓口への連絡（処遇・労働条件等）への対応 （予　定） ・労働環境・生活環境・就労実態に関する意見交換及び実態把握（継続的に実施） ・意見交換及び実態把握に基づく解決策の検討・実施・結果のフィードバック（継続的に実施） ・作業員へのアンケートによる実態把握（実施中） ・相談窓口への連絡（処遇・労働条件等）への対応	
設備管理・労務環境改善	7	大型休憩所の設置	（実　績） ・内装工事・設備工事・外構工事他 （予　定） ・内装工事・設備工事・外構工事・各種検査	H26年度末 完了目標
	8	新事務本館の建設	（実　績） ・設計 （予　定） ・設計、準備工事	H26年度末 完了目標 敷地要件により 工程変更
	9	福島給食センターの設置	（実　績） ・外装工事他 （予　定） ・外装工事他 ・内装工事・設備工事他	H26年度末 完了目標
	10	道路整備の実施	（実　績） ・構内道路補修，整備箇所の検討・設計 （予　定） ・ふれあい交差点－五差路間の舗装工事（側溝・歩道整備含む） ・入口野尻の森南側道路周辺の舗装工事（側溝・歩道整備含む） ・プロセス建屋周辺道路、４Ｓ，６号機周辺道路、入口裏手台周辺道路、※Ｈ５，Ｈ６，Ｃエリア付近道路、ゲート中央通りの舗装工事 ・4m盛周辺道路、Ｇエリア周辺道路については、フェイシング工事にて実施	



全面マスク着用省略可能エリアの拡大に関する検討状況について

平成27年1月29日

東京電力株式会社

全面マスク着用省略化の運用について

- 福島第一原子力発電所の原子力事故により、 空気中放射性物質濃度（以下、ダスト濃度）が上昇したため、構内で作業する際は全面マスク着用としたが、ダスト濃度がマスク着用基準※ 以下であることを確認したエリアを「全面マスク着用省略可能エリア」に設定し、作業員の負荷軽減、作業性の向上を図っている。

- 平成２３年１１月８日から運用開始、順次エリアを拡大し、現在、構内面積の約６５％を全面マスク着用省略可能エリアに設定。平成２７年度末までに、構内面積の約９０％（１~４号機周辺以外の全エリア）に拡大する計画。

- 全面マスク着用省略可能エリアでは、「構内バス等による入退域管理施設・免震重要棟・休憩所間の移動時」はサージカルマスク着用、「作業時」は、汚染した表土の舞い上がりを考慮し、使い捨て式防じんマスク（ＤＳ２）着用する運用としている。

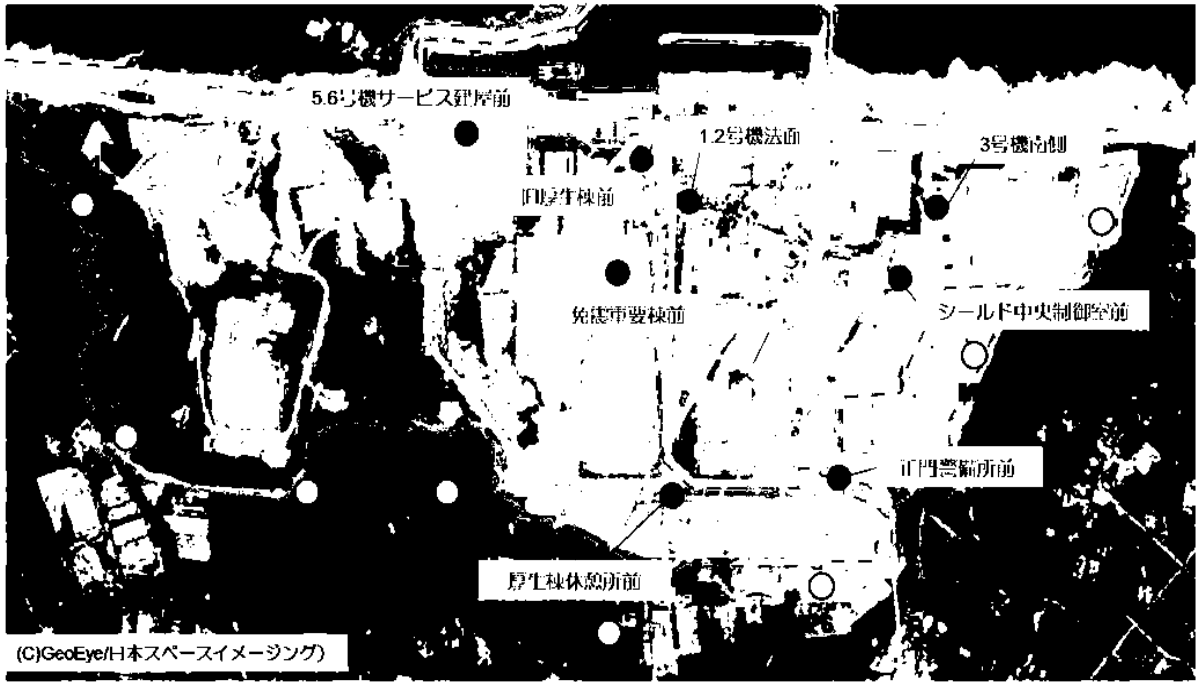
- 不測の事態に備えて、全面（半面）マスクを携行し、連続ダストモニタによる監視を行って異常を検知した場合には、マスク着用指示を行う運用としている。
  なお、平成23年10月以降、作業員の有意な内部取り込みは認められていない。

※「東京電力株式会社福島第一原子力発電所原子炉施設の保安及び特定核燃料物質の防護に関して必要な事項を定める告示」に定める放射線業務従事者の呼吸する空気中の濃度限度の1/10：2E-4Bq/cm^3（Cs-134）

現状の全面マスク着用省略可能エリア

連続ダストモニタでダスト濃度を監視することで、「全面マスク着用省略可能エリア」を設定。
より負荷の少ない防じんマスクの着用により、作業性の向上を図っている。

＜現状の全面マスク着用省略可能エリア（ ）＞



＜連続ダストモニタ設置箇所＞

- 全面マスク着用省略可能エリア監視用（５箇所）
  １～４号機を中心とした方向性と警報対応の管理員が常駐している箇所を考慮して、連続ダストモニタを配置
- １～４号周辺監視用（３箇所）
  原子炉建屋瓦礫撤去作業のダスト監視用として配置（● より先に検知）

※現在、いずれのダストモニタも
-6乗Bq/cm3 オーダーで推移

＜全面マスク着用省略可能エリア監視用(●)の運用＞

■全面マスク着用基準（粒子状）2E-4Bq/cm^3
　●法令に定める放射線業務従事者の呼吸するダスト濃度限度（Cs-134）の1/10で設定）
■連続ダストモニタの「高高警報」
　●全面マスク着用基準の1/2の値（1.0E-4Bq/cm^3）
　●警報が鳴ったら全面マスク着用指示を出す。

現状の各エリアのマスク運用

＜エリアに応じたマスク区分＞

全面マスク着用のみ

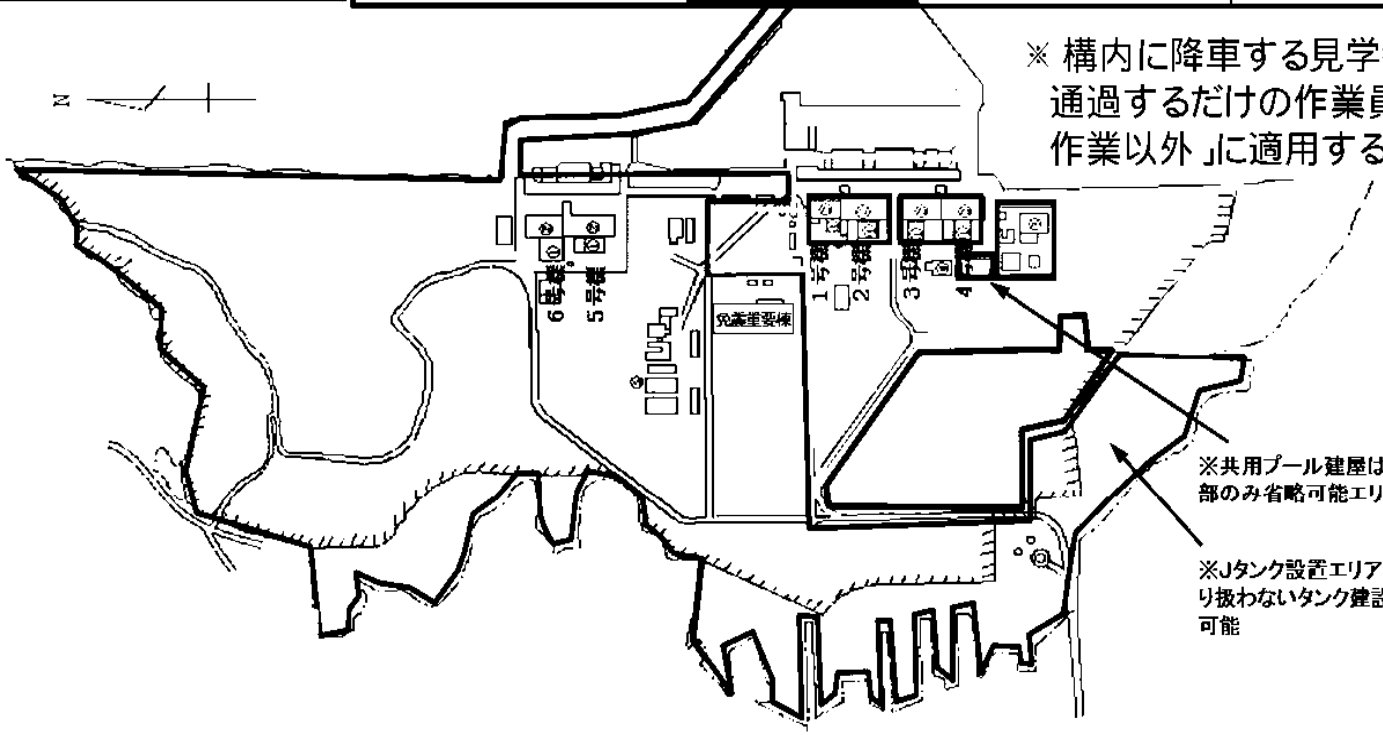
半面マスク着用可能
(全面 or 半面)

DS2着用可能 (全面マスク着用省略可能エリア)
(全面 or 半面 or DS2)

＜作業内容に応じたマスク区分※＞

		全面マスク着用省略可能エリア以外のエリア (1~4号機周辺など)	全面マスク着用省略可能エリア (5, 6号機周辺、免震重要棟周辺、入退域管理施設周辺など)
高濃度粉塵作業 (土壌のはぎ取り、アスファルトのはつり、工作物の解体等の作業)		全面マスク もしくは 半面マスク	全面マスク もしくは 半面マスク
高濃度粉塵作業以外		全面マスク もしくは 半面マスク	全面マスク もしくは 半面マスク もしくは 使い捨て式防塵マスク (DS2)

※ 構内に降車する見学者、当該エリアを通過するだけの作業員は、「高濃度粉塵作業以外」に適用するマスクを着用

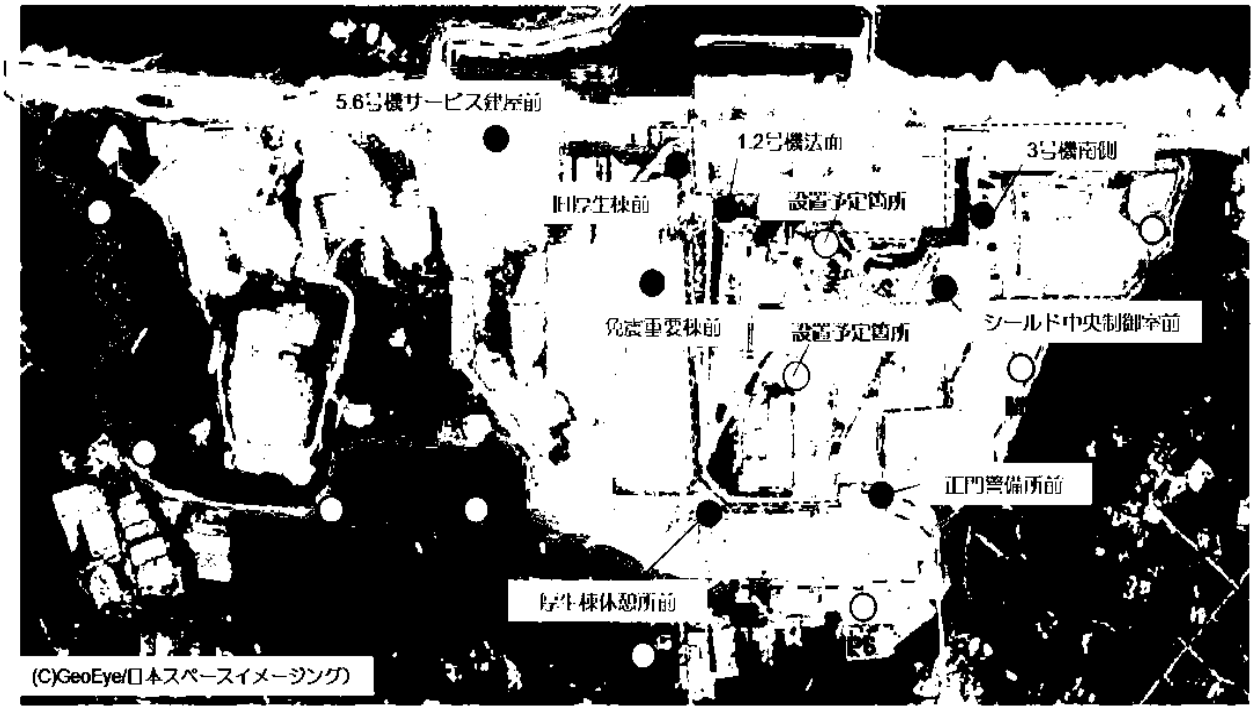


今後の全面マスク着用省略可能エリアの拡大計画

（１）下図（[redacted]）のエリアを全面マスク着用省略可能エリアに設定できるように、１～４号機を中心とした方向性を考慮して、連続ダストモニタを配置し、データ伝送して免震重要棟でダスト濃度を監視できるようにする。【平成２７年２～３月】

（２）ダスト濃度を確認した上で、関係省庁の了解を得る。【平成２７年３～４月】

（３）全面マスク着用省略可能エリアとして運用開始【平成２７年５月運用開始予定※】



※タンクエリアは、ダスト濃度の他に、濃縮塩水（高Sr汚染水）の摂取リスクを考慮する必要がある（シート６参照）

全面マスク着用省略可能エリア

今後の全面マスク着用省略検討範囲

- 全面マスク着用省略可能エリア監視用（５箇所）
- １～４号周辺監視用（３箇所）
- ○ 平成２７年３月末までに追加設置予定（２箇所）

計１０箇所によるエリア監視を実施

タンクエリアにおける課題

＜濃縮塩水（高Sr汚染水）の内部取り込みリスクを考慮したエリア設定（案）＞

・濃縮塩水を内包しているタンクエリアでの作業は、操作ミス等で漏えいした汚染水の内部取り込みのリスクを考慮する必要がある。

・設備面や管理面で濃縮塩水摂取の可能性がある現状では、全面マスクは必要。（厚生労働省指導）

現在、タンク周囲には堰を設置しており、堰内へ入る作業員は限定化している。

タンクエリアのうち、タンク堰外を省略可能とし、タンク堰内は貯蔵水の種類に応じたマスクを着用する。

		多核種除去設備等 処理済水のタンク群
堰内		全面マスク　もしくは 半面マスク　もしくは 使い捨て式防じんマスク（DS2）
堰外 （作業※2、通過、見学）	全面マスク　もしくは　半面マスク　もしくは　使い捨て式防じんマスク（DS2）	

※1：S処理水のタンク群の堰内における半面マスクの着用については今後検討

※2：ただし、タンク移送ラインに関わる作業は堰内のマスクを適用

（参考）構内のマスク着用基準

ダスト濃度に応じて、全面マスク、半面マスク、使い捨て式防じんマスク（DS2）のマスク着用基準を定めている。

空気中の放射性物質濃度
(粒子状セシウム)

2×10^{-2}Bq/cm^3

2×10^{-3}Bq/cm^3

2×10^{-4}Bq/cm^3
(マスク着用基準値)

10^{-6}～10^{-7}Bq/cm^3

全面マスク着用

半面マスク着用可能

使い捨て式防じんマスク(DS2)着用可能
（全面マスク着用省略可能エリア内作業）

構内の定期測定時のダストのオーダー

新事務本館の進捗について

平成27年1月29日

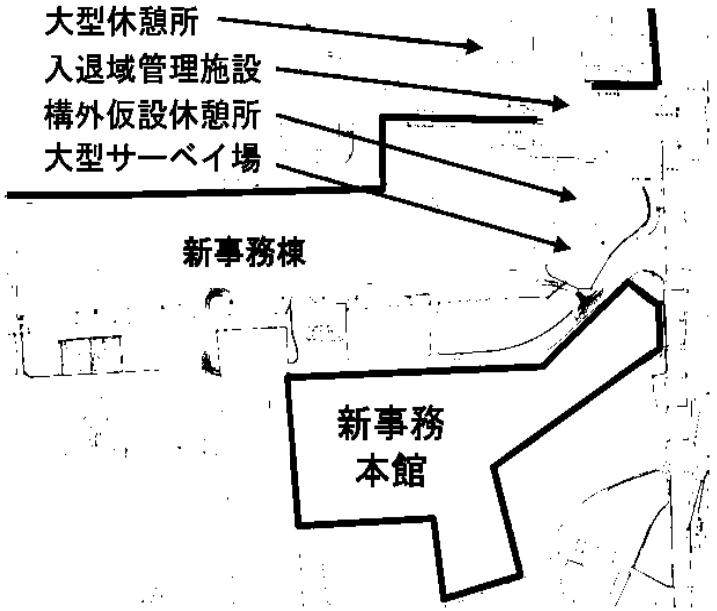
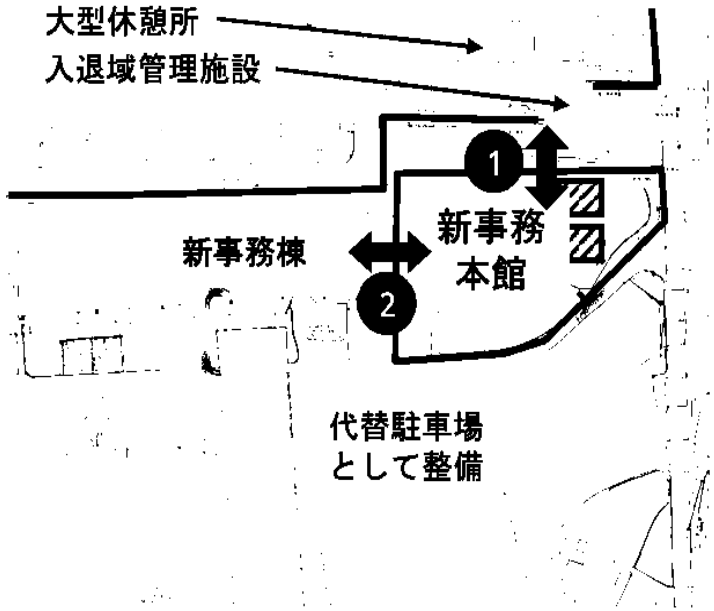
東京電力株式会社

労働環境改善分野

1. 新事務本館の敷地について

- 周辺建物との連携性を高め、効率的な業務運営を図ること、および敷地の有効利用を図るため、建設敷地を変更

■建設敷地の比較

項目	当初計画	敷地変更
配置図 <凡例> 計画敷地 移設等 境界柵		
敷地選定の考え方	駐車場や電柱等の干渉物がなく、早期整備が可能（森林伐採エリア）	①入退域管理施設と隣接 ②協力企業棟として活用予定の新事務棟と隣接

2. 今後の工程について

- 干渉物の撤去・移設作業が多数発生したため、工程の見直しを実施
- 平成27年6月に本体工事着工、平成28年8月に完成の予定

■見直し後の工程表

実施項目		H26年度			H27年度										H28年度					
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9
代替駐車場整備		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
干渉物移設			■	■	■	■	■	■	■	■	■	■	■	■	■	■						
新事務本館建設	準備工事			■	■	■	■	■	■	■	■	■	■	■	■	■						
	本体工事				★着工予定																竣工予定★	

【参考】敷地現況および建物概要について

敷地現況

当初敷地（干渉物なし）

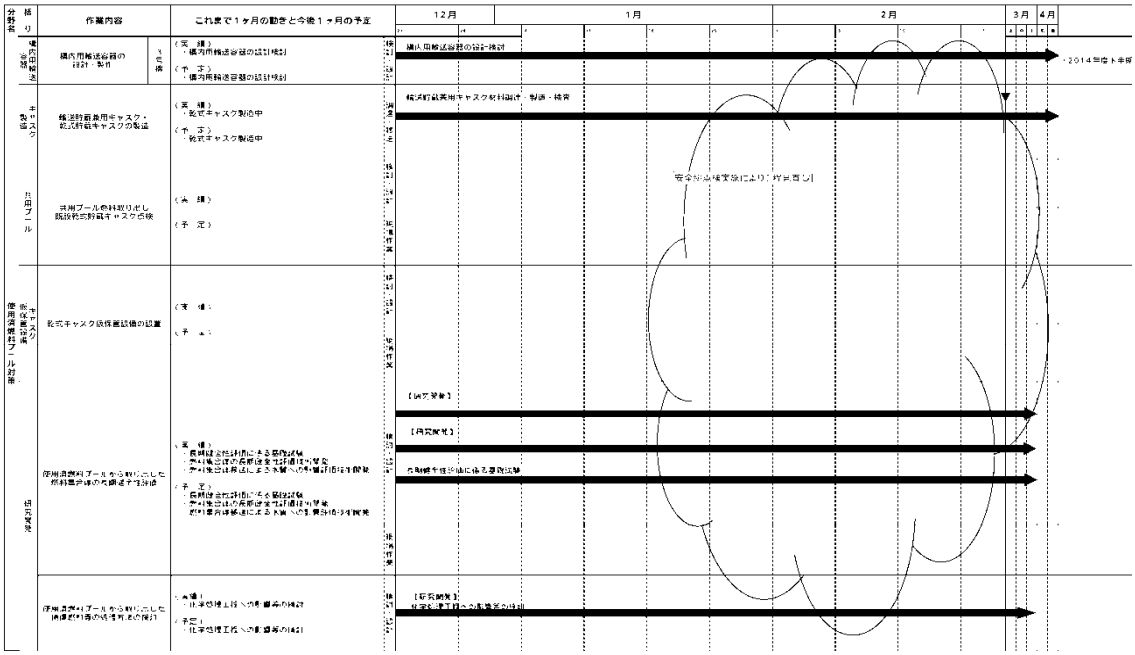
変更敷地（干渉物あり）

建物概要

○建築面積　：　約8,500 ㎡
○延べ面積　：　約23,000 ㎡
○階　　数　：　地上3階
○構造種別　：　鉄骨造
○場　　所　：　周辺監視区域の外側

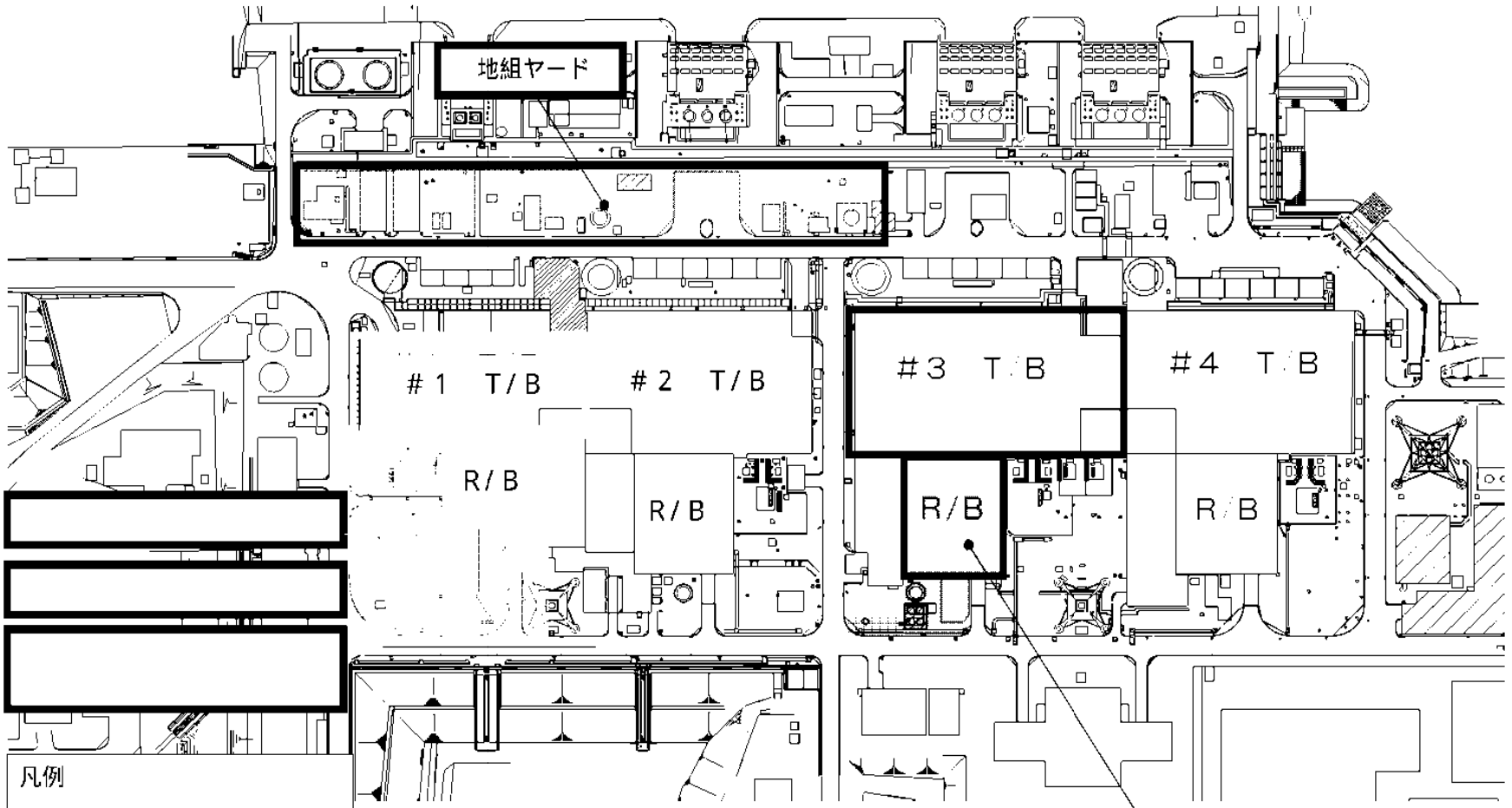
使用済燃料プール対策　スケジュール

使用済燃料プール対策　スケジュール



東京電力株式会社
使用済燃料プール対策
2015年1月29日

1，3号機 原子炉建屋上部瓦礫撤去工事 燃料取り出し用カバー工事 他 作業エリア配置図



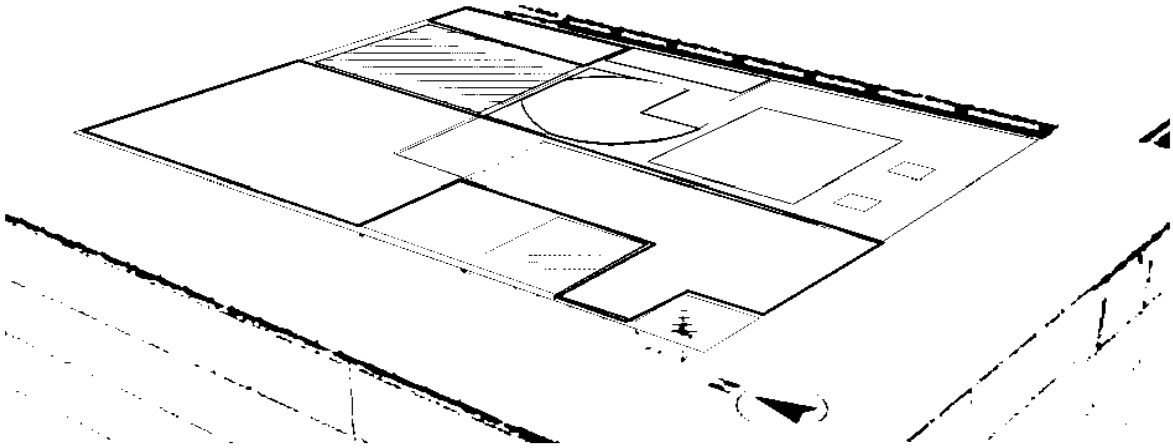
備考 R/B :原子炉建屋 T/B :タービン建屋 Rw/B :廃棄物処理建屋

東京電力株式会社
使用済燃料プール対策
2015年1月29日

【３号機原子炉建屋上部除染・遮へい工事】

■１２月２５日（木）～１月２８日（水）主な作業実績
・Ｒ／Ｂ上部除染(ガレキ集積、ガレキ吸引、床表層切削)
・ＳＦＰ内燃料ラック養生材設置
・飛散防止剤散布
・作業ヤード整備

□作業進捗イメージ図



【凡例】
除染対象外　ガレキ集積　ガレキ吸引　床表層切削　遮へい材設置
SFP内ガレキ撤去　追加飛散防止剤散布
※除染・遮へい対策手順：ガレキ集積→ガレキ吸引→床表層切削→遮へい材設置

■１月２９日（木）～２月２５日（水）主な作業予定
・Ｒ／Ｂ上部除染(ガレキ集積、ガレキ吸引、床表層切削)
・ＳＦＰ内瓦礫撤去
・飛散防止剤散布
・作業ヤード整備

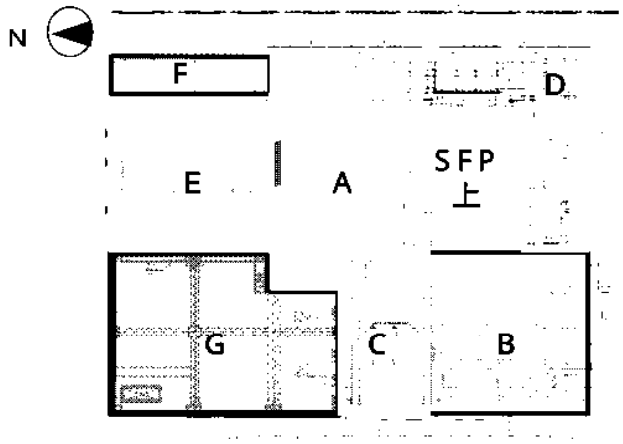
■備考
・Ｒ／Ｂ：原子炉建屋
・ＳＦＰ：使用済燃料貯蔵プール
・飛散防止剤散布：当該月の作業進捗に合わせた追加散布（作業前、作業後）及び定期散布のエリアのみを記載

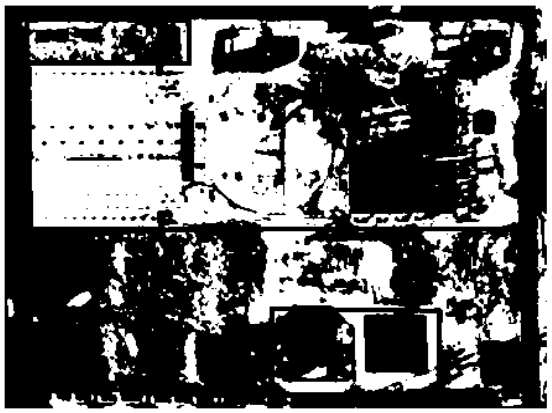
以　上

東京電力株式会社
使用済燃料プール対策
２０１５年１月２９日

３号機飛散防止剤散布週報

□... 散布範囲を示す





1/19(月) ~ 1/25(日)

日	1/19 (月)	1/20 (火)	1/21 (水)	1/22 (木)	1/23 (金)	1/24 (土)	1/25 (日)
オペフロ作業の有無	×	×	×	×	×	×	×
散布エリア	-	A ,B ,C ,F ,G※	-	-	-	-	-
散布面積合計	-	560㎡	-	-	-	-	-
平均散布量(L/m2 ･回)	-	3.2	-	-	-	-	-
日々のトピックス	■ 周辺ヤード 資 機材整備	■ オペフロ 飛散防止剤散布 (定期) ■ 周辺ヤード 資 機材整備	■ 周辺ヤード 安全総点検	■ 作業なし ※ キャスク洗浄器上、大物搬入口上、EV開口部は除く	■ 作業なし	■ 作業なし	■ 作業なし

1/26(月) ~ 2/1(日)

日	1/26 (月)	1/27 (火)	1/28 (水)	1/29 (木)	1/30 (金)	1/31 (土)	2/1 (日)
オペフロ作業の有無	×	×	×	×	×	×	×
散布エリア	-	-	-	-	-	-	-
散布面積合計	-	-	-	-	-	-	-
平均散布量(L/m2 ･回)	-	-	-	-	-	-	-
日々のトピックス	■ 作業なし	■ 作業なし	■ 作業なし	■ 未定 作業再開次第、飛散防止剤の定期散布を実施する予定			

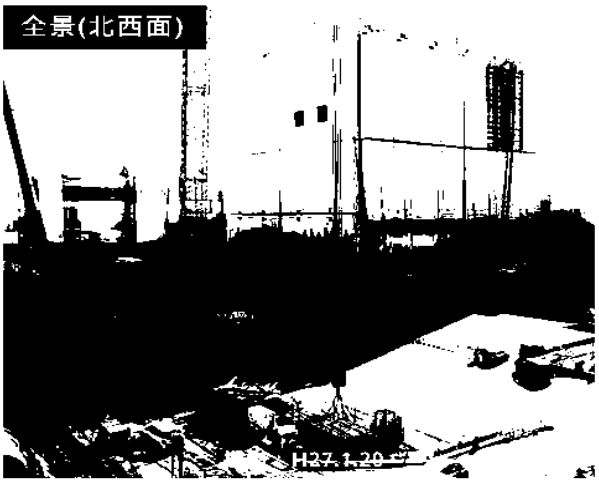
凡例 □･･･実績 □･･･予定

東京電力株式会社
使用済燃料プール対策
2015年1月29日

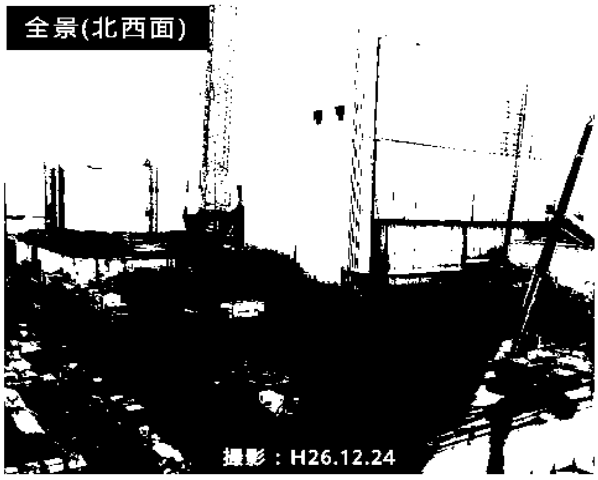
【１号機原子炉建屋カバー解体工事】

■ １２月２５日（木）～１月２８日（水）主な作業実績
・資機材整備

□ 今月



□ 先月



■ １月２９日（木）～２月２５日（水）主な作業予定
・資機材整備

■ 備考

以　上

１，３号機原子炉建屋上部作業における飛散抑制策について

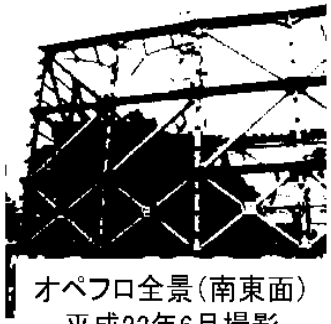
平成２７年１月２９日
東京電力株式会社

無断複製・転載禁止　東京電力株式会社

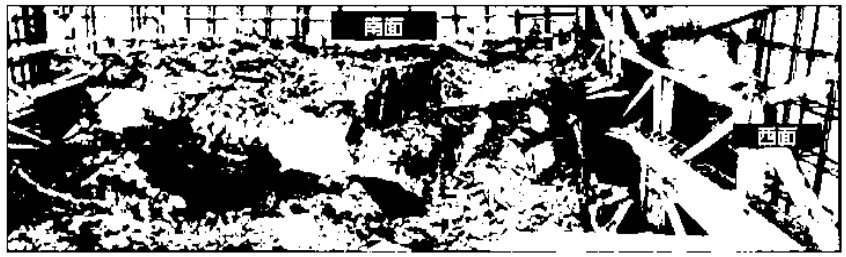
1-1　1号機のオペフロ状況

原子炉建屋オペフロ状況

オペフロ全景（北西面）
平成23年6月撮影



オペフロ全景（南東面）
平成23年6月撮影



カバー設置後（現状）

平成26年12月撮影

【 オペフロの状態（現在）】
・屋根カバー閉止中 （平成26年12月4日閉止完了）

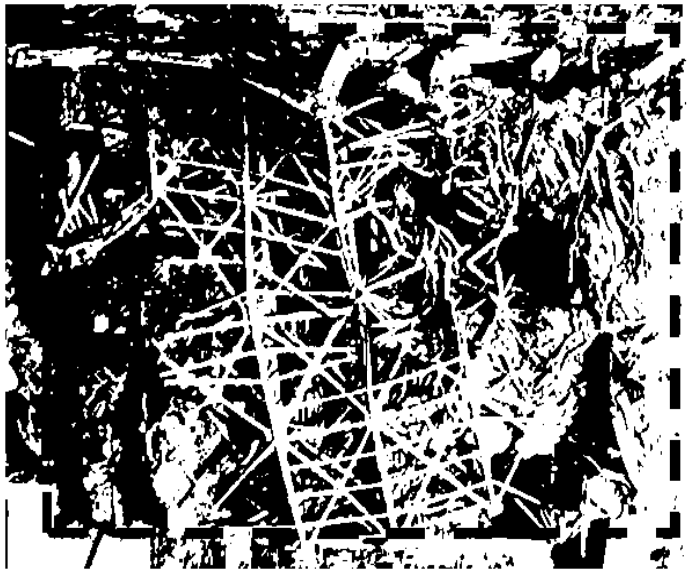
【 今後の主な作業予定】

①カバー解体 → ②瓦礫撤去 → ③除染作業 → ④遮蔽設置 → ⑤燃料カバー設置

無断複製・転載禁止　東京電力株式会社

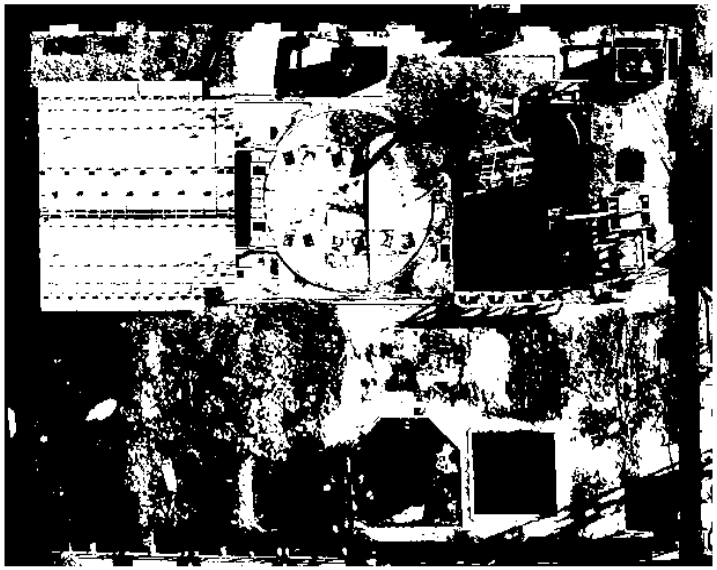
1-2　3号機のオペフロ状況

大型瓦礫撤去前



平成23年3月撮影

除染中(現在)



平成26年12月撮影

【 オペフロの状態(現在)】

・オペフロ上の大型瓦礫の撤去は完了し、除染・遮蔽工事を実施中

→除染作業時も瓦礫撤去時と同等の飛散抑制策を実施

・使用済燃料プール内の大型瓦礫撤去を実施中

→水中瓦礫のため飛散防止剤散布対象外

【 今後の主な作業予定】

①ｵﾍﾟﾌﾛ瓦礫撤去→ **②除染、ﾌﾟｰﾙ内瓦礫撤去** →③遮蔽設置→④燃料カバー設置

無断複製・転載禁止　東京電力株式会社

2-1　オペフロ上の飛散抑制策の概要（１）

		ガレキ撤去作業範囲の対策					オペフロ全体への対策			
		①飛散防止剤			②作業時散水	③局所排風機	①飛散防止剤散布	④防風シート	⑤簡易バルーン等の設置	⑥散水設備
		希釈濃度	散布量	散布頻度						
3号機	事象発生前	1/100	1.5L/m2以上※1	■ガレキ撤去作業範囲に作業開始前に散布	無	無	ー	無	無	無
3号機	現状	1/10	1.5L/m2以上※1	■当日のガレキ撤去作業範囲に作業開始前・終了後に散布	無	無	■飛散防止剤の固着性を継続させるため原則1回/月の頻度で全面に散布	無	無	無
1号機		1/10	1.5L/m2以上※1	■当日のガレキ撤去作業範囲に作業開始前・終了後に散布 ■ガレキ切断・圧砕などダストが飛散する可能性が高い作業直前に散布	■散水しながらガレキ撤去作業を実施	■吸引しながらガレキ撤去作業を実施	■飛散防止剤の固着性を継続させるため原則1回/月の頻度で全面に散布	有	有	■ダストモニタが上昇傾向若しくは発報した時に散水（緊急） ■湿潤状態を維持するために散水（間欠）

※1 希釈濃度及び散布量は、飛散防止剤の希釈倍率を変化させた場合の固化状況、使用済燃料プール内の水質への影響、冷却システム等の部材腐食に対する影響、燃料へ付着した場合の熱伝導率等の影響を実験等により確認し、採用した値である。

※2 3号機はオペレーティングフロア上の大型瓦礫撤去作業が完了しているため、瓦礫切断や圧砕等の作業はない。

無断複製・転載禁止　東京電力株式会社

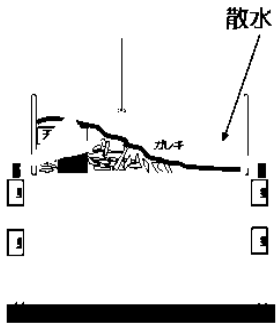
2-2　オペフロ上の飛散抑制策の概要（２）飛散防止剤

		定期	作業当日			
			作業開始前	作業直前	作業中	作業終了後
1号機 ※1		飛散防止剤散布（原則1回/月） ガレキ	当日飛散防止剤散布 ガレキ	飛散防止剤散布 ガレキ	⑥局所排風機 ⑤作業時散水 ガレキ	当日飛散防止剤散布
3号機 ※1	事象発生前 ※2	—	飛散防止剤散布 ガレキ	—	ガレキ	
	現状 ※2	飛散防止剤散布（原則1回/月） 除染	当日飛散防止剤散布 除染	—	除染装置 除染	当日飛散防止剤散布

※1　今後、ガレキ撤去作業のモックアップ等を行い、ダスト飛散を抑制する最適な散布方法・頻度等について継続して検討を進める。
※2　平成25年8月に免震重要棟前のダスト濃度が上昇する事象が発生し、飛散防止剤散布方法（散布頻度、濃度）を変更した。

無断複製・転載禁止　東京電力株式会社

2-3　オペフロ上の飛散抑制策の概要（３）飛散防止剤以外

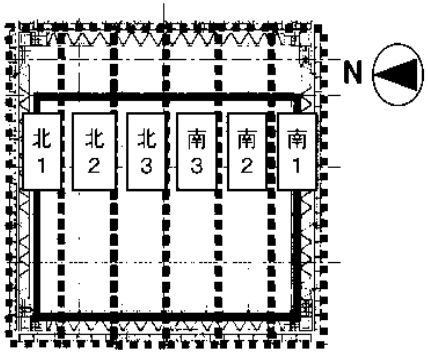
オペフロ全体への対策			
目的	風の流入量を抑制する		湿潤させる
3号機	－	－	－
1号機	④防風シート	⑤バルーン　等	⑥散水設備
		3階の機器ハッチ開口部にバルーンを設置）	

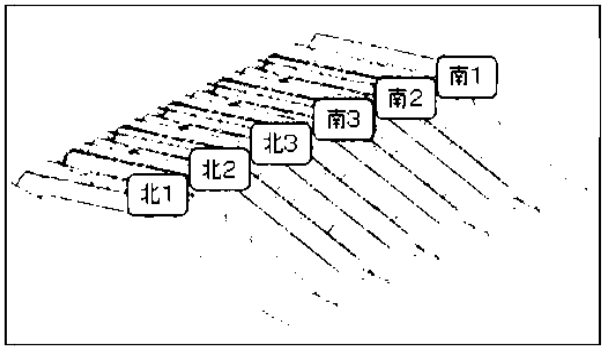
※ 今後、ガレキ撤去作業のモックアップ等を行い、ダスト飛散を抑制する最適な散布方法・頻度等について継続して検討を進める。

無断複製・転載禁止　東京電力株式会社

3-1　1号機飛散防止剤散布実績

平成26年10月～12月の作業は屋根パネル南3、北3を開けて各種調査を行った。屋根パネル取り外しによるダスト濃度上昇を抑制するため、屋根パネル穴明けによるオペフロ床面等の全面散布と屋根パネル取り外し部オペフロ床面等の集中散布を行った。





【散布方法】
・屋根パネルに孔を明けながら、オペフロ全体に散布
・上記孔を利用して屋根パネル裏に散布
・屋根パネルを外した後、その直下、斜め下に散布
・屋根パネルを外した後、両側屋根パネル裏面に散布
・崩落スラブ下に東側空間部から横に散布

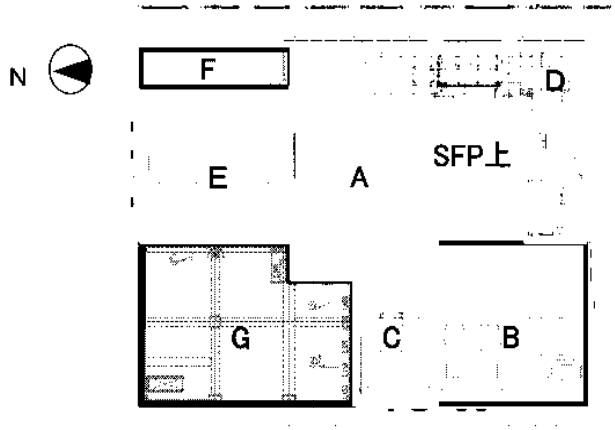
散布量(実績)

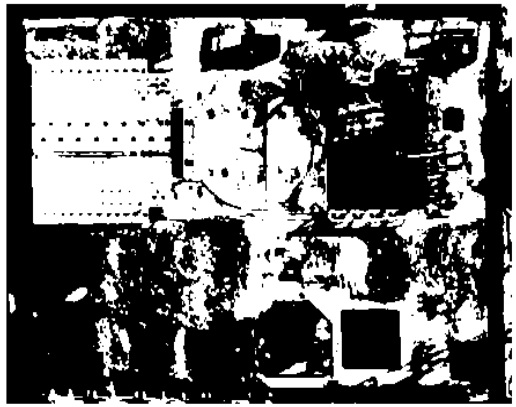
作業工区		北1	北2	北3	南3	南2	南1
オペフロ床面	散布期間	2014/10/22	2014/10/23 2014/10/24 2014/10/27 2014/10/28 2014/11/11	2014/10/23 2014/10/27 2014/10/28 2014/11/5 2014/11/11 2014/11/18	2014/10/25 2014/10/28 2014/10/29 2014/11/4 2014/11/18	2014/10/24 2014/10/25 2014/10/28 2014/10/29 2014/11/4	2014/10/24
	散布日数※	1	5	6	5	5	1
	平均散布量(L/m2・回)	15.9	49.9	69.4	58.1	41.2	15.9
屋根パネル裏	散布期間	2014/10/22	2014/10/25 2014/10/24 2014/11/19	2014/10/23 2014/11/6	2014/10/25	2014/10/24 2014/10/25 2014/11/6	2014/10/24
	散布日数※	1	3	2	1	3	1
	平均散布量(L/m2・回)	1.9	7.2	6.0	2.0	6.1	2.0
崩落スラブ下	散布期間	－	－	－	2014/11/1	－	－
	散布日数※	－	－	－	1	－	－
	平均散布量(L/m2・回)	－	－	－	1.5	－	－

無断複製・転載禁止　東京電力株式会社

3-2　3号機飛散防止剤散布実績（ダスト飛散事象発生後）

オペレーティングフロア上の大型瓦礫撤去を平成25年10月に完了し、その後、除染・遮へい作業を実施中である。除染作業を実施する日は作業開始前、終了後に飛散防止剤の散布を行った。



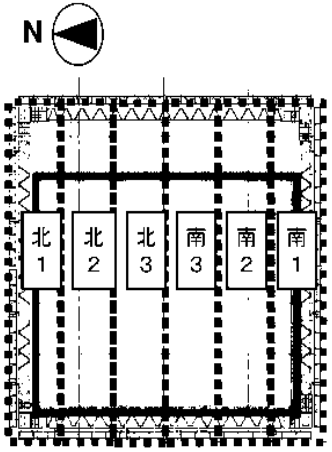


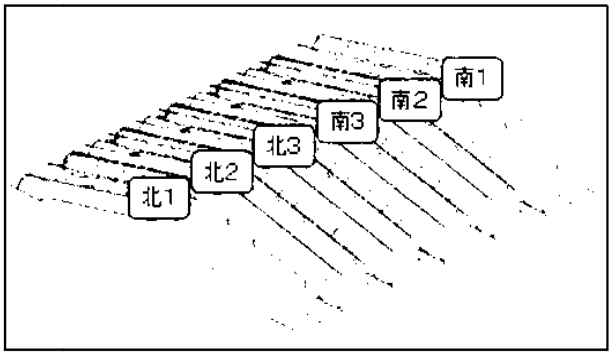
散布量（平成25年8月29日以降の実績）

作業工区	A	B	C	D	E	F	G
散布期間	2013/8/29 ～2015/1/20	2013/8/29 ～2015/1/20	2013/8/29 ～2015/1/20	2013/8/29 ～2014/11/8	2013/10/9 ～2014/3/25	2013/10/9 ～2015/1/20	2013/8/29 ～2015/1/20
除染作業日数※	62	38	33	24	21	0	3
散布日数※	77	48	50	32	29	10	18
平均散布量(L/m2・回)	2.3	2.5	3.4	3.1	2.5	3.9	3.2

無断複製・転載禁止　東京電力株式会社

4-1 1号機飛散防止剤散布週報 (平成26年10月20日~10月26日)





…散布範囲を示す

【散布方法】
・屋根パネルに孔を明けながら、オペフロ全体に散布
・上記孔を利用して屋根パネル裏に散布
・屋根パネルを外した後、その直下、斜め下に散布
・屋根パネルを外した後、両側屋根パネル裏面に散布
・崩落スラブ下に東側空間部から横に散布

日		10/20(月)	10/21(火)	10/22(水)	10/23(木)	10/24(金)	10/25(土)	10/26(日)
オペフロ作業の有無		×	×	○	○	○	○	—
散布エリア	オペフロ床面	—	—	北1	北2、北3	北2、南1、南2	南2、南3	—
	屋根パネル裏	—	—	北1	北2、北3	北2、南1、南2	南2、南3	—
	崩落スラブ下	—	—	—	—	—	—	—
散布面積合計	オペフロ床面	—	—	200	300	400	300	—
	屋根パネル裏	—	—	200	300	400	300	—
	崩落スラブ下	—	—	—	—	—	—	—
平均散布量(L/m2・回)	オペフロ床面	—	—	15	15	15	15	—
	屋根パネル裏	—	—	2	2	2	2	—
	崩落スラブ下	—	—	—	—	—	—	—
日々のトピックス		■周辺ヤード・資機材整備	■周辺ヤード・資機材整備	■飛散防止剤散布	■飛散防止剤散布	■飛散防止剤散布	■飛散防止剤散布	—

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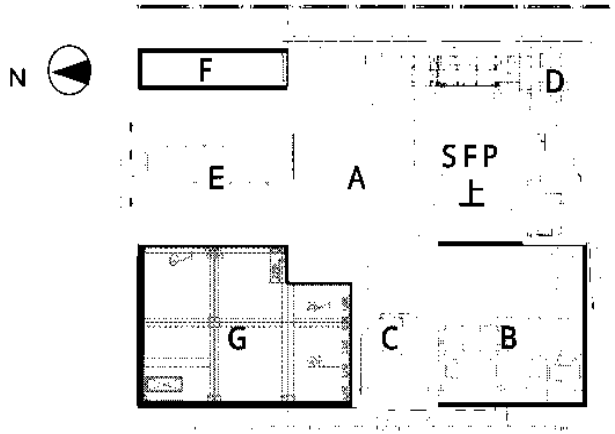
4-2 3号機飛散防止剤散布週報 (平成27年1月19日~1月25日)

□…散布範囲を示す



日	1/19(月)	1/20(火)	1/21(水)	1/22(木)	1/23(金)	1/24(土)	1/25(日)
オペフロ作業の有無	×	×	×	×	×	×	×
散布エリア	−	A, B, C, F, G※	−	−	−	−	−
散布面積合計	−	560m²	−	−	−	−	−
平均散布量(L/m2・回)	−	3.2	−	−	−	−	−
日々のトピックス	■周辺ヤード ・資・機材整備	■オペフロ ・飛散防止剤散布(定期) ■周辺ヤード ・資・機材整備	■周辺ヤード ・安全総点検	■作業なし	■作業なし	■作業なし	■作業なし

※キャスク洗浄器上、大物搬入口上、EV開口部は除く

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（参考）放射性物質濃度の監視体制

【放射性物質濃度の監視体制】

●オペフロ上のダストモニタで監視※(1，3号機各4箇所)

○原子炉建屋近傍の可搬型連続ダストモニタで監視(3箇所)

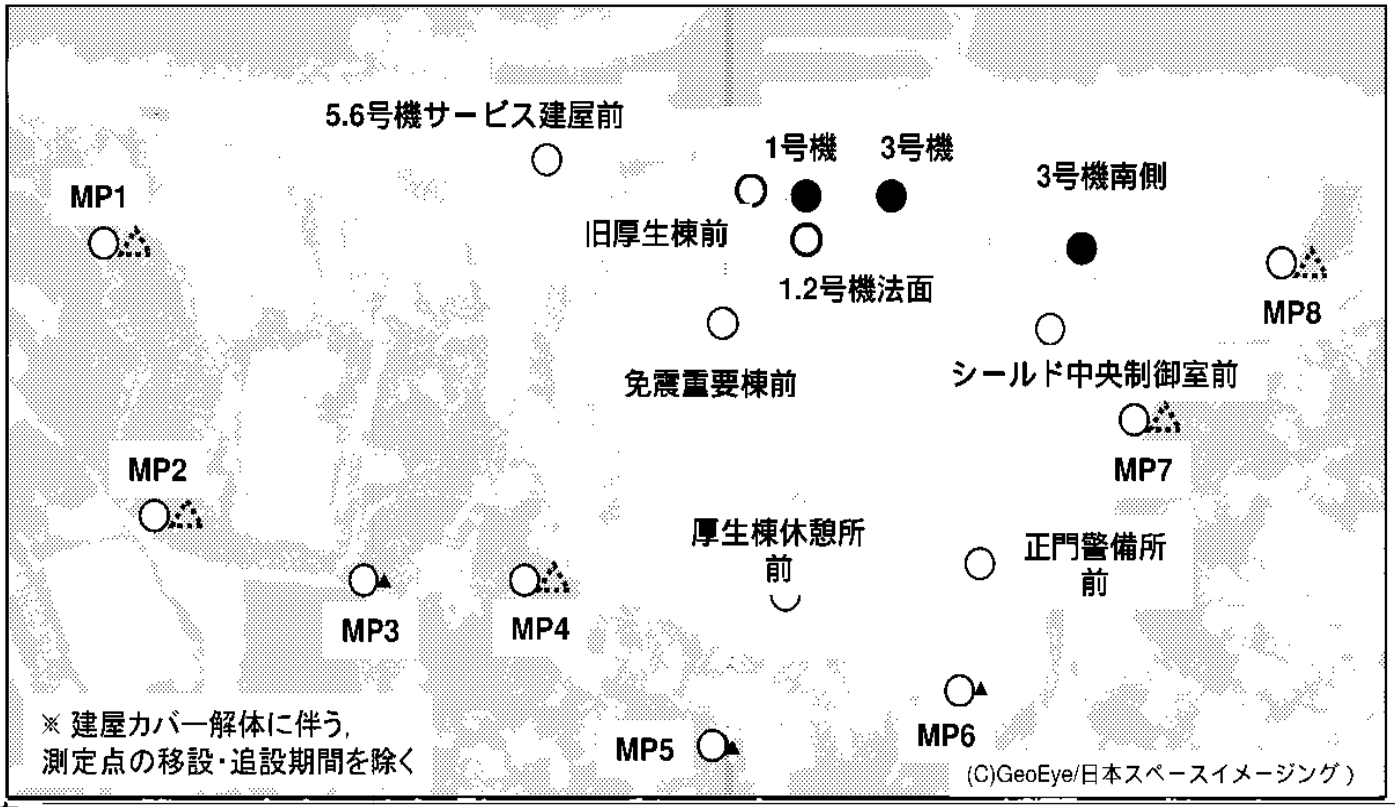
●3号機南側における可搬型連続ダストモニタで監視(1箇所)

構内の可搬型連続ダストモニタで監視(5箇所)

●敷地境界におけるモニタリングポスト(8箇所)

⁂敷地境界付近における可搬型連続ダストモニタ(5箇所)による監視

▲敷地境界付近におけるダストサンプラ(3箇所)による監視(計画中)



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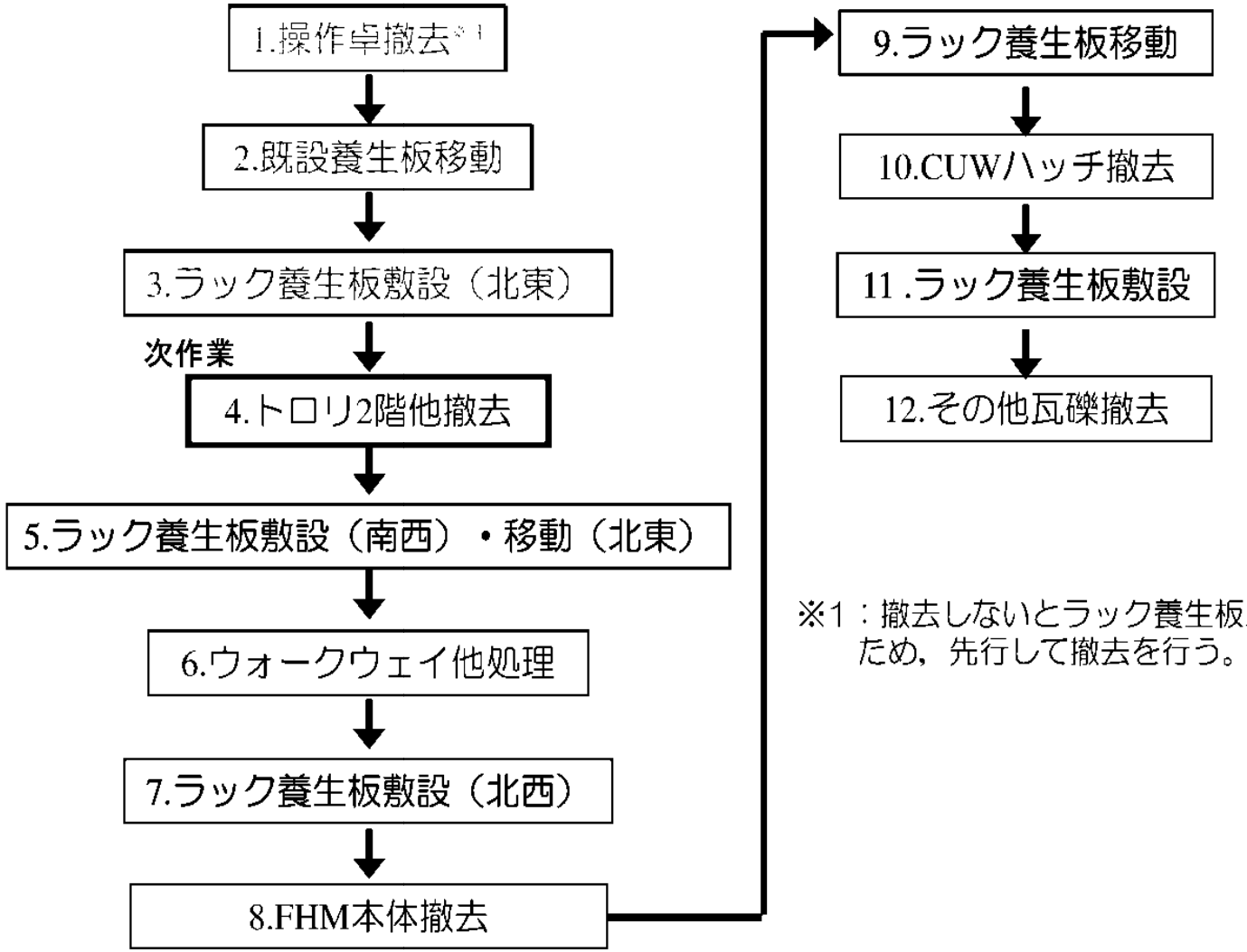
３号機使用済燃料プール内大型ガレキ撤去作業の進捗状況について

平成２７年1月29日

東京電力株式会社

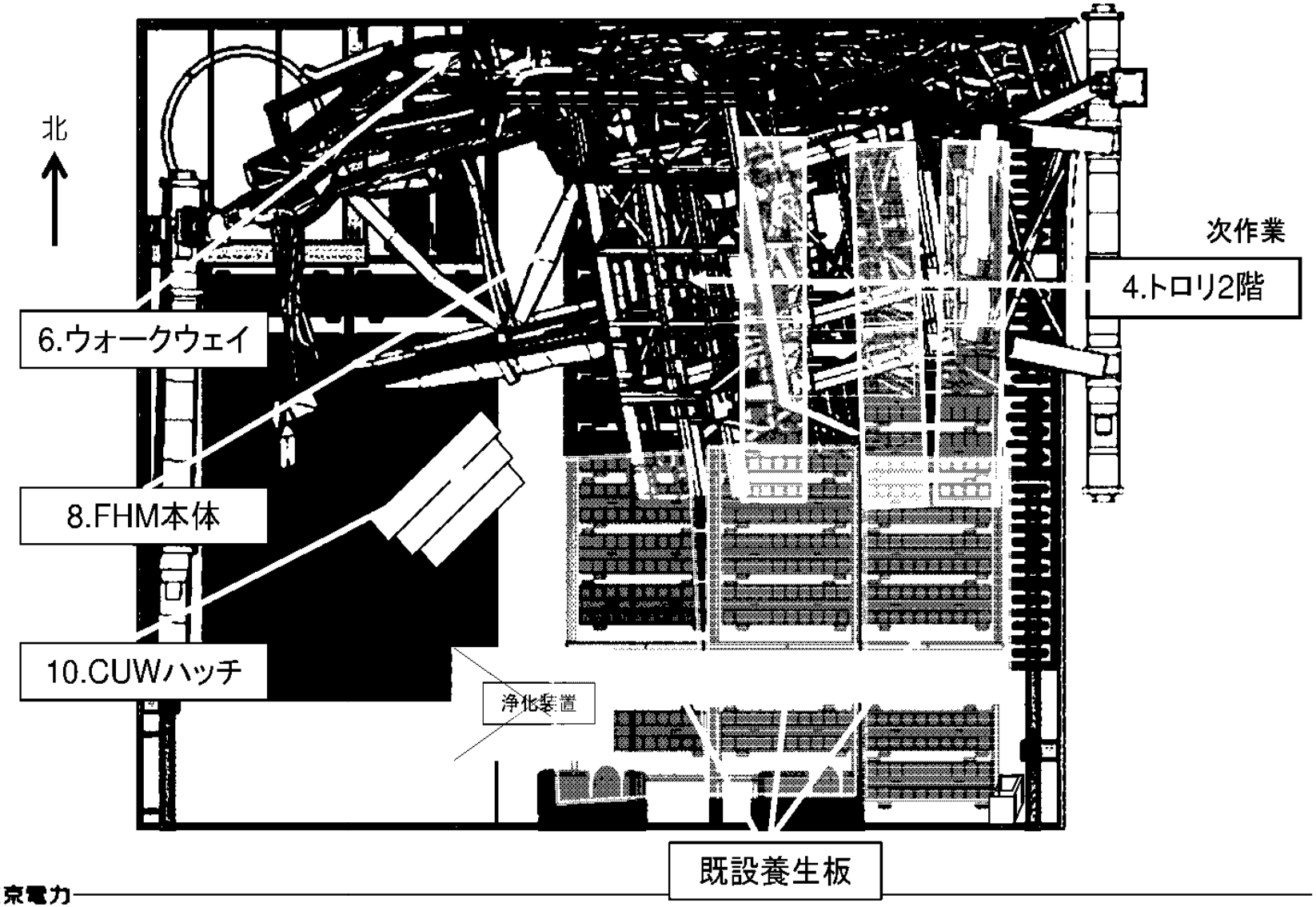
東京電力 TEPCO

ラック養生板設置および瓦礫撤去手順案（概略）



※1：撤去しないとラック養生板が敷設できないため，先行して撤去を行う。

瓦礫および養生板配置状態（H27.1.28）



ラック養生板敷設

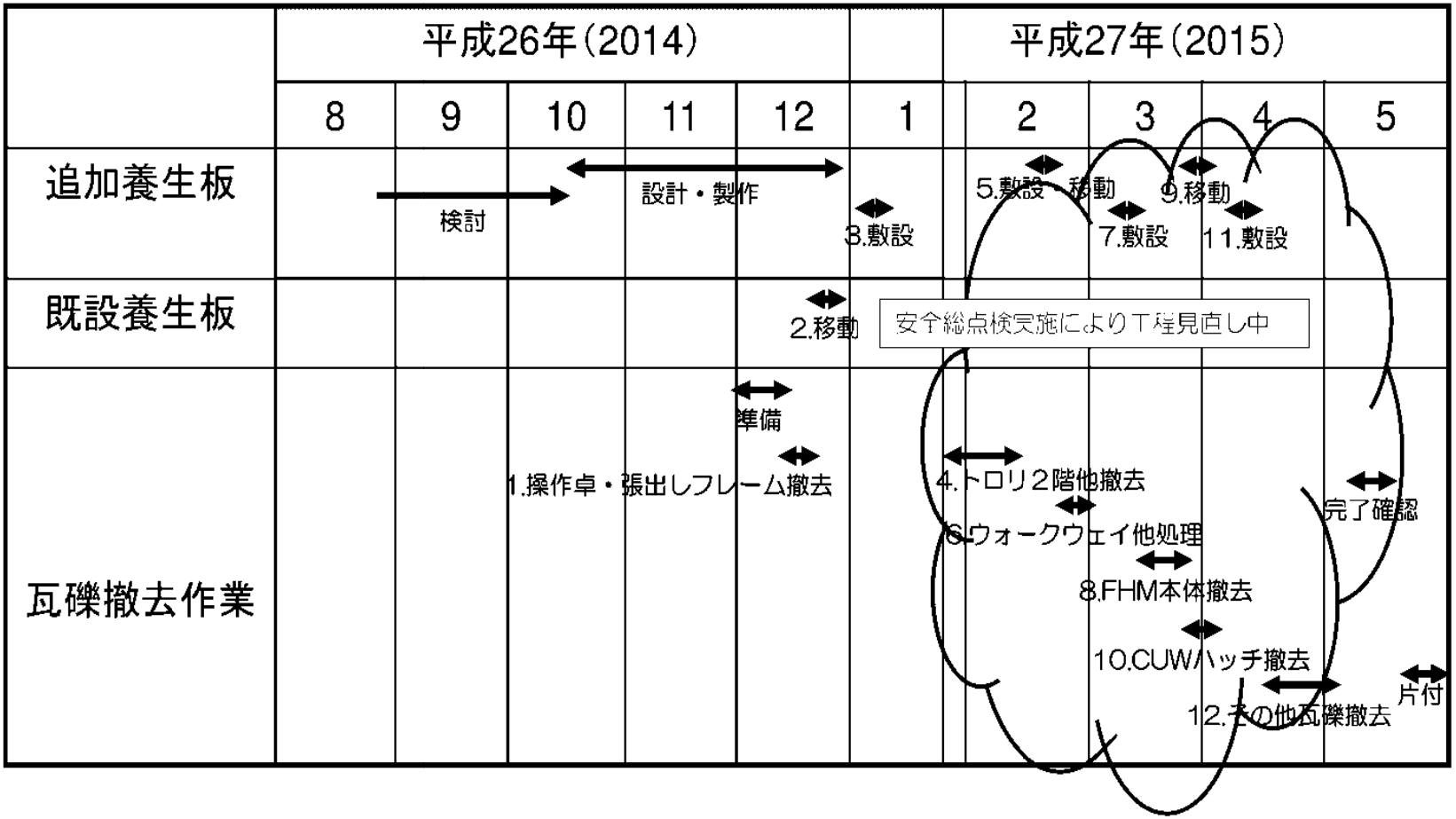
鋼材用カッター

FHM

既設養生板

ラック養生板

工程案



今後，瓦礫撤去を進めるうえで，瓦礫に応じた新撤去治具等を新規製作する場合は，
工程に影響を及ぼす可能性がある。

（参考）３号機大型瓦礫撤去作業の状況について

- ３号機使用済燃料プールからの燃料取り出しに向け、使用済燃料プール内の大型瓦礫撤去を開始(2013.12.17)。
- ３月中にＦＨＭに干渉している鉄筋・デッキプレート等の撤去をほぼ完了。FHM撤去作業に着手。
- 8月末に操作卓落下事象により作業を中断。
- 12月17日作業再開。
- これまでの撤去瓦礫量は累計で鉄筋322本、デッキプレート55枚、屋根トラス材6本、走行式補助ホイスト1基、張出フレーム1枚，操作卓1台

＜使用済燃料プール内瓦礫撤去作業状況＞

使用済燃料プール内大型瓦礫撤去順序

落下防止対策（ライニング養生）

↓

ＦＨＭに干渉していない瓦礫の撤去（①～②）

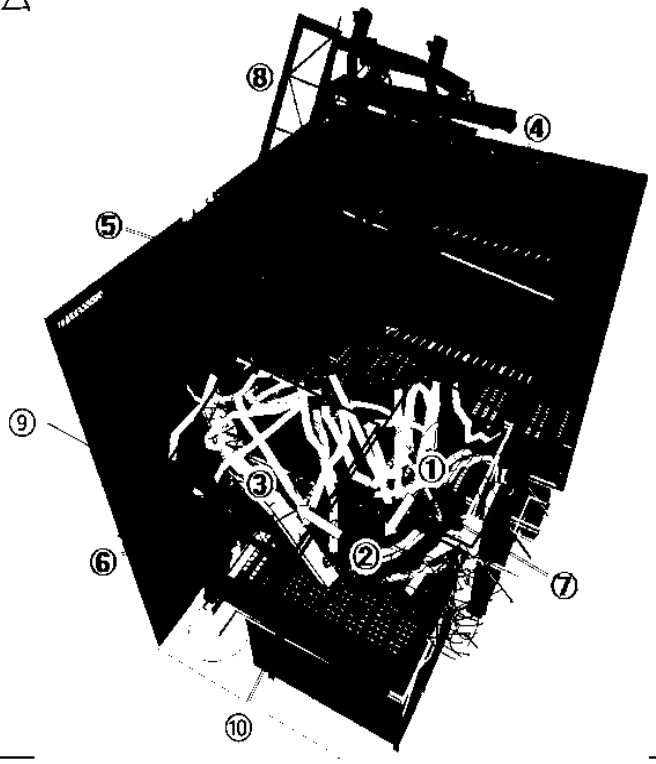
↓

ＦＨＭに干渉している瓦礫の撤去（③ ～⑦）

↓

現在実施中

ＦＨＭ他残存瓦礫の撤去（⑧，⑨，⑩）



操作卓落下事象を受け，今後の瓦礫撤去作業中に，ラック養生板追加敷設を行う。

（参考）ガレキ撤去状況

○プール内ガレキ

（平成27年1月28日現在）

名　　称	撤去実績	前回実績 (H26.12.24)	総量	備　　考
鉄筋(約0.01t)	322本	322本	330本※1	10mと想定
デッキプレート(約0.04t)	55枚	55枚	65枚※1	
屋根トラス材(約0.8t)	6本	6本	9本※2	
コンクリートガレキ(約0.07t)	－	－	－	0～500mm程度 人頭大コンクリートガレキ (300×300×300(mm))
FHMマスト(約1.6t)	1本	1本	1本	
FHM(約35t)	0基	0基	1基	トロリ部：走行式補助ホイストフレーム、主ホイスト滑車装置、走行式補助ホイスト、張出フレーム、操作卓撤去済
FHMエンドトラック(約2.6t)	0本	0本	1本	
その他ガレキ	56個	56個	－	手摺、鉄板、チェッカープレート等

※1　プール内ガレキの推定量であり、実際と異なる。なお、ガレキ撤去作業の進捗に伴い、作業開始前に確認された量から変更した。

※2　プール内に落下している屋根トラス材の推定量。

○気中ガレキ

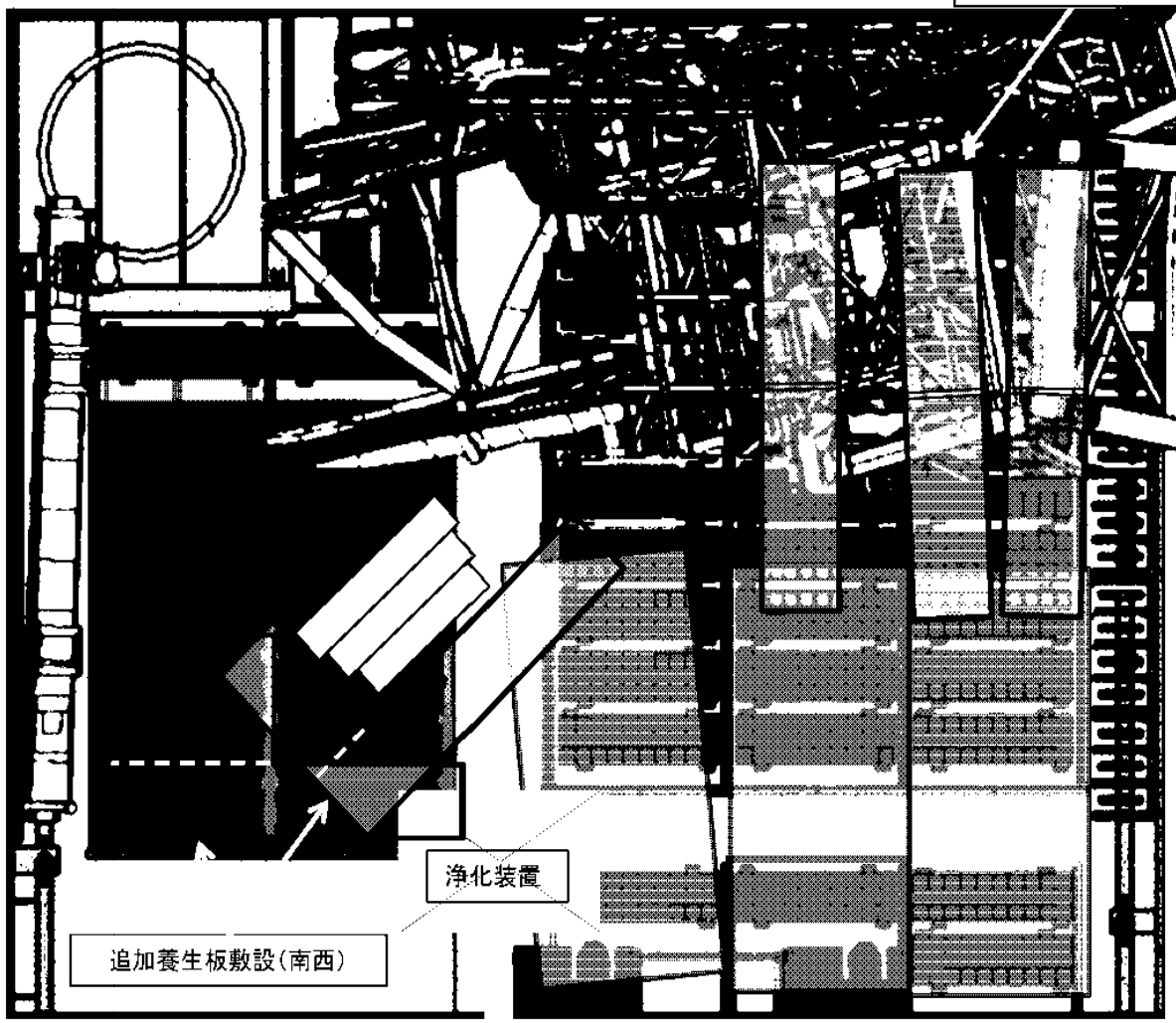
（平成27年1月28日現在）

名　　称	撤去実績	前回実績 (H26.8.27)	備　　考
鉄筋	25本	25本	FHMに干渉していた鉄筋
その他ガレキ	16個	16個	手摺、チェッカープレート、制御盤扉、鉄板、端子台、配管等

（参考）ＦＨＭ本体撤去前養生板敷設予定図

養生板敷設（北西）

追加養生板は，
操作卓撤去後に敷設



養生材の寸法、枚数は
今後最適化を図る。

：追加養生材
：既設置養生材

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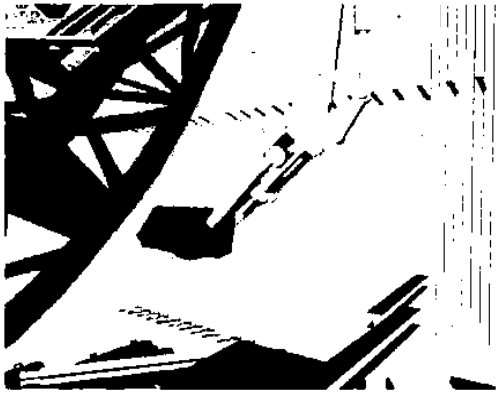
（参考）撤去案(1/2)

操作卓撤去案



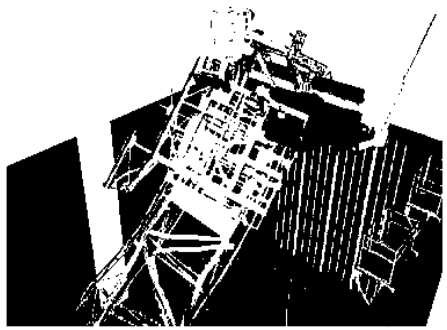
手順（案）
・鋼材用カッターにて操作卓を把持
・操作卓撤去

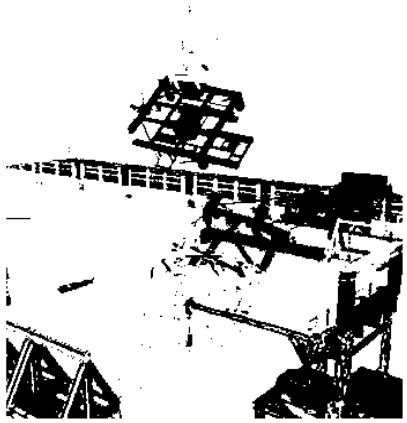
使用取扱具
・C/C1台
・鋼材用カッター

鋼材用カッター機にて把持し，吊り上げ高さ管理し，万が一の落下時の衝突を低減

吊上げ，プール外搬出，その後，養生材を設置

次作業　トロリ２階撤去案





手順（案）
・フォークにより撤去対象物を確実に把持
・鋼材用カッター，ケーブル用カッターによるフレーム変形，切断
・フォークにて吊り上げ・撤去

使用取扱具
・C/C2台
・鋼材用カッター
・ケーブル用カッター
・フォーク

フォークにより確実に把持した上で切断

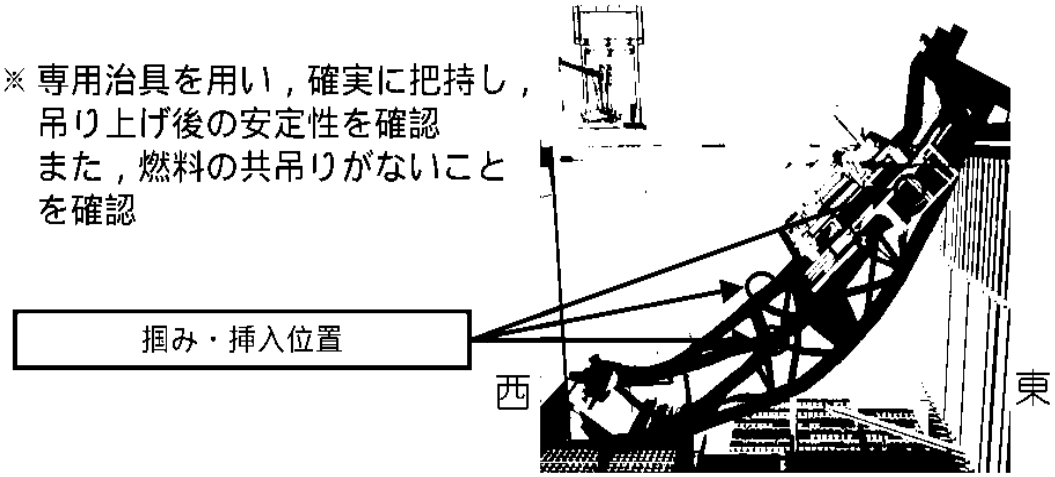
吊上げ，撤去

東京電力

（参考）撤去案(2/2)

ＦＨＭ本体撤去案

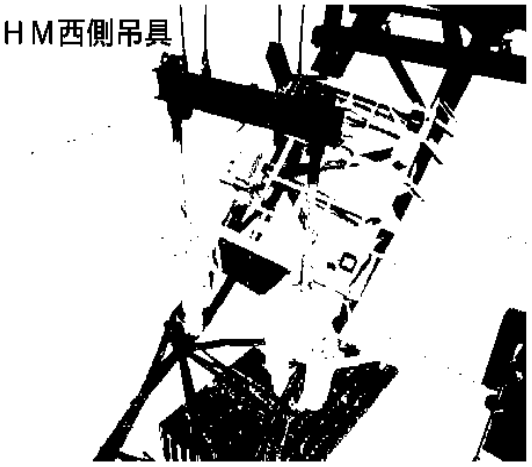
※ 専用治具を用い，確実に把持し，吊り上げ後の安定性を確認
また，燃料の共吊りがないことを確認



手順（案）
・FHM西側をFHM西側吊具にて把持
・FHM東側をFHM東側吊具にて把持
・FHM西側吊具，FHM東側吊具の順序にて交互に吊上げ，ヤードに吊り降ろす

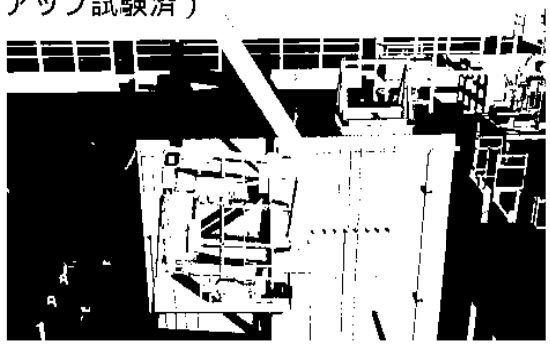
使用取扱具
・C／C2台
・鋼材用カッター機
・FHM西側吊具
・FHM東側吊具

ＦＨＭ西側吊具



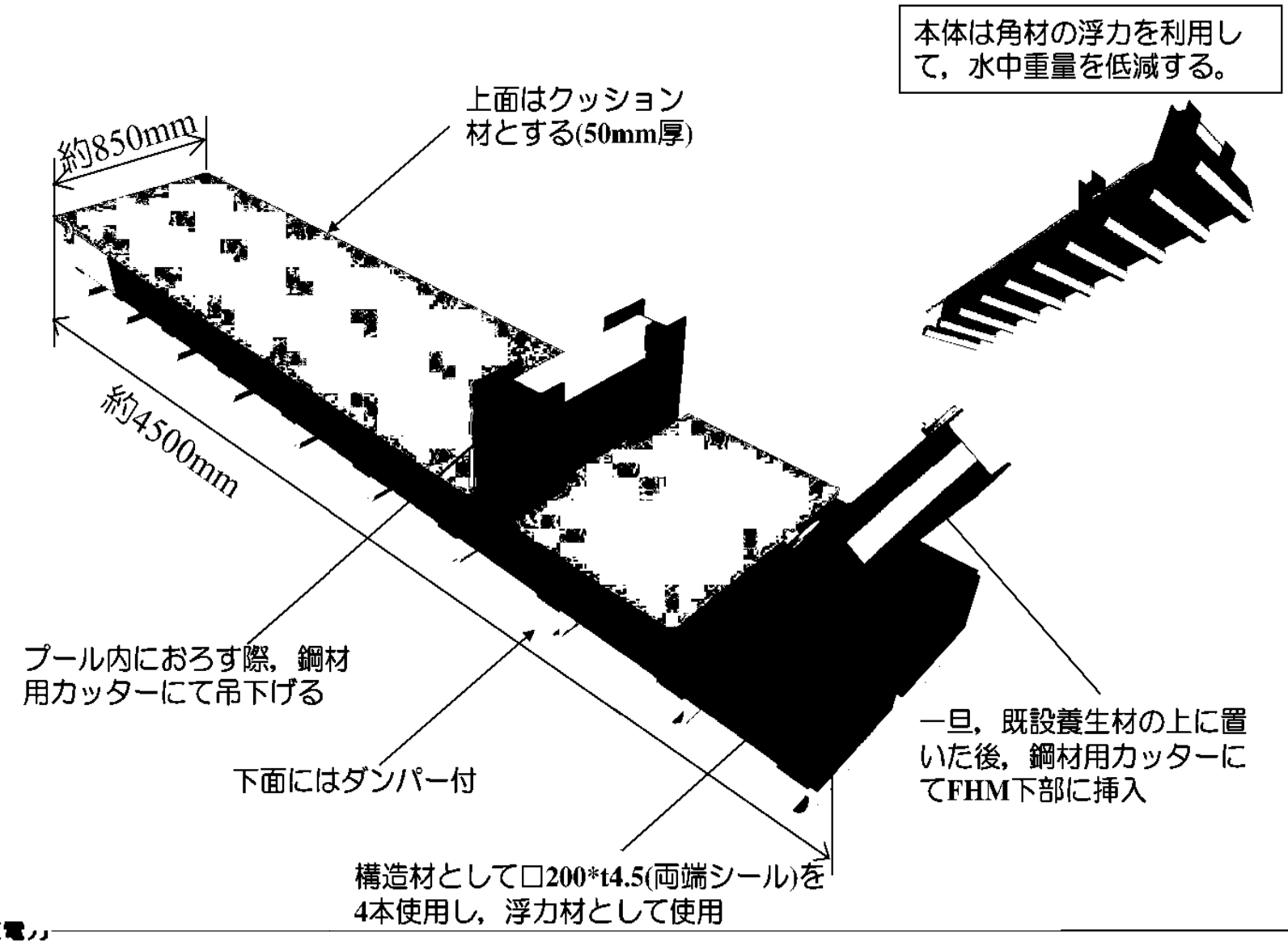
ＦＨＭ西側をＦＨＭ西側吊具にて把持

ＦＨＭ東側吊具
（モックアップ試験済）

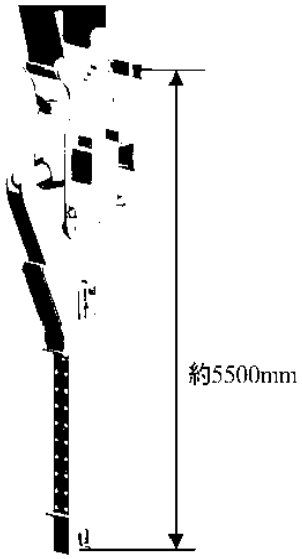
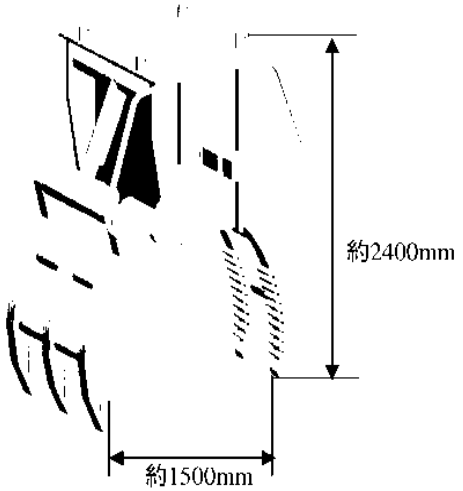


ＦＨＭ東側をＦＨＭ東側吊具を挿入し，吊上げ，撤去

（参考）ラック養生板について（概略例）

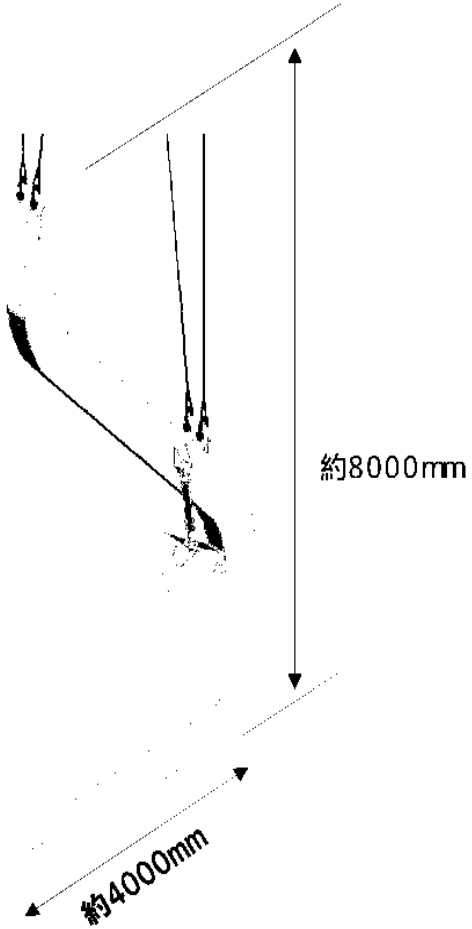


（参考）瓦礫取扱具

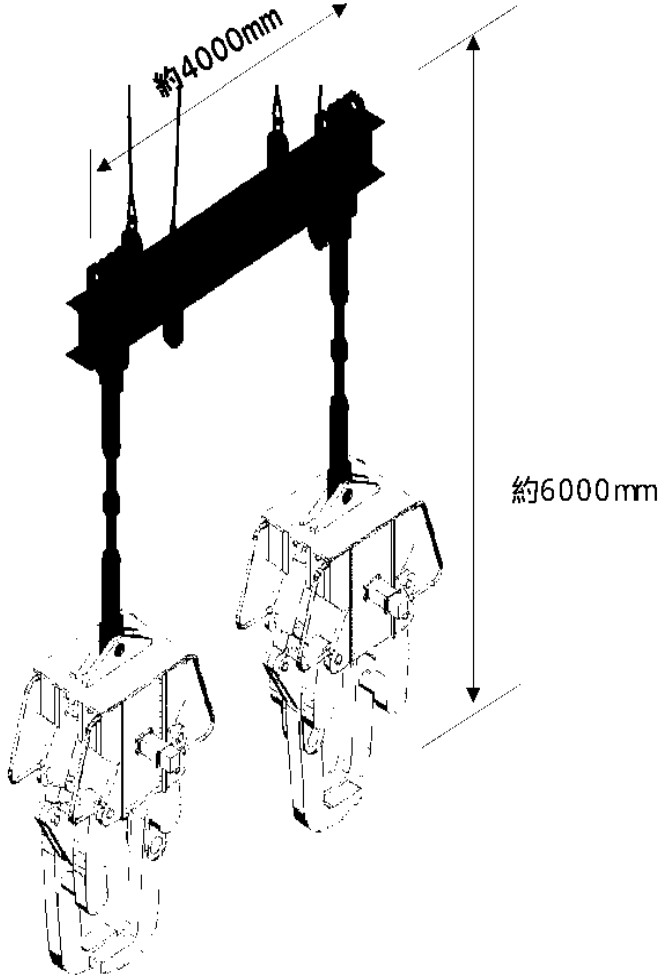
		
鋼材用カッター	ケーブル用カッター	フォーク
鋼材を切断、または把持して撤去する場合に使用。刃の根本部分で旋回・曲げ動作が可能。FHM構成部材へのアクセスが大型カッターに比べ容易。	鋼材用カッターに取付けて使用。ケーブル、細い鋼材の切断に使用。	水中・気中の瓦礫（鋼材、コンクリート等）を把持して撤去する場合に使用。

（参考）ＦＨＭ吊具

- ＦＨＭブリッジ一括撤去吊具　概略図



FHM東側吊具　外形図



FHM西側吊具　外形図

１F-４使用済燃料プールから共用プールに輸送された漏えい燃料の調査結果について

２０１５年1月２９日

東京電力株式会社

東京電力 TEPCO

概要

概　要

福島第一原子力発電所 4号機の使用済燃料プールから共用プールに移送した漏えい燃料 (2体)※ について、移送後の状態を確認するため、水中カメラによる外観点検およびファイバースコープによる漏えい燃料棒の調査を実施。

※ 当該燃料 2体は漏えいが確認された後、平成22年2月から3月にかけて、超音波による調査を行い、漏えい燃料棒を特定。また、ファイバースコープによる観察の結果、被覆管に割れや孔は確認されていない。

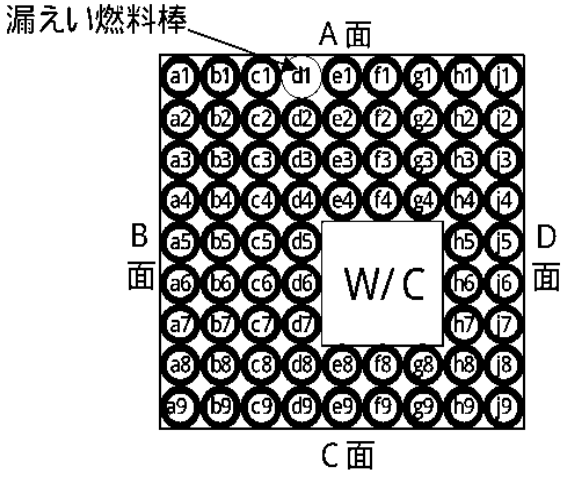
現場作業実施期間

平成26年12月17日, 12月18日

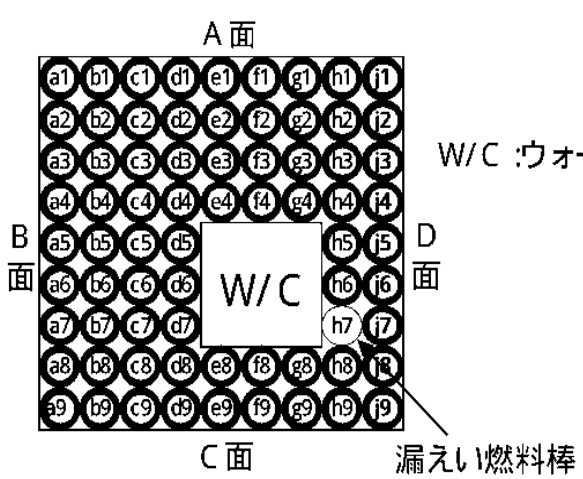
実施内容

① 漏えい燃料 2体に対して、水中テレビカメラによる外観点検を実施

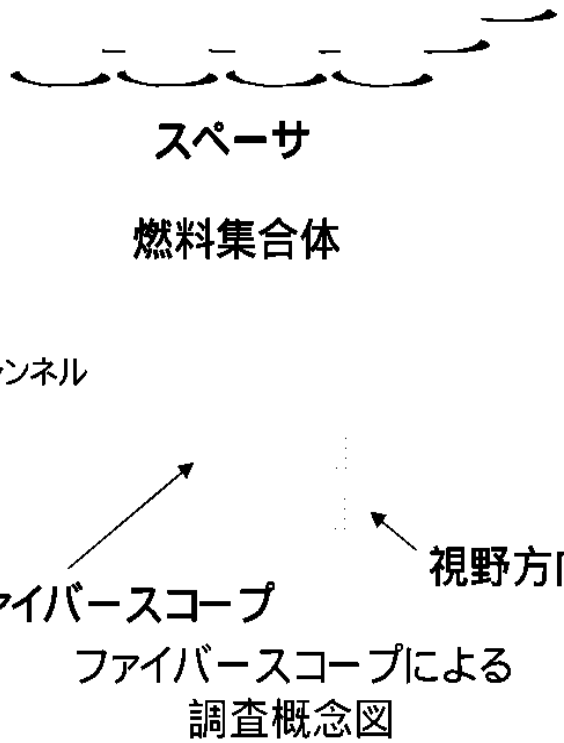
② 震災前の調査により特定されている漏えい燃料棒は、ファイバースコープによる被覆管の詳細観察を実施



燃料集合体断面 (F4UN4)

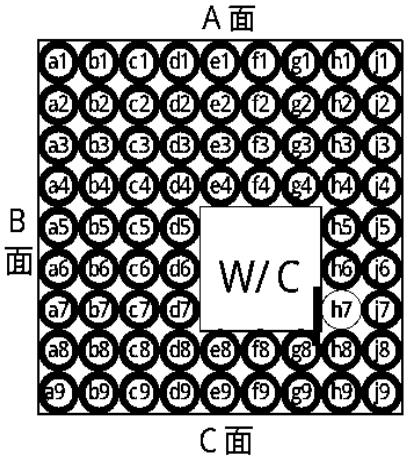


燃料集合体断面 (F4UN22)



ファイバースコープによる調査概念図

燃料集合体断面 (F4UN22)



○ 漏洩燃料棒

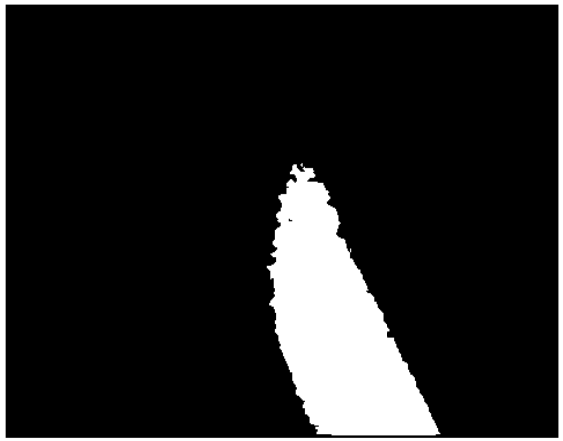
━ FS挿入位置

FS:ファイバースコープ

W/C :ウォータチャンネル

燃料集合体断面 (F4UN22)

W/C側



h7

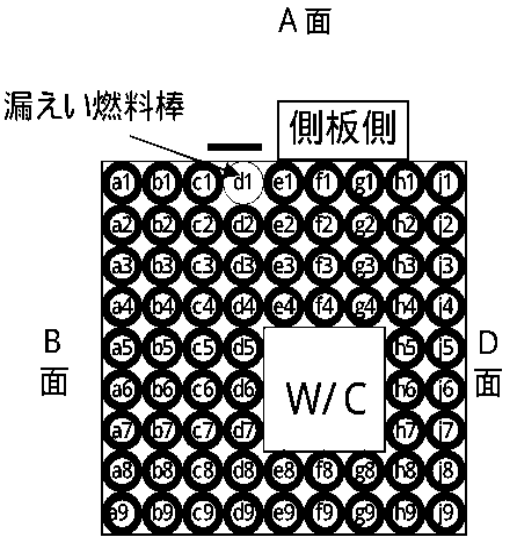
2010年観察時燃料棒の膨らみ

W/C側

h7

2014年観察時燃料棒の膨らみ

燃料集合体断面 (F4UN4)



○ 漏えい燃料棒

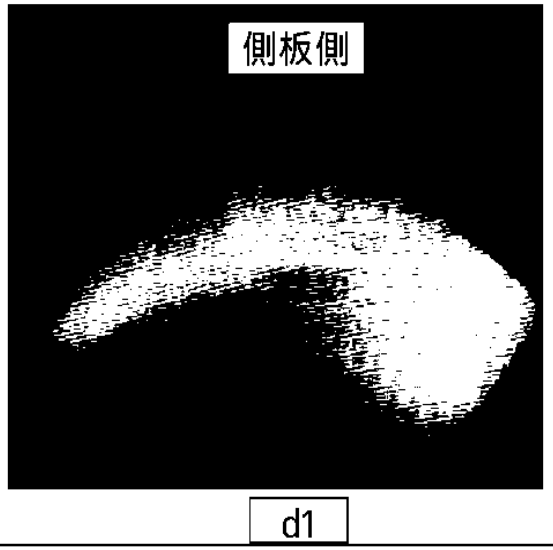
— FS挿入位置

FS:ファイバースコープ

W/C :ウォータチャンネル

燃料集合体断面 (F4UN4)

2010年観察時ｄ1燃料要素の膨み



2014年観察時ｄ1燃料要素の膨み

観察結果

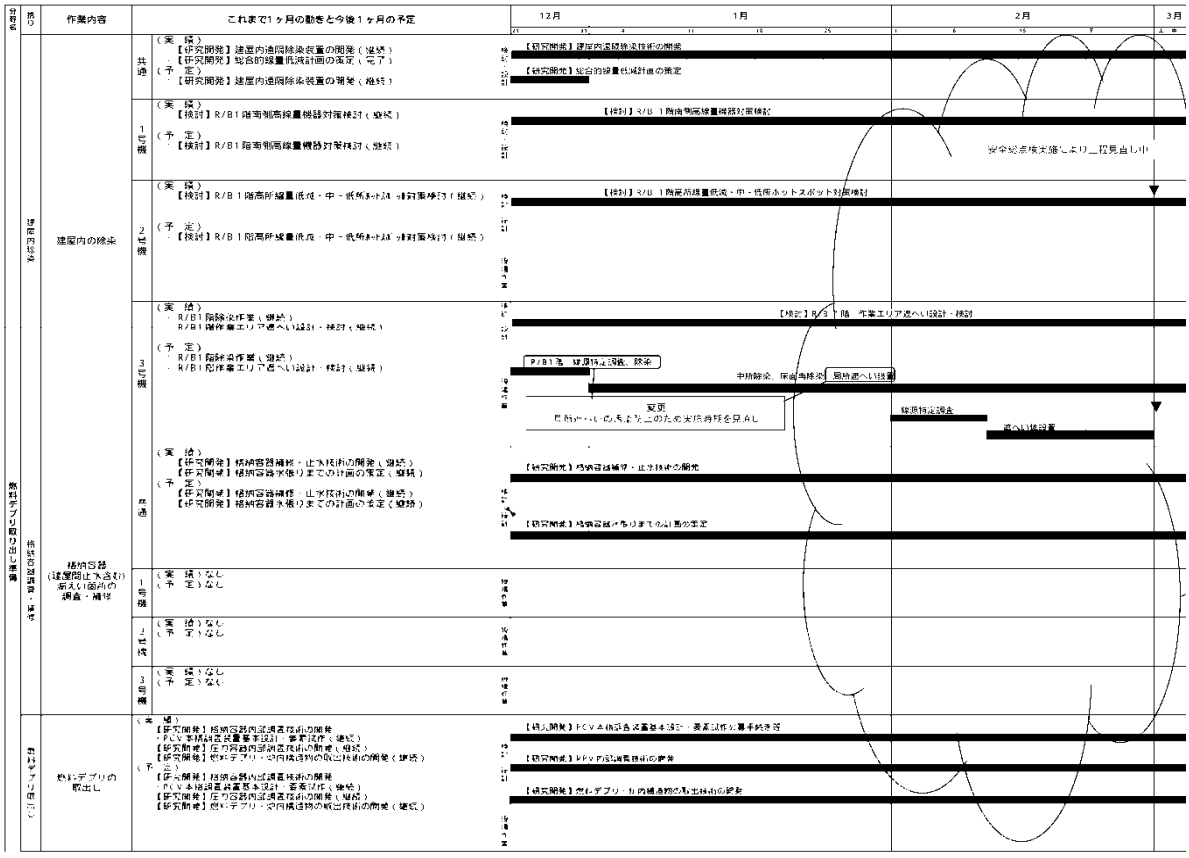
1F4の漏えい燃料2体は(F4UN22、F4UN4)を共用プールにおいてファイバースコープ等を用いて観察を行った。

今回の観察において、2010年に実施した結果と比較し、がれきの有無の違いはあったが、燃料棒の膨らみに変化はなく、新たなクラックの異常も認められなかった。また、外観観察においても上部タイプレートや燃料棒に有意な変形は見られず、大きな荷重がかかった形跡は見られなかった。

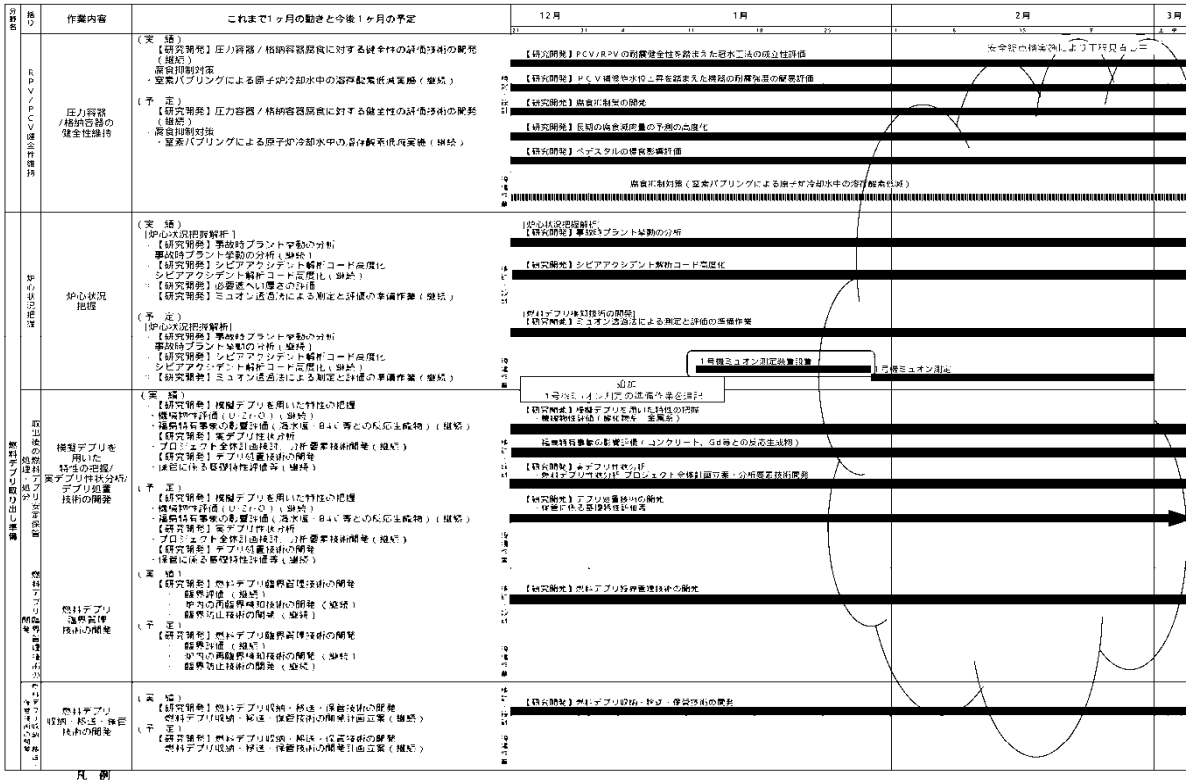
観察結果から、当該燃料2体には、4号機から共用プールへの燃料輸送が漏えい燃料棒へ影響を及ぼすことがなかったと判断される。

以上よりこれらの2体の漏えい燃料を共用プールに保管するにあたって、被覆管の亀裂等によりペレットが散逸するといった事象の恐れがないと考える。

燃料デブリ取り出し準備　スケジュール



燃料デブリ取り出し準備　スケジュール



凡　例

- 検討業務・設計業務・準備作業
- 状況変化により、再度検討・再設計等が発生する場合
- 現場作業予定
- 天候状況及び他工事調整により、工期が左右され完了日が確定な場合
- 機器の運転確認のみで、現場作業（工事）がない場合
- 2014年9月以降も作業や検討が継続する場合は、矢印で記載
- 工程調整中のもの

原子炉内燃料デブリ検知技術の開発
設置作業の進捗報告

2015年1月29日

東京電力株式会社

東京電力
TEPCO

IRID

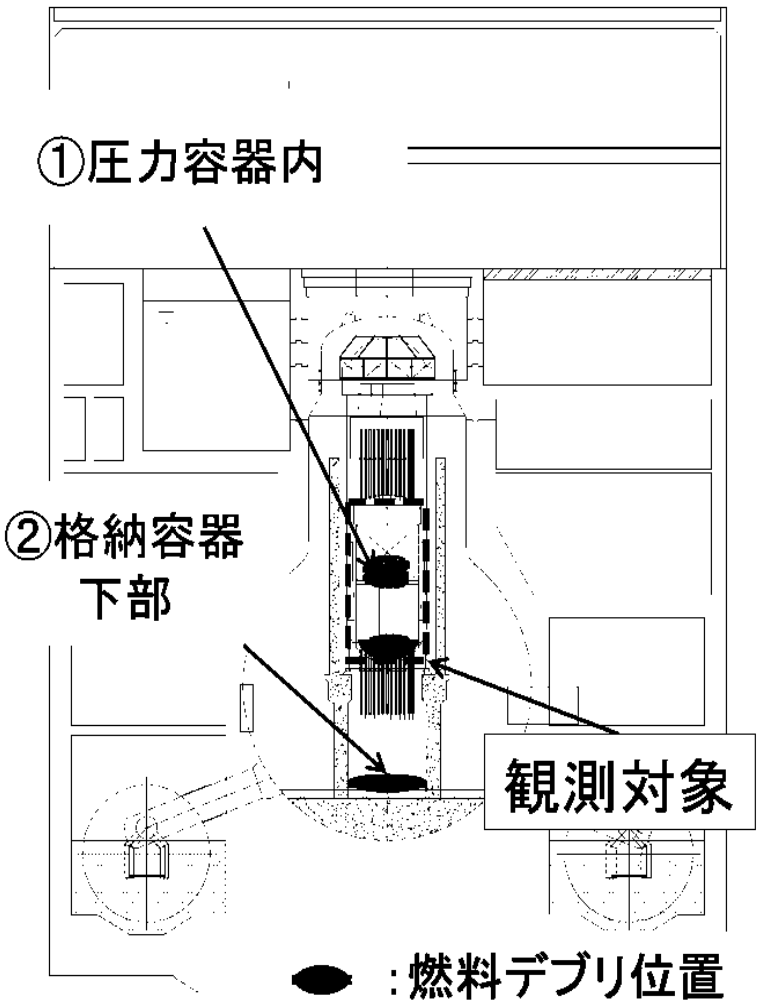
本資料の内容においては、技術研究組合国際廃炉研究開発機構（IRID）の成果を活用しております。

1. 全体計画－目的

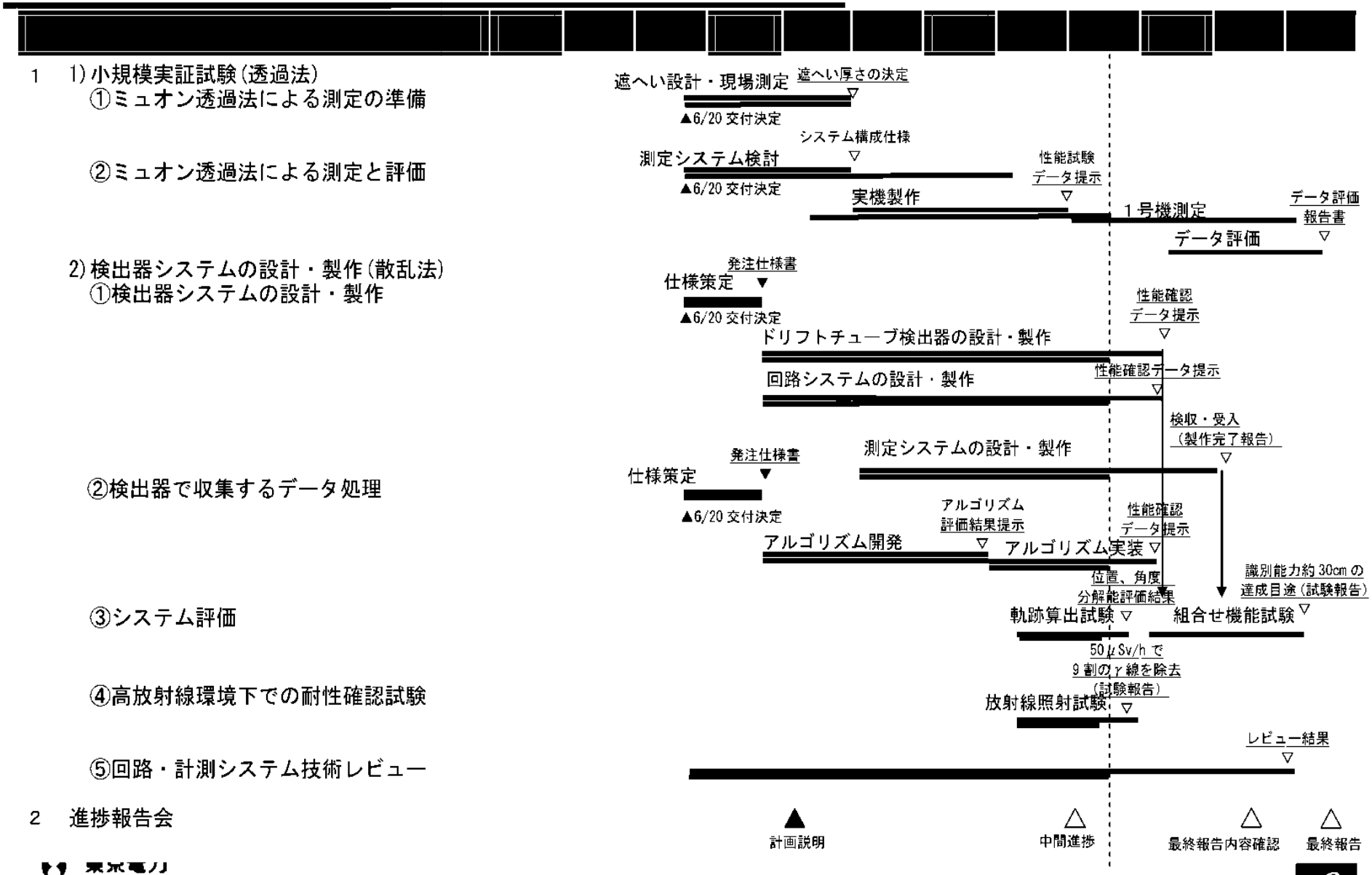
●圧力容器内(①)と格納容器下部(②)
　の燃料デブリの位置、量の把握が重要
◆燃料集合体の損傷状態
◆狭隘部への溶融燃料の流れ込み有無
◆燃料デブリの密度等の詳細分布

圧力容器内部は
高放射線場で
アクセス困難

**ミュオンによる透視技術で
早期に燃料デブリ分布を
廃炉技術開発に提供**



2. H26年度実施計画

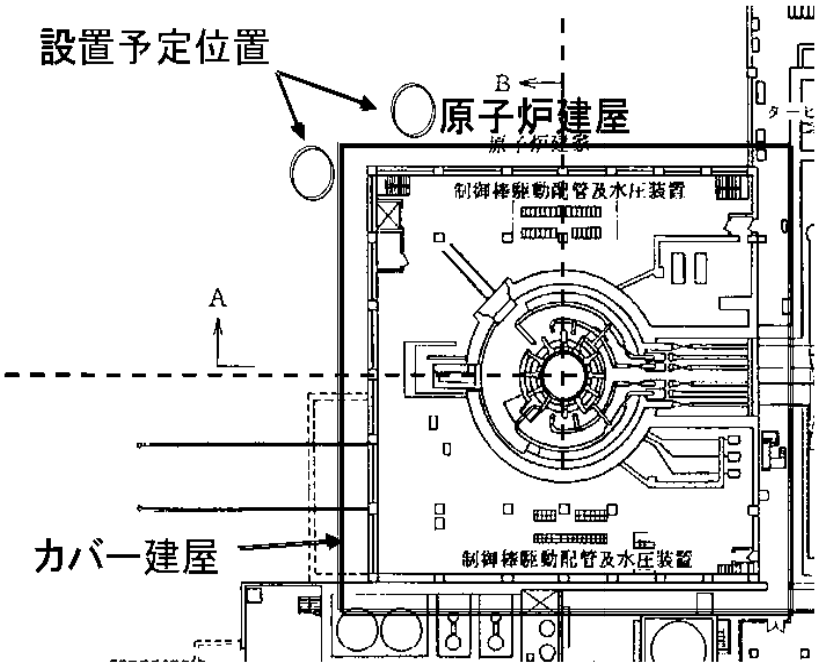

1 1)小規模実証試験(透過法)
①ミュオン透過法による測定の準備
②ミュオン透過法による測定と評価
2)検出器システムの設計・製作(散乱法)
①検出器システムの設計・製作
②検出器で収集するデータ処理
③システム評価
④高放射線環境下での耐性確認試験
⑤回路・計測システム技術レビュー
2 進捗報告会
遮へい設計・現場測定
遮へい厚さの決定
▲6/20 交付決定
システム構成仕様
測定システム検討
▲6/20 交付決定
性能試験
データ提示
実機製作
1号機測定
データ評価
報告書
データ評価
発注仕様書
仕様策定
▲6/20 交付決定
性能確認
データ提示
ドリフトチューブ検出器の設計・製作
回路システムの設計・製作
性能確認データ提示
検収・受入
(製作完了報告)
発注仕様書
仕様策定
▲6/20 交付決定
測定システムの設計・製作
アルゴリズム
評価結果提示
アルゴリズム開発
アルゴリズム実装
性能確認
データ提示
位置、角度
分解能評価結果
識別能力約30cmの
達成目途(試験報告)
軌跡算出試験
組合せ機能試験
50μSv/hで
9割のγ線を除去
(試験報告)
放射線照射試験
レビュー結果
計画説明
中間進捗
最終報告内容確認
最終報告

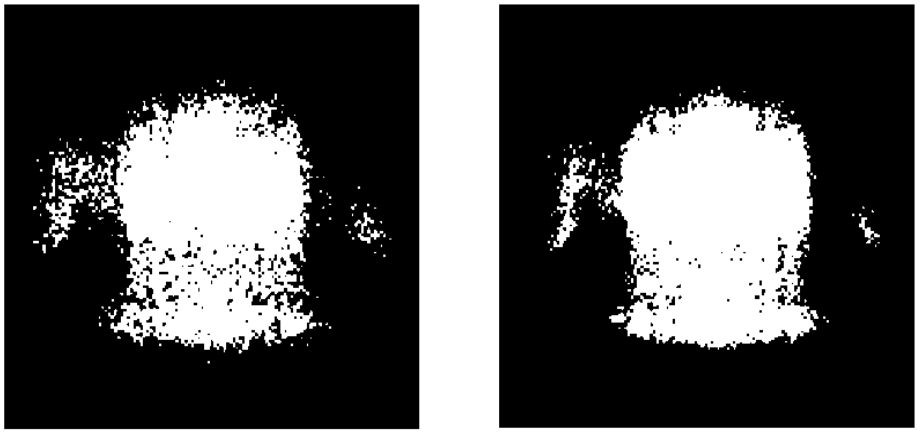
3. 透過法：設置位置及び測定結果のイメージ

■検出器は、原子炉建屋の北側及び
北西コーナに設置予定（1月下旬以降）

■測定開始は最速で2月初旬頃

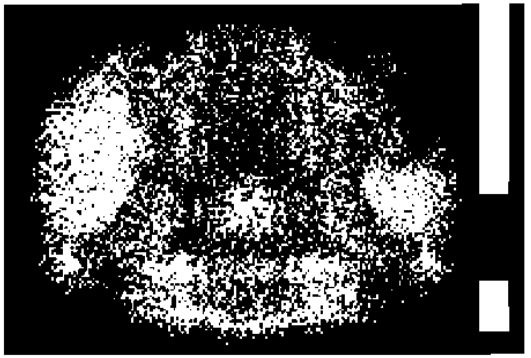
■建屋前検出器は10cm厚鉄板で遮蔽

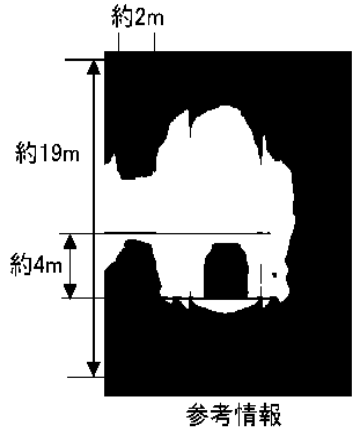




30日　　90日

シミュレーションによる予備評価





高密度領域の抽出結果（30日）

RPV・PCVの形状が既知のため、燃料有無を検知可能

4．設置作業の進捗状況

前回報告（12/25）以降、

遮へい体の納入

遮へい体への装置の組み込み・断熱材の施工

測定用システムの作動確認

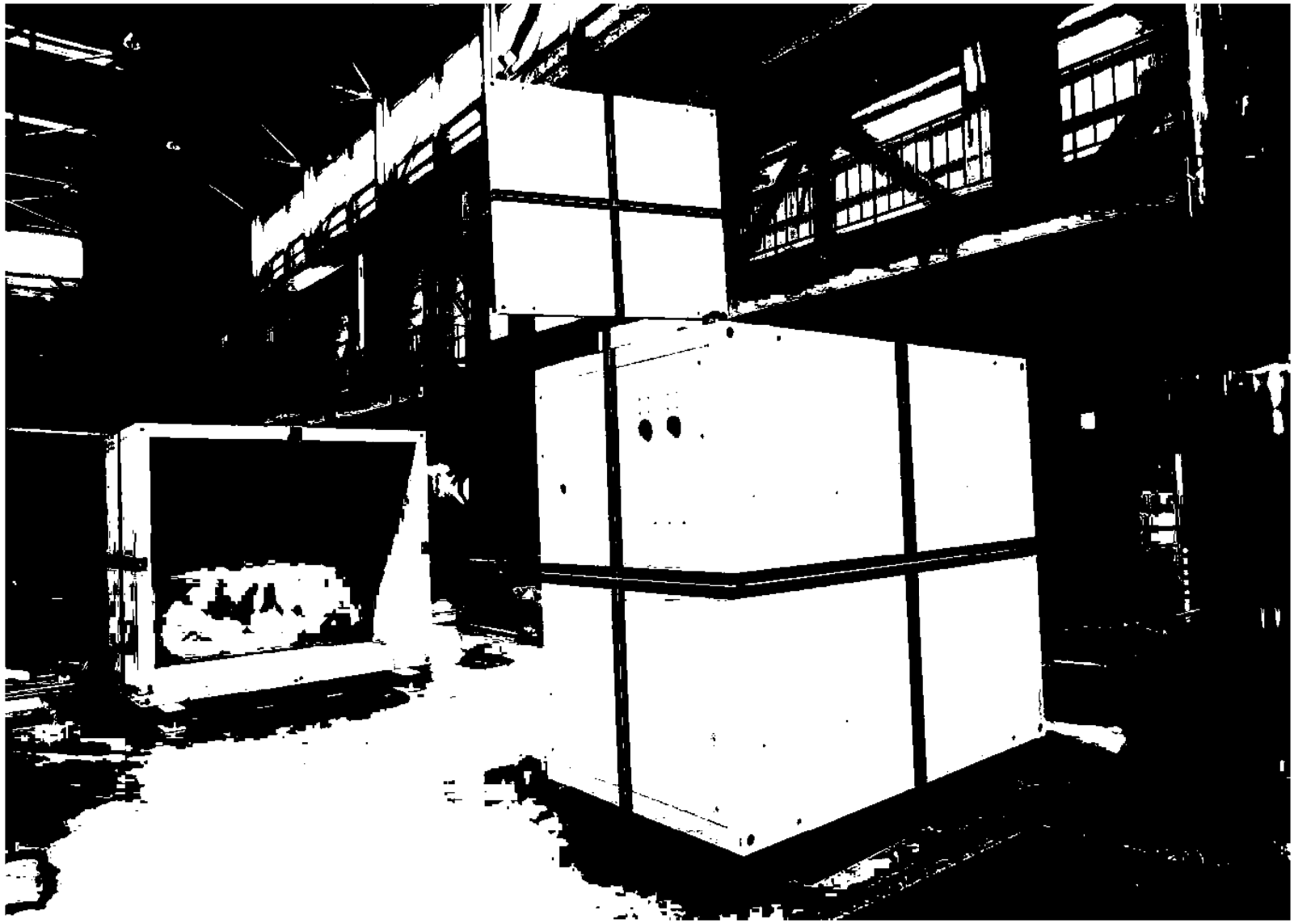
高エネルギー加速器研究機構より、1F構外への輸送

が完了した

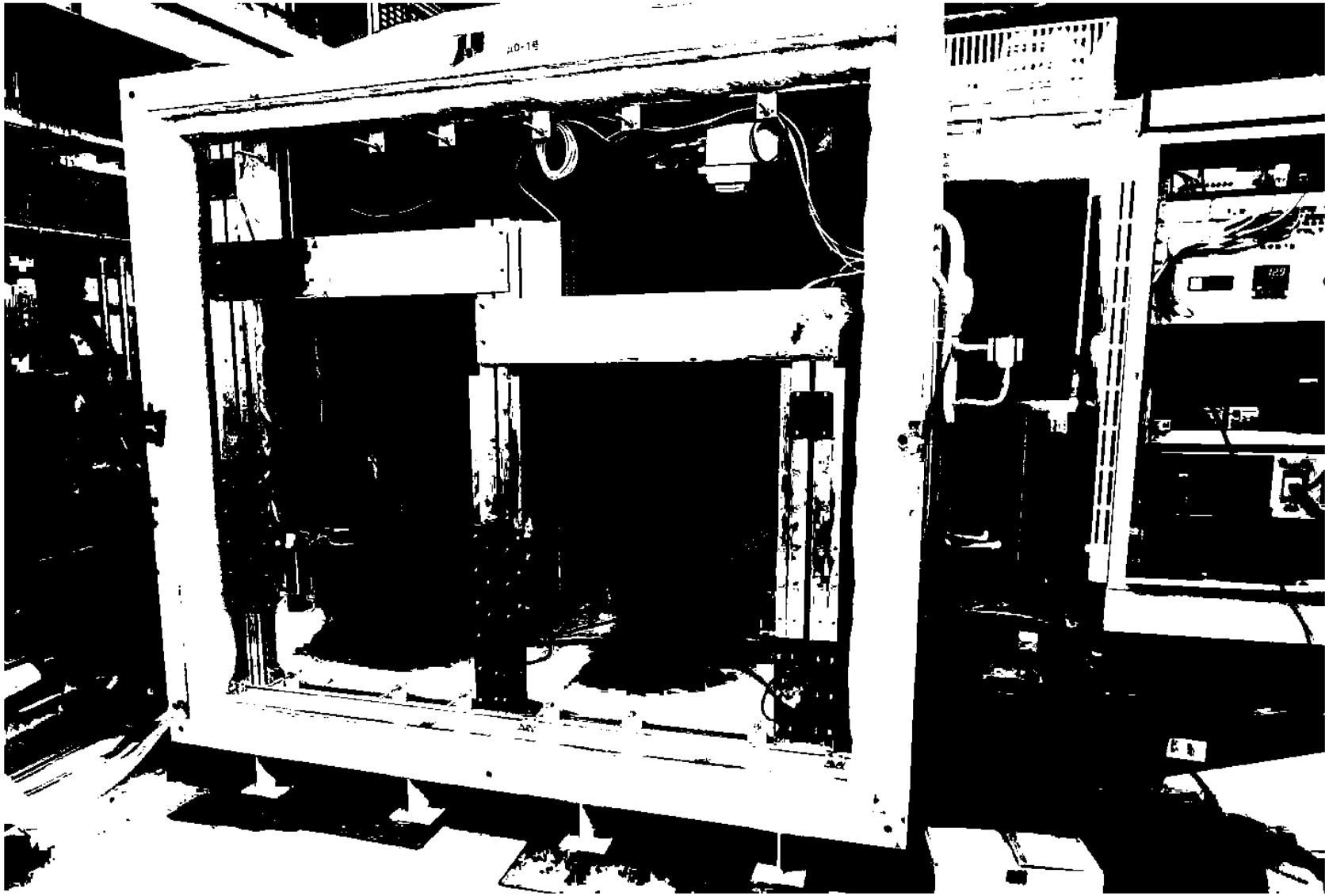
1F構内では、設置位置への鉄板敷設が完了し、電源及び通信ケーブルの敷設作業が一部完了している状態

今後、１号機北側及び北西側への設置作業を実施し、測定を開始予定

（参考）遮へい体



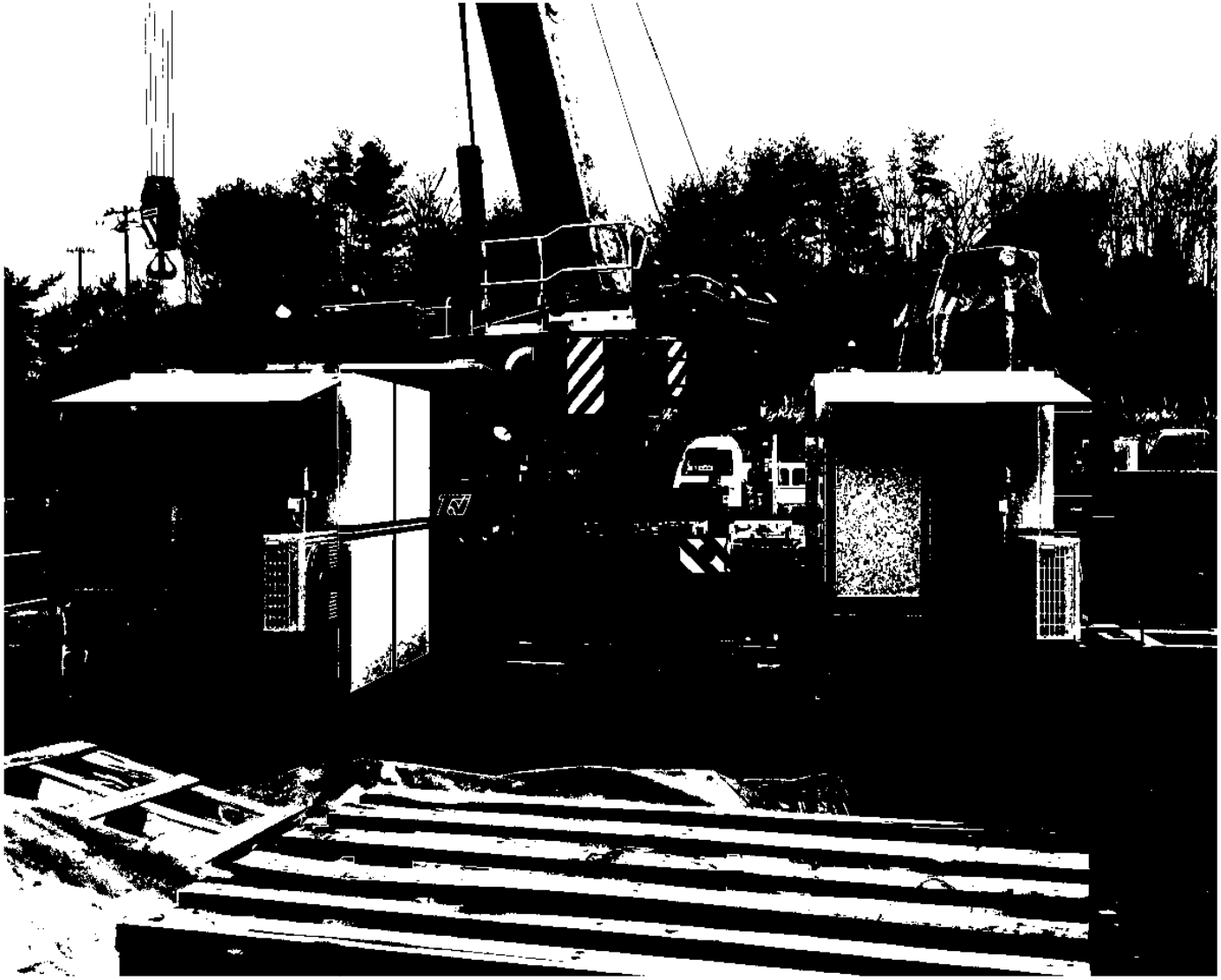
（参考）測定装置（遮へい体内への組み込み、断熱材設置後）



（参考）データ蓄積用PC（作動確認中）

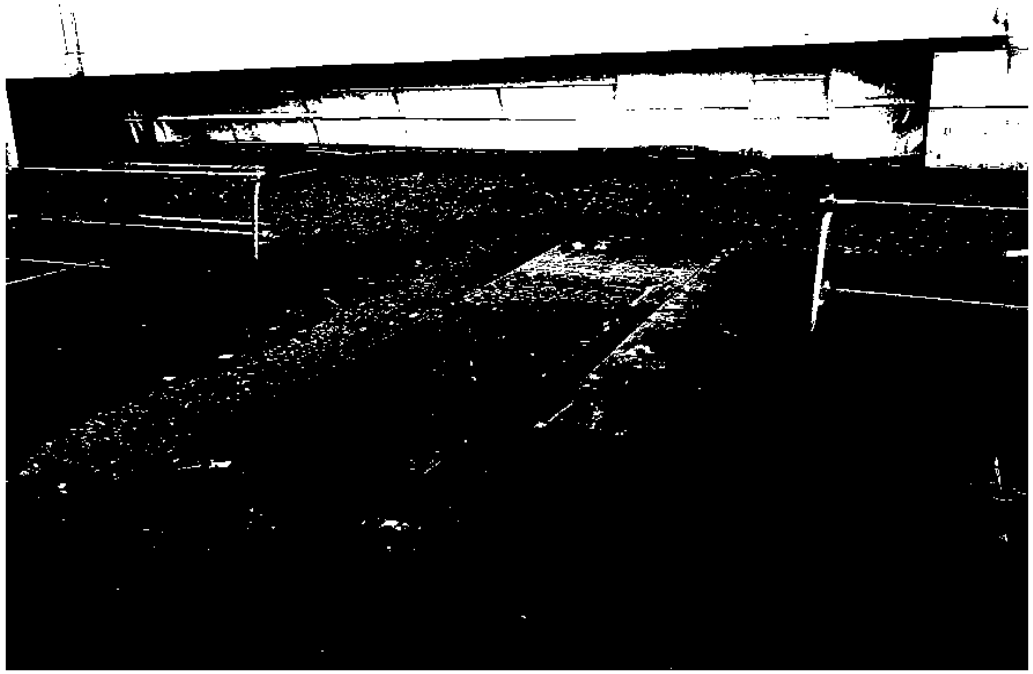
測定装置2の電源ケーブルを
意図的に切り離し、電源供給エラー
（赤）が表示されることを確認

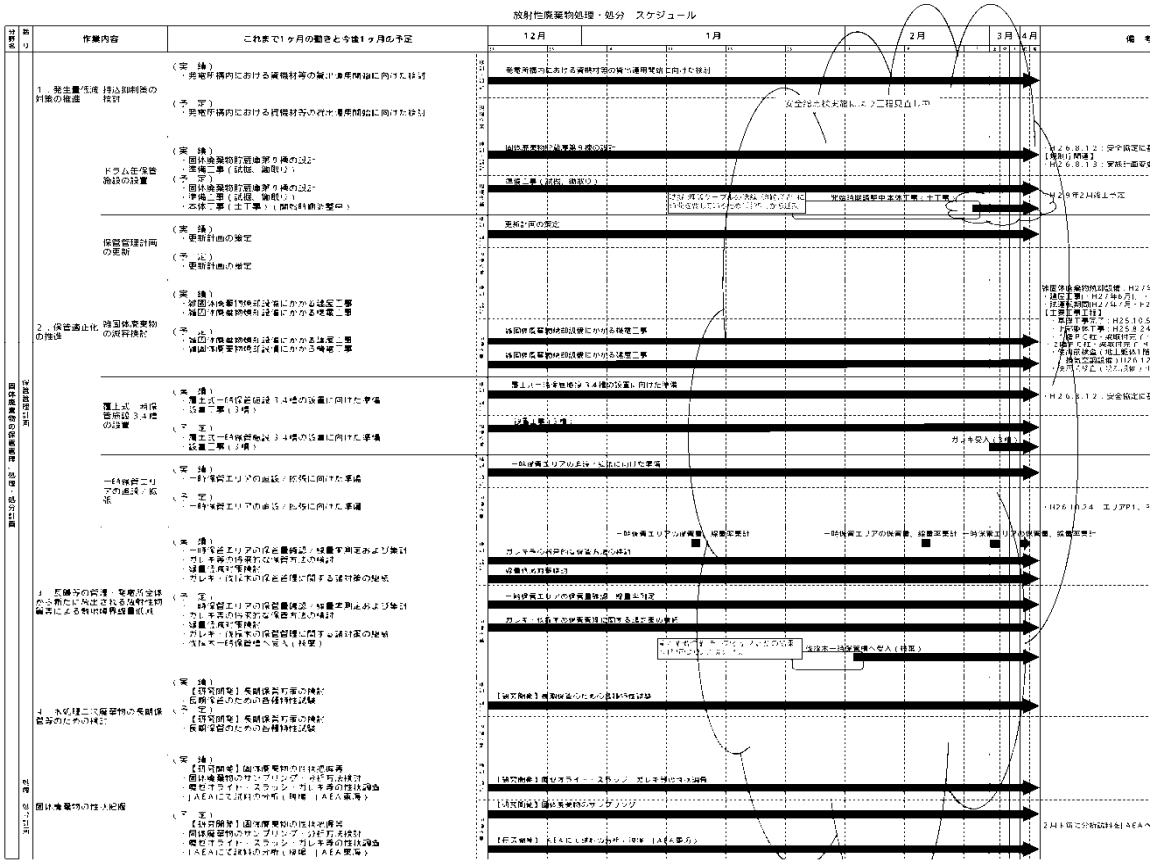
（参考）福島第一原子力発電所構外にて仮置き中の測定装置



（参考）鉄板敷き作業

ミュオン装置設置予定場所の一部に
鉄板が敷かれていなかったため、
追加で鉄板を敷設（1/12完了）




放射性廃棄物処理・処分　スケジュール
12月
1月
2月
3月
4月
備　考
作業内容
これまで1ヶ月の動きと今後1ヶ月の予定
分野名
取り
固体状廃棄物の保管管理
処理・処分計画
1．発生量低減対策の推進
持込制限等の検討
（実　施）
・発電所構内における資機材等の再利用推進に向けた検討
（予　定）
・発電所構内における資機材等の再利用推進に向けた検討
ドラム缶保管設備の設置
（実　施）
・固体廃棄物貯蔵庫第９棟の設計
・準備工事（試掘、調整）
（予　定）
・固体廃棄物貯蔵庫第９棟の設計
・準備工事（試掘、調整）
・本体工事（土工事）（間接利害者説明）
保管管理計画の更新
（実　施）
・更新計画の策定
（予　定）
・更新計画の策定
2．保管適正化の推進
雑固体廃棄物の減容検討
（実　施）
・雑固体廃棄物焼却設備にかかる建屋工事
・雑固体廃棄物焼却設備にかかる電気工事
（予　定）
・雑固体廃棄物焼却設備にかかる建屋工事
・雑固体廃棄物焼却設備にかかる電気工事
覆土式　第四保管庫設３,４棟の設置
（実　施）
・覆土式一時保管施設３,４棟の設置に向けた準備
・設置工事（３棟）
（予　定）
・覆土式一時保管施設３,４棟の設置に向けた準備
・設置工事（３棟）
一時保管エリアの造成・拡張
（実　施）
・一時保管エリアの造成／拡張に向けた準備
（予　定）
・一時保管エリアの造成／拡張に向けた準備
3．廃棄物の管理・発生状況の全体像から将来に発生する放射性物質等による影響評価量低減
（実　施）
・一時保管エリアの保管量推定・処理量予測および検討
・ガレキ等の除染方法等保管方法の検討
・減量化技術情報
・ガレキ・伐採木の保管基準に関する検討案の策定
（予　定）
・一時保管エリアの保管量推定・処理量予測および検討
・ガレキ等の除染方法等保管方法の検討
・減量化技術情報
・ガレキ・伐採木の保管管理に関する検討案の策定
・伐採木一時保管槽へ受入（検査）
4．水処理二次廃棄物の長期保管等のための検討
（実　施）
・【研究開発】長期保管対策の検討
・長期保管のための各種特性試験
（予　定）
・【研究開発】長期保管対策の検討
・長期保管のための各種特性試験
固体廃棄物の性状把握
（実　施）
・【研究開発】固体廃棄物の性状把握
・固体廃棄物のサンプリング・分析方法検討
・模擬ガラス・スラッジ・ガレキ等の性状調査
・IAEAにて説明の可否（現場（IAEA要領））
（予　定）
・【研究開発】固体廃棄物の性状把握
・固体廃棄物のサンプリング・分析方法検討
・模擬ガラス・スラッジ・ガレキ等の性状調査
・IAEAにて説明の可否（現場（IAEA要領））
発電所構内における資機材等の再利用推進に向けた検討
安全対策工事大詰めにより二程見直しで
・H26.9.12：安全協定に基
【報告】現場
・H26.8.13：実施計画変
固体廃棄物貯蔵庫第９棟の設計
準備工事（試掘、調整）
本体工事（土工事）
・H26年2月頃上予定
更新計画の策定
雑固体廃棄物焼却設備にかかる建屋工事
雑固体廃棄物焼却設備にかかる電気工事
覆土式一時保管施設３,４棟の設置に向けた準備
設置工事（３棟）
ガレキ受入（検査）
・H26.9.12，安全協定に基
一時保管エリアの造成／拡張に向けた準備
一時保管エリアの保管量、処理量予測
一時保管エリアの保管量、処理量予測
一時保管エリアの保管量、処理量予測
ガレキ等の保管方法等の検討
処理量予測
一時保管エリアの保管量推定・処理量予測
ガレキ・伐採木の保管管理に関する検討案の策定
伐採木一時保管槽へ受入（検査）
【研究開発】長期保管のための各種特性試験
【研究開発】固体廃棄物のサンプリング
【研究開発】IAEAにて説明の可否（現場（IAEA要領））
2月下旬で分析結果をIAEAへ

東京電力株式会社
放射性廃棄物処理・処分
2015年1月29日

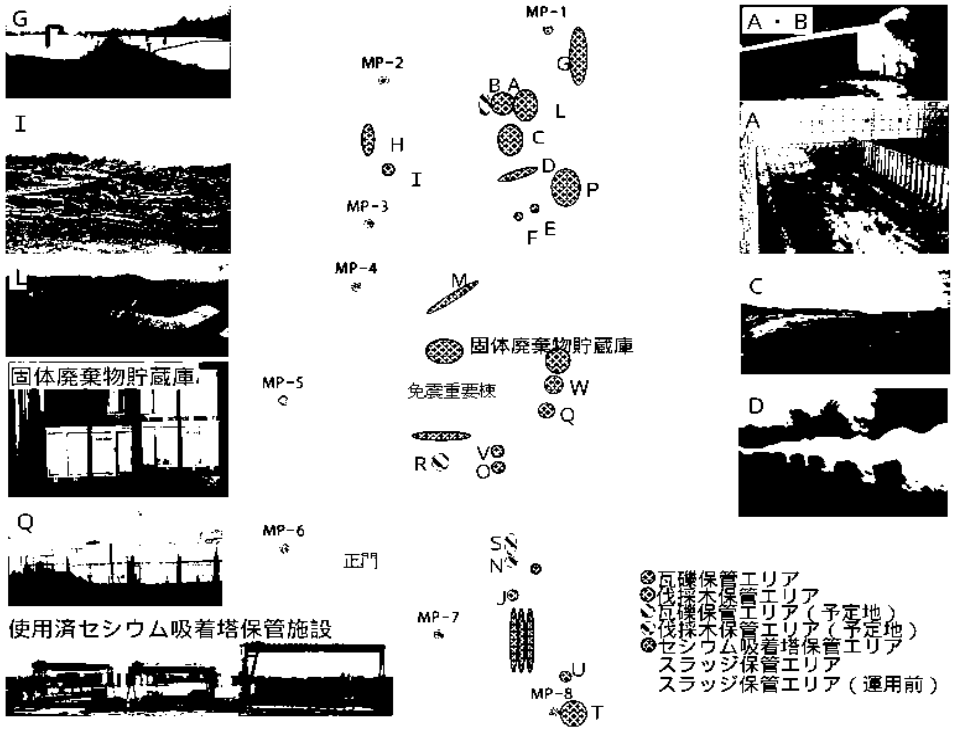
ガレキ・伐採木の管理状況（2014.12.26時点）

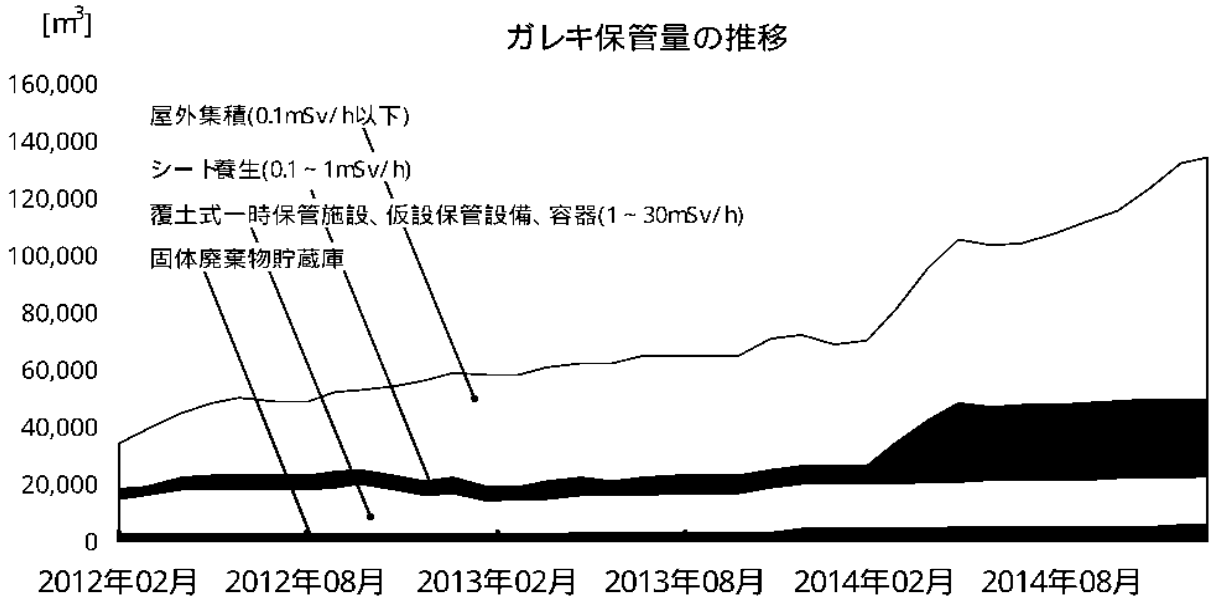
保管場所	エリア境界空間線量率（mSv/h）	種類	保管方法	保管量※1		前回報告比※2（2014.11.30）		変動※3理由	エリア占有率
固体廃棄物貯蔵庫	0.03	ガレキ	容器	5,100	m³	微増	m³	①	43%
A：敷地北側	0.45	ガレキ	仮設保管設備	3,000	m³	+100	m³	③	42%
C：敷地北側	0.01未満	ガレキ	屋外集積	50,500	m³	+1,700	m³	③④⑤	89%
D：敷地北側	0.01	ガレキ	シート養生	2,600	m³	0	m³	①	88%
E：敷地北側	0.02	ガレキ	シート養生	4,200	m³	0	m³	①	27%
	0.01未満	ガレキ※4	容器	0	m³	微増	m³	①	0%
F：敷地北側	0.01	ガレキ	容器	600	m³	0	m³	①	99%
			屋外集積	2,600	m³	+600	m³	⑥	35%
J：敷地南側	0.03	ガレキ	屋外集積	4,700	m³	0	m³	①	98%
L：敷地北側	0.01未満	ガレキ	覆土式一時保管施設	8,000	m³	0	m³	⑪	100%
O：敷地南西側	0.02	ガレキ	屋外集積	26,200	m³	0	m³	①	95%
P：敷地北側	-	ガレキ	屋外集積	0	m³	0	m³	①	0%
Q：敷地西側	0.12	ガレキ	容器	5,700	m³	微増	m³	①	93%
U：敷地南側	0.01未満	ガレキ	屋外集積	700	m³	0	m³	①	100%
W：敷地西側	0.03	ガレキ	シート養生	20,400	m³	+100	m³	④⑫	70%
合計（ガレキ）				134,400	m³	+2,500	m³	①	56%
G：敷地北側	0.01未満	伐採木	伐採木一時保管槽	7,300	m³	0	m³	①	27%
H：敷地北側	0.01	伐採木	屋外集積	14,300	m³	0	m³	⑪	81%
I：敷地北側	0.02	伐採木	屋外集積	10,500	m³	0	m³	①	100%
M：敷地西側	0.01未満	伐採木	屋外集積	37,600	m³	0	m³	①	83%
T：敷地南側	0.01	伐採木	伐採木一時保管槽	10,100	m³	0	m³	①	44%
V：敷地南側	-	伐採木	屋外集積	0	m³	0	m³	①	0%
合計（伐採木）				79,700	m³	0	m³	①	58%

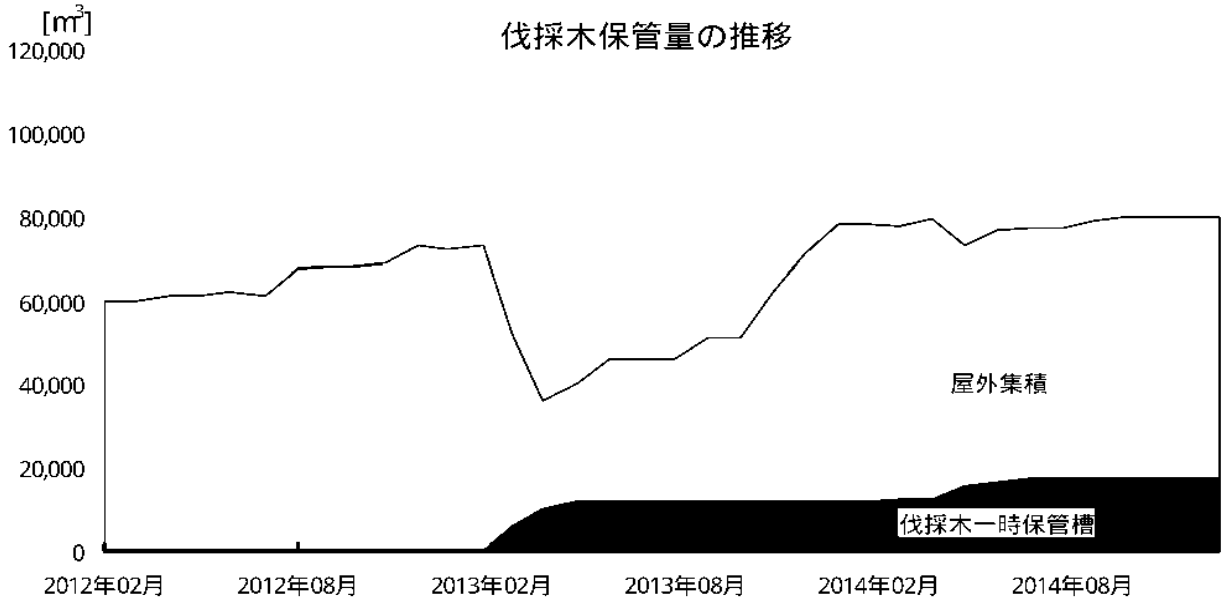
※1　端数処理で100m³未満を四捨五入しているため、合計値が合わないことがある。
※2　100m³未満を端数処理しており、微増・微減とは100m³未満の増減を示す。
※3　主な変動理由：①1～4号建屋周辺瓦礫撤去関連工事　②タンク設置関連工事　③多核種除去設備増設関連工事
④フェーシング関連工事　⑤陸側遮水壁設置関連工事　⑥焼却対象物の集約作業　等
※4　水処理二次廃棄物（小型フィルタ等）を含む。

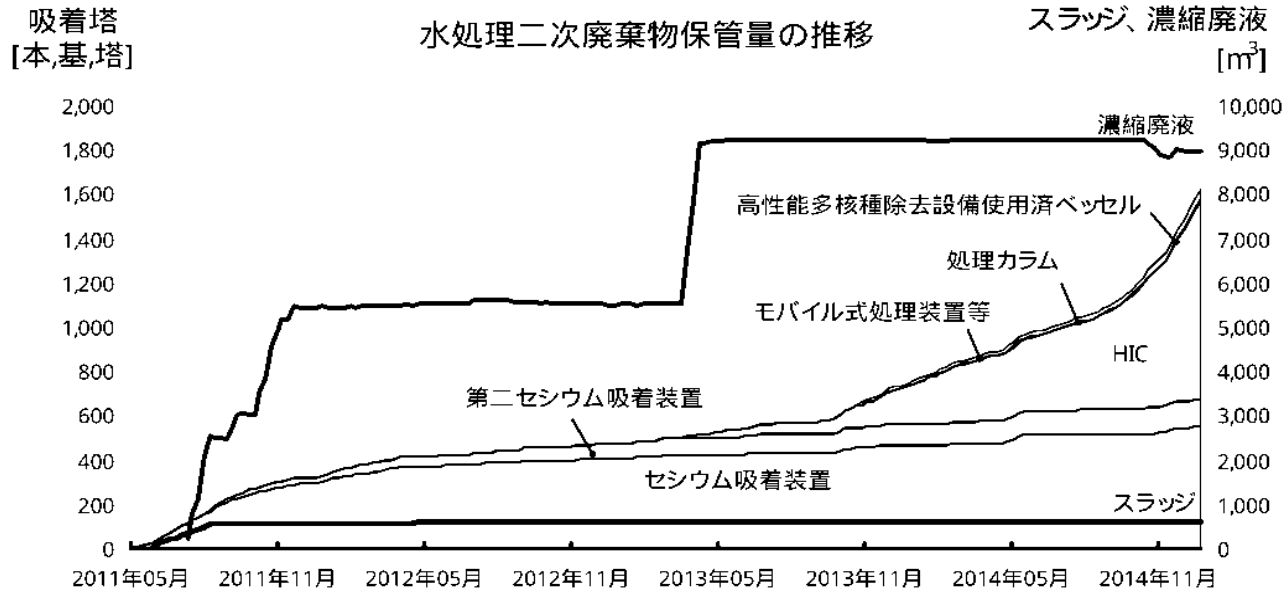
水処理二次廃棄物の管理状況（2015.1.22時点）

保管場所	種類		保管量		前回からの増減（2014.12.23）		保管量/保管容量
使用済セシウム吸着塔保管施設	セシウム吸着装置使用済ベッセル		550	本	+10	本	49%
	第二セシウム吸着装置使用済ベッセル		120	本	0	本	
	多核種除去設備等保管容器	既設	690	基	+98	基	
		増設	205	基	+65	基	
	多核種除去設備処理カラム	既設	3	塔	0	塔	
	高性能多核種除去設備使用済ベッセル	高性能	9	本	+8	本	
	モバイル式処理装置等使用済ベッセル及びフィルタ類		44	本	+7	本	
廃スラッジ貯蔵施設	廃スラッジ		597	m³	0	m³	85%
濃縮廃液タンク	濃縮廃液		8,948	m³	0	m³	45%




[m³]
ガレキ保管量の推移
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
屋外集積(0.1mSv/h以下)
シート養生(0.1～1mSv/h)
覆土式一時保管施設、仮設保管設備、容器(1～30mSv/h)
固体廃棄物貯蔵庫
2012年02月
2012年08月
2013年02月
2013年08月
2014年02月
2014年08月


[m³]
伐採木保管量の推移
120,000
100,000
80,000
60,000
40,000
20,000
0
屋外集積
伐採木一時保管槽
2012年02月
2012年08月
2013年02月
2013年08月
2014年02月
2014年08月


吸着塔
[本,基,塔]
水処理二次廃棄物保管量の推移
スラッジ、濃縮廃液
[m³]
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
濃縮廃液
高性能多核種除去設備使用済ベッセル
処理カラム
モバイル式処理装置等
HIC
第二セシウム吸着装置
セシウム吸着装置
スラッジ
2011年05月
2011年11月
2012年05月
2012年11月
2013年05月
2013年11月
2014年05月
2014年11月

ガレキ・伐採木・水処理二次廃棄物の保管におけるトピックス（H27年1月29日）

分類		保管量（m^3）	保管容量（m^3）	占有率（%）	トピックス
		H26年12月26日時点（H26年11月30日報告からの増減）			
ガレキ	屋外集積 （0.1mSv/h未満）	84,700 (+2,300)	158,100 (+60,900)	54	・主なガレキは、工事で発生した廃材。 ・エリアP1運用開始（H26年10月24日）
	シート養生 （0.1～1mSv/h）	27,200 (+100)	48,300	56	・主なガレキは、工事で発生した廃材、建屋内に設置していた撤去機器、水処理で使用したホース類及び廃車両。 ・今後発生量の増加が見込まれるため、廃棄物発生量の抑制や既保管物の減容処理を進めていく。 ・エリアP2運用開始（H26年10月24日）
	覆土式一時保管施設、仮設保管設備、容器 （1～30mSv/h）	17,300 (+100)	23,700 (+1,800)	73	・主なガレキは、原子炉建屋上部等で撤去されたガレキ。 ・1号機ガレキ撤去に向けて、覆土式一時保管施設3,4槽設置（8,000m^3）の安全協定に基づく事前了解（H26年8月12日）。 ・エリアE2運用開始（H26年10月24日） ・覆土式一時保管施設3槽設置工事開始（H26年11月10日）
	固体廃棄物貯蔵庫	5,100	12,000	43	・主なガレキは、原子炉建屋上部等で撤去された高線量ガレキ。 ・第9棟設置（ドラム缶 約11万本）に向けて安全協定に基づく事前了解（H26年8月12日）。 ・第9棟設置に伴う実施計画変更認可申請（H26年8月13日）
伐採木	屋外集積 （幹・根・枝・葉）	62,400	88,200	71	・主にエリアP1造成により伐採した幹・根を受入。 その他工事により発生した幹・根を随時受入中。
	一時保管槽 （枝・葉）	17,400	50,100	35	・当面受入を計画していた枝葉については、チップ化した後、エリアTの伐採木一時保管槽へ受入完了。

※ 保管量、保管容量については端数処理で100m^3未満を四捨五入

分類		保管量	保管容量	占有率（%）	トピックス
		H27年1月22日時点（H26年12月23日報告からの増減）			
水処理二次廃棄物	使用済ベッセル （セシウム吸着装置使用済ベッセル、第二セシウム吸着装置使用済ベッセル、多核種除去設備等の保管容器及び処理カラム、高性能多核種除去設備使用済ベッセル、モバイル式処理装置等使用済ベッセル及びフィルタ類）	1,621本 (+188)	3,317 本	49	・多核種除去設備の高性能容器を保管する使用済吸着塔一時保管施設 第三施設（容量3,456本/18ブロック※）について実施計画変更認可（H26年11月20日） 使用前検査が終了し使用承認を得た範囲（768本/4ブロック※）を運用開始(H26年12月9日) ※ 192本/ブロック
	スラッジ	597 m^3	700 m^3	85	・除染装置の運転計画は無く 新たに廃棄物が増える見込みは無い。 ・準備が整い次第、除染装置の廃止について実施計画の変更申請を行う。
	濃縮廃液	8,948 m^3	20,000 m^3	45	

燃料デブリ取り出し代替工法に関する概念検討事業等の中間報告

平成27年1月29日
資源エネルギー庁

平成25年度補正予算「廃炉・汚染水対策事業費補助金」に係る補助事業では、福島第一原発の燃料デブリ取り出しにおいて、原子炉の冠水が実現できなかった場合の工法（代替工法）等について、国内外の叡智を集めた検討するため、次の事業を、昨年6月から公募し、同年10月に採択しております。

代替工法に関する概念検討事業	（4事業）
視覚・計測技術の実現可能性検討事業	（4事業）
切削・集塵技術の実現可能性検討事業	（3事業）

これら11事業は、年度末の取りまとめに向けて、事業を進めてもらっており、その中間報告を昨年12月に受けております。（別添参照）

<u>公募テーマ事業と採択先</u>

1.代替工法に関する概念検討事業
- 株式会社IHI【日本】
- 株式会社AREVA ATOX D&D SOLUTIONS【日本】
- Cavendish Nuclear Ltd【英国】、株式会社ビージーイー【日本】、清水建設株式会社【日本】
- 公益財団法人原子力バックエンド推進センター【日本】、木村化工機株式会社【日本】、一般財団法人日本クリーン環境推進機構【日本】

2.視覚・計測技術の実現可能性検討事業
- 株式会社キュー・アイ【日本】
- Create Technologies Limited【英国】
- 浜松ホトニクス株式会社【日本】
- 株式会社フジクラ【日本】

3.切削・集塵技術の実現可能性検討事業
- 株式会社IHI【日本】
- ONET TECHNOLOGIES NUCLEAR DECOMMISSIONING OTND【仏国】
- 大成建設株式会社【日本】

燃料デブリ取出しの代替工法に関する概念検討事業　＜株式会社IHI＞

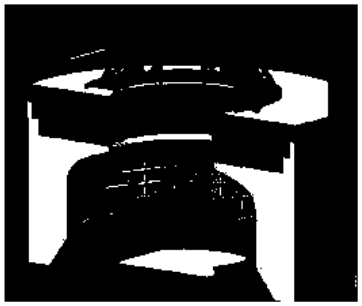
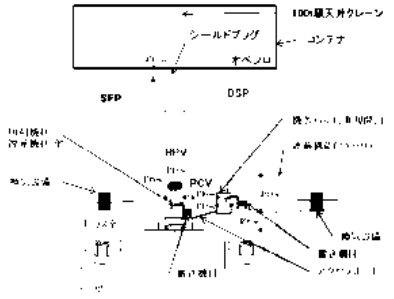
目的と目標

PCVを冠水させることなく、原子炉ウェルまたはPCV側面の開口から安全に燃料デブリを回収する工法を提案する。

事業の概要と特長

【事業全体概要】

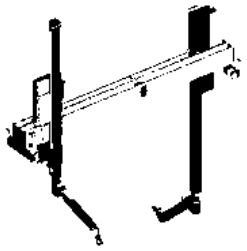
適用工法
懸垂回収装置を用いた懸垂工法
マニプレータとプレハブエンクロージャを用いた側面工法

項目	懸垂工法	側面工法
概　要		
概念手順	回収装置が下降し、PCVヘッド、保温架台、RPVヘッドにアクセス開口を設けながら、燃料デブリまで下降する。 この工法は燃料デブリまたは破損機器に近接してハンドリングすることが可能である。	新たなアクセス開口を生体しゃへい壁とPCVに設ける。この開口の前面に工場で組立てたエンクロージャを据え付け、気密バウンダリを維持して燃料デブリにアクセスする。 この工法は燃料デブリがRPVペデスタル内部にあれば、燃料デブリまで最短離である。

基本コンセプト
- *安全な放射線遮へい*
- *作業中のPCVバウンダリからのリークの最小化*
- *気中および冷却水中からの集塵システム*
- *実用的な据付工法と構造設計*
- *水・ジルコニウム反応等による水素ガス爆発防止*
- *継続的なモニタによる再臨界防止*

実積のある信頼性の高いマニピュレータ
- *高耐放射線性マニピュレータの採用*
- *継続的な運用のため救援・補修システムの併設*

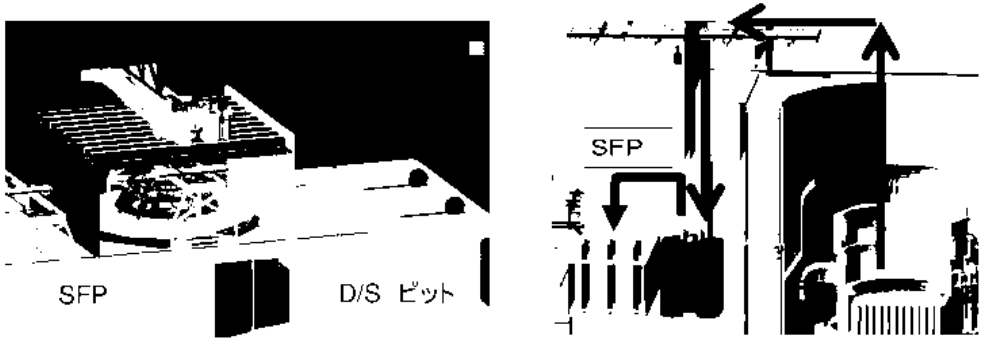
高耐放射線性マニピュレータ


ダブルマニピュレータ

これまでに得られた成果／これから得られる見込みの成果

【これまでの実施事項】

- *燃料デブリの取出し手順図*
- *燃料デブリの冷却方法の考え方*
- *集じんおよび回収方法*
- *気密バウンダリ維持および概略システム系統の検討*
- *放射線防護の考え方*



燃料デブリ取出し手順（案）

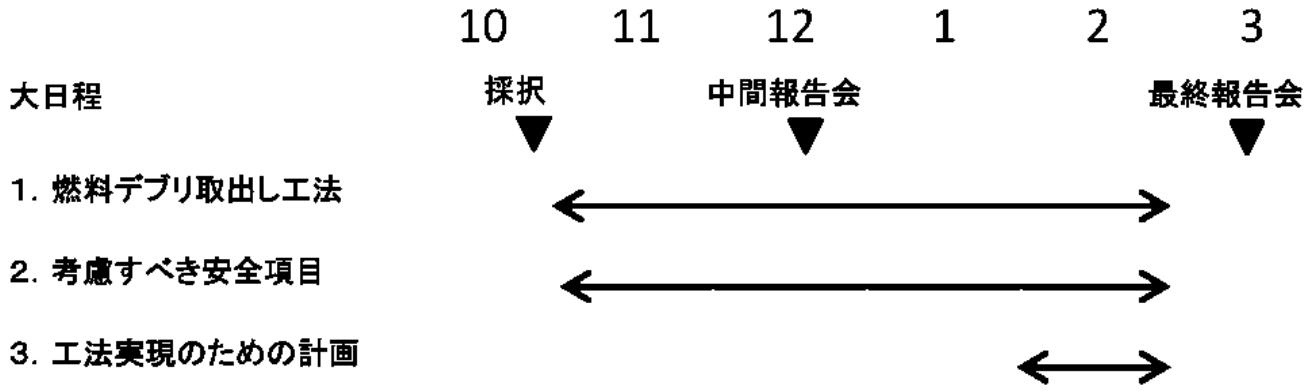
【これから得られる見込み成果】

1. 燃料デブリ取出し工法
- *機材の配置計画および配置図*
- *機材の搬出入計画図*
- *内部確認方法*
- *燃料デブリ回収に必要な技術リスト*
- *機器の解体・撤去手順*

2. 考慮すべき安全項目
- *被ばく低減*
- *耐震設計*
- *補修・修理の概念*
- *水素ガス蓄積への配慮*

3. 工法実現のための計画

全体スケジュール



燃料デブリ取出しの代替工法に関する概念検討 ＜㈱AREVA ATOX D&D SOLUTIONS＞

目的と目標

福島第一原子力発電所の各原子炉建屋のPCV及びRPV内の状況を踏まえ、冠水せずに気中において燃料デブリ取出しを行う代替工法の概念検討を目的とする。

本概念検討では、冠水せずに気中において燃料デブリ取出しを行うために必要な技術を福島第一原子力発電所に適用させるために、放射線リスクの低減や放射性物質の拡大防止、耐震安全性を踏まえ、事前準備から収納缶への搬送、後片付けまでの一連のプロセスのシナリオを構築することを目標とする。

事業の概要と特長

1. 本事業の体制

・ANADECが事業主体としてプロジェクトを総合的に管理し、世界の主要な原子力施設の廃止措置の豊富な経験を有するAREVAが具体的な技術検討と専門的な技術レビューを実施し、福島第一原子力発電所での豊富な現場経験を有するアトックスが現場適用性のレビューを行うことで、事業を適切かつ効率的に実施する。

2. 本事業の概要

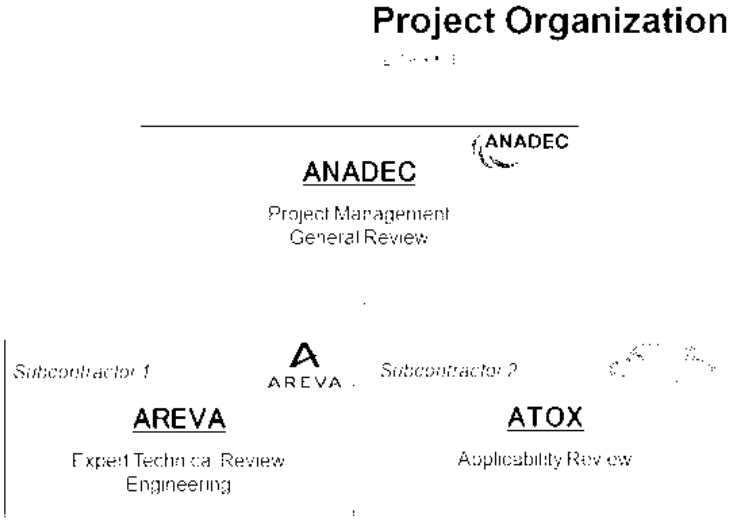
・本検討では、RPV上方及び側面双方のアプローチを検討する。上方からのアプローチは切断ツールや回収用バスケットツールを装着可能な回転式のプラットフォームをRPV上に設置し、燃料デブリが存在すると考えられているRPV底部及びPCV最底部にアプローチをして回収を行う。

・この際、PCVの最底部までアクセスするためには長距離のアプローチが必要になること等から、事前にワイヤーソウによりPCV上部とRPV上部を切断する工法を検討する。

・これらの技術を福島第一原子力発電所に適用させるために、事前準備から後片付けまでの一連をプロセスを、放射線リスクやバウンダリ、耐震安全性を踏まえてシナリオを構築する。

3. 本事業の特長

①建屋上部からのアプローチと側面からのアプローチの連携
②RPV／PCV上部のシナリオ
③RPC／PCV内部での燃料デブリの大まかなカッティング（気中）
④炉内構造物の撤去と燃料デブリの回収
⑤SFP内での廃棄物分別、リサイズ、最終的な収納（水中）



これまでに得られた成果／これから得られる見込みの成果

4. 現在までの実施状況（平成26年12月現在の進捗）

・データ収集を実施中
・機能分析を実施中
・上部からのアプローチシナリオ検討を実施中
　－オペフロの生体遮へいや閉じ込め機能の導入
　－コンクリートシールドプラグの除去
　－PCV、RPV上部の切断
・側面からのアプローチシナリオ検討を実施中
　－下部での除去
・ワイヤーカッティングの実現可能性検討を実施中

5. 事業終了までに得られる成果の見込み

・燃料デブリ取出し手順、機器配置、アクセス位置と手法、内部観察、燃料デブリ冷却手法、燃料デブリ回収手法、技術的要求事項、搬出機器、廃棄物処理を含めたレポート。
・本レポートには必要に応じて線量低減、バウンダリの維持、耐震安全性確保、メインテナンス、水素蓄積への配慮といった考察も含まれる。
・代替工法実現に向けた開発計画

全体スケジュール

No	Items		2014 Nov	2014 Dec	2015 Jan	2015 Feb	2015 Mar
1	Review						
2	Reporting			Intermediate Report			Final Report
3	Basic data synthesis						
4	Design deliverables						
4.1	①	Steps for FDR					
4.2	①	Layout of equipment for FDR					
4.3	②	Access location and method of FDR					
4.4	①	Internal observation for FDR					
4.5	③④	Fuel debris cooling method					
4.6	③	Method of collecting the fuel debris					
4.7	①～⑤	Technologies required for FDR					
4.8	④⑤	Removal of equipment					
4.9	⑤	Waste disposal					
5	Development plan to realize the proposed innovative approach						

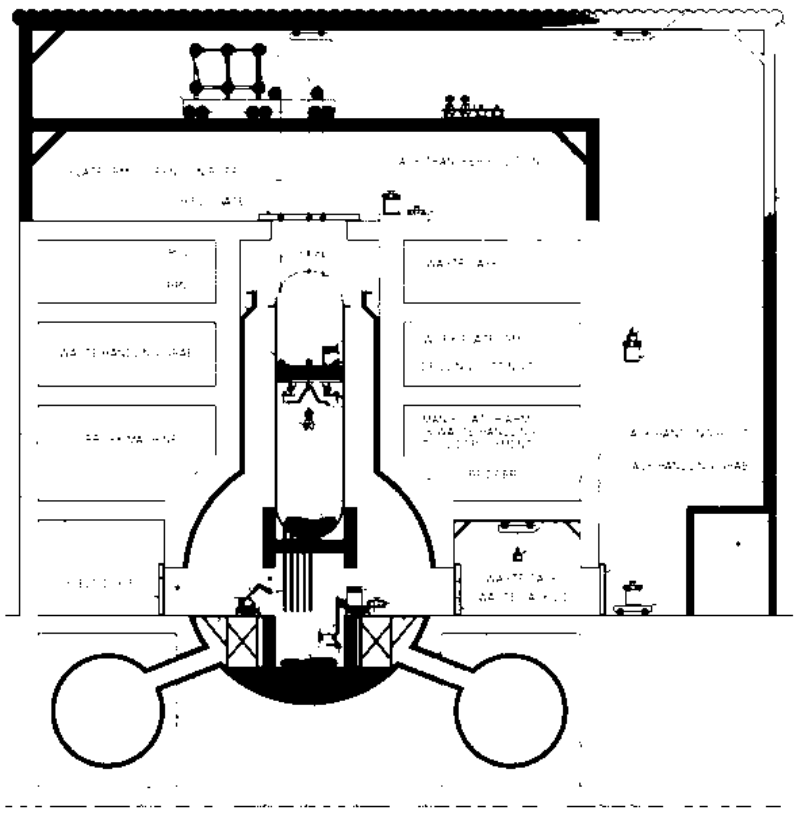
1st Dec.

燃料デブリ取出しの代替工法に関する概念検討　Cavendish Nuclear -BGE- 清水建設

目的と目標

福島第一原子力発電所のRPV内部・下部からの燃料デブリ取り出しに適用可能な方法及び作業体制を示す概念検討を現在、実施中である。燃料デブリ取出し概念検討の第一目的は、福島第一原子力発電所の事故炉から燃料デブリを乾燥状態の気中で安全・安定的に取り出すため、技術的に実現可能な方策を実証することである。

事業の概要と特長



本事業の概要

- 事故炉の内部構造物の解体撤去及び燃料デブリの取り出しに関する本工法では、上部からからRPV内部に吊り下ろす環状の作業プラットフォームを使用する。また、RPV下部から燃料デブリを取り出すため、別途側面からのデブリ取り出しシステムを使用する。（略図参照）

プロジェクトの以下の部分に注力し、強みを活かす。

- 上部及び下部からの取り出しのための格納及び遮へいシステム
- 上部からPCV/RPVへのアクセス、大型機器の原子炉建屋から撤去のためのサイズ縮小及びパッケージングの方法
- 下部からPCV及びペデスタルエリアへのアクセス、原子炉建屋から廃棄物を撤去する方法
- 格納容器バウンダリの確定
- 原子炉内からの取り出しの際及び一時保管の際の燃料デブリの冷却系
- 燃料デブリの切削・ハンドリング技術及び削り屑・粉塵の拡散防止
- 臨界管理システムの要件

これまでに得られた成果／これから得られる見込みの成果

概念検討における技術的な作業を進め、正式な技術報告書に記録。CADレイアウト 図面と共に現在2つの報告書を作成中。

- **B0108-RPT-001「1F原子炉からの燃料デブリ取出し代替工法に関する概念検討」**本技術報告書の一部にCADレイアウト図面を含む。最終報告書ドラフト版: 2015年3月6日締切、最終報告: 2015年3月27日締切。
- **B0108-RPT-002「1F原子炉からの燃料デブリ取出し代替工法に関する概念検討の設計条件」**
  最終報告書ドラフト版: 2015年3月6日締切、最終報告: 2015年3月27日締切。
- 主に1号機を基にし、以下の観点で概念検討に取り組んでいる。
  - ✓ 上部格納構造のレイアウト
  - ✓ 一次・二次格納バウンダリの設計、遮へいバウンダリの設計
  - ✓ 原子炉建屋の機器搬入・搬出ルート
  - ✓ 遮へいプラグ、PCV上蓋・RPV上蓋の取り外し方法
  - ✓ 天井部ハンドリング装置ークレーン、アクセス要件、荷重容量
  - ✓ 原子炉建屋外に廃棄物を搬送する方法
  - ✓ PCV上側に配置する上部ガンマゲートのレイアウト
  - ✓ 炉内構造物の解体撤去及び燃料デブリ切削時の一次格納バウンダリ

全体スケジュール

全体スケジュール

- 2014年11月6日補助事業開始。開始日は補助金交付決定日。
- 概念検討の補助事業は2015年3月31日完了予定。
- プロジェクト作業内訳及びタスク期間を記載したプロジェクトスケジュール B01018-SCHD-001を作成済み。技術報告書の特定の章の完成付近にマイルストーンを設定。
- 2014年12月中旬、スケジュールに従い計画された活動が進行中。プロジェクトスケジュールに含まれる各活動の進捗を2週間毎に進捗報告書でIRID/PMOに報告する。
- 2014年12月中旬より、スケジュールにおけるタスクを継続的に展開。2015年3月6日までに2つの技術報告書の初稿提出を目標とする。PMO/IRIDとの最終報告会は2015年3月18日又は19日に実施予定。

燃料デブリ取出しの代替工法に関する事業

＜(公財)原子力バックエンド推進センター、(一財)日本クリーン環境推進機構、木村化工機㈱＞

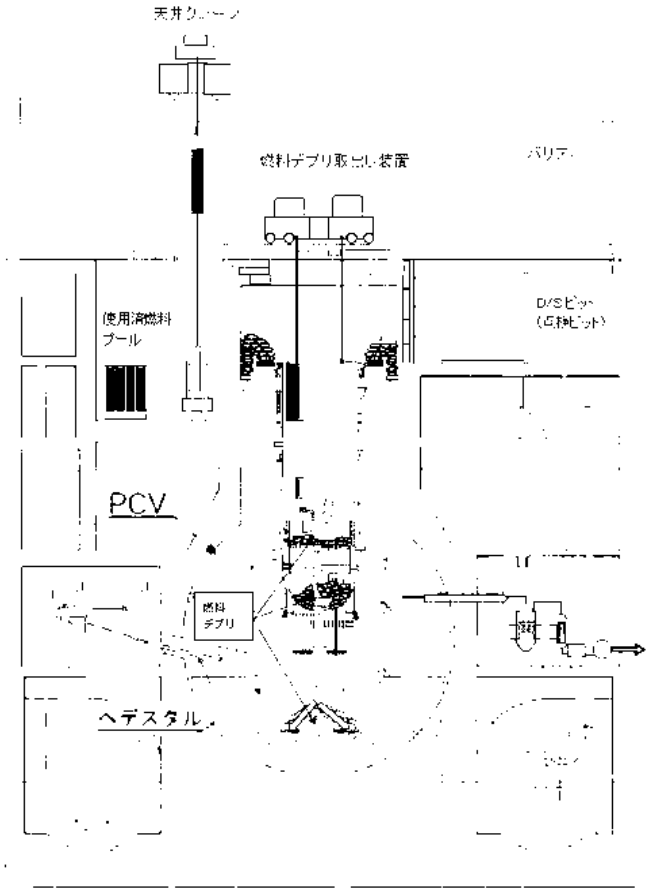
目的と目標

福島第一原子力発電所の原子炉容器内及び格納容器内(ペデスタル床等)に滞留している燃料デブリを取り出す工法として、冠水工法が行えない場合の代替工法として気中で燃料デブリを取り出す工法の検討が求められている。

本補助事業においては、「燃料デブリ取出し装置(伸縮回転プラットホームマニプレータ装置)による遮へい材充填・気中での燃料デブリ取出し工法」に関して概念検討を行うことを目的としている。

事業の概要と特長

- 本工法は、気中にて、燃料デブリ上に遮へい材(鋼球又はこれを入れた遮へい袋等)を被せて放射線を遮へいした状態で、燃料デブリ取出し装置を原子炉上部から挿入して燃料デブリを取り出す工法である。本事業では、この取出し工法を検討する。
- 燃料デブリ取出し装置は、原子炉建屋5階オペフロに設置し、マニプレータ装置と、これを吊って昇降・移動するクレーン装置(門型クレーン又は走行クレーン式)から構成される。
- マニプレータ装置は、デブリ切削機器、マニプレータ等を内胴円板(プラットホーム)に搭載した単胴又は多重円筒構造で、クレーン装置により原子炉容器内～格納容器ペデスタル床上まで吊り降ろし、燃料デブリ・炉内構造物等を切削して取り出す。
- 切削した燃料デブリは、収納缶に収納し、遮へい付き移送容器に収容して天井クレーンで吊り上げて使用済燃料プールに移送し、保管ラックに保管する。



これまでに得られた成果／これから得られる見込みの成果

気中での燃料取出し代替工法に関して、次の項目の検討を行い、本工法の技術的成立性等を示す。

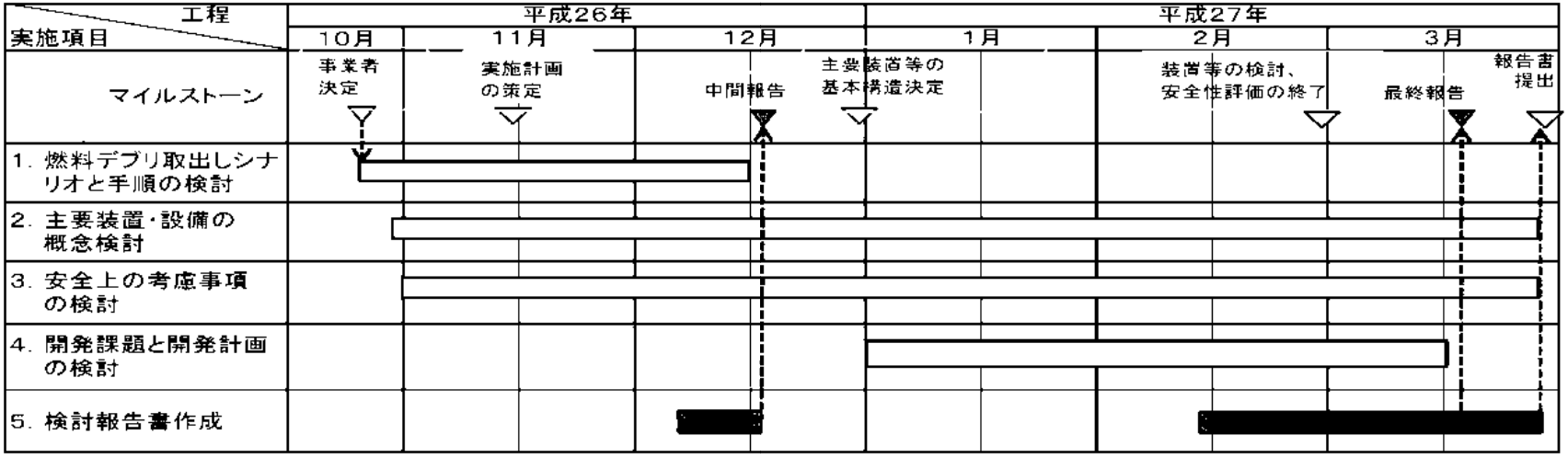
a) 燃料デブリ取出しシナリオと手順
- 基本シナリオを中心に、PCV蓋、RPV上部ヘッド及び内部構造物等の取外し及び、炉心部～格納容器ペデスタル下部の燃料デブリの取出しに関するシナリオ・手順について、オプションシナリオを含めて検討。
- 取出し装置・設備の検討の進展に応じて、シナリオ・手順の追加・見直しを行う。

b) 燃料デブリ取出し装置・設備の検討
- 燃料デブリ取出しに必要な主な装置・設備の基本構想を検討。
- 基本構想に基づく主な装置・設備の構造概念を纏める。

c) 安全上の考慮事項の検討
- 放射線遮へい、臨界安全性及びデブリ冷却性に係る評価モデル、条件等を検討。
- 設定したモデル、条件で解析・評価を行い、工法の安全性を示す。

d) 開発課題と開発計画の検討
- 主な装置・設備の実機適用のための技術開発課題の抽出・検討作業を開始。
- 開発課題に係る開発・試験計画を検討し、取り纏める。

全体スケジュール



代替工法のための視覚・計測技術の実現可能性検討事業　＜株式会社 キュー・アイ＞

目的と目標

①目的：代替工法で必要となる耐放射線ＴＶカメラシステムの、実現可能性を検討する。
②目標：耐放射線性は、累積線量2MGy、線量率10kGy/hを目標線量とする。
カメラヘッド寸法/重量については、Φ100mm×600mm/4kgを目標仕様とし、小型化の実現可能性を検討する。

事業の概要と特長

- 事業の概要
以下について、ＴＶカメラシステムに要求される機能/性能の実現可能性を検討する。（図1参照）
  - TVカメラの耐放射線性
  - 耐放射線レンズ
  - 照明機能と耐放射線性
  - パン／チルト機能と耐放射線性
  - 上記をベースとした、耐放射線性カメラシステムの構築

- 当社は多くの耐放射線TVカメラ製作に係る保有技術や実績を有している。
- それらをベースにして、システム全体としての実現可能性の検討を行う。
- レンズについてはカメラヘッド部の小型化を目的とした、小型耐放射線ズームレンズの実現可能性を検討する。

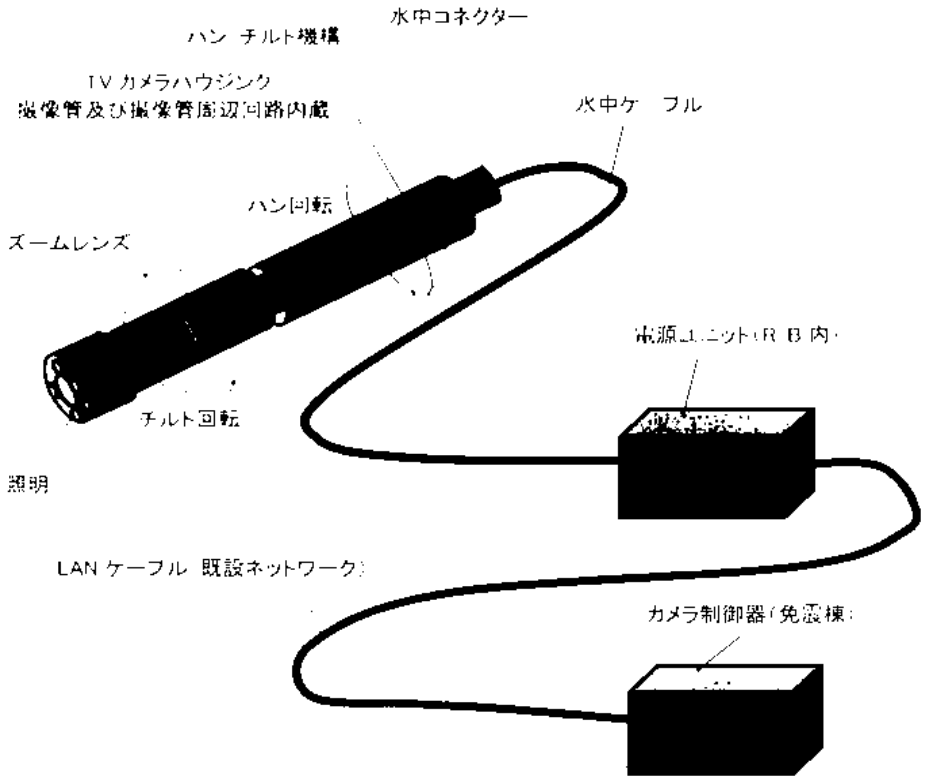


図1．想定する耐放射線TVカメラのシステム図（R&D完了時）

これまでに得られた成果／これから得られる見込みの成果

	①これまでに得られた成果	②これから得られる見込みの成果
カメラヘッド	• 撮像管、偏向ヨークの選定終了 • TVカメラ回路の詳細設計開始	• 評価用試作および目標線量照射後の機能/性能評価結果
レンズ	• 評価用試作を行なう単焦点レンズの仕様を検討中	• 耐放射線単焦点レンズの評価用試作 • 目標線量照射後の光学性能評価結果
ケーブル	• シース材質の選定終了 • 評価用複合ケーブルを設計中	• 評価用試作および目標線量照射後の性能評価結果
照明	• LEDの選定終了 • 評価用LED照明を設計中	• 評価用試作および目標線量照射後の性能評価結果
パンチルト機構	• モータの選定終了 • 評価用パンチルト機構の構造設計中	• 評価用試作および目標線量照射後の機能評価結果
全体システム	• 評価用一体型TVカメラシステムの設計中	• 評価用TVカメラシステム全体の機能/性能評価結果 • 小型/軽量化、搬送機器への搭載性に関する検討結果

全体スケジュール

マイルストーン1： 照射試験（第１回）
目的：構成部品・材料の耐放射線性評価
日程：2015年1月下旬（予定）

マイルストーン2： 照射試験（第２回）
目的：試作した評価用TVカメラシステムの耐放射線性評価
日程：2015年3月中旬（予定）

- 照射条件（予定）は下記の通り：
  線量率：10kGy/h
  累積線量：2MGy

現時点での進捗状況：マイルストーン1、2として実施する照射試験に向けて、構成部品・材料の選定および各評価用構成要素やシステムの設計を実施中。（詳細は、前項の表を参照）

代替工法のための視覚・計測技術の実現可能性検討事業
＜Createc Ltd ＞

目的と目標

事業の目標: ガンマ線イメージング及び3Dレーザースキャンによる燃料デブリ位置特定の実現性の実証。

提案の強み: 福島にて実証済みのN-Visage の基本原理を基にしている。
システム: 小型、軽量、柔軟性のある配置及び高耐放射性を備える予定。

事業の概要と特長

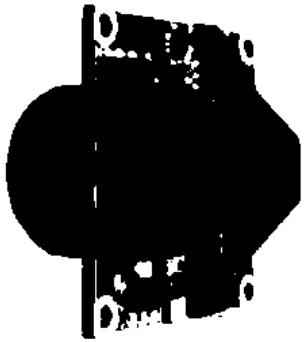
OC Robotics社によるスネークアームロボットにCreatecが開発したN-Visageガンマカメラを搭載して使用。

本事業では以下を示すことに重点を置く。

1. 最大線量
2. 小型・迅速なシステム
3. 既存のレーザーセンサーを使用した内蔵式レーザースキャナ
4. イメージングプロセスとしての有効な配置

これまでに得られた成果／これから得られる見込みの成果

- センサーオプションのレビュー完了
- レーザーセンサー及び放射線センサーの実現可能なオプションを選定
- これまでに得た結果が有望であること。
- 次のフェーズでは測定やシミュレーションを通して耐放射線性を実証。

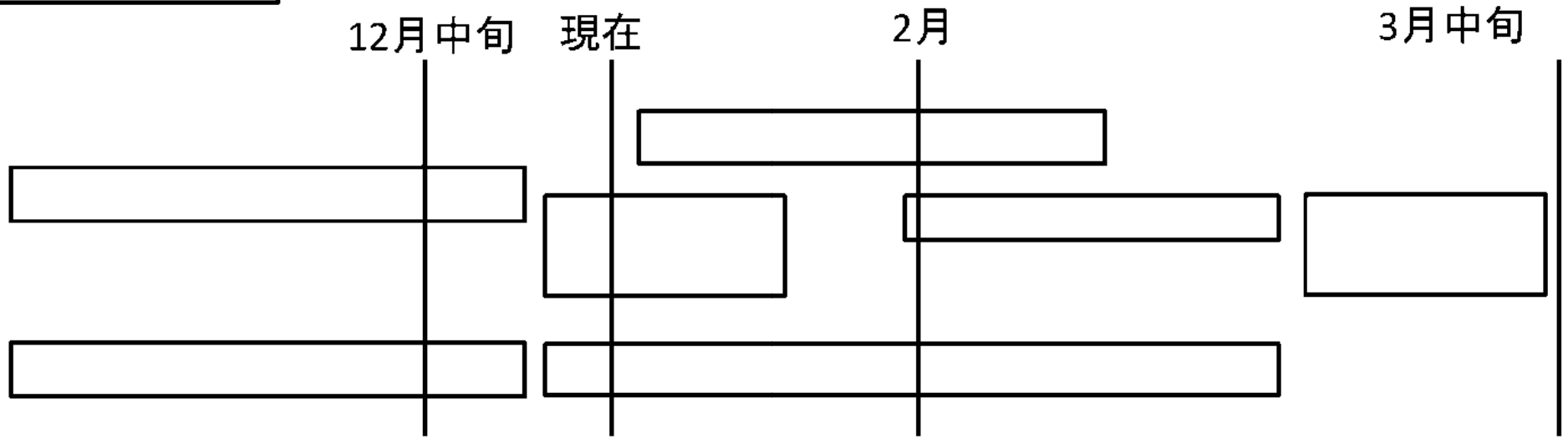


レーザーセンサーモジュール

光ファイバーシンチレーター

シリコンダイオード線量計

全体スケジュール



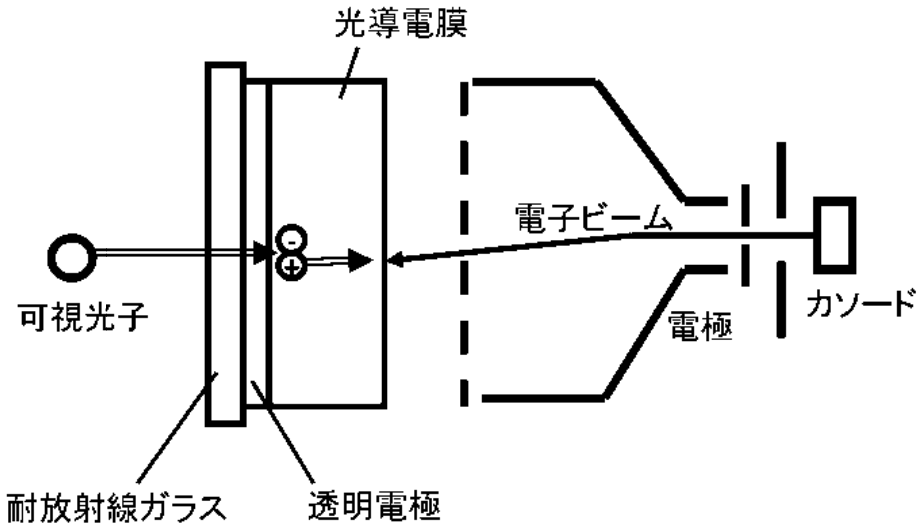
代替工法のための視覚・計測技術の実現可能性検討事業 〈浜松ホトニクス株式会社〉

目的と目標

目的　PCV，RPV内視認のための『耐放射線イメージセンサ技術の実現化可能性検討』
目標　耐放射線性　2MGy

事業の概要と特長

当社のみが保有する技術を活用し、耐放射線性に最も優れるイメージセンサとして撮像管を提案する。
概要
耐放射線撮像管の試作、評価および耐放射線性試験を実施する。
試作管をカメラに装填し、動作確認および映像評価を行う。
廃炉に必要な撮像管に使用する材料の入手性を調査検討する。
R&D以降の計画を立てる。



これまでに得られた成果／これから得られる見込みの成果

これまでに得られた成果

① 耐放射線撮像管試作、評価のための全工程の立上を完了
② 撮像管用新規購入材料の仕様を決定し発注
③ 映像評価用カメラの選定を完了し発注
④ 廃炉に使用する撮像管製作に必要な材料の数量を検討中

これから得られる見込みの成果

① 弊社保有材料での撮像管一次試作、評価および放射線照射試験の結果
② 新規材料を使用しての撮像管二次試作および①との比較結果
③ カメラでの映像評価結果
④ 廃炉に使用する撮像管製作に必要な材料入手の条件
⑤ R&D以降の計画

全体スケジュール

	12月中旬	1月	2月	3月
① 撮像管一次試作	工程立上	試作評価	工程見直し	放射線照射試験
② 撮像管二次試作	材料発注		試作評価	放射線照射試験
③ カメラでの映像評価	選定、発注		動作確認	映像評価
④ 材料入手性調査	数量検討	→	入手性調査	入手条件明確化
⑤ R&D以降の計画		検討	→	→

代替工法のための視覚・計測技術の実現可能性検討事業　＜株式会社フジクラ＞

目的と目標

燃料デブリ取り出し代替工法のための高放射線線量環境下においても使用可能な視覚化機材の実用化を目的として開発検討を行う。 本補助事業においては、純粋石英ガラスを用いたイメージファイバは、高い耐放射線特性を有することから、石英ガラス光ファイバ製造技術を応用して、燃料デブリ取り出しに求められる2MGy以上の高い放射線耐久性を有するファイバスコープを開発するための基礎検証作業と、石英ガラスイメージファイバの短所を補うものとして高解像度・高可撓性を有するファイバアレイ型スキャンイメージングシステムの実現性に関する設計検証を実施する。

事業の概要と特徴

高放射線環境下における視覚技術の実現へ向けて、3つの可能性検討を実施する。

A. 高OH基含有純粋石英ガラスイメージファイバを用いた近赤外領域での観察における放射線照射耐久性の検証

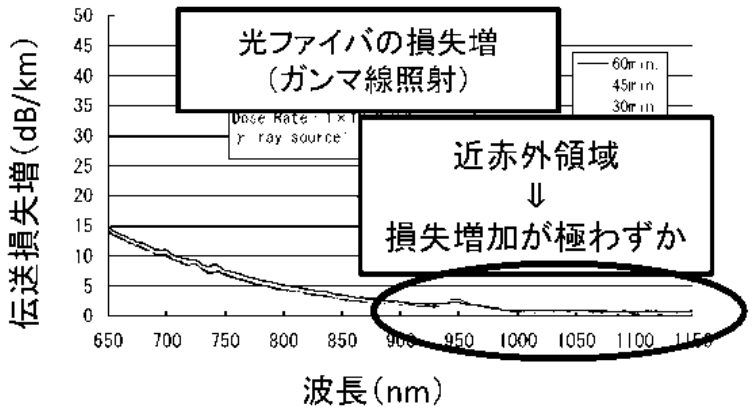
B. フッ素ドープ純粋石英ガラスコア・イメージファイバの開発検討とその耐放射線特性の検証

C. 光ファイバアレイを用いた高解像・高可撓性イメージングシステムの検証

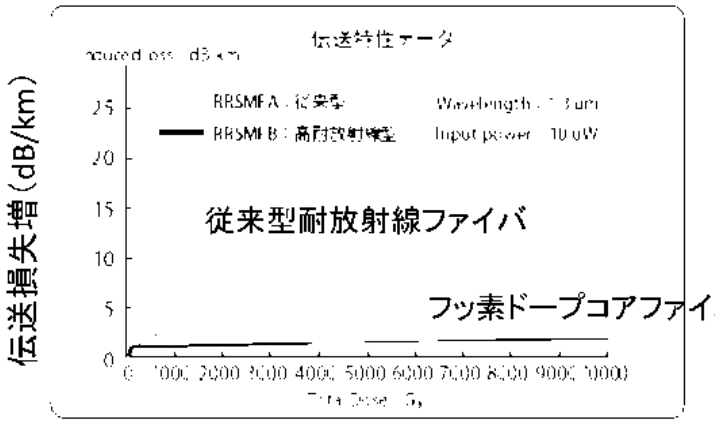
・テーマA：石英ガラスファイバは、高い耐放射線性を有しますが、特に近赤外域では放射線照射による伝送特性の劣化の影響を受けない領域となります。この特徴を活かし、近赤外域を用いた観察を行うことで2MGy以上の放射線照射に耐え得る高耐久性ファイバスコープの実現を目指すものです。

・テーマB：石英ガラスに微量のフッ素を添加することで、光ファイバの耐放射線特性が大きく改善されることがわかっています。光通信用ファイバとして、1.3um～1.55umの伝送を目的とした光ファイバは実現されていますが、この技術を画像伝送用のイメージファイバに展開し、可視領域での高耐放射線性ファイバスコープの実現を目指すものです。

近赤外域を利用した高耐久化の根拠



フッ素ドープコアファイバの放射線特性（1.3um）



これまでに得られた成果／これから得られる見込みの成果

今年度の事業では、イメージファイバのガンマ線照射試験を実施し、伝送画像の観察と伝送特性の計測を行って、放射線照射に対する耐久性に評価を行い、2MGyの累積線量レベルに対するファイバスコープの実現可能性を検証する。

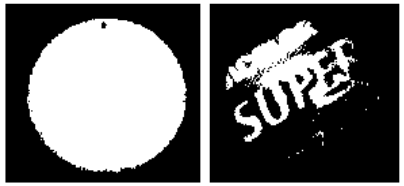
1） 照射試験条件の決定と照射試験施設の選定を行った。 線量率10kGy/hrで累積2MGyまでの照射試験を実施すること。ガンマ線照射中にイメージファイバの伝送画像の観察評価及び伝送特性評価を実施できることが条件となる。この条件をもとに照射試験実施の施設を選定し、2月中旬から試験を実施することとした。

2） 照射試験用イメージファイバの設計と試作を行った。 照射試験実施環境により、試験用イメージファイバは照射部を20mとして全長で100mが必要となる。また線量率10kGy/hrを得るためにはイメージファイバをR100mmの小径に束ねる必要がある。この条件から、今回の照射試験に供するファイバを画素数6000画素として設計、試作を行った。

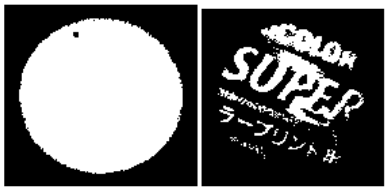
3） 照射試験用機材の準備中。上記試作イメージファイバを用いて、画像観察試験、伝送特性試験を実施するための各種機材の選定、準備を進めている。

試作中のイメージファイバの伝送画像サンプルを以下に示す。

A. 高OH基含有石英
イメージファイバ
（近赤外観察用）

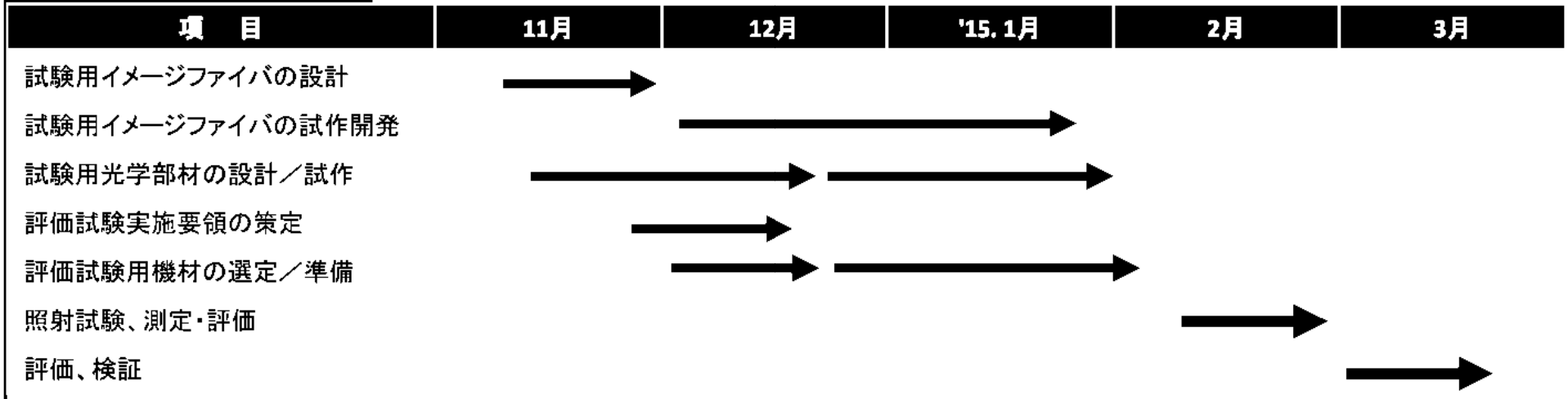


B. フッ素ドープコア
イメージファイバ
（可視観察用）



○ 2月のガンマ線照射試験での各種評価結果により、2MGy照射に対するファイバスコープの性能評価、実現性の検証を実施する。

全体スケジュール



代替工法のための燃料デブリ切削・集塵技術の実現可能性検討事業　＜株式会社IHI＞

目的と目標

切削能力の高いレーザ切断と安全性の高い液体窒素切断（NitroJet®切断）の切断性能（安全性・切断速度）を、想定燃料デブリ材料（硬度・融点）を用いて確認し、現場適用性を含む実現可能性の検討を行う。

事業の概要と特長

【検討項目】

①提案技術実現のための基本計画

・レーザ切断と集塵機能を有するシステム構築と実現可能性の検討

・システム構成機材の個別仕様設定と実現可能性検討

・ジルコニウムの安全切削検討（レーザ／NitroJet®切断基礎試験の実施）

②現場適用に向けた検討

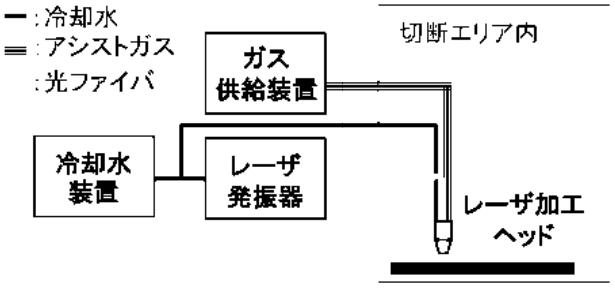
・燃料デブリ切断実現に向けての課題抽出と課題解決策立案

③提案技術実現のための工程、体制及び費用検討

・集塵機能を有するレーザ切断装置の開発から現地適用までの工程、体制及び費用検討

【本事業における切断技術概要と特長】

レーザ切断



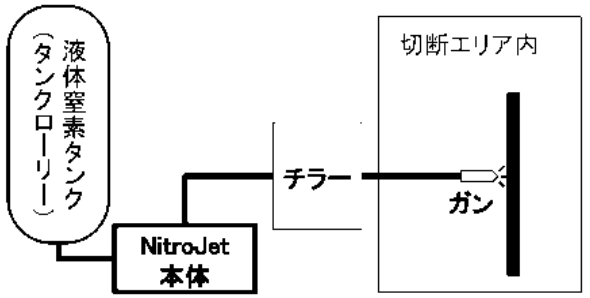
・切断性能が高く、切断速度が早い

・遠隔操作機器に与える切断時反力が小さい

・2次廃棄物発生量が少ない（フューム・スパッタは発生）

⇒熱的切断であるため、ジルコニウム切断に対する安全性確認を実施する（切断基礎試験）

NitroJet®切断



・良好な切断性能

・熱的影響が小さい（入熱を嫌う物質切断に適）

・2次廃棄物発生量が少ない（研磨材は発生。液体窒素は気化する）

⇒デブリに相当する硬い材料に対する切断性能を確認する（切断基礎試験）

【本事業での注力点と強み】

- ✓ **デブリ取出し実現のため、デブリ切削技術の多様化が重要**
  （速く、安全に切削する技術へのチャレンジ）
- ✓ **より現場適用が可能なレベルに近づける検討として、切断試験実施に注力**
  （現場では、デブリ性状が不明な状況下で切削する状況と想定）
- ✓ **高放射線環境下での廃棄物解体装置として納入実績がある、遠隔気中レーザ切断技術に基づいた現実的な検討実施**

これまでに得られた成果／これから得られる見込みの成果

【これまでの実施事項】

①システム関連
- ・システム構築：レーザ／NitroJet®切断システム構成、集塵システム系統の検討
- ・仕様：切断性能・耐放射線性・集塵機能の仕様明確化と各構成機器の仕様検討

②切断基礎試験関連
- ・切断試験材料選定／手配
- ・ジルコニウム切断に関する安全性検討
- ・レーザ／NitroJet®切断試験方案

⇒集塵システム（一次案）は、燃料デブリ取出し工法を考慮し、現場で実現可能なレベルへ仕様絞り込みを行っていく

【これから得られる見込み成果】

- ✓ 実現可能な集塵機能付きレーザ切断装置の仕様（据付施工、遠隔操作性含む）
- ✓ ジルコニウム安全切断に対する検討結果
- ✓ 高融点材料・高硬度材料の切断、物性に応じた切削データ
- ✓ 現場適用に向けた課題抽出、解決方法とスケジュール検討結果
- ✓ レーザ切断技術、集塵システムの開発、現場適用のための開発工程、体制、概算費用の検討結果

【切断基礎試験概要】

レーザ切断
- ・Zrの安全切断条件を設定 （切断条件1）
- ・切断条件1の範囲で、下表に示す材料に対する切断試験を実施

NitroJet®切断
- ・下表に示す材料に対する切断性能を確認
- ・すべてを網羅する切断条件を設定

＜切断試験材料＞

想定する部位	試験材料
被覆管	Zr
燃料デブリ（硬い材料）	ZrO_2
	Al_2O_3
炉内構造物（難切削材）	Inconel（NCF600）

切断技術	切断材料	切断基礎試験での確認項目
レーザ	①Zr	水-Zr反応を起こさない条件確立
	②NCF600	①とNCF600切断の両立性確認
	③Al_2O_3	①とAl_2O_3切断の両立性確認
	④ZrO_2	切断データ取得
NitroJet®	⑤NCF600	難切削材の切断性能
	⑥Zr	⑤とZr切断の両立性確認
	⑦ZrO_2, Al_2O_3	切断データ取得

全体スケジュール

	大日程	2014年度（平成26年度） 10月	11月	12月	1月	2月	3月
①提案技術実現のための基本計画可能性の検討	・レーザ切断と集塵機能を有するシステム構築と実現可能性の検討	システム仕様（一次案決定）▼					
	・システム構成機材の個別仕様設定と実現可能性検討				▽搬入	遠隔仕様決定	
	・ジルコニウムの安全切削検討（レーザ／NitroJet®切断基礎試験の実施）	材料選定・手配、試験方案作成				▽切断試験開始	
②現場適用に向けた検討	・燃料デブリ切断実現に向けての課題抽出と課題解決策立案						
③提案技術実現のための工程、体制及び費用検討	・集塵機能を有するレーザ切断装置の開発から現地適用までの工程、体制及び費用検討						まとめ含む

代替工法のための燃料デブリ切削・集塵技術の実現可能性検討

ONET TECHNOLOGIES NUCLEAR DECOMMISSIONING

目的と目標

本補助事業の**目的**は遠隔操作による燃料デブリに対するYAGレーザー切削及び集塵の成立性を評価することである。以下のステップを通して成立性を実証することを**目標**とする。:

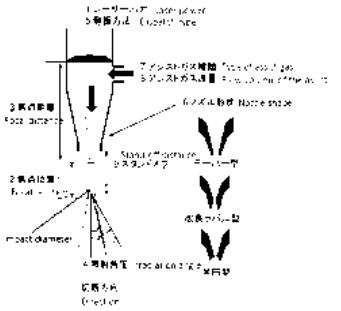
- **切削機器の確定**(原理、耐放射線性、粉塵やヒュームの発生、遠隔操作の適用)
- **非放射性材料の切削試験** (非放射性模擬体の確定・供給、融解による連続的な切削の試験)
- **福島の現場への適用評価** (設備配置、制限、潜在的な課題)
- **R&Dプログラムの提案** (課題解決、試験プログラム、スケジュール及びコストの評価)

事業の概要と特長

プロジェクト期間中以下のタスクを実施する。

スイスのマニピュレーター搭載されたレーザートーチの例

- **準備タスク**:
  - 試験用模擬体の選定とその根拠
  - 模擬体の供給及び試験計画の確定
  - RPV/PCV の標準状態の3Dモデル化
  - 切削作業の機能解析
- **切削試験**: 高出力レーザーによる模擬体のような材料の切削は研究開発中であるため、挙動を推測するのが困難である。**試験計画 は2段階あり**、まず連続的な模擬体の切削に関する基本的な成立性を評価し、次にパラメーターや切削の可能性に関してさらに詳細に検討する。
- **切削機器の確定**:
  - 切削原理及び機器の主な特性の確定
  - 耐放射線性評価
  - 遠隔操作の適用
  - 粉塵・ヒュームの収集
- 確認した課題を基に技術の実現化に向けたR&Dプログラム案を提案。



本プロジェクトでは、CEA(協力事業者)の以下の強みを活かし、燃料デブリ模擬体へのレーザー切削の適用性に関する切削試験の実証に注力する:

- **VULCANO施設**は切削試験用模擬体として使用する燃料デブリサンプルを保有
- **CELENAレーザー切削 施設**で切削試験を実施

またプロジェクトでは**ONETの**遠隔ハンドリング及び廃炉におけるレーザーの使用等の**豊富な経験を利用して、レーザー切削 の遠隔操作適用**及びRPV/PCV内部の切削シナリオにも注力。

これまでに得られた成果／これから得られる見込みの成果

これまでに得られた成果:

- 切削の試験で使用する3つの模擬体の選定と代表性の根拠
- 使用環境における切削機器の機能分析
- Phase 1 の試験では、模擬体切削時の挙動において良い結果が得られた
  (全結果は開示不可)。これらの試験では燃料デブリの連続的なレーザー切削の良好な適合性を確認した。

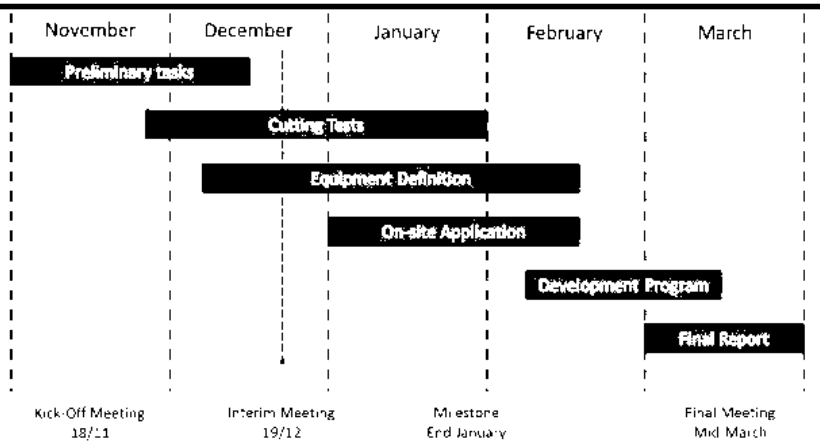
期待される成果:

- 模擬体の切削及び関連する性能のパラメーターを確定
- レーザー切削機器の耐放射線性の推定
- 粉塵・ヒューム収集の成立性
- 現場適用シナリオの提案
- R&D段階で取り組む課題のまとめ及び開発プログラムの提案

全体スケジュール

12月以降～:

- 準備タスクの完了 (模擬体の選定・供給及び機能解析を含む)
- 切削試験のPhase 1完了
- レーザー関連機器の確定(トーチ、ファイバー、光源)



代替工法のための燃料デブリ切削・集塵技術の実現可能性検討事業 ＜大成建設株式会社＞

目的と目標

本事業は、燃料デブリ切削用遠隔ロングボーリング技術の開発をテーマに、燃料デブリ取出し代替工法をサポートする要素技術の実用化に資することを目的としている。目標としては、極めて高硬度で多様な物性が予想される燃料デブリを、新開発するロボットボーリングマシン及び新設計のダイヤモンドビットでオペフロレベルからのロングボーリングで切削し、切削時の粉塵、冷却水、燃料デブリを回収するための、機材及びシステム概念と実現可能性の検討を行い、具体的な開発計画を立案することとしている。

事業の概要と特長

遠隔ロボットボーリングマシン

・マシンのチルト、スイングでオペプロの開口1箇所から複数箇所を掘削。
・オペフロから35 m以上のロングボーリングに対応したロッド支持構造。
・新開発のロッド自動継ぎ足し機構、ビット交換機構を搭載。
・全操作が自動を含む遠隔操作で、クローラータイプの自走式。

ダイヤモンドビット、ドリリングツールス

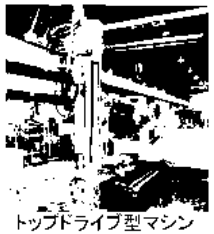
・PDC、サーフェイス、インプリを基本に、多様な物性のデブリに対応。
・新設計による特殊ビット形状、ダイヤモンド及びマトリックス仕様。
・掘削の確実性の高いノンコアビット、コアを残すコアビットの両タイプ。
・DHMなど先端駆動機構のドリリングツールスの適用性を検討。

粉塵、燃料デブリ回収システム

・送水削孔で発塵がほとんどないため、粉塵抑制装置を補助的に使用。
・TMI-2の実績を参考として、燃料デブリ吸引・搬送システムを新開発。
・1Fで検討中の小型収納管に対応する、セパレータ内蔵の収納装置。

遠隔作業の補助システム

・燃料デブリの寸法・形状を把握する写真計測システム。
・作業エリアの無線による線量モニタリングシステム。
・上記マシンシステムとの併用によって遠隔作業の安全・円滑化を図る。


トップドライブ型マシン

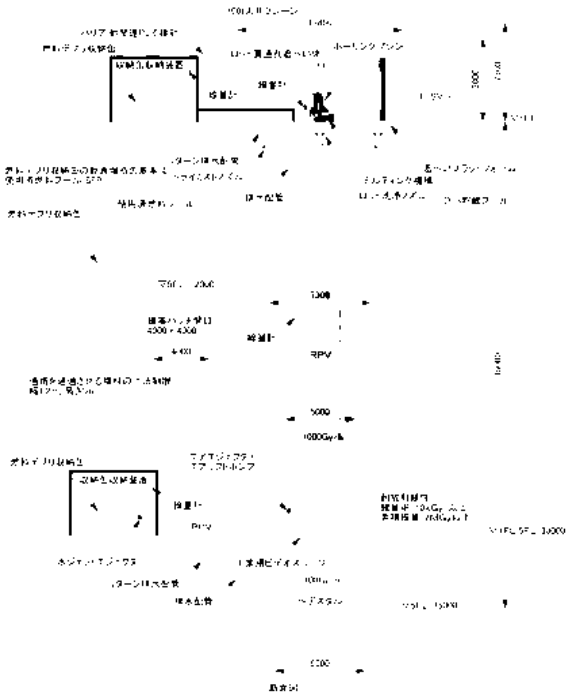
セパレータ

ダイヤモンドビット

ドライミストノズル

水ジェットエジェクター

■ 要素技術の例



■ 開発技術の全体概念図

特に力を入れている点、得意分野の活用

・実施体制にボーリング機材で国内トップの鉱研工業㈱、㈱クリステンセン・マイカイ。
・世界レベルの技術を適用した、効率的かつ実効性のある技術開発計画。

これまでに得られた成果／これから得られる見込みの成果

- ロボットボーリングマシンの概念
- ロッド支持方法、デブリへの定着方法
- ロッドの寸法仕様、形状
- ロッド継足し手順
- ボーリングマシン制御フロー
- 遠隔制御システム概念
- 遠隔操作、ビット交換方法
- ボーリングマシン仕様
- 新設計、構想による複数のビット概念
- ドリリングツールス適用上の課題（耐放射線性）
- 燃料デブリ回収装置及びシステム概念
- 写真計測システムの概念
- 線量モニタリングシステムの概念

■ これから得られる見込みの成果

- ロッド収納装置（本体搭載）の概念
- ビット交換装置（本体搭載）の概念
- ビット供給装置（別ユニット）の概念
- 各装置の仕様表
- 設計上の課題と解決策
- 現場適用に向けた検討（設置、配線、調査）
- 技術開発計画（工程、体制、費用）

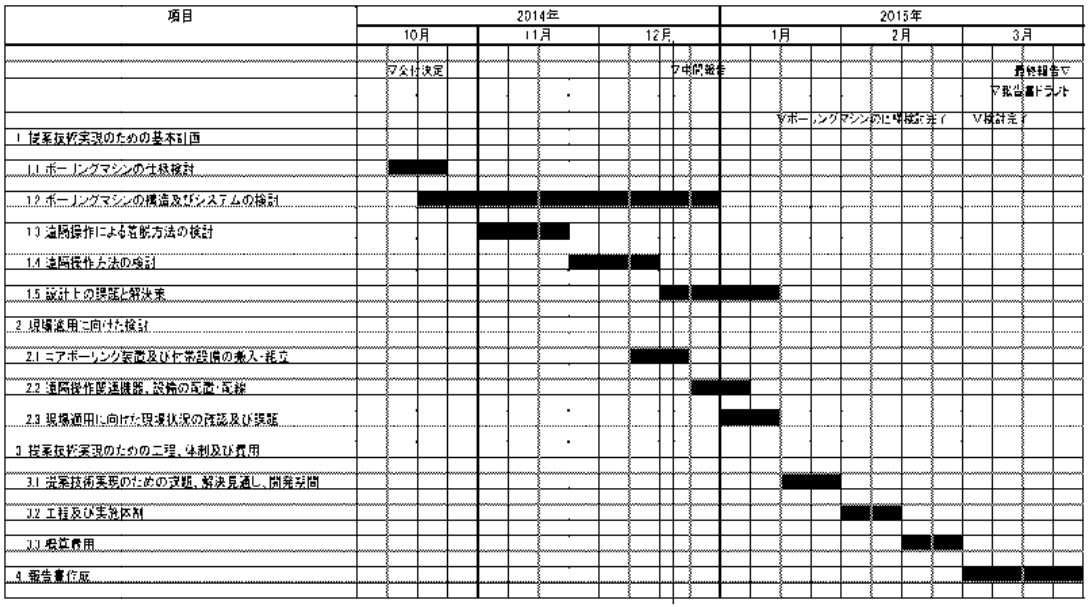
全体スケジュール

- 当初の計画工程通りに検討が進捗している。
- 切削機材の構造、システムの検討がほぼ完了。
- 現時点まで、特に技術開発上の問題点はない。

■ 今後のスケジュール

- 今後も継続して計画工程の通りに検討を進める。
- 設計上の課題と解決策の検討（1月中旬完了）。
- 現場適用に向けた検討（1月中旬完了）。
- 技術開発計画の検討（2月末完了）。
- 3月に最終報告。

事業開始時の全体スケジュール（計画工程）



戦略プラン」とリスクの考え方

無断複製 転載禁止 原子力損害賠償・廃炉等支援機構
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「戦略プラン」の目的と中長期ロードマップとの関係

福島第一原子力発電所の廃炉を安全かつ着実に実施する観点から、政府の中長期ロードマップの着実な実行や改訂の検討に資することを目的に、NDFが策定するもの

政府が提示する目標、政策
政府が決定する戦略、方針、計画の重要要素

政府が決定する
「中長期ロードマップ」

戦略
- 目標の実現に向けた取り組みや判断の考え方、優先順位等

戦略実行のための具体的な方針
- 取り組みや判断を進めていくための具体的な方針（要件）

戦略実行のための統合的な計画
- 現場作業、研究開発等の取り組みに関する統合的な計画

NDFが策定する
「戦略プラン」
（正式名称：東京電力（株）
福島第一原子力発電所の
廃炉のための技術戦略プラン2015）

東京電力、研究機関等による具体的計画
（現場作業、エンジニアリング、研究開発）

東京電力、研究機関等
の具体的な実行計画

無断複製・転載禁止　原子力損害賠償・廃炉等支援機構
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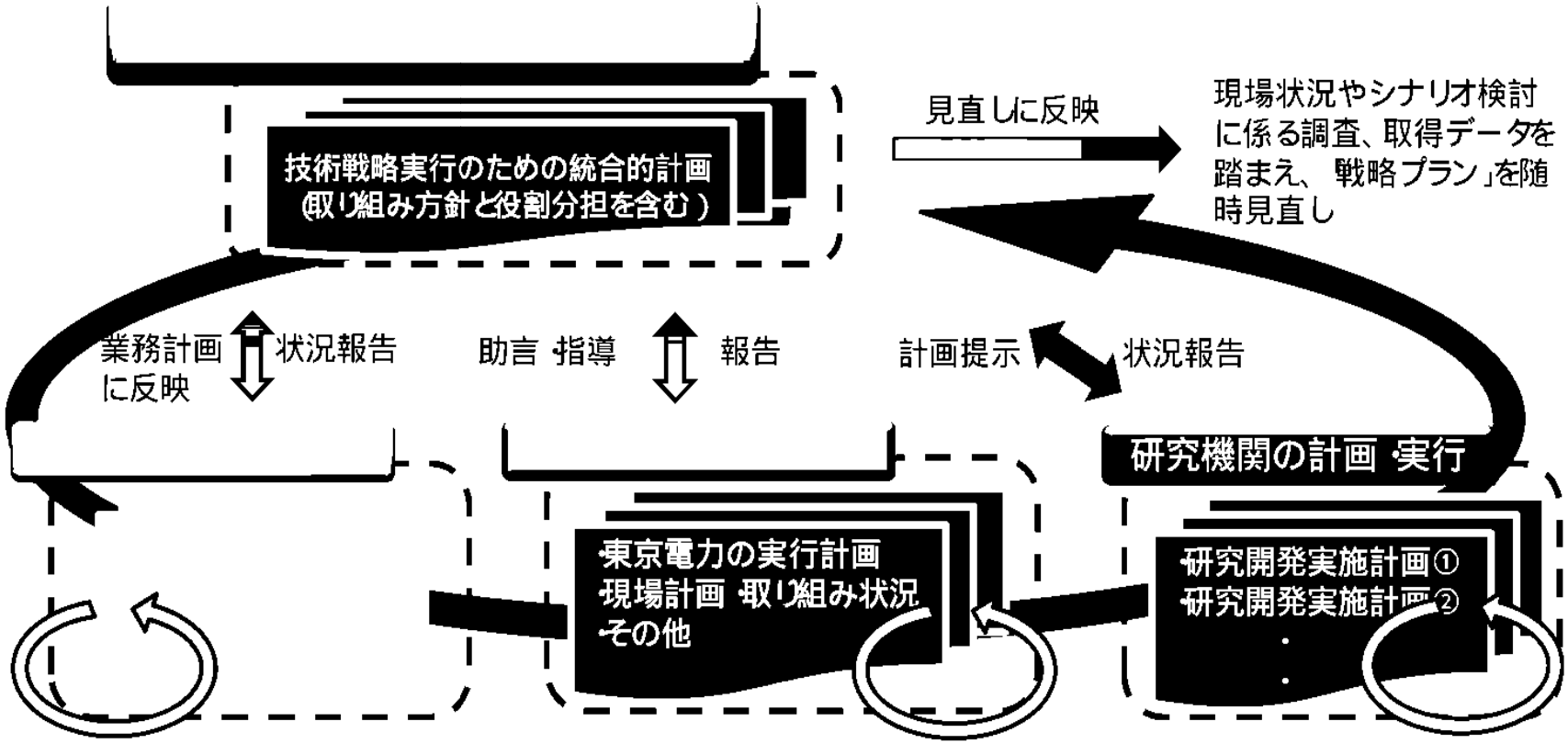
戦略プラン」による統合的な実施・管理のサイクル

- 技術戦略を実行していくための方針・要件に加え、現場作業、研究開発の取り組み方針と関係機関の役割分担を提示
- NDFは、関係機関の参加を得て、各分野の優先事項毎に、統合的な実施・管理のサイクルを進め、「戦略プラン」の見直しに反映



無断複製・転載禁止 原子力損害賠償・廃炉等支援機構
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戦略プラン」検討における基本的考え方

- 戦略プラン」策定及び実行に当たってのリスク低減のための5つの基本的考え方を設定
  - ✓ 基本的考え方1 :安全　　放射性物質によるリスクの低減（敷地外環境への影響、作業員の被ばく）
  - ✓ 基本的考え方2 :確実　　信頼性が高く柔軟性のある技術
  - ✓ 基本的考え方3 :合理的　　リソース（ヒト、モノ、カネ、スペース等）の有効活用
  - ✓ 基本的考え方4 :迅速　　時間軸の意識
  - ✓ 基本的考え方5 :現場指向　　徹底した三現主義（現場、現物、現実）

- 中長期的視点に立って、総合的に検討する必要がある以下の2分野の戦略について、まず早期に検討
  - ➢ 燃料デブリ取り出し分野
    - 号機毎の状況を踏まえ、いくつかの工法（冠水、気中）とそれを組合せた実現可能性のある燃料デブリ取り出しシナリオを検討
  - ➢ 廃棄物対策分野
    - 処分の安全確保や処理のあり方の基本的考え方を踏まえ、保管管理、処理・処分の方策等について、中長期的観点から方針を定める

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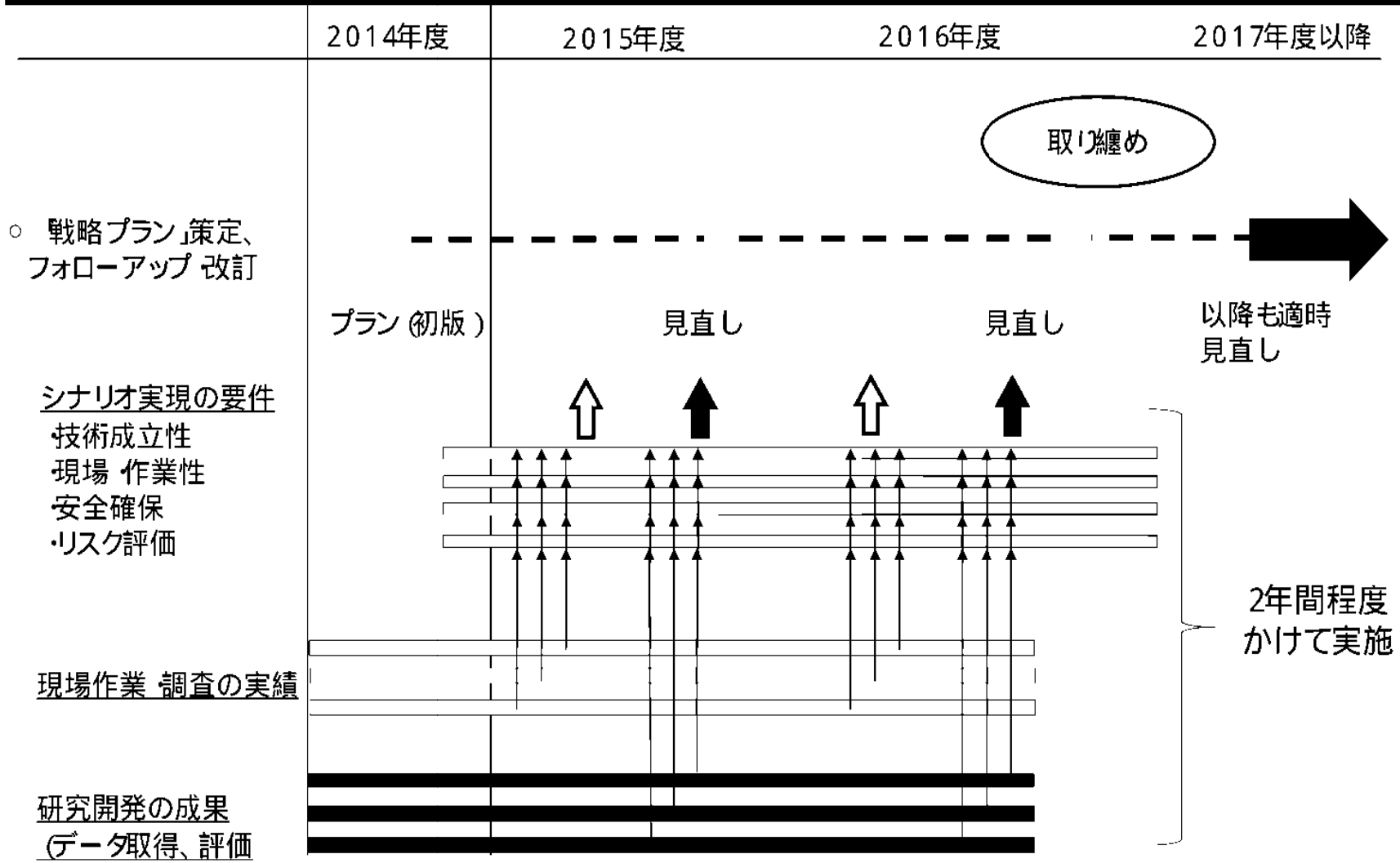
戦略プラン」検討への取り組み



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戦略プラン」におけるリスク低減の考え方（1）

1. 基本的な考え方

- 福島第一原子力発電所の「廃炉」は、過酷事故により顕在化した放射性物質によるリスクから、人と環境を守るための継続的なリスク低減活動であり、「戦略プラン」では、中長期の時間軸に沿ったリスク低減戦略を設計

2. リスクの源

- 福島第一原子力発電所に現存するリスクの源は放射性物質であり、主要なものを以下に示す
  - 建屋及び海水配管トレンチ内に滞留する汚染水
  - タンクに貯蔵されている浄化処理前の汚染水
  - 使用済燃料プール内に貯蔵されている燃料
  - 原子炉格納容器内の燃料デブリ
  - 水処理設備から発生する二次廃棄物
  - ガレキ、伐採木等及び作業等により発生する固体廃棄物
- 各々についてリスクを評価し、そのリスクに基づいて優先順位を決定し、対処方針を策定

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戦略プラン」におけるリスク低減の考え方（2）

3. リスクの考え方

① 放射性物質によるリスク

- リスクは、影響度 と起こりやすさで決まる。

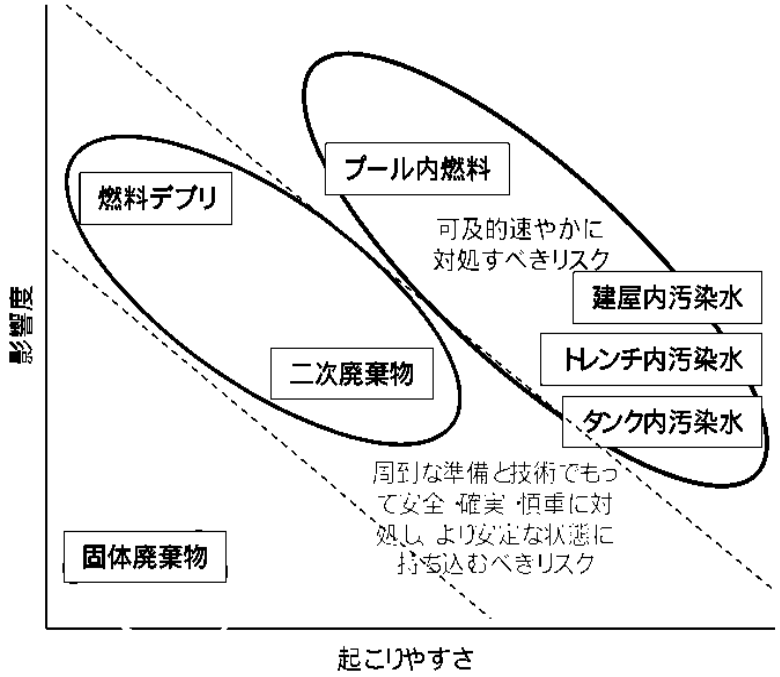
② 影響度

- 閉じ込め機能を失うと、放射線影響（被ばく 環境汚染 ）が生じる。
- 影響度 は、放射能量と性状 （固体・液体 ・気体 ）で決まる。

③ 起こりやすさ

- 閉じ込め機能を失わせる要因として、自然現象、故障、誤操作等がある。
- 上記要因が発生したときの施設の脆弱性を考慮する必要がある。
- 起こりやすさは、要因発生の可能性と施設の脆弱性で決まる。

④ 福島第一原子力発電所のリスク評価



⑤ リスク低減の進め方

- より安全・安定な施設への移動
  →起こりやすさを低減
- 放射能の減衰や性状の変化
  →影響度を低減

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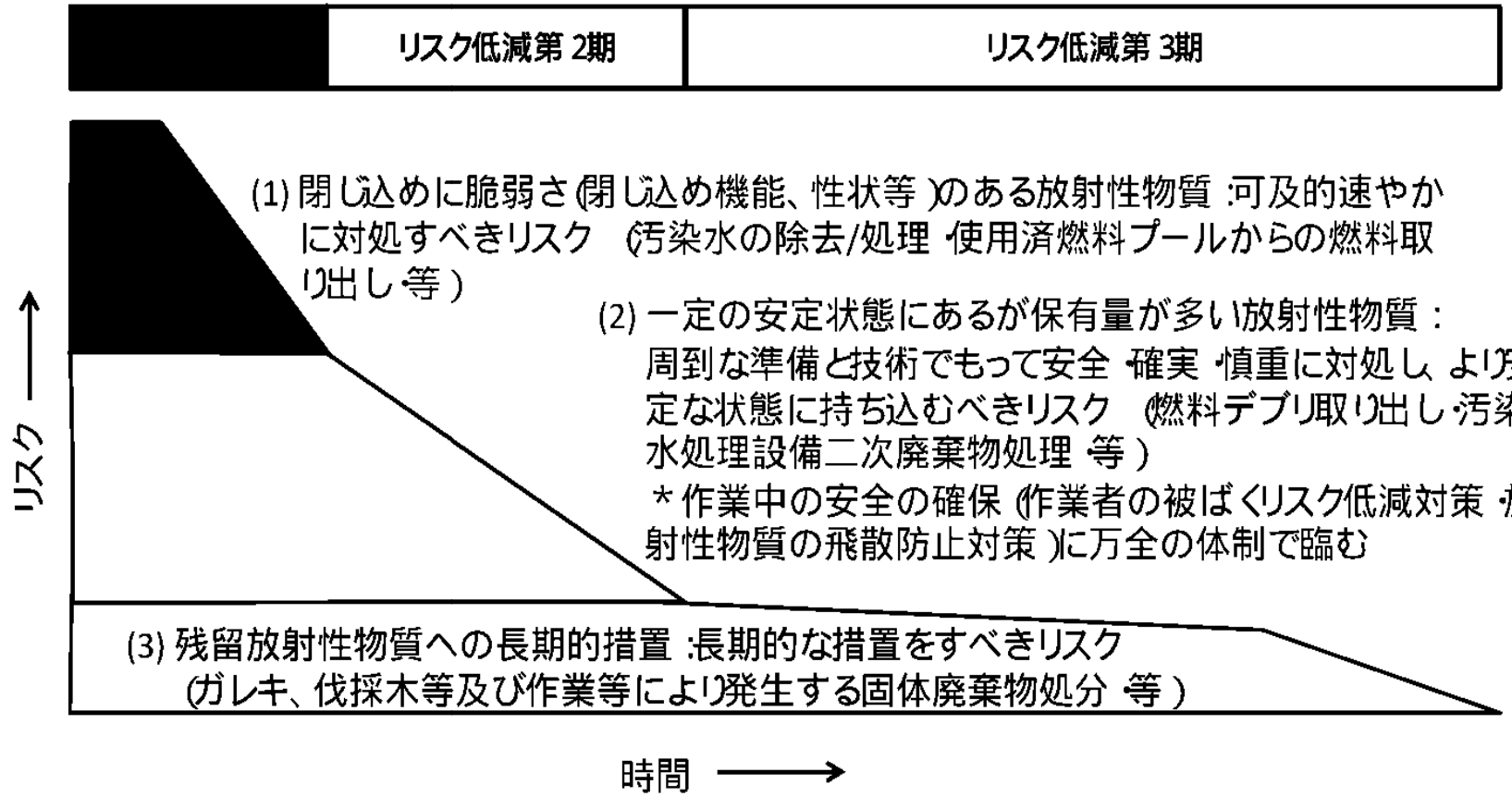
戦略プラン」におけるリスク低減の考え方（3）

4. 廃炉工程におけるリスク低減戦略の期間設定



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＜Reference＞

Update on the completion of contaminated water treatment

January 23, 2015
Tokyo Electric Power Company

東京電力
TEPCO

1－1. Status of contaminated water treatment

Capability of water treatment for January 2015 (based on actual performance)

Multi-Nuclide Removal Equipment (exisiting＋improved＋high performance ALPS):

Approximately 1,260 tons/day

Aiming to increase this amount by remodeling the decives and revising the operation flow to raise performance.

Other treatment facilities: Approximately 800 tons/day

Approximately 800 tons/day is the actual monthly average for January. If the additional capabilities of the RO water treatment system and 2nd Cesium adsorption device, which were both installed mid-month, were included in the average, the amount would come to 1,260 tons/day.

A series of additional decontamination measures such as the use of mobile type strontium removal equipment and the efficient use of excess capacity in the cesium adsorption device is expected to boost treatment capacity further.

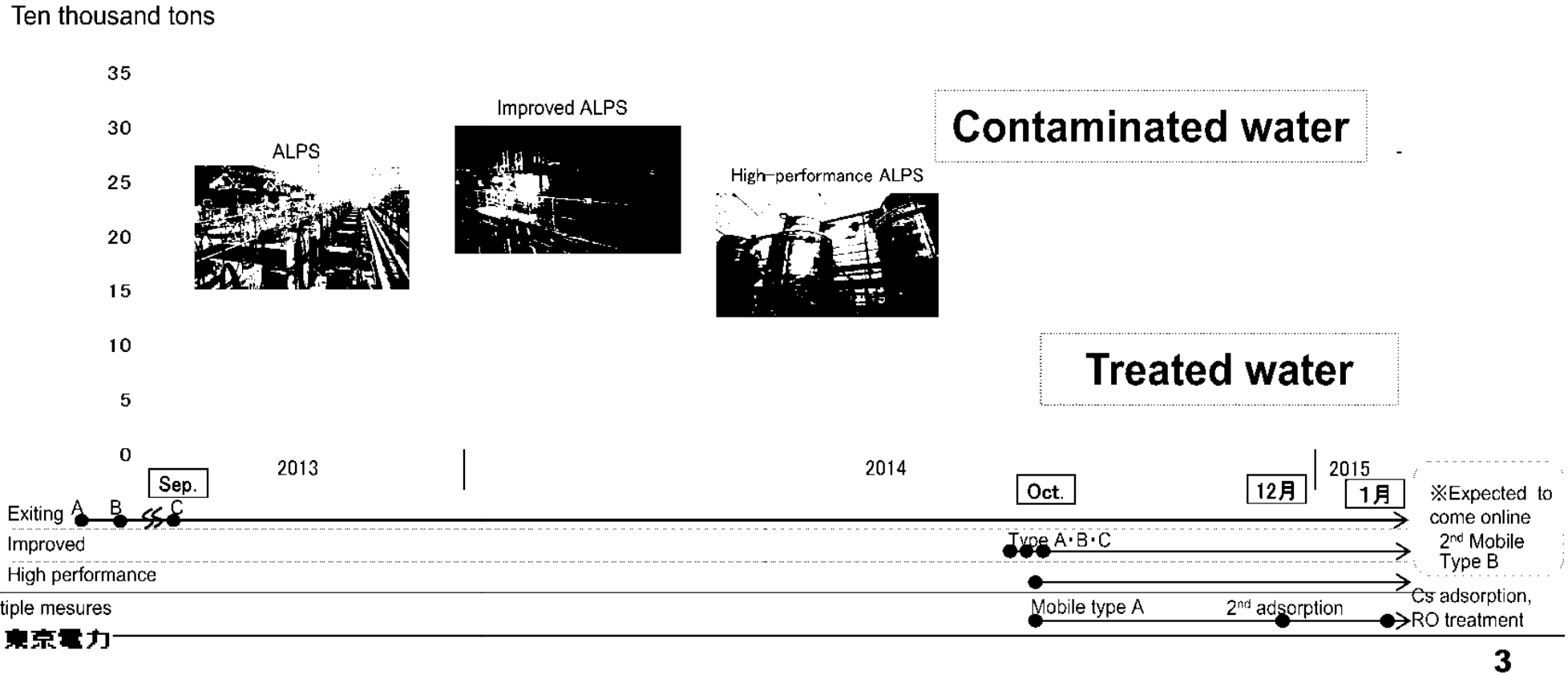
Previous forecasts of water treatment capabilities for January 2015 (as reported in December 2014)

Multi-Nuclide Removal Equipment (exisiting,＋improved＋high performance ALPS) was forecast to treat approximately 1,960 tons/day

Other treatment facilities was forecast to treat approximately 1,800 tons/day

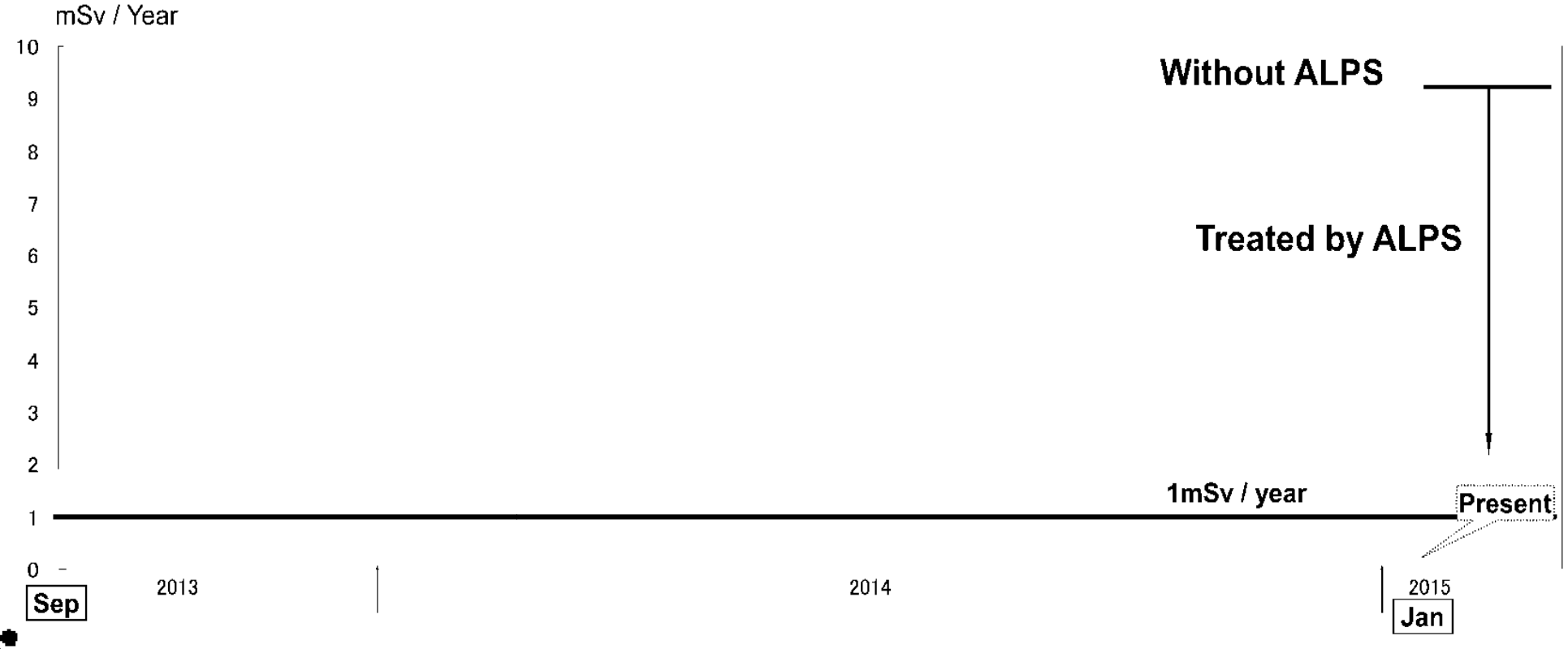
1－2. Status of contaminated water treatment

- We have made significant progress in our efforts to reduce the risk associated with contaminated water at Fukushima Daiichi, and more treatment systems will come online in the coming weeks and months.
- We plan to announce the projected timing of the completion of water treatment in mid-March, once we have confirmed the actual utilization rates of the additional equipment, but at the moment we expect to complete the treatment in May.
- While target dates are obviously important, we are committed to putting the safety of our workers first and at the same time to continuously improve the performance of the many initiatives of the water management system.



2. Regarding the radiation levels derived from the treated water storage tanks at the Fukushima site boundary (guidelines set by government regulation authority)

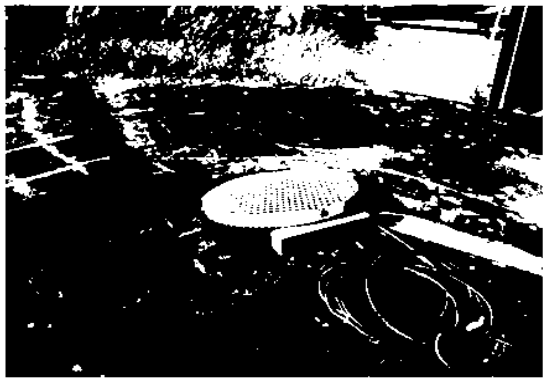
- Currently, the effective dose derived from the water storage tanks at the site boundary is less than 3.5 mSv/year. Without the multi-nuclide removal equipment, that amount would have reached 9 mSv/year.
- Tepco is committed to achieving the rate of 1mSv/year at the site boundary by the end of March, using ALPS and other reduction strategies such as the mobile type strontium removal system.



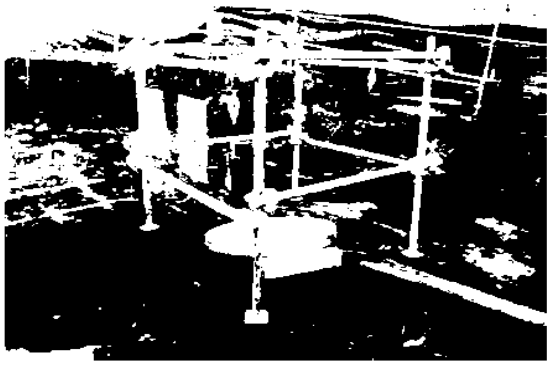
Corrective actions taken for Safety Improvement at Fukushima Daiichi Nuclear Power Station

<Reference>
January 26, 2014
Tokyo Electric Power Company
Fukushima Daiichi D&D Engineering Co.

■ Facing work (around groundwater bypass)

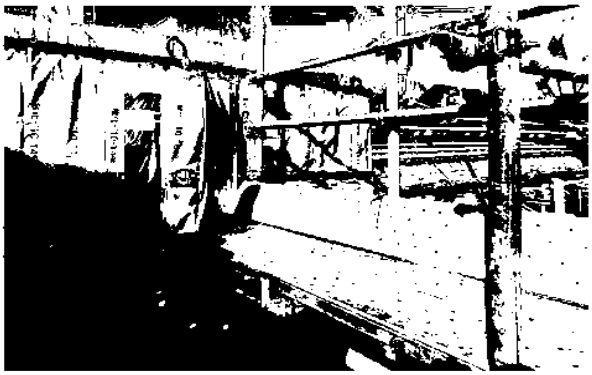


Before the corrective action taken

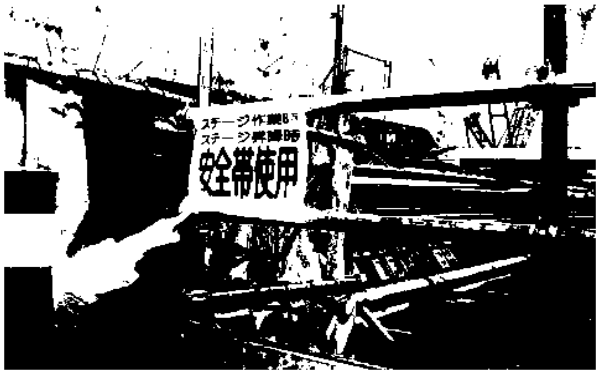


After the corrective action taken
(barricade was set up around the opening.)

■Trench filling up work for Unit 3 (Shaft B at Unit 3)

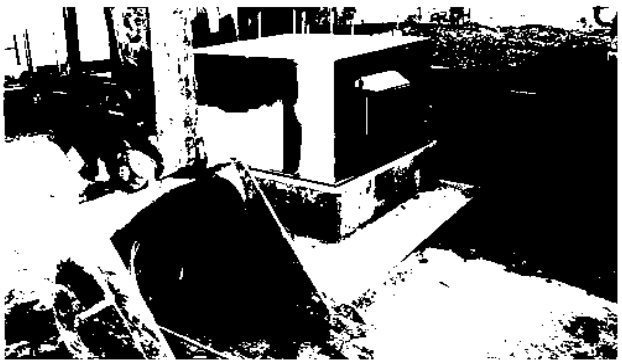


Before the corrective action taken

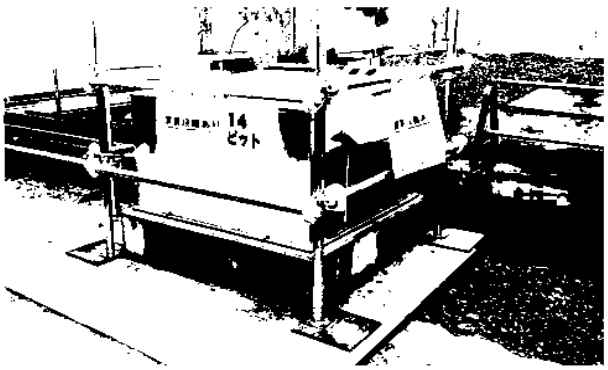


After the corrective action taken
("Use Safety Belt " sign was installed.)

■Land Side Impermeable Wall (frozen soil wall) Construction (on the west side of Unit 4 Reactor)



Before the corrective action taken



After the corrective action taken
(Barricade was set up to prevent access.)

Norton, Charles

From: Tateiwa, Kenji <tateiwa.kenji@tepco.co.jp>
Sent: Thursday, January 29, 2015 8:53 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 30, 2015 at 3pm EST
Attachments: Fukushima Spent Fuel Issues@NAS_01292015_c.pdf

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 30, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 6** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (1/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_05-j.pdf
(English translation as of 12/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141225_01-e.pdf

1-3. Retrieval of Thermocouple Installed in Unit 2 RPV Bottom via SLC Line
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_08-j.pdf

1-6. Work Condition Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_10-j.pdf

1-8. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_11-j.pdf

1-9. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_12-j.pdf

1-10. Status Update of Study on Alternate Core Debris Retrieval Methods (METI)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_14-j.pdf

1-11. Strategic Plan and Risk Mitigation (Nuclear Damage Compensation and Decommissioning Facilitation Corporation)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_15-j.pdf

2. Updated Schedule on Completion of Contaminated Water Treatment (1/23/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150123_02-e.pdf

3. Occupational Safety Corrective Actions (1/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150126_01-e.pdf

4. National Academy of Sciences Fukushima Lessons Learned Committee Phase 2 #3 (1/29/2015)
http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=7732
Attached is a compact version of TEPCO's presentation.
Let me know if you would like to receive the original sized file.

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: +1-202-412-2860

----- Original Message -----
From: Tateiwa, Kenji (mobile)
To: Tateiwa, Kenji
Sent: Thursday, January 22, 2015 10:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 23, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 23, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 30** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. Briefing Materials for Fishermen's Association of Iwaki City (1/16/2015)
(only in Japanese)
1-1. Addition of Sr-Removal Capability to KURION and SARRY Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150119_03-j.pdf
1-2. Illustration of Contaminated Water Removal Process from Underground Piping Trenches
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_10-j.pdf

1-3. Treated Water Discharge Criteria for Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_07-j.pdf

2. Contract Worker Dies After Falling Into Rainwater Receiving Tank at Fukushima Daiichi (1/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150119_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 15, 2015 8:41 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST

Nuclear Sector Colleagues,

Happy New Year!
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 16, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (12/25/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf
(English translation as of 11/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141127_01-e.pdf

1-3. Shortening the Length of Circulating Water Cooling System Loop
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_08-j.pdf

1-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

1-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_11-j.pdf

1-8. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (12/26/2014)
(only in Japanese)
2-1. Status of Filling Up Underground Seawater Piping Trenches
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_01.pdf

2-2. Measures to Achieve Incremental Effective Dose Limit at Site Boundary
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_03.pdf

2-3. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_05.pdf

2-4. Leakage of ALPS-Treated Water from J6 Tank Farm
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_06.pdf

3. IAEA to Review Fukushima Daiichi Decommissioning and Kashiwazaki Kariwa Operational Safety (1/7/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247076_6844.html

4. Figures and Video Clips Describing Various Water Management Measures
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

5. Overview of Fukushima Daiichi Accident and Lessons Learned (33 MB)
http://www.tepco.co.jp/en/decommision/accident/images/outline01.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, December 22, 2014 7:59 PM
Subject: [TEPCO Weekly Fukushima Update Call] TUE, Dec. 23 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
TUE, **Dec. 23**, 2014 at 3 pm Eastern Standard Time
(**No call next two weeks.** Next call will be on **Fri, Jan. 16, 2015** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (12/19/2014)
(only in Japanese)
1-1. Removal of Cs and Sr from Seawater, etc.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_03-j.pdf

1-2. Unit 1 Reactor Building Refueling Floor Inspection Results
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_05-j.pdf

1-3. Applicability of Plastic Scintillation Fiber (PSF) to Detect Minor Leakage from Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_07-j.pdf

1-4. Leakage of ALPS-Treated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_08-j.pdf

1-5. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_09-j.pdf

2. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool (12/22/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

2-1. Video Clip Summarizing Path to Success (6 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w220b15k&catid=61795

2-2. Video Message from Mr. Hirose, TEPCO's President (5 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w785h9cj&catid=61783

2-3. Explanation Slides (only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141222_04-j.pdf

Happy holidays to you all!

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, December 11, 2014 10:07 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Dec. 12 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Dec. 12th, 2014 at 3 pm Eastern Standard Time
(**No call next week**. Next call will be on **TUE, Dec. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. Overview of Measures to Treat Contaminated Water
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

2. Explanation on Subdrain and Groundwater Drain Systems to the Fishermen's Association of Iwaki City (12/10/2014)
(only in Japanese)
2-1. Confirmation of Stable Performance in Removing Radionuclides from Subdrain and Groundwater Drain
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_06-j.pdf

2-2. Basic Concept of Operating the Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_07-j.pdf

2-3. Detection of High Concentration of Radioactivity from Subdrain Pits # 18/19 and Measures Taken

http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141210_09-j.pdf

3. Approval by NRA on Design Modification to add Sr Removal Capability to SARRY (Cs Removal) System (12/11/2014)
(only in Japanese; 8.8 MB, 372 pages)
http://www.tepco.co.jp/cc/press/betu14_j/images/141211j0101.pdf

All the best,
Kenji

Spent Fuel and Spent Fuel Storage Facilities at Fukushima Daiichi

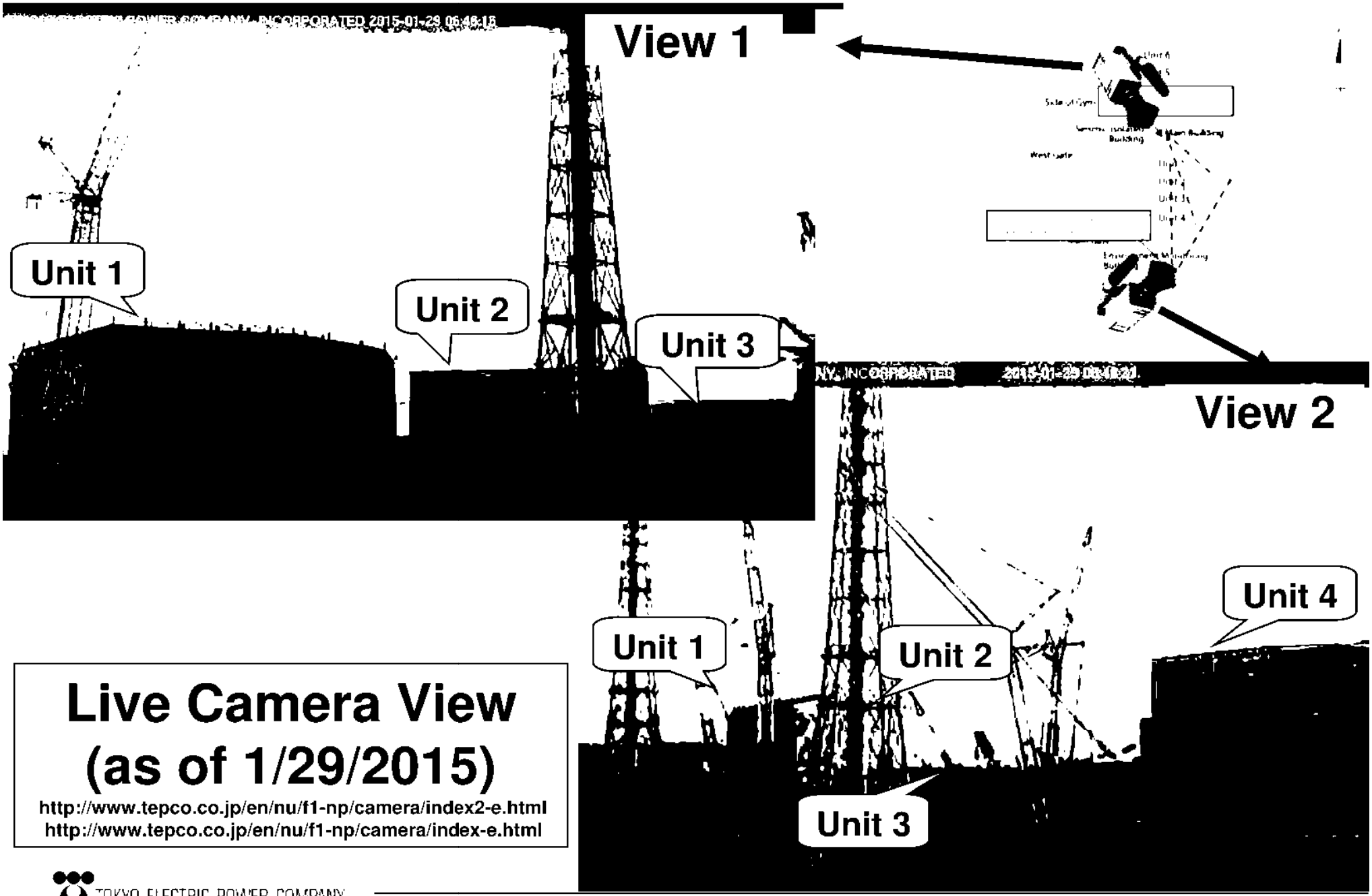
The National Academies "Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants: Phase 2" Meeting #3

Washington, DC
January 29th, 2015

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company, Washington Office
tateiwa.kenji@tepco.co.jp

TEPCO

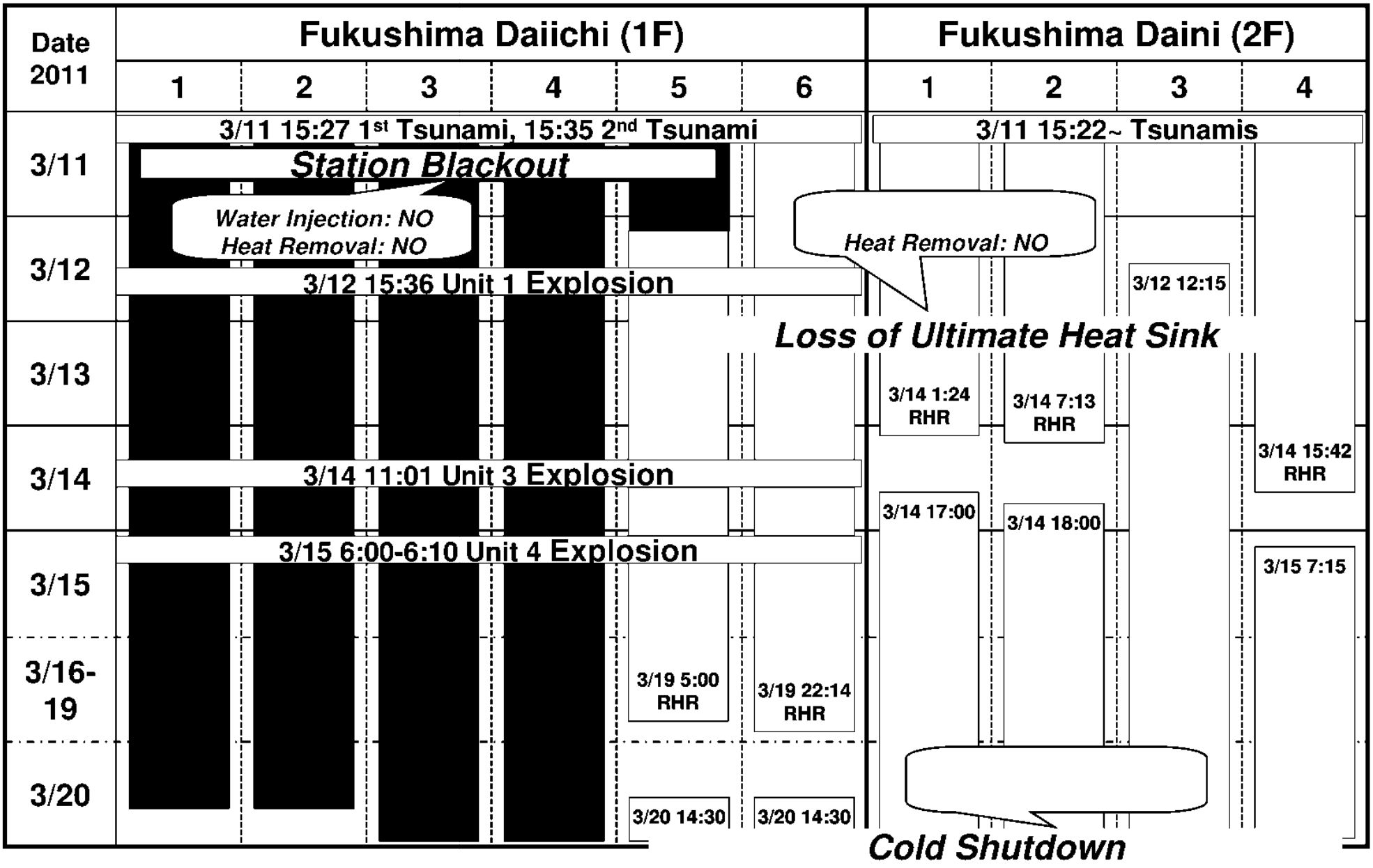
Current Status of Fukushima Daiichi (1F)



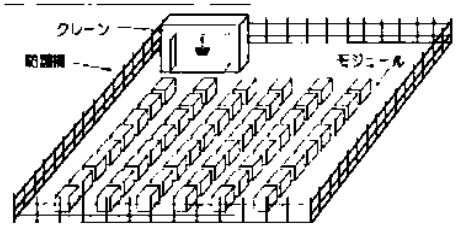
Live Camera View (as of 1/29/2015)

http://www.tepco.co.jp/en/nu/f1-np/camera/index2-e.html
http://www.tepco.co.jp/en/nu/f1-np/camera/index-e.html

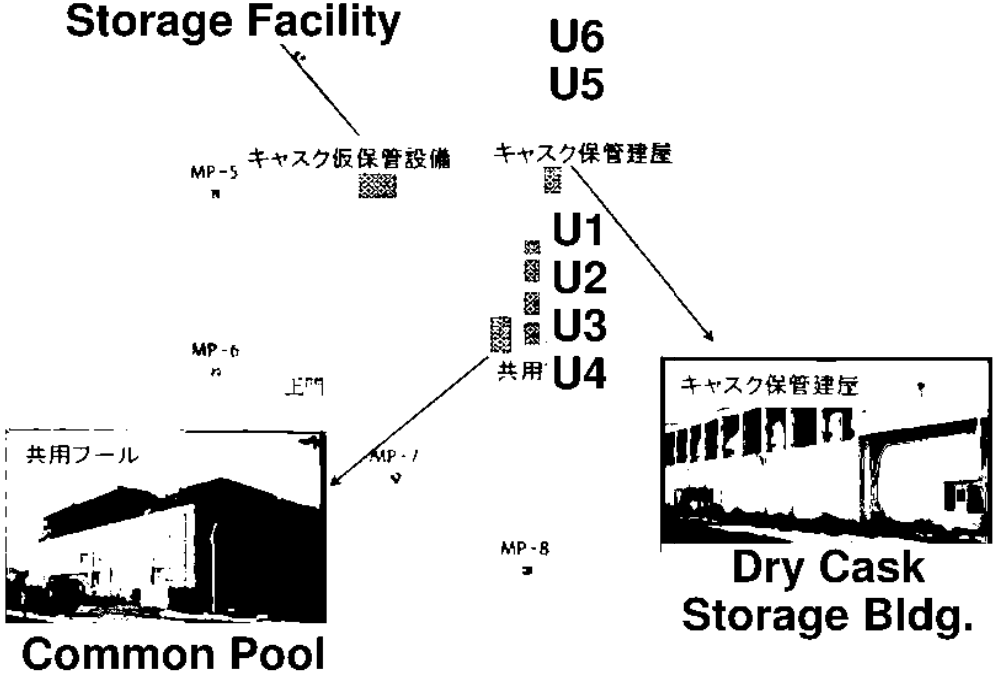
Overview of the 10-Unit Simultaneous Accidents



Spent Fuel Storage Facilities: Overview



Temporary Dry Cask Storage Facility



Dry Cask Storage Bldg.

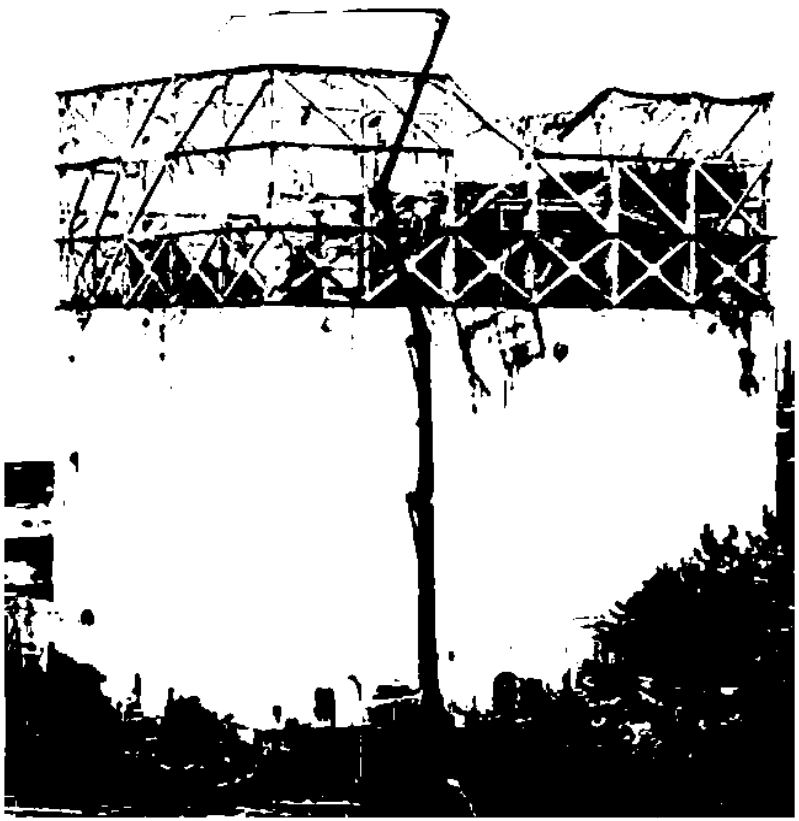
Common Pool

Fukushima Daiichi NPS

Unit	As of 3/11/2011			12/22/2014
	Spent Fuels	New Fuels	Decay Heat (MW)	Total # of Fuels
1	292	100	0.18	392
2	587	28	0.62	615
3	514	52	0.54	566
4	1,331	204	2.26	0
5	946	48	1.01	994
6	876	64	0.87	1,884
Common Pool	6,375	0	1.13	6,799
Dry Cask Storage	408	0	-	0
Temp. Dry Cask Storage	-	-	-	2,930

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

Unit 1 Spent Fuel Pool: Water Injection



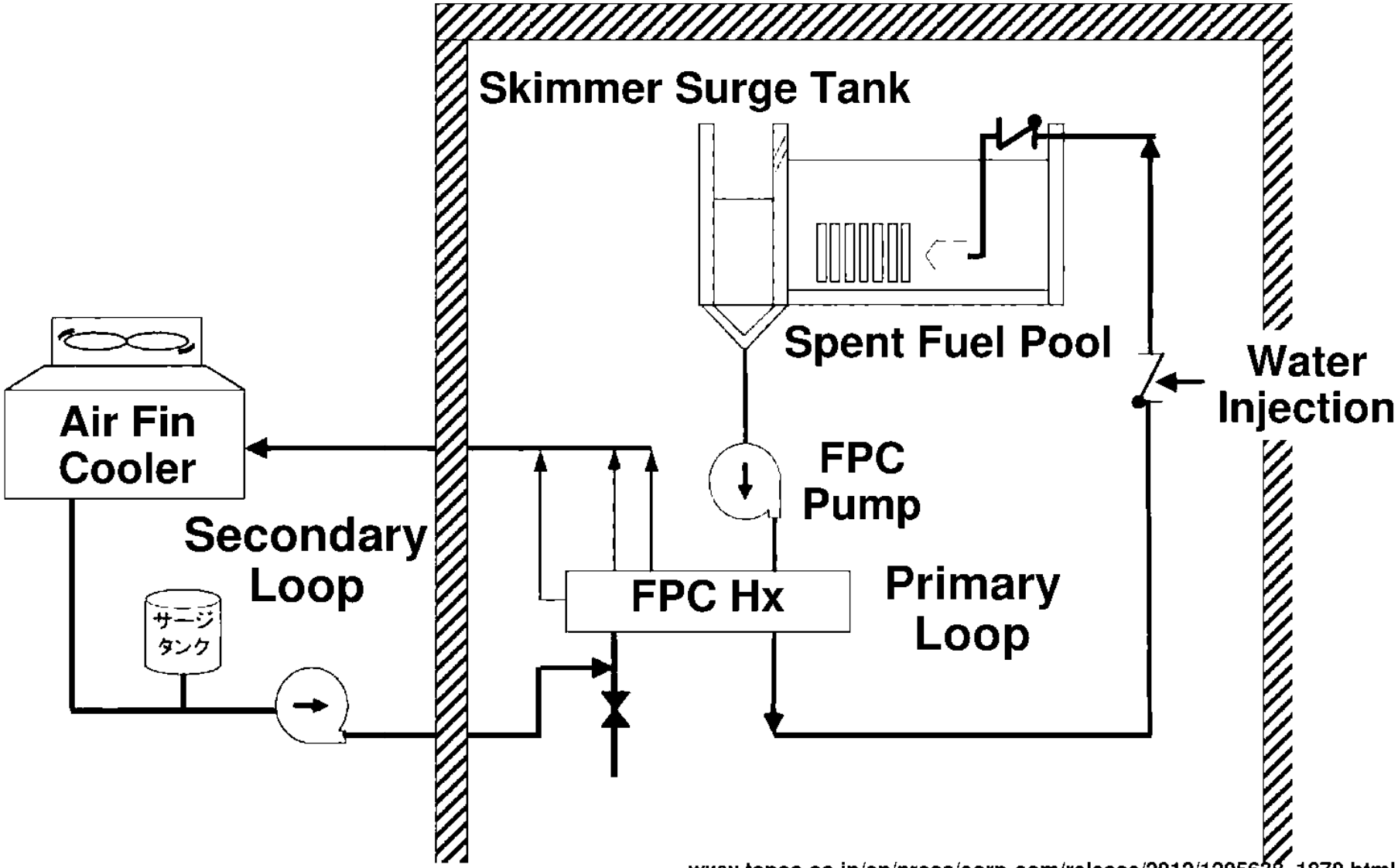
Water Injection into SFP with Concrete Pumper

Date (2011)	Injection Volume (ton)	Source	Injection Method
3/31	90	Fresh Water	Concrete Pumper
5/20	60		
5/22	90		
5/28	5		Fuel Pool Cooling (FPC) System
5/29	168		
6/5	15		
7/5	75		
8/5	75		
8/10	10		
8/10	Closed Cycle Cooling		

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Injected only fresh water (no seawater)

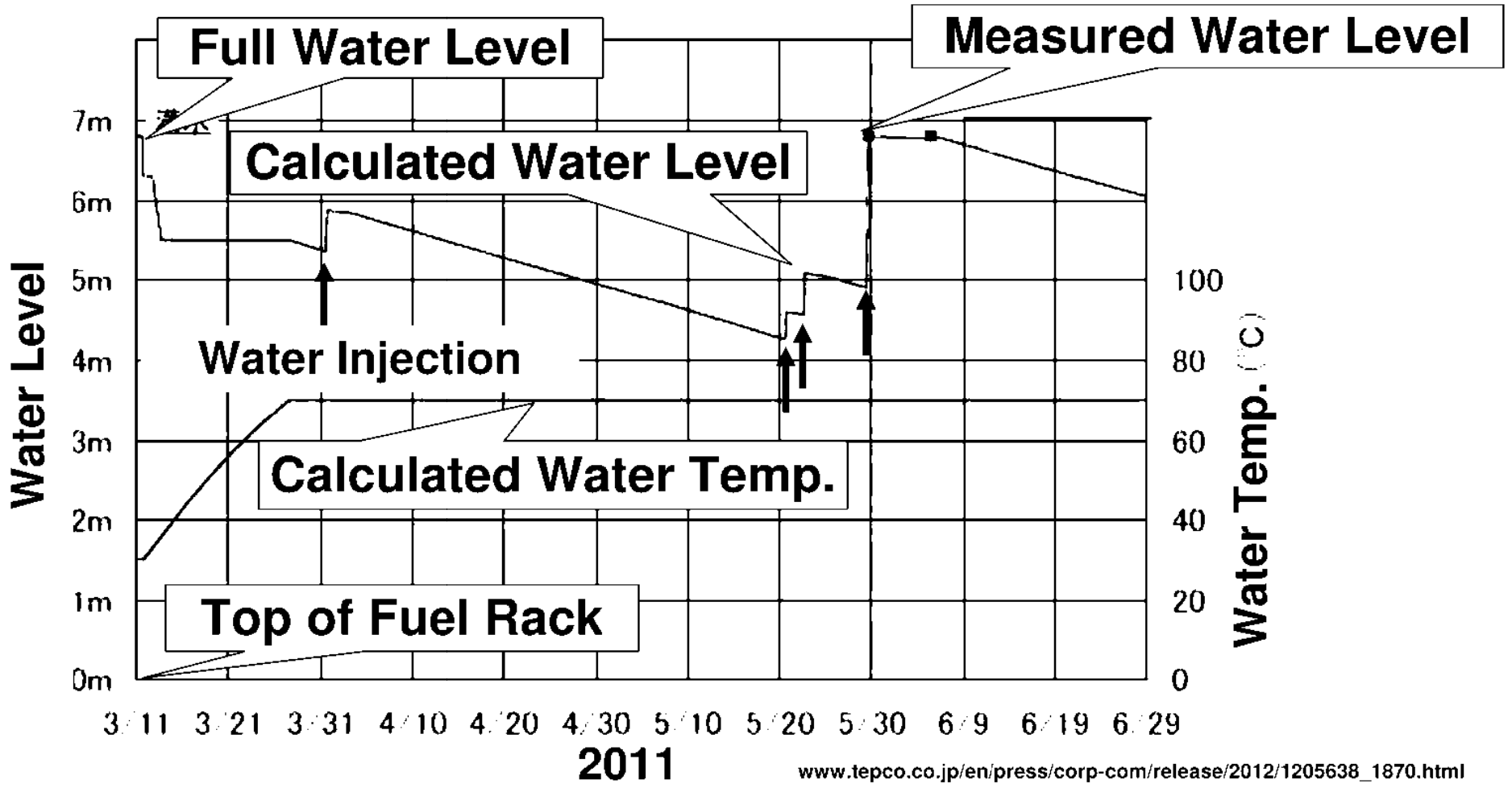
Unit 1 SFP: Closed-Cycle Cooling



www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Stable closed-cycle cooling from 8/10/2011

Unit 1 SFP: Reconstruction of Events



Water level highly unlikely to have dropped close to top of fuel rack

Unit 1 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm^3)			
		Unit 1 Skimmer Surge Tank		*Unit 1 SFP*	*Unit 1 T/B*
		6/22/2011	8/19/2011	*2/11/2011*	*3/26/2011*
Cs-134	2 years	12,000	18,000	*ND*	*1.2E5*
Cs-137	30 years	14,000	23,000	*0.078*	*1.3E5*
I-131	8 days	68	ND	*ND*	*1.5E5*

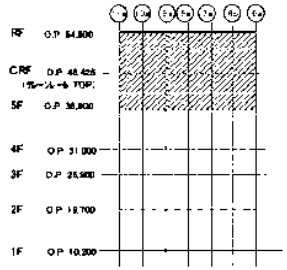
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

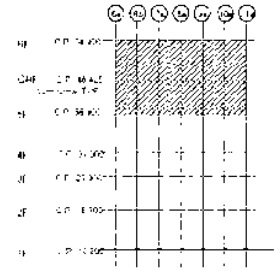
	6/22/2011	7/17/2012
Chloride (ppm)	4.4	5.0

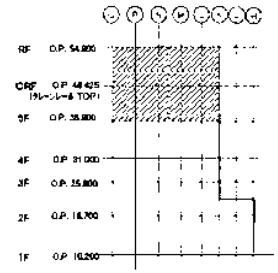
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

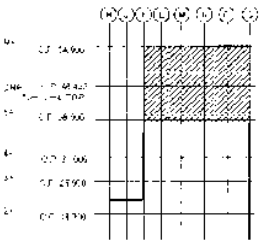
- I-131 most likely to have originated from reactor, not SFP (all fuels >1 year after shutdown)
- Injection of hydrazine for microbes prevention

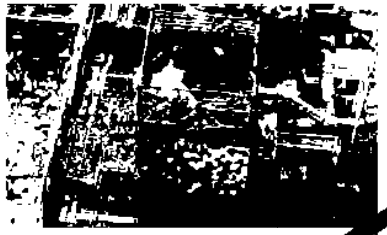
Unit 1 SFP: Structural Integrity Assessment



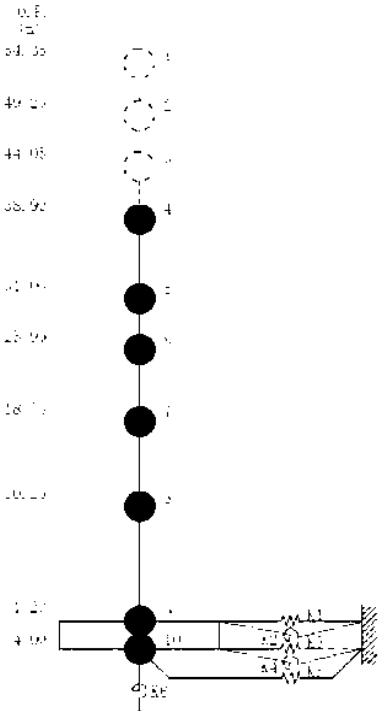








Structural Damage Assessment



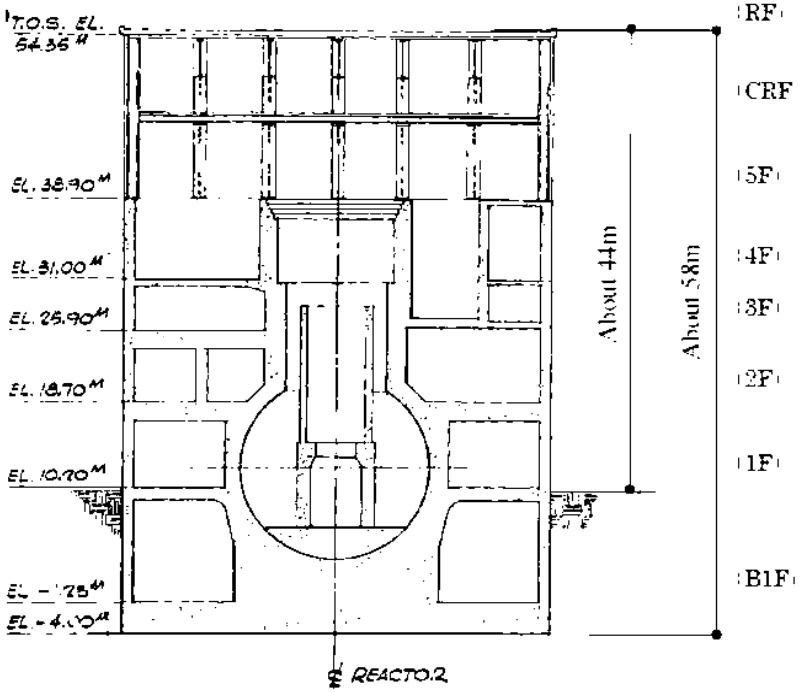


Figure Analysis Model for Seismic Response of the Reactor Building of Unit [illegible]tion)

Seismic Response Model Incorporating Damaged Condition

http://www.tepco.co.jp/en/press/corp-com/release/11052801-e.html

Shear strain from design-basis earthquake confirmed to be within safety limit (5/28/2011)

Unit 1 SFP: Condition of Refueling Floor

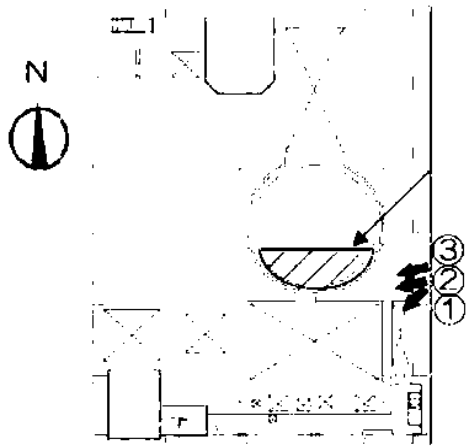
Fuel Handling Machine

Rubble

Reactor Well Cover

Fuel Handling Machine

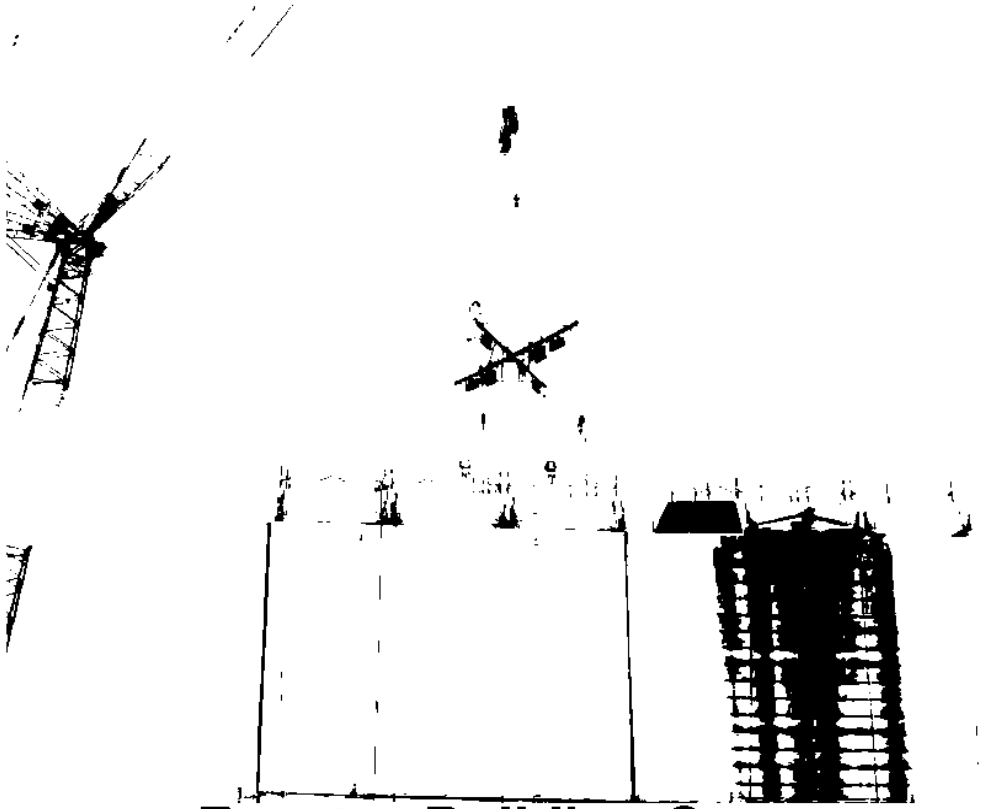
Spent Fuel Pool Surface



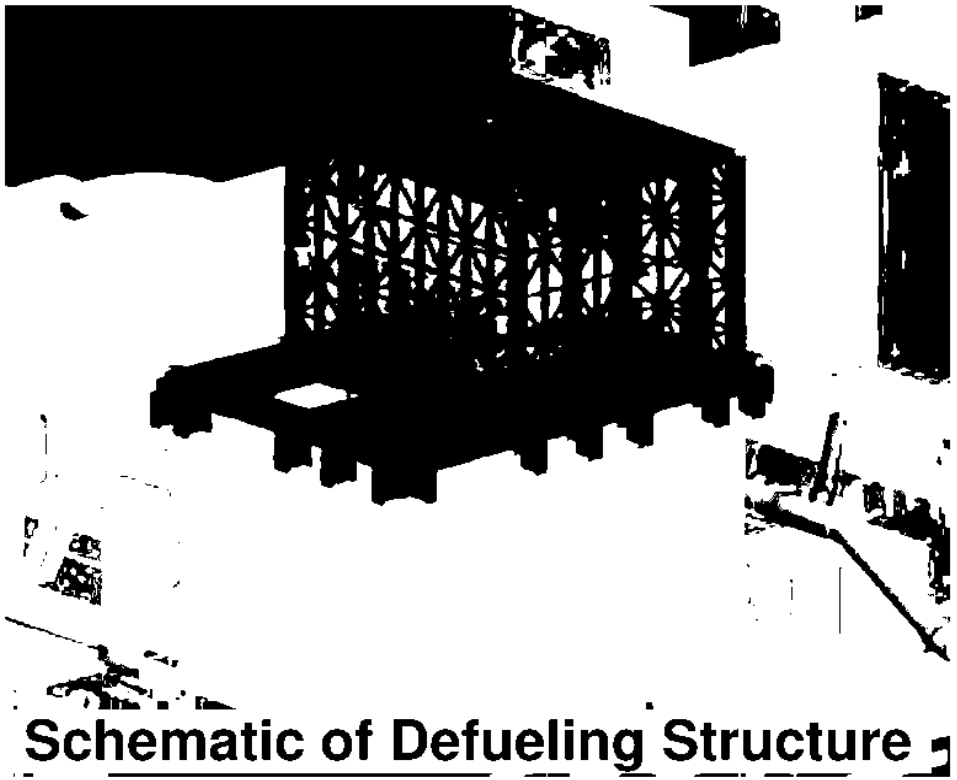
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

Fuel handling machine and overhead crane do not seem to have dropped into SFP (Nov. 2014)

Unit 1 SFP: Next Step



Reactor Building Cover
(12/4/2014)



Schematic of Defueling Structure

Reactor building cover to be dismantled to prepare for defueling

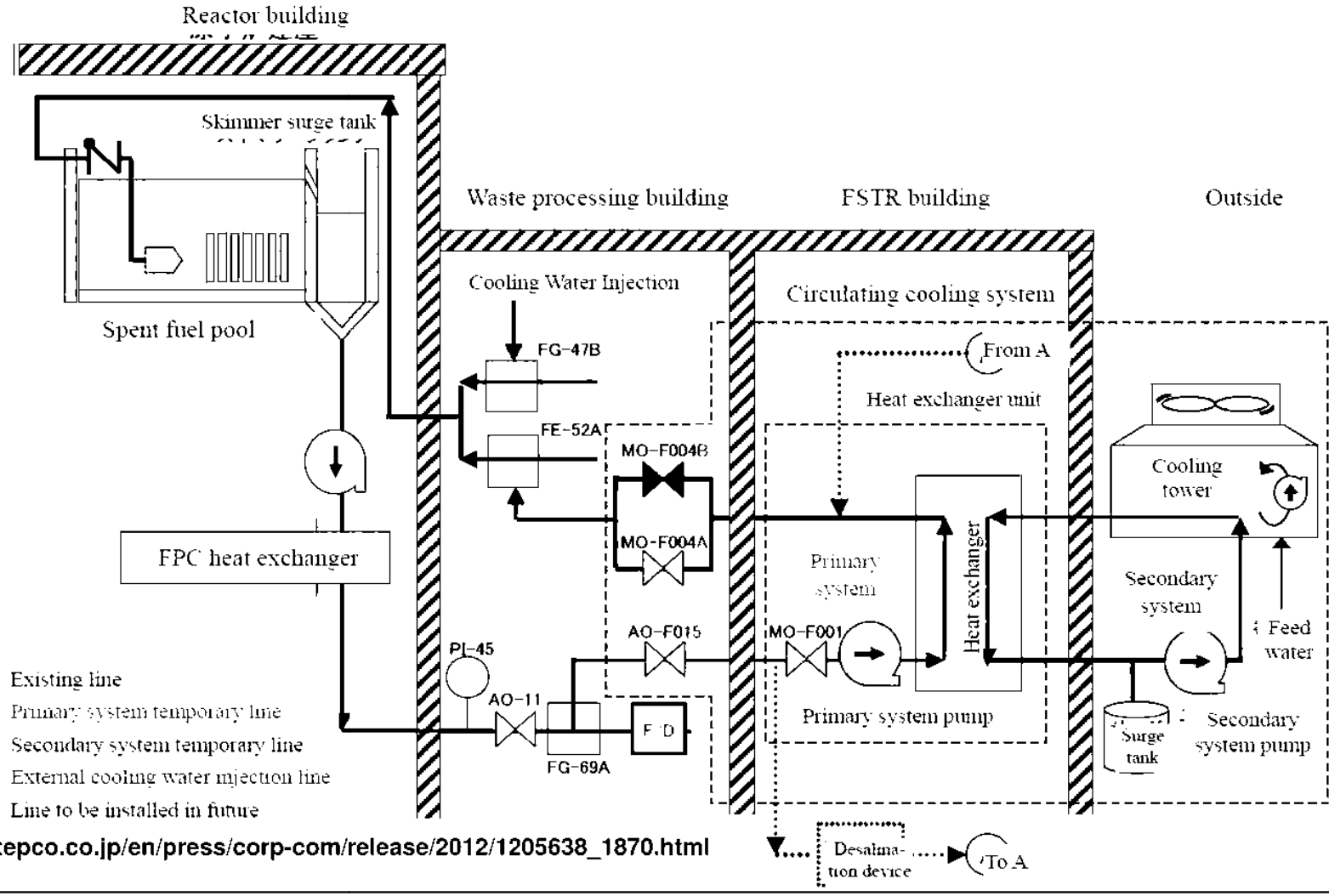
Unit 2 Spent Fuel Pool: Water Injection

Date (2011)	Injection Volume (ton)	Source	Injection Method
3/20	40	Seawater	Fuel Pool Cooling System
3/22	18		
3/25	30		
3/29	15-30	Fresh Water	
3/30	<20		
4/1	70		
4/4	70		
4/7	36		
4/10	60		
4/13	60		
4/16	45		
4/19	47		
4/22	50		
4/25	38		
4/28	43		
5/2	55		
5/6	58		
5/10	56		
5/14	56		
5/18	53		
5/22	56		
5/26	53		
5/30	53		
5/31	Closed Cycle Cooling		

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

FPC system utilized for water injection

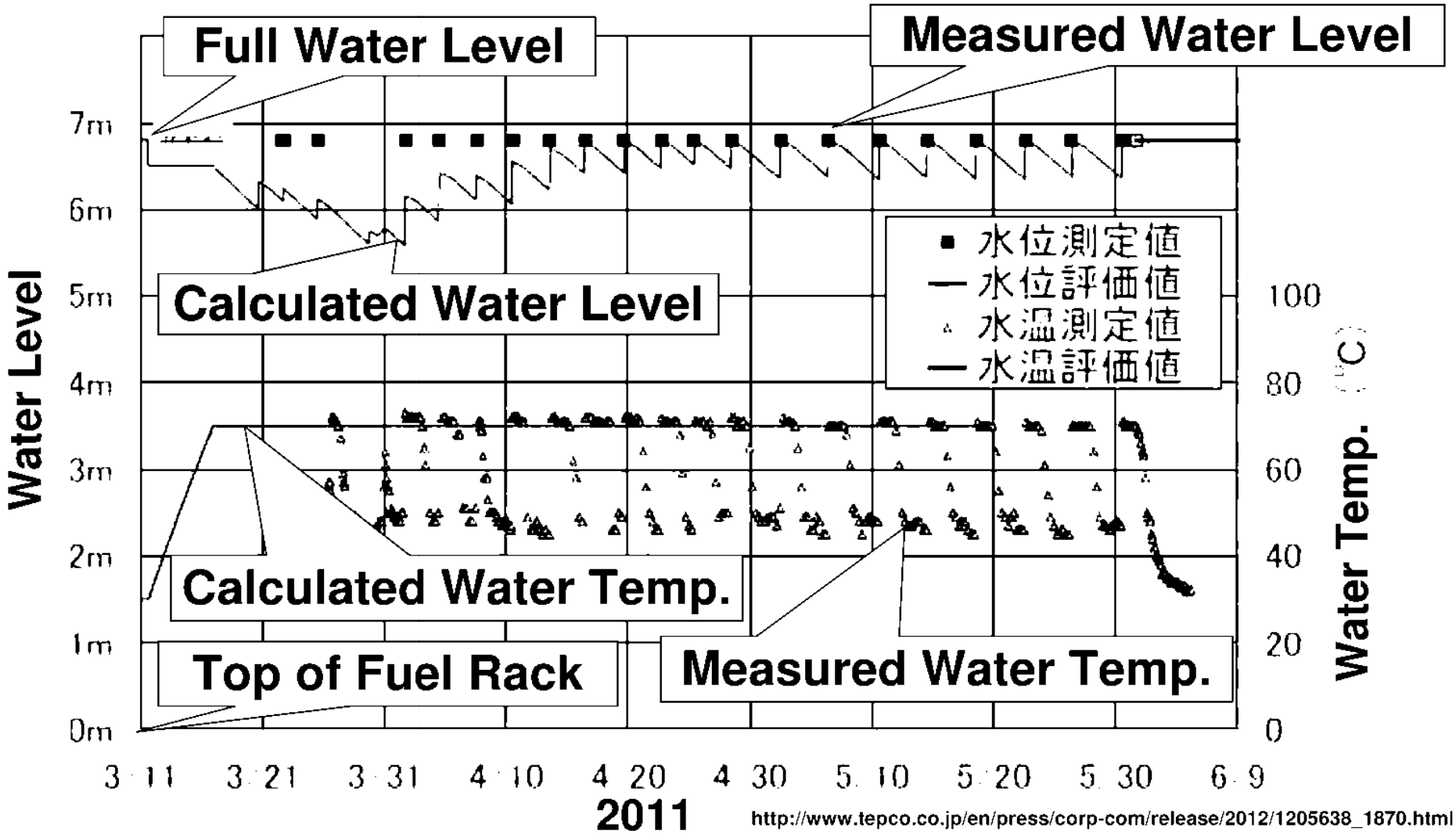
Unit 2 SFP: Closed-Cycle Cooling



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

- **Stable closed-cycle cooling from 5/31/2011**
- **Injection of hydrazine for anti-corrosion and microbe prevention**

Unit 2 SFP: Reconstruction of Events



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Water level highly unlikely to have dropped close to top of fuel rack

Unit 2 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm^3)			
		Unit 2 Skimmer Surge Tank		*Unit 2 SFP*	*Unit 2 T/B*
		4/16/2011	*8/19/2011*	*2/10/2011*	*3/27/2011*
Cs-134	2 years	160,000	110,000	*ND*	*3.1E6*
Cs-137	30 years	150,000	110,000	*0.28*	*3.0E6*
I-131	8 days	4,100	ND	*ND*	*1.3E7*

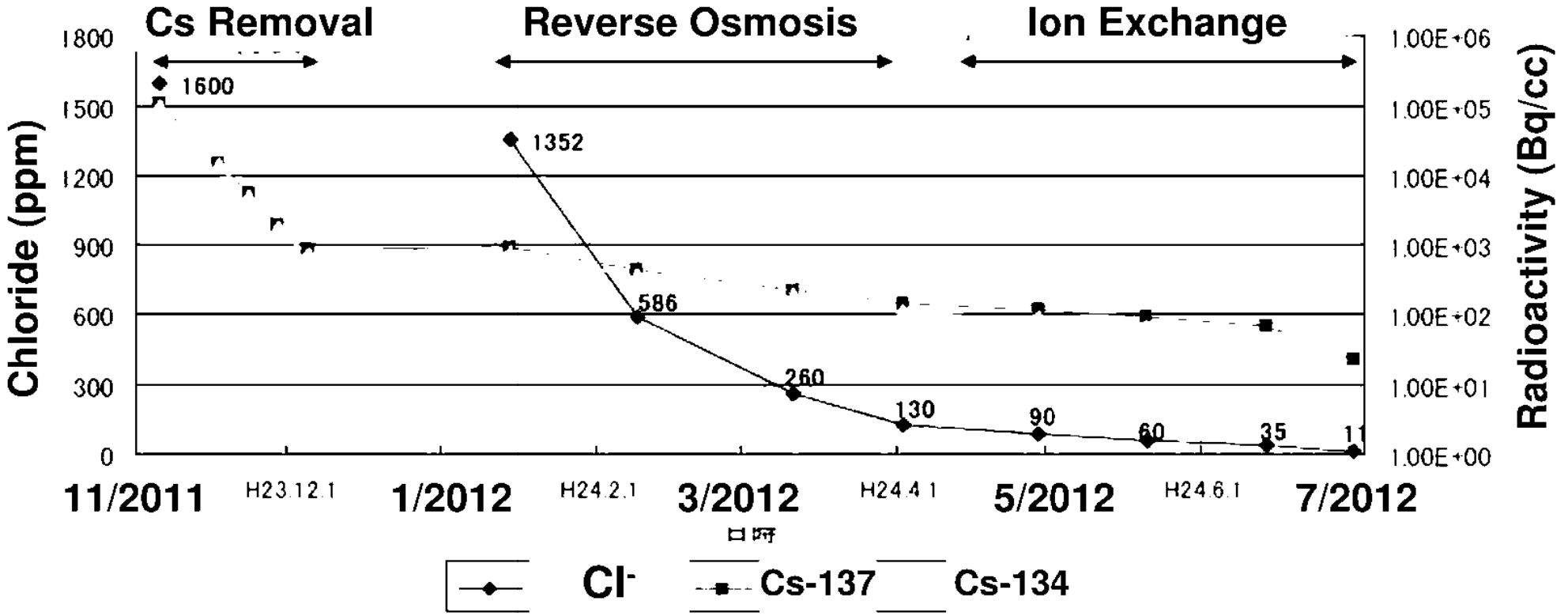
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

	4/16/2011	11/15/2011	4/2/2012	8/30/2012
Chloride (ppm)	1100	1600	130	14

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

I-131 most likely to have originated from reactor, not spent fuel (all fuels >7 months after shutdown)

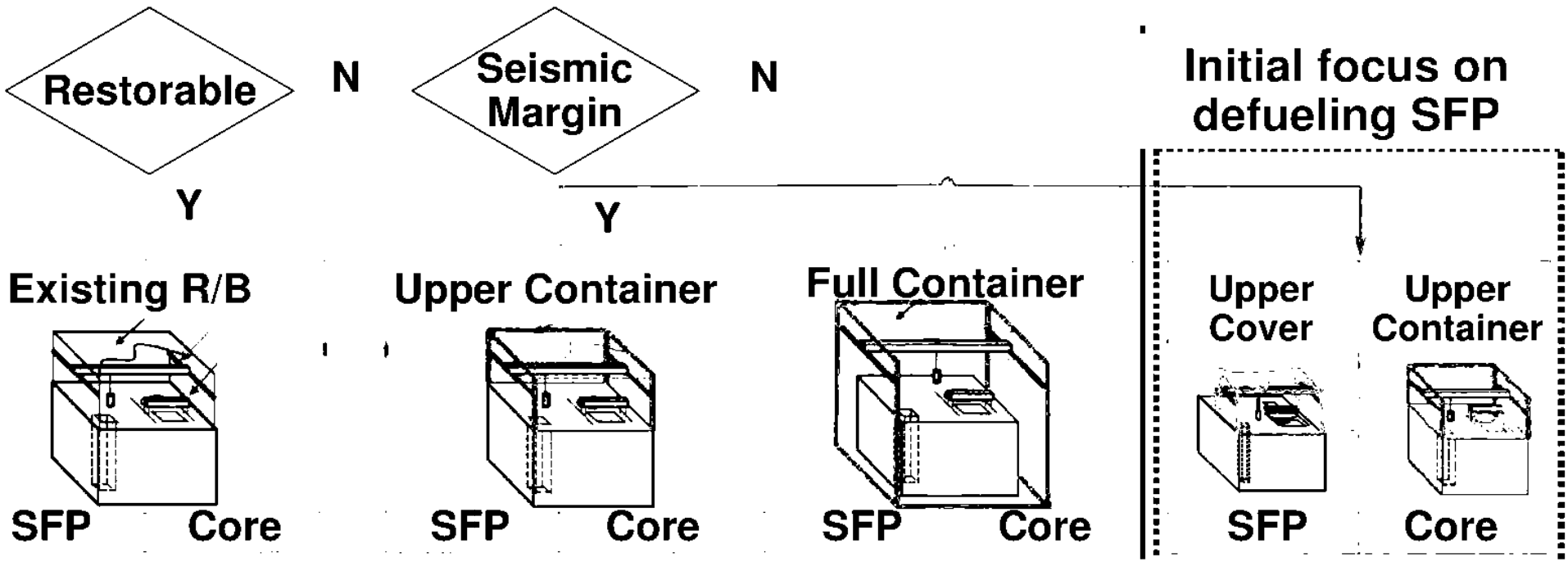
Unit 2 SFP: Water Chemistry (cont'd)



http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m121022_05-j.pdf

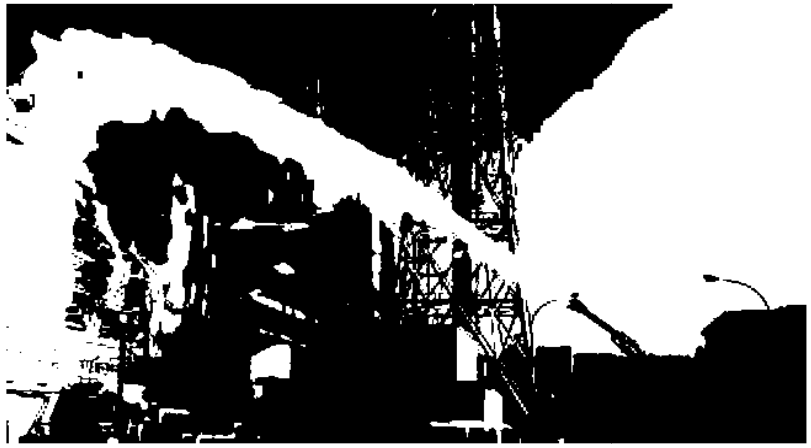
Water quality steadily improved

Unit 2 SFP: Next Step



Defueling strategy to be determined after path for core debris retrieval becomes clearer

Unit 3 Spent Fuel Pool: Water Injection



http://www.mod.go.jp/gsdf/crf/pa/saigaihaken/touhokutihoujisin/kakogazou/kako-jv-touhoku/march/23.3.30_2/jv-touhoku.html

Japan Self Defense Force

http://www.tfd.metro.tokyo.jp/hp-kouhouka/kts/kts_03/kts04.html

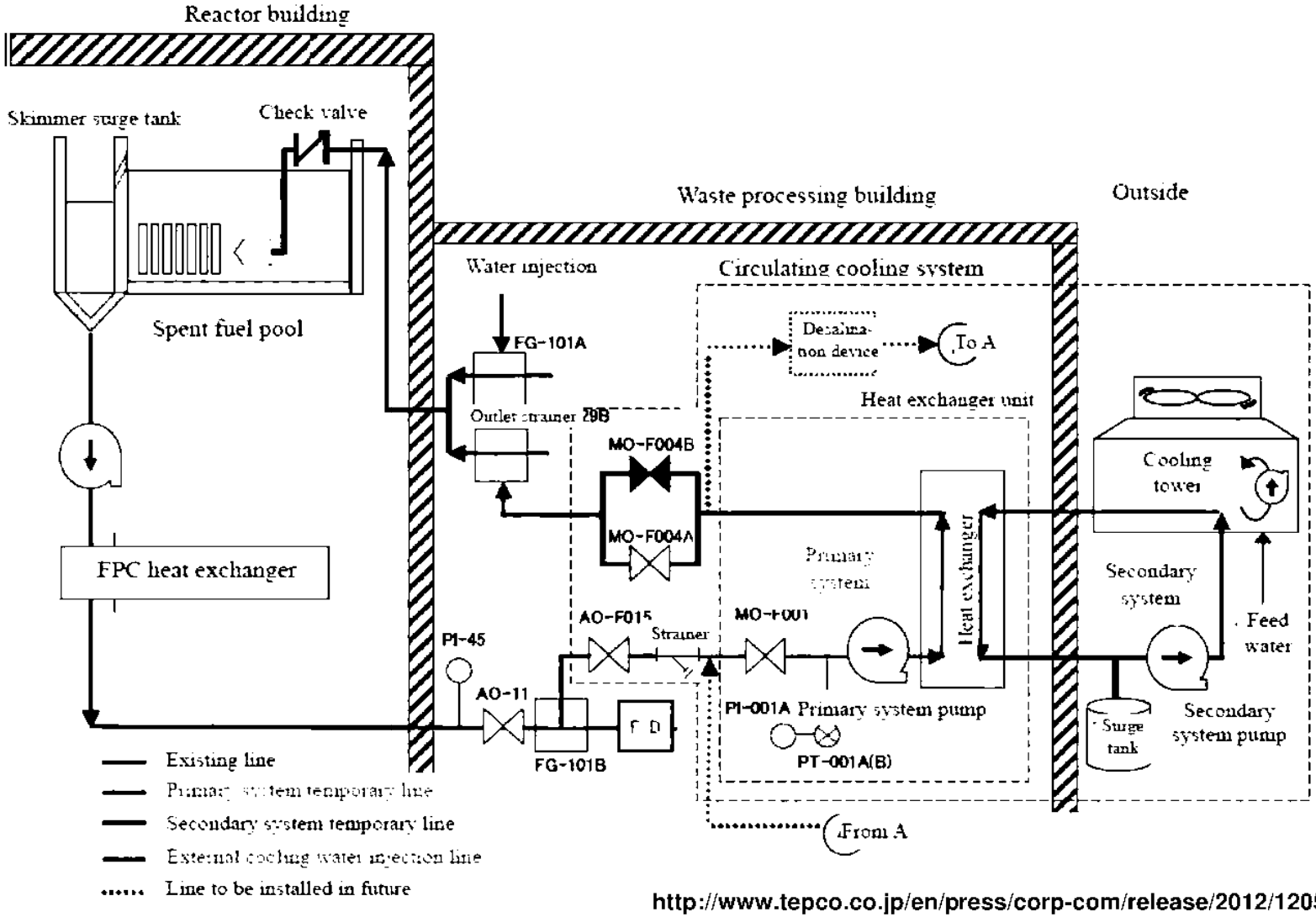
Tokyo Fire Department

Various attempts to inject water

Date (2011)	Injection Volume (ton)	Source	Injection Method
3/17	30	Seawater	Helicopter
3/17	44		
3/17	30	Fresh Water	Water Cannon
3/18	40		
3/18	2		
3/19	60	Seawater	Fire Truck
3/19	2430		
3/20	1137		
3/22	150		
3/23	35		FPC
3/24	120		
3/25	450		Fire Truck
3/27	100		
3/29	100	Fresh Water	Concrete Pumper
3/31	105		
4/2	75		
4/4	70		FPC
4/7	70		
4/8	75		
4/10	80		
4/12	35		
4/14	25		
4/18	30		
4/22	50		
4/26	47.5		
5/8	60		
5/9	80		
5/16	106		
5/24	100		
5/28	50		
6/1	40		
6/5	60		
6/9	55		
6/13	42		
6/17	49		
6/26	45	w/ Boron	
6/27	60		
6/29	30	Fresh Water	
6/30	Closed Cycle Cooling		

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

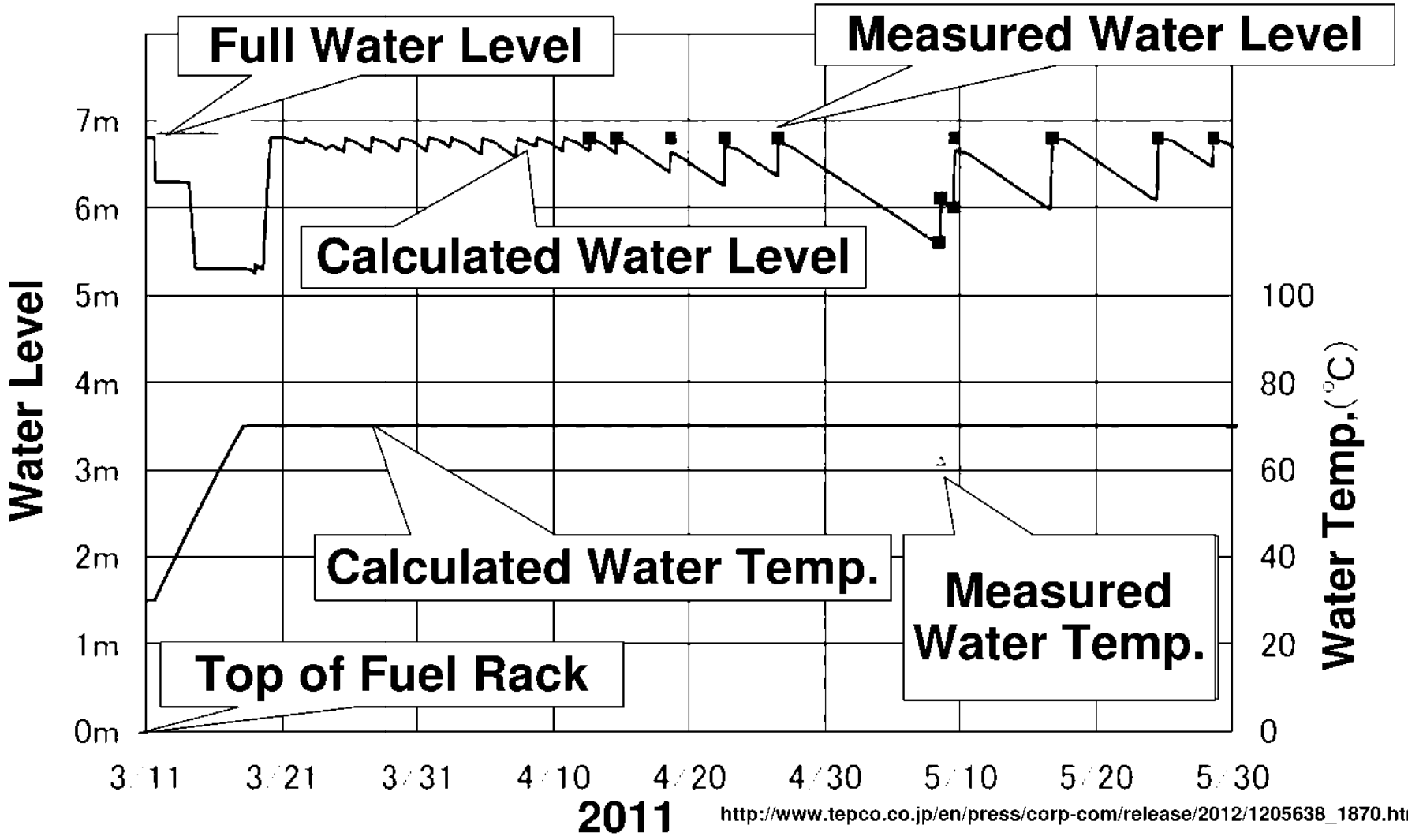
Unit 3 SFP: Closed-Cycle Cooling



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Stable closed-cycle cooling from 6/30/2011

Unit 3 SFP: Reconstruction of Events



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Water level highly unlikely to have dropped close to top of fuel rack

Unit 3 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm^3)				
		Unit 3 SFP			*Unit 3 SFP*	*Unit 3 T/B*
		5/8/2011	7/7/2011	8/19/2011	*3/2/2011*	*4/22/2011*
Cs-134	2 years	140,000	94,000	74,000	*ND*	*1,500,000*
Cs-136	13 days	1,600	ND	ND	*ND*	*44,000*
Cs-137	30 years	150,000	110,000	87,000	*ND*	*1,600,000*
I-131	8 days	11,000	ND	ND	*ND*	*660,000*

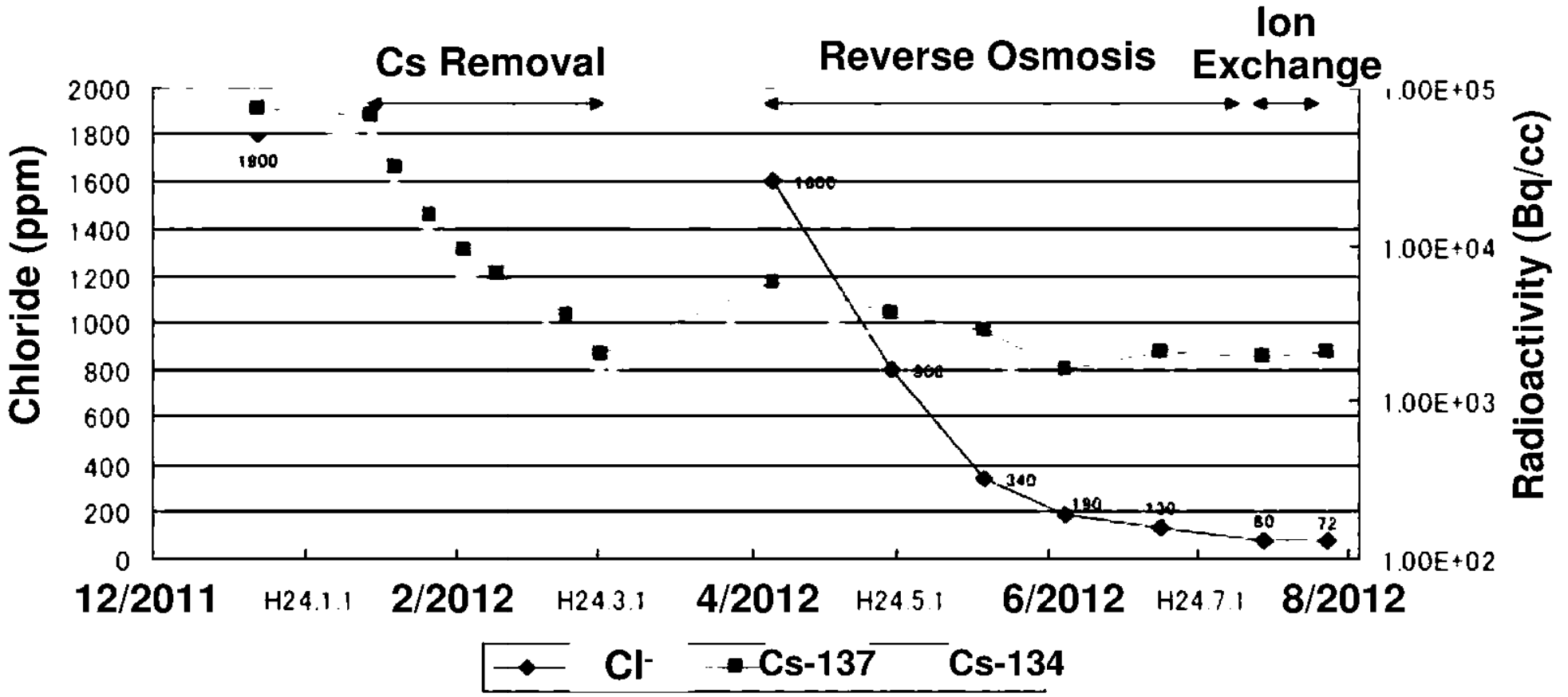
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

	5/8/2011	4/5/2012	6/23/2012	8/30/2012
Chloride (ppm)	2400	1600	130	73

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

- I-131 and Cs-136 most likely to have originated from reactor, not SFP (all fuels >10 months after shutdown)
- Injection of boric acid to neutralize alkalinity from concrete rubble
- Injection of hydrazine for anti-corrosion and microbe prevention

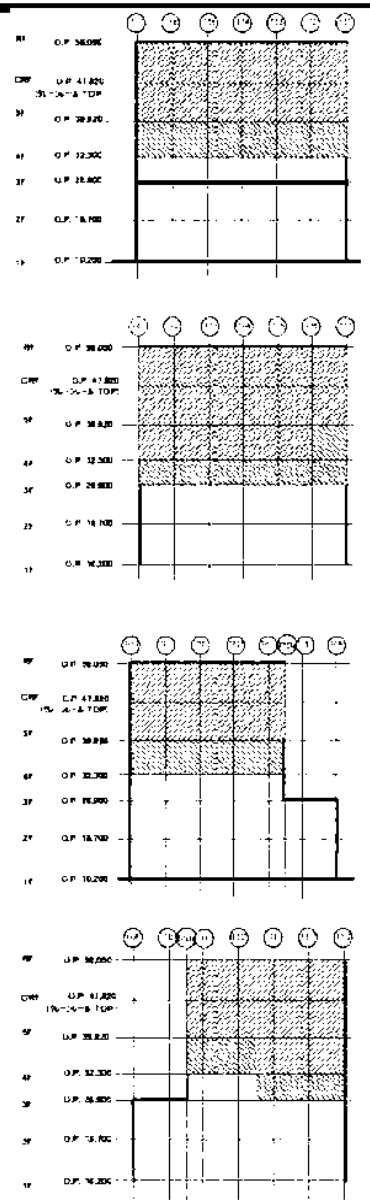
Unit 3 SFP: Water Chemistry (cont'd)

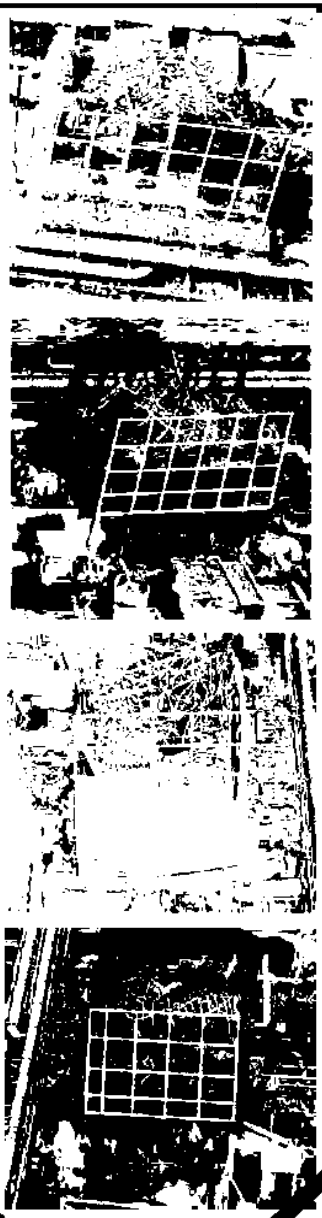


http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m121022_05-j.pdf

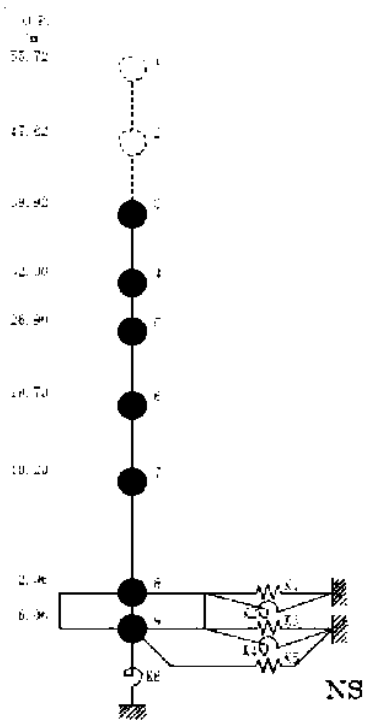
Water quality steadily improved

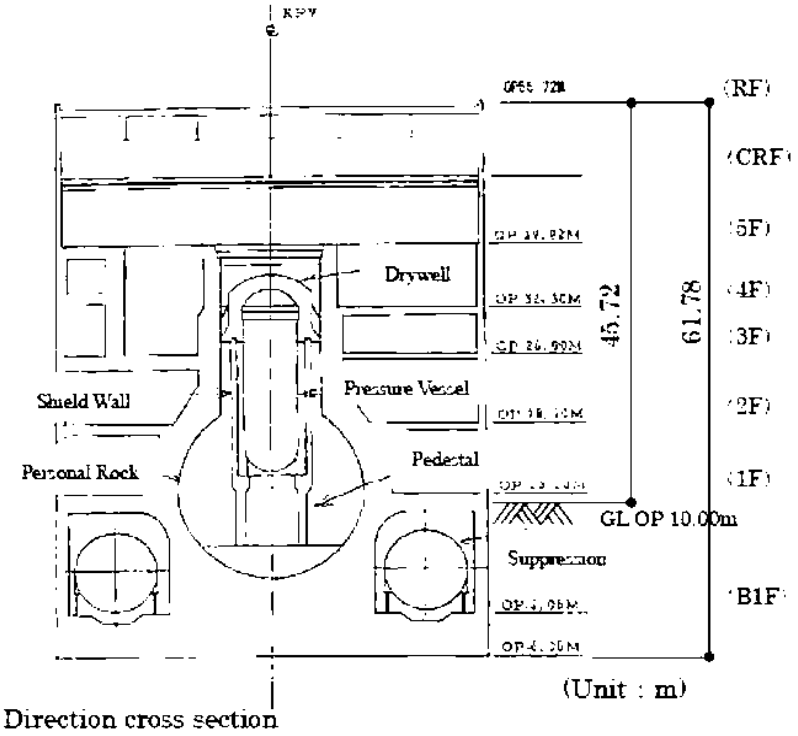
Unit 3 SFP: Structural Integrity Assessment





Structural Damage Assessment





NS Direction cross section

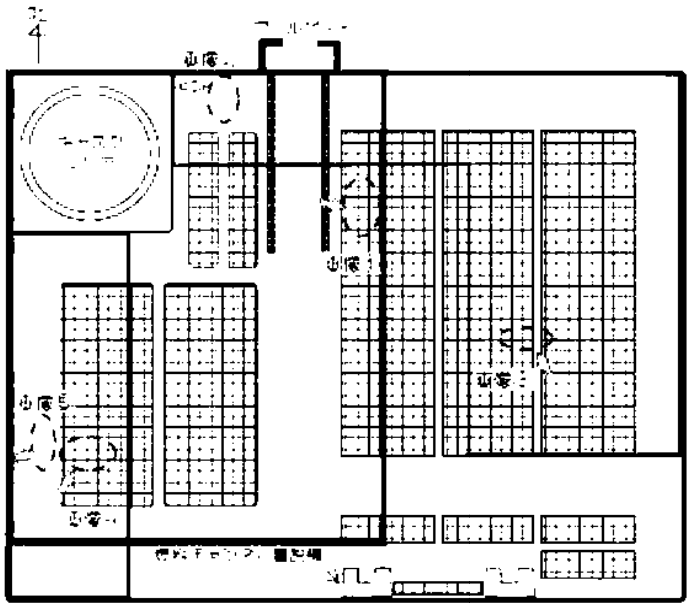
Seismic Response Model Incorporating Damaged Condition

http://www.tepco.co.jp/en/press/corp-com/release/11071307-e.html

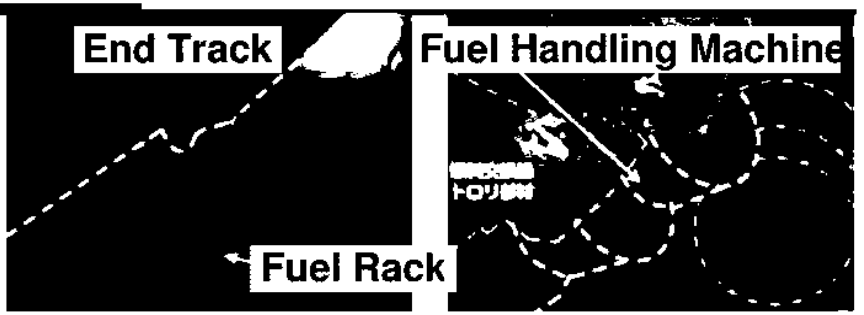
Shear strain from design-basis earthquake confirmed to be within safety limit (7/13/2011)

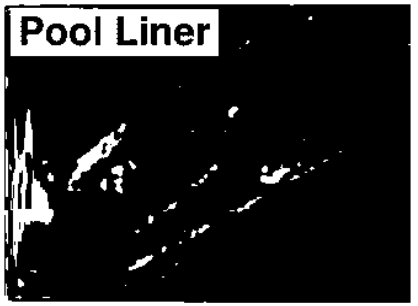
TOKYO ELECTRIC POWER COMPANY

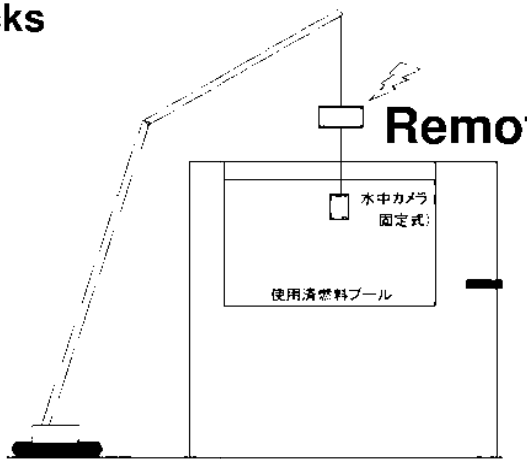
Unit 3 SFP: Rubble Removal

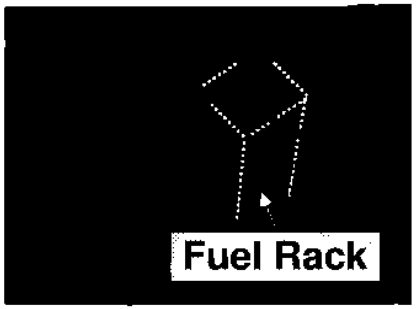


Fuel Racks
Oct. 11
Oct. 12





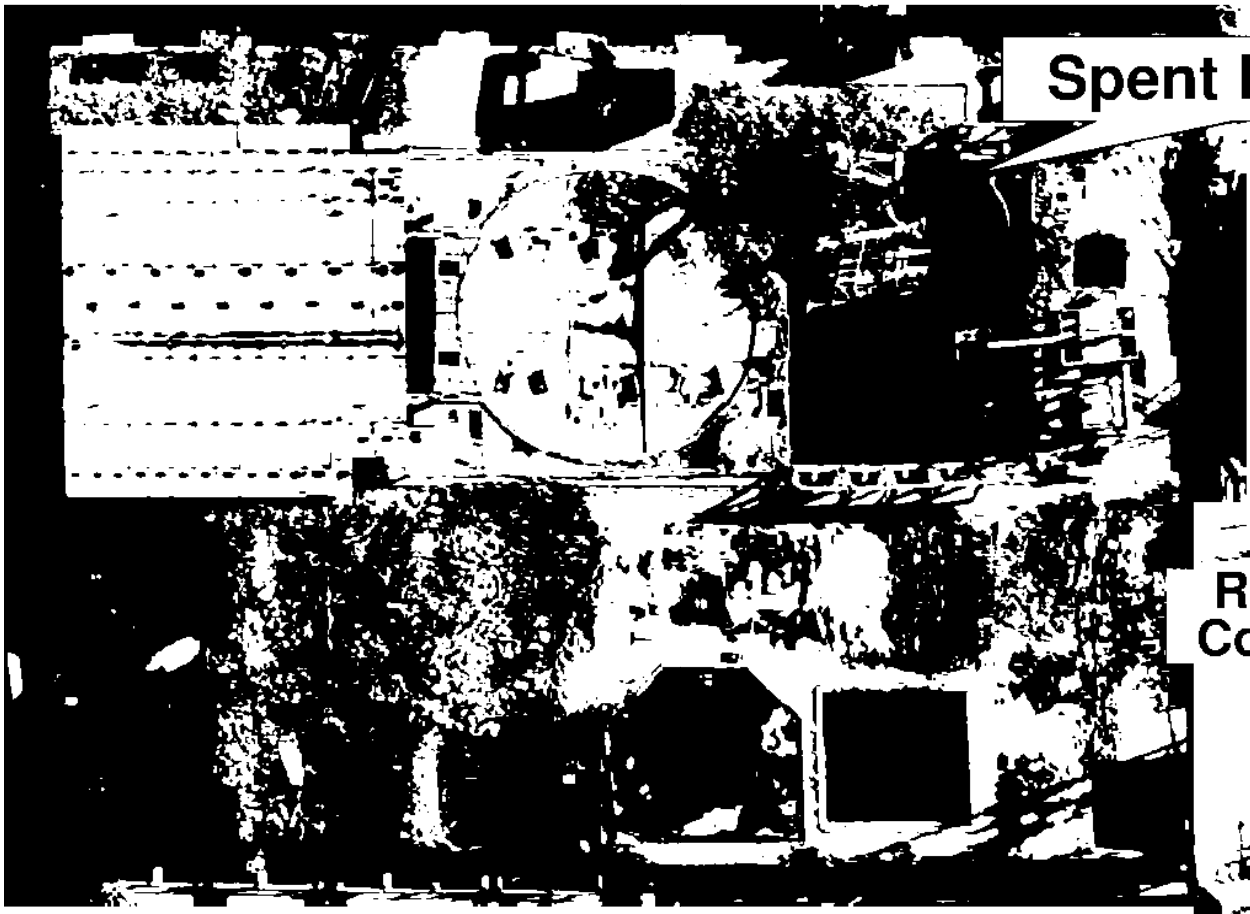




http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m121022_05-j.pdf

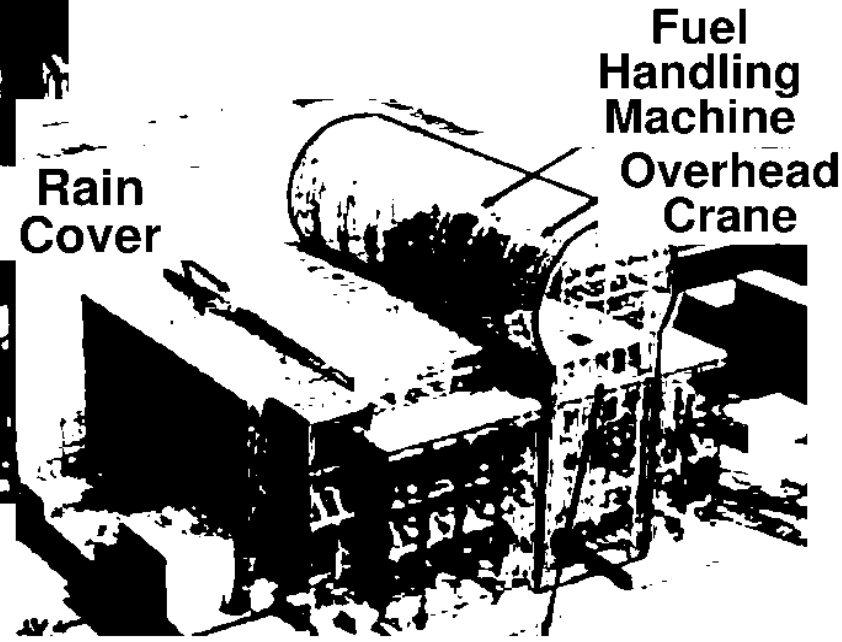
Information on rubble in SFP obtained by remote-controlled underwater camera (Oct. 2012)

Unit 3 SFP: Next Step



Refueling Floor (Dec. 2014)

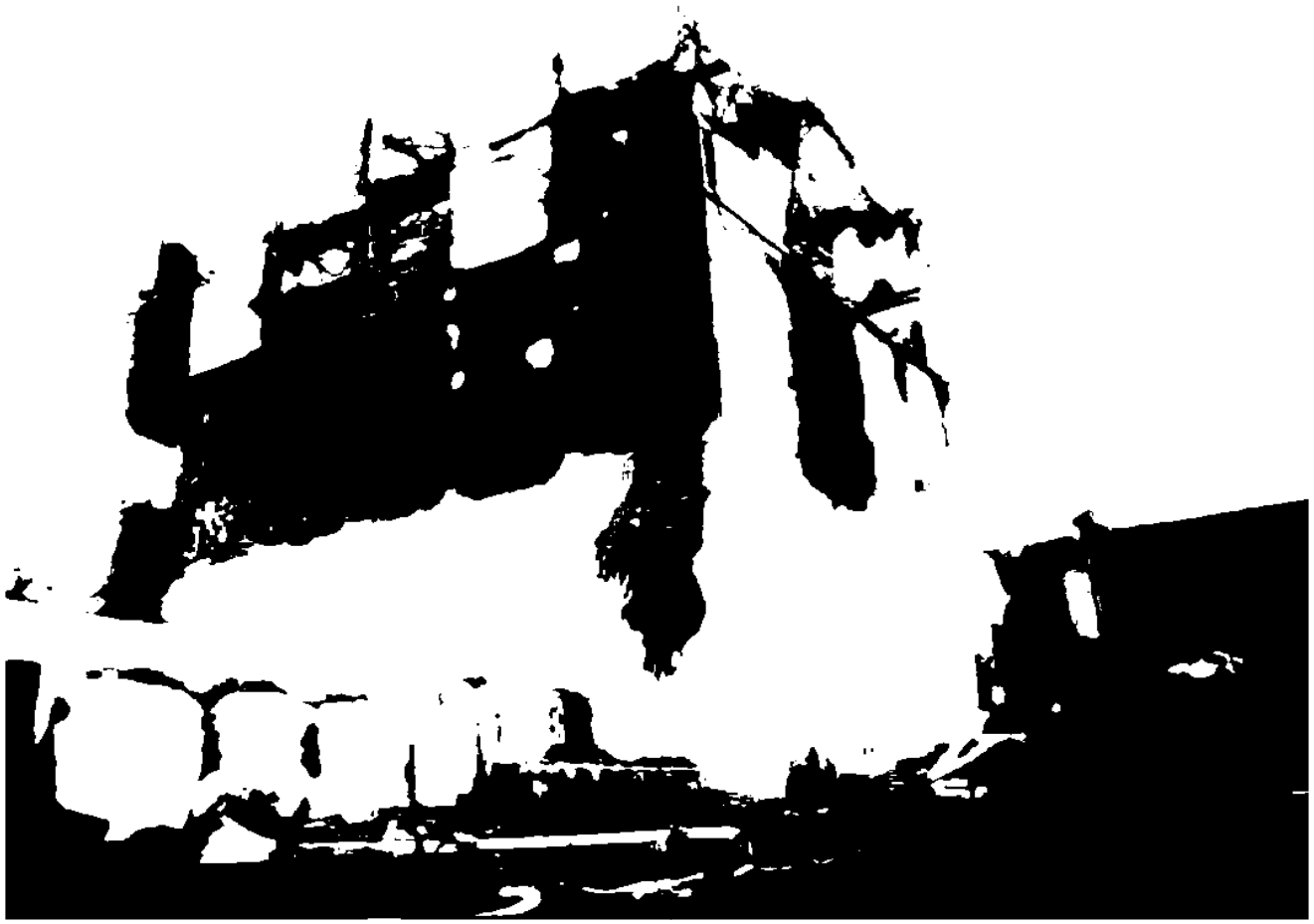
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_10-j.pdf



Schematic of Defueling Structure

Removing rubble from SFP in preparation for defueling

Unit 4 Spent Fuel Pool: Water Injection



Water Injection with Concrete Pumper (3/22/2011)

3/20, water cannon, fresh water, 80 ton

7/31, Closed Cycle Cooling, fresh water

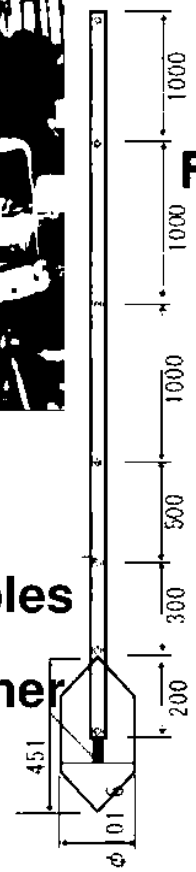
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Injection of seawater and fresh water from Mach 20 using water cannons, concrete pumpers, etc. until July 31, 2011

Unit 4 SFP: Water Level/Temp. Measurement

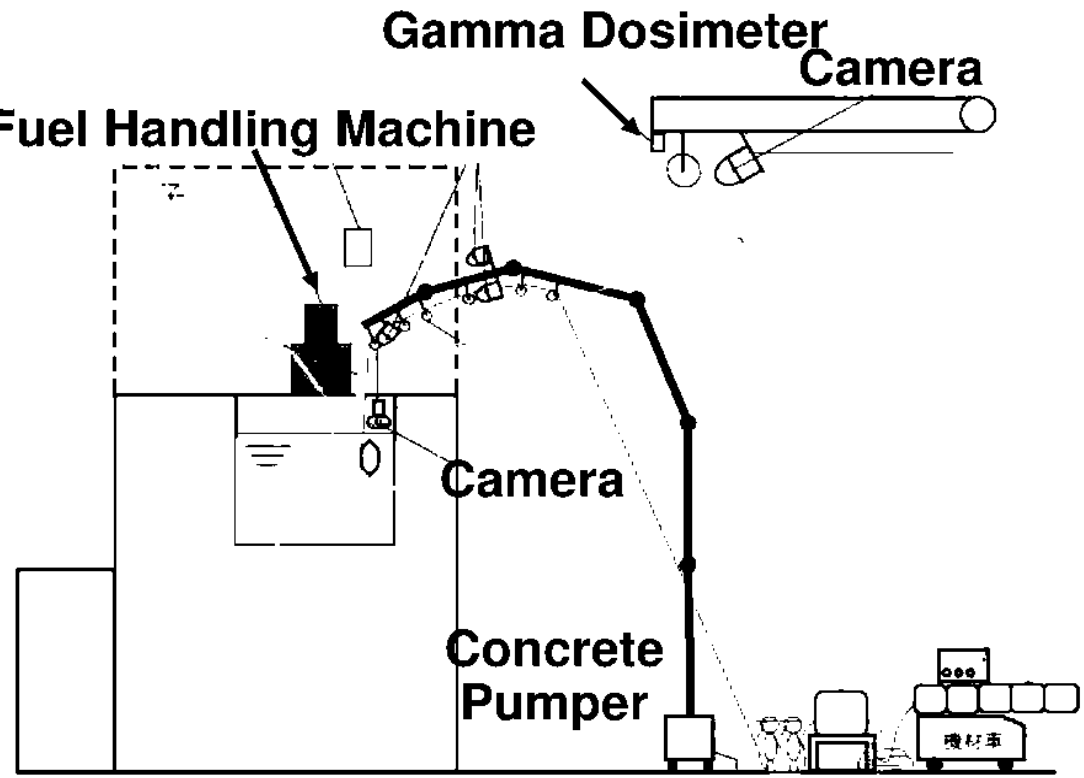
Collecting Water Samples
(4/15/2011)

http://photo.tepco.co.jp/date/2011/201104-j/110415-01j.html



Thermocouples

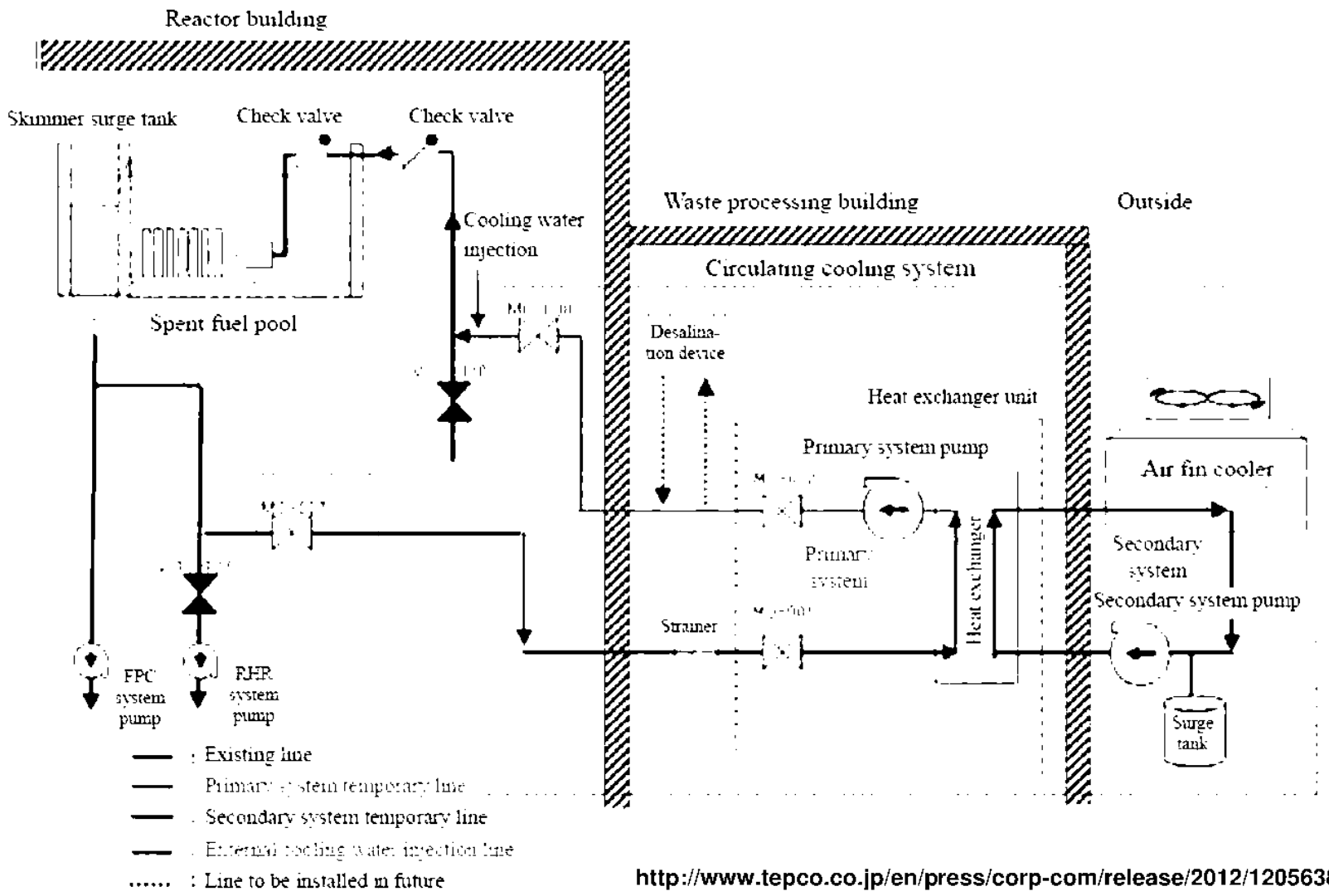
Sampling Container



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Concrete pumper used to measure SFP water level/temperature and collect water samples

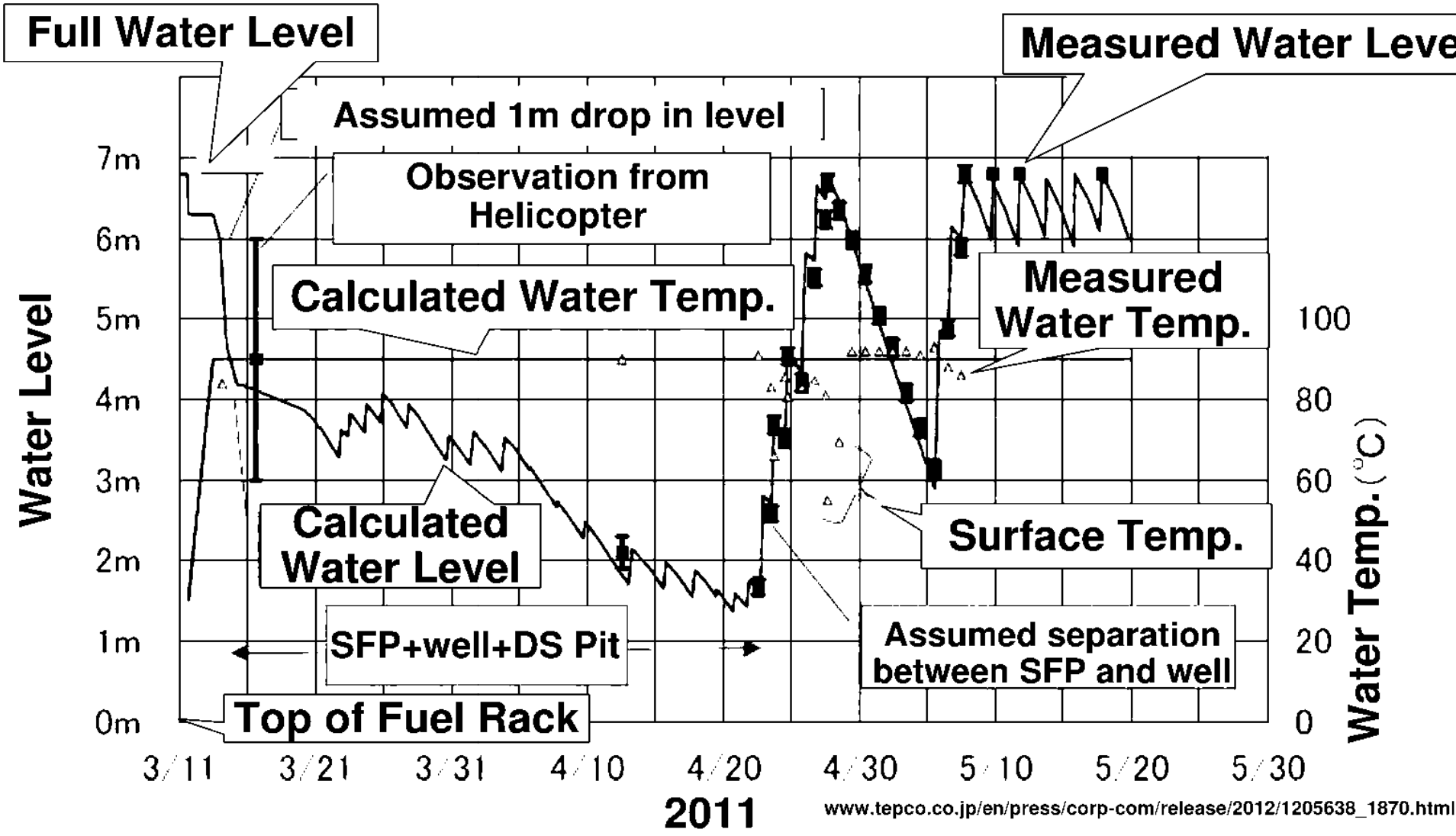
Unit 4 SFP: Closed-Cycle Cooling



http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

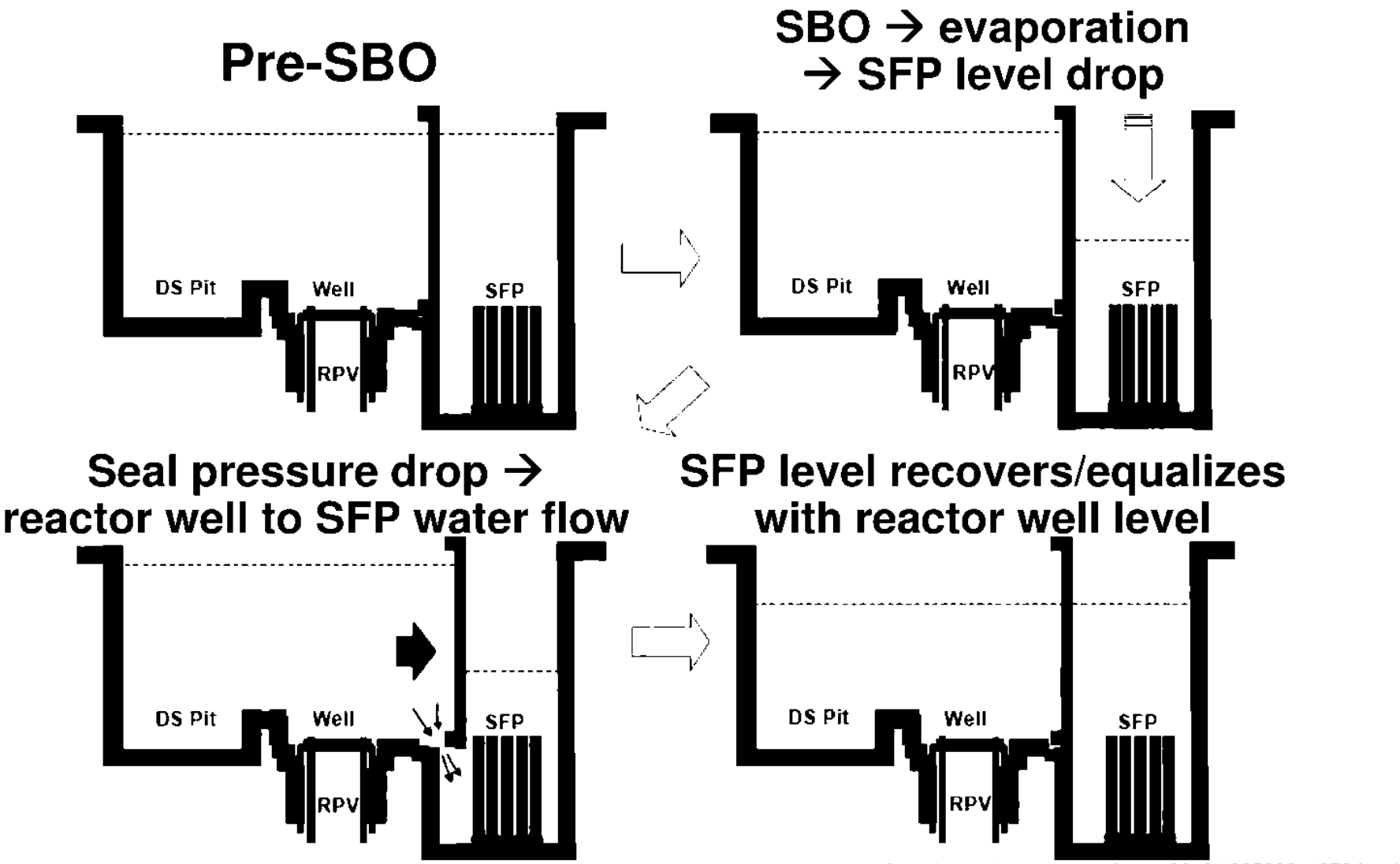
Stable closed-cycle cooling from 7/31/2011

Unit 4 SFP: Reconstruction of Events



Lowest water level at top of fuel rack +1.5 m at around April 20, 2011

Unit 4 SFP: Reconstruction of Events (cont'd)



www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Water from reactor well flowed into SFP during the event

Unit 4 SFP: Water Chemistry

Radio Nuclide	Half Life	Concentration (Bq/cm^3)					
		Unit 4 SFP				*Unit 4 SFP*	*Unit 4 T/B*
		4/12/2011	4/28/2011	5/7/2011	8/20/2011	*3/4/2011*	*3/24/2011*
Cs-134	2 years	88	49	56	44	*ND*	*31*
Cs-137	30 years	93	55	67	61	*0.13*	*32*
I-131	8 days	220	27	16	ND	*ND*	*360*

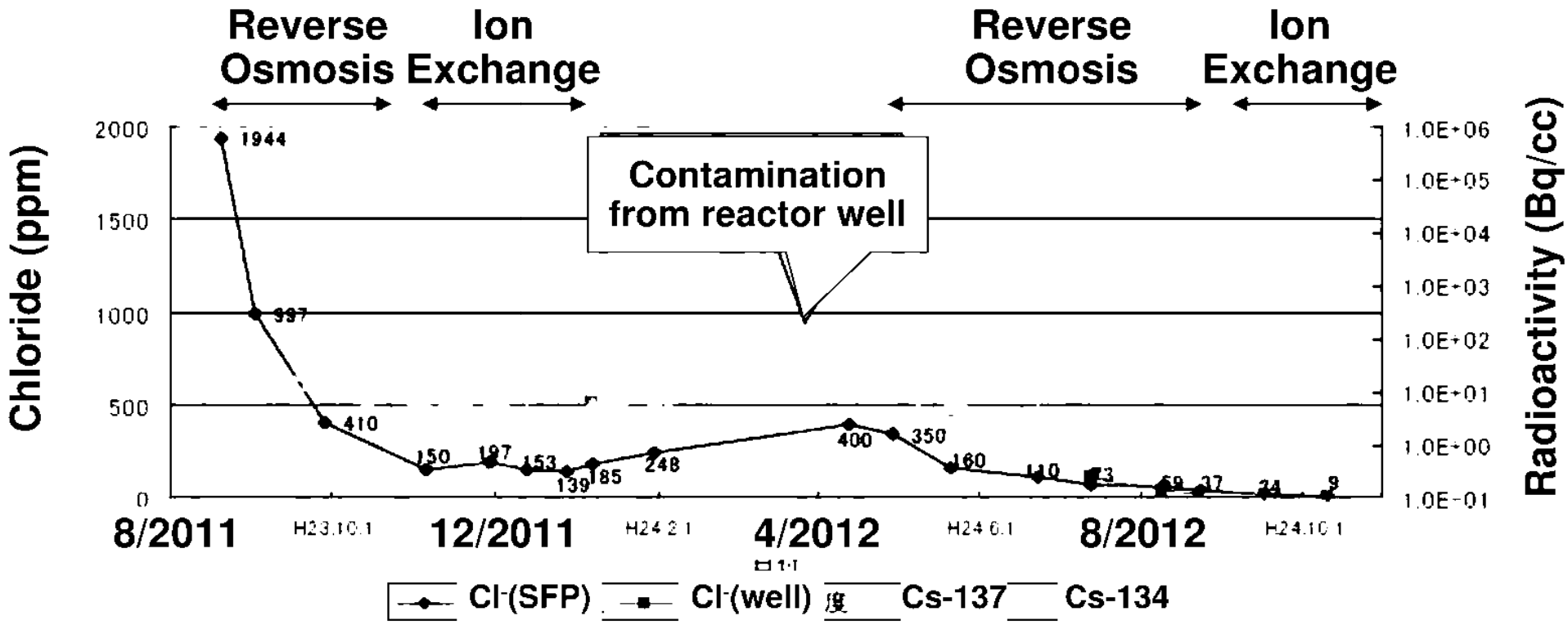
http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

	4/12/2011	8/20/2011	11/29/2011	9/16/2012
Chloride (ppm)	6000	1944	197	24

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m120924_05-j.pdf

- I-131 most likely to have originated from other reactors, not SFP (all fuels >4 months after shutdown)
- Injection of hydrazine for anti-corrosion and microbe prevention

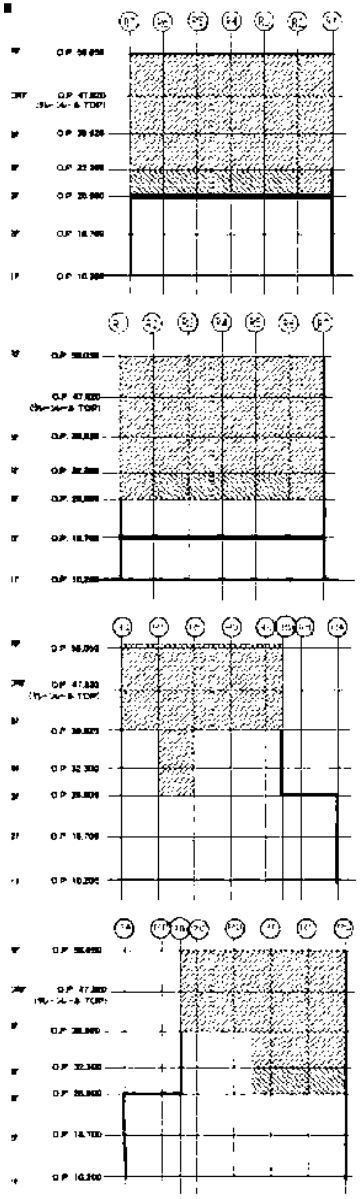
Unit 4 SFP: Water Chemistry (cont'd)

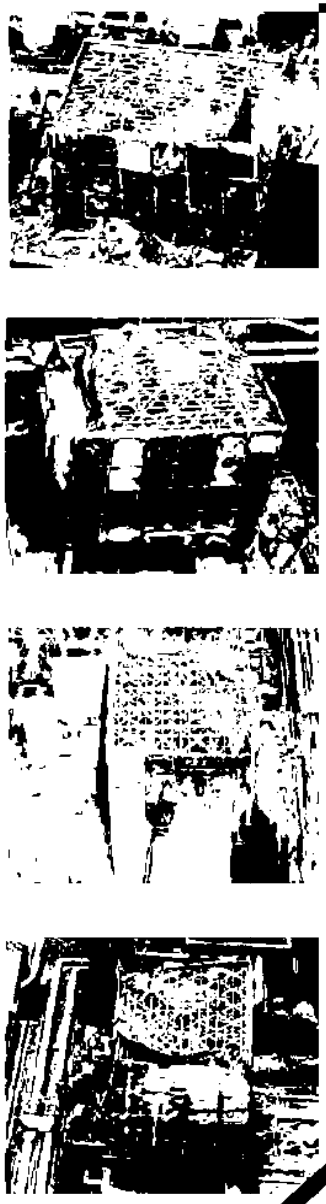


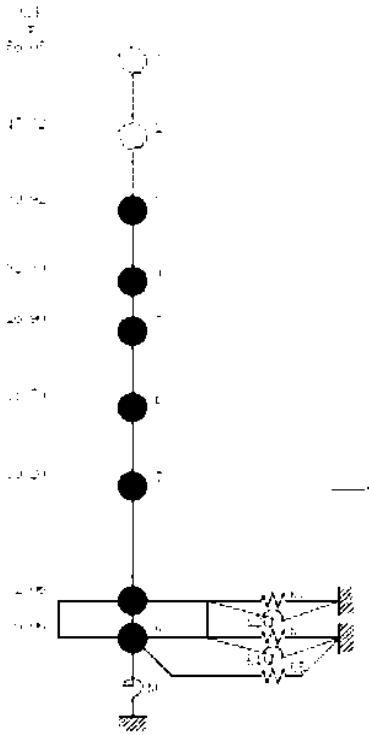
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/m121022_05-j.pdf

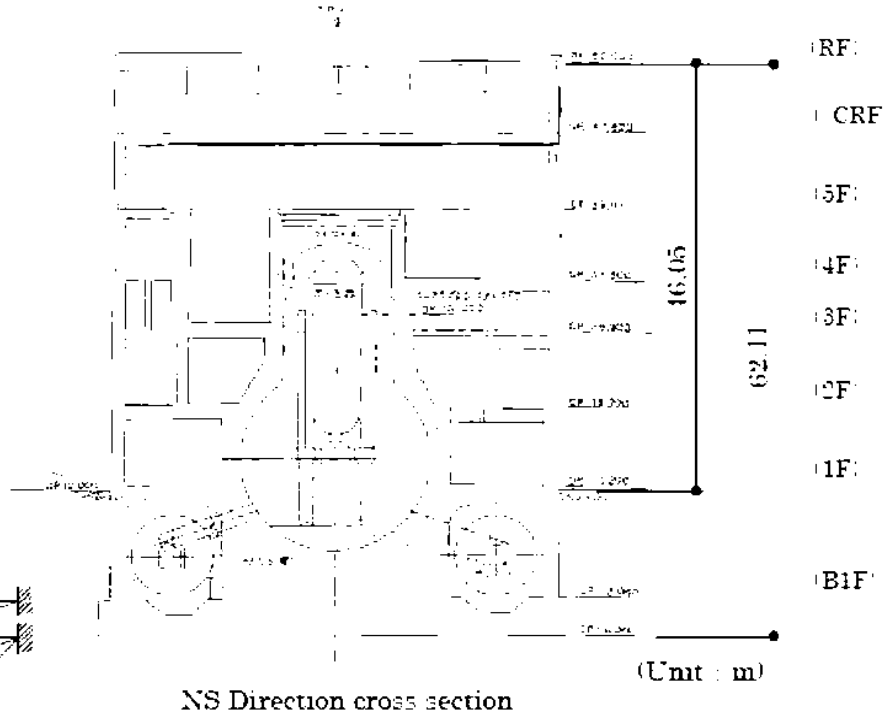
Water quality steadily improved

Unit 4 SFP: Structural Integrity Assessment









NS Direction cross section

Seismic Response Model Incorporating Damaged Condition

http://www.tepco.co.jp/en/press/corp-com/release/11052801-e.html

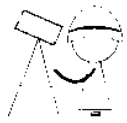
Shear strain from design-basis earthquake confirmed to be within safety limit (5/28/2011)

Structural Damage Assessment

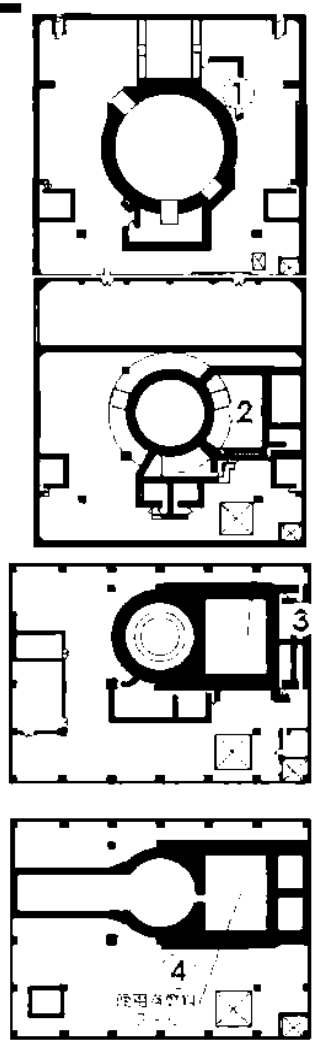
TOKYO ELECTRIC POWER COMPANY

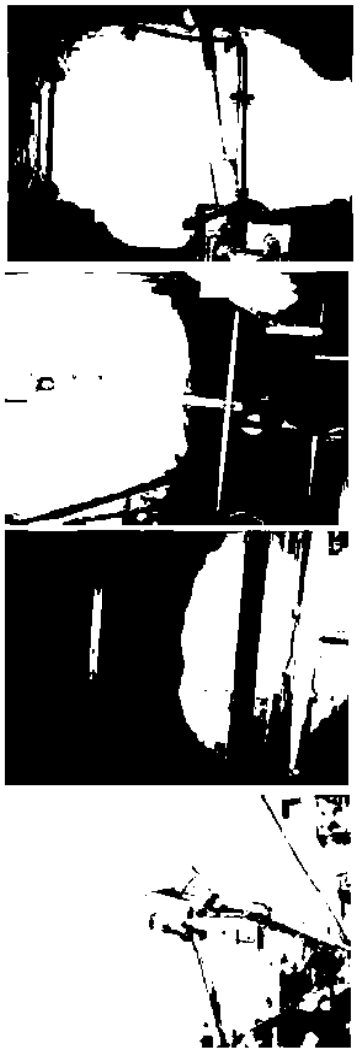
Unit 4 SFP: Structural Integrity Assessment (cont'd)

Optical Measurement
Confirmed No Tilting



Schmidt Hammer Testing
Confirmed Concrete Strength





R/B 1st Floor

R/B 2nd Floor

R/B 3rd Floor

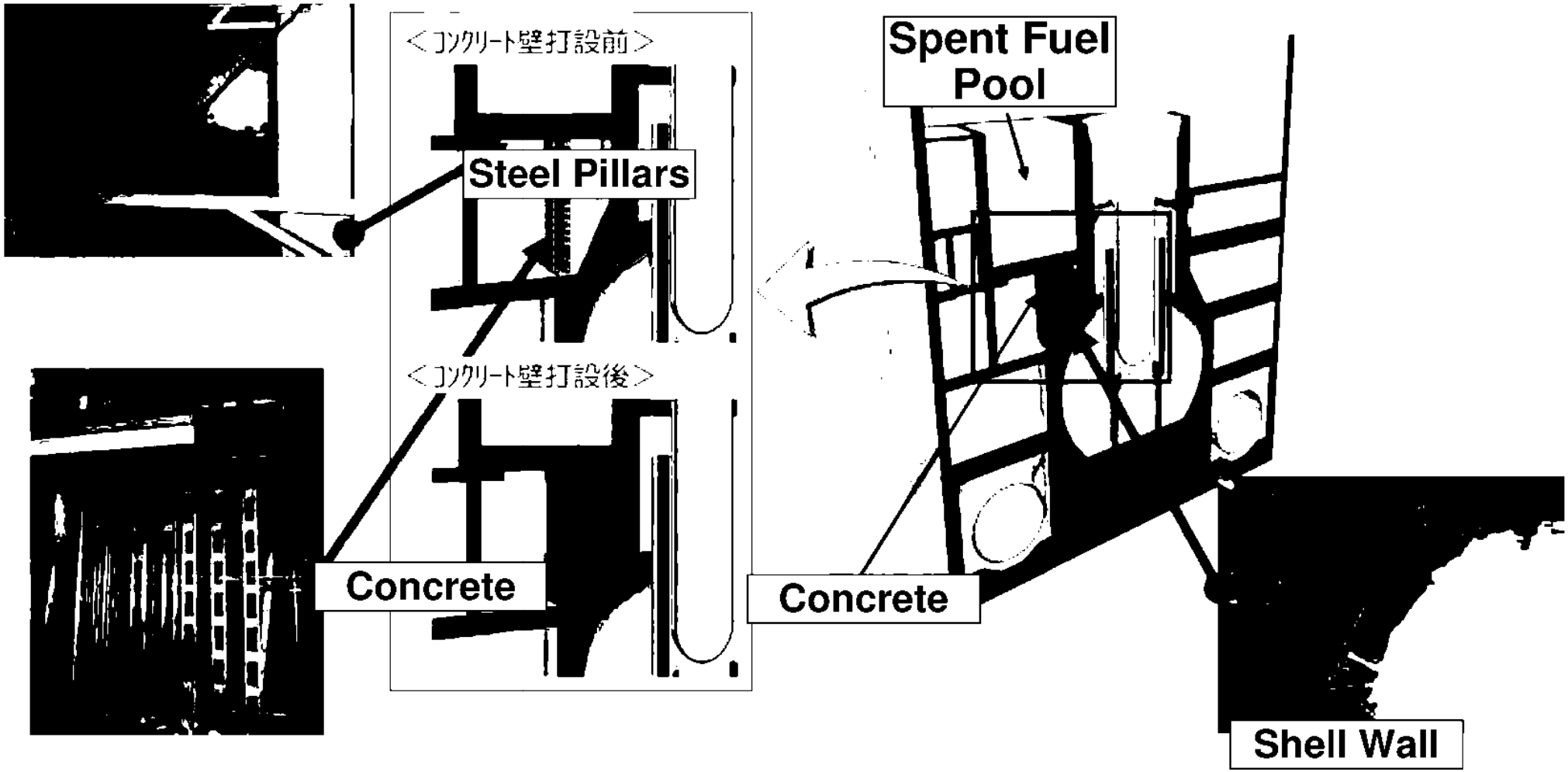
R/B 4th Floor

No Cracks found in SFP Outer Walls

http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120525_07-j.pdf

Quarterly structural integrity inspection found no issues (since 5/25/2012)

Unit 4 SFP: Structural Integrity Reinforcement



http://www.tepco.co.jp/nu/fukushima-np/images/handouts_120516_07-j.pdf

Additional seismic margin by 20% (7/30/2011)

Unit 4 SFP: Progress To Date

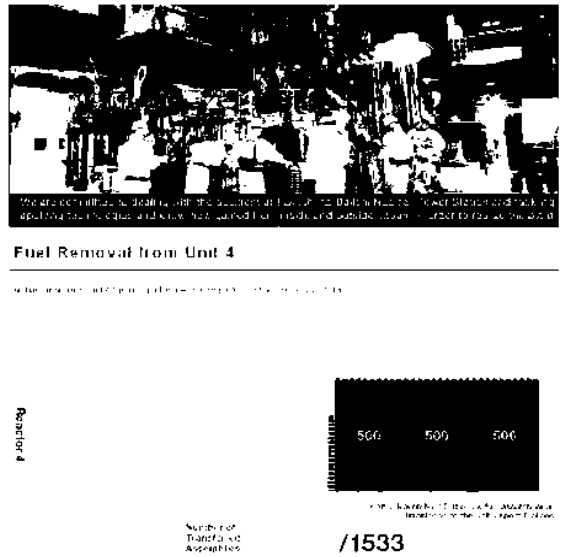
Pre-work Condition
(9/22/2011)

Drywell Head Removal
(8/10/2012)

Defueling Structure
Construction (1/14/2013)

Completion of Defueling
Structure (7/20/2013)

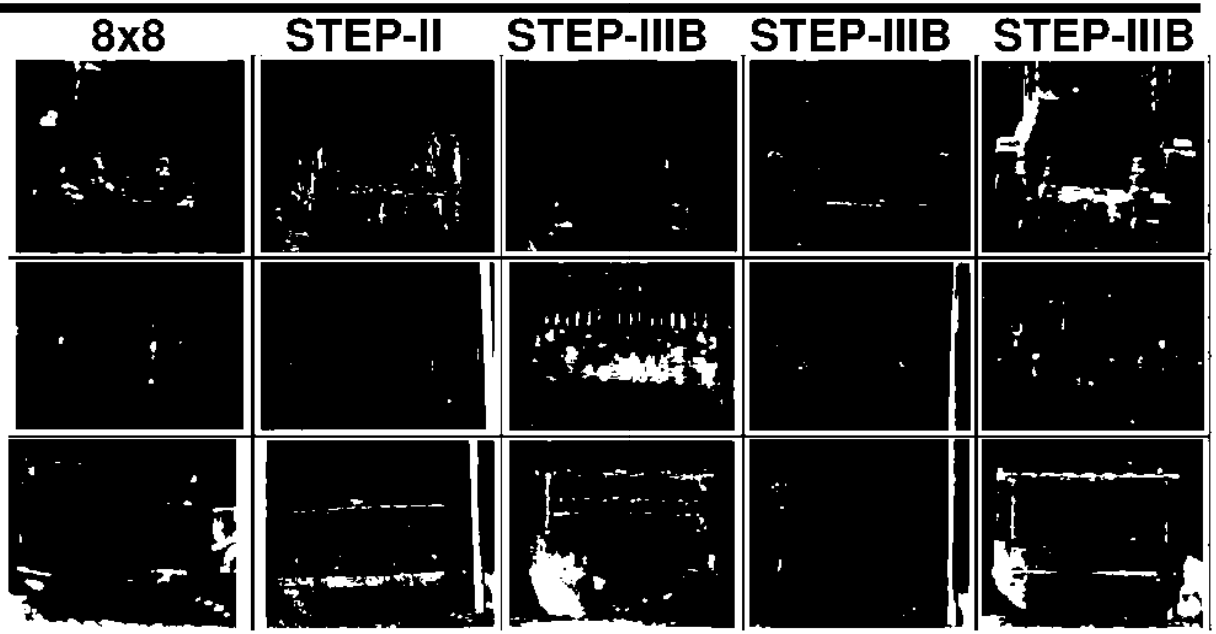
Beginning of Defueling
(11/18/2013)



http://www.tepco.co.jp/en/decommision/index-e.html

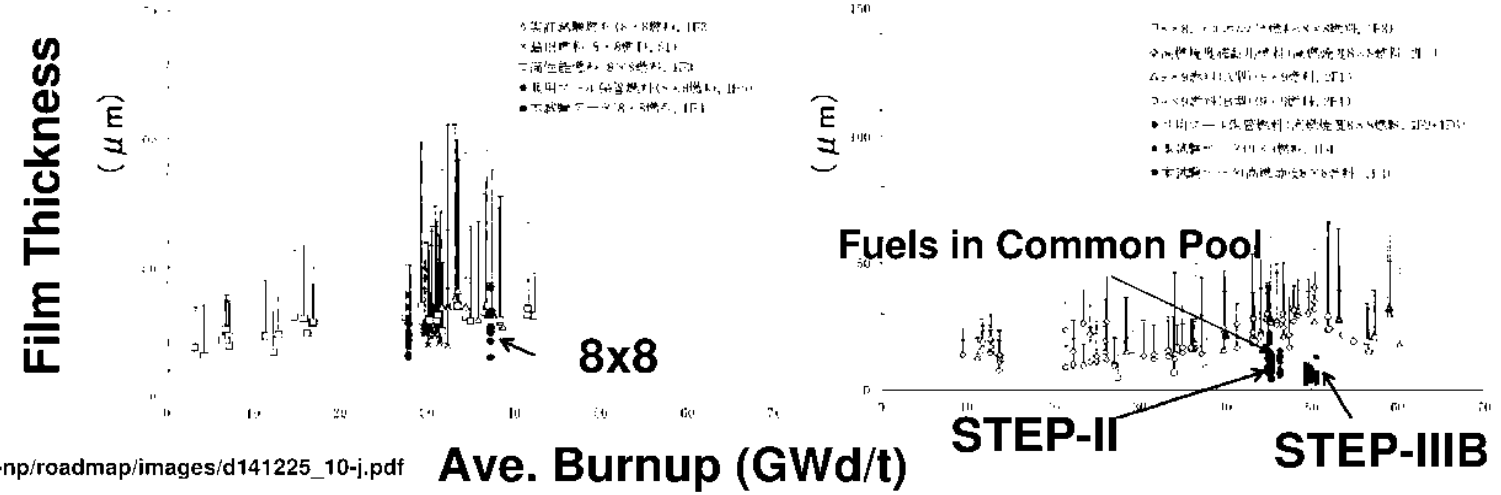
Successful removal of all fuels from SFP (12/22/2014)

Unit 4 SFP: Inspection of Spent Fuels



Visual Inspection

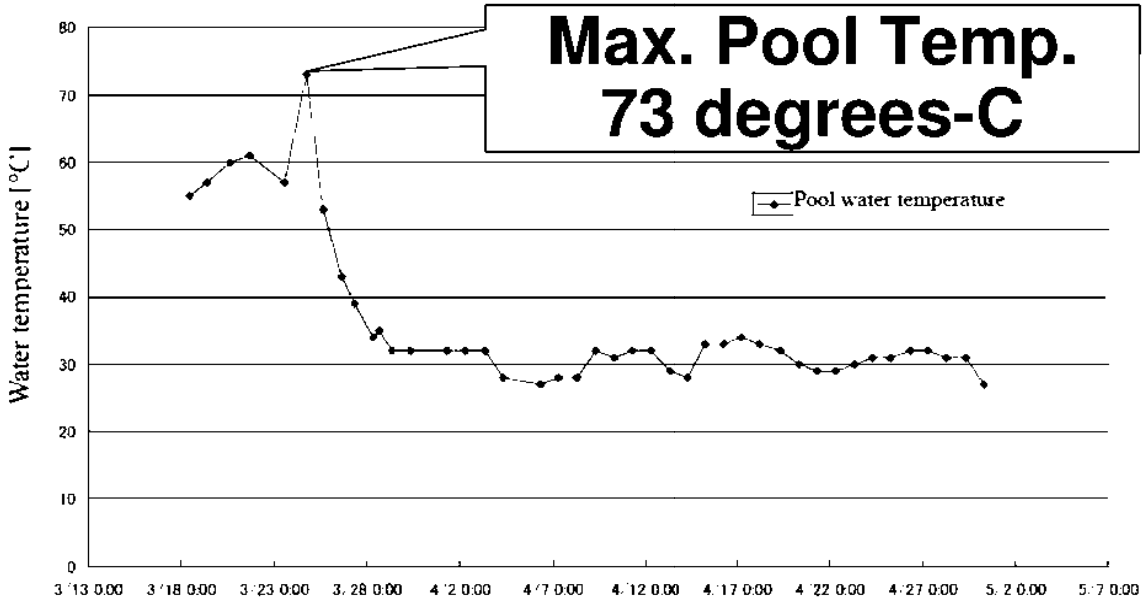
Oxidization Film Thickness Measurement

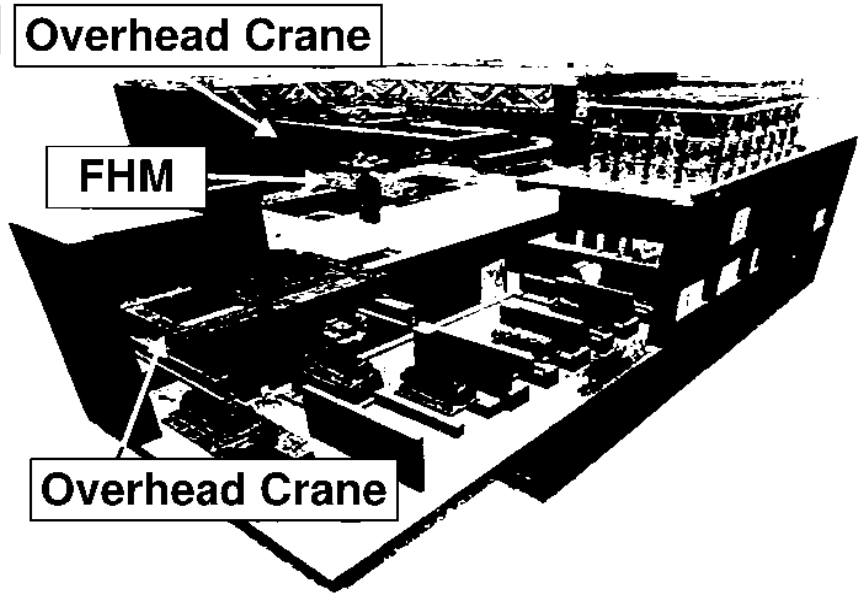


http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

Inspection of five spent fuels from Unit 4 SFP showed no abnormalities (Nov. 2014)

Common Pool



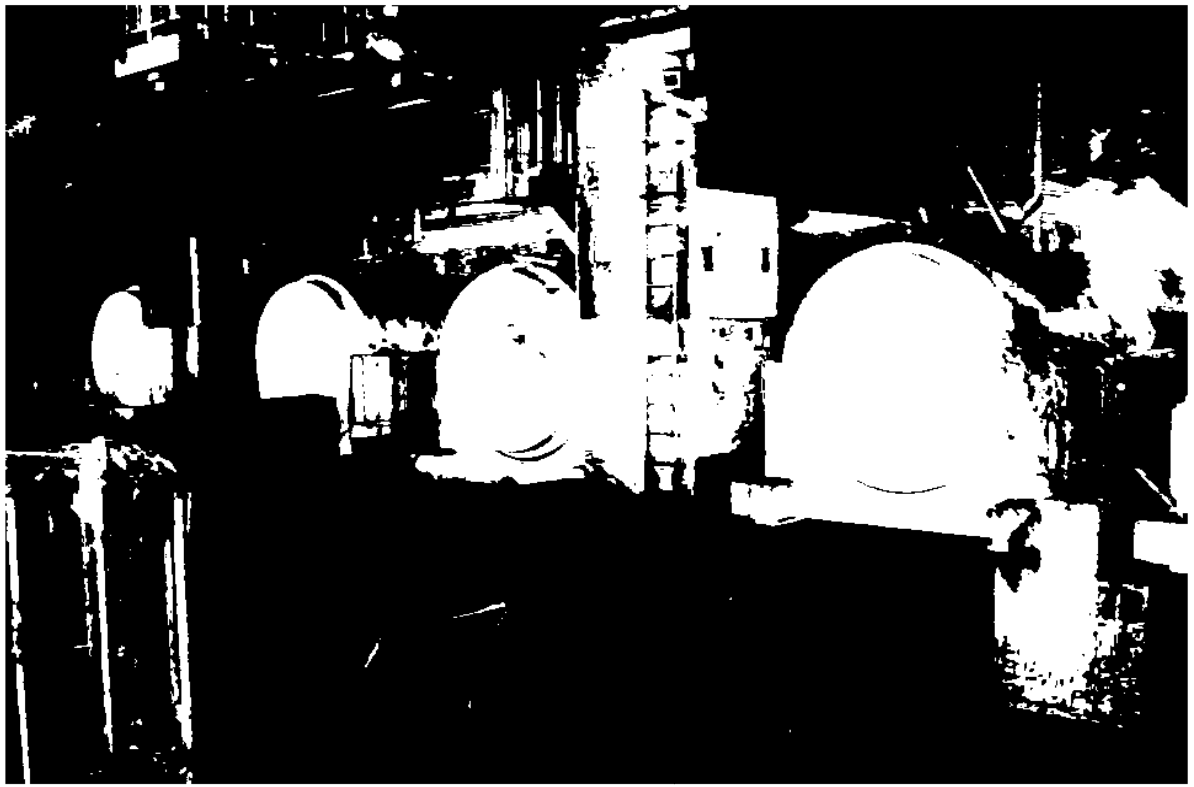


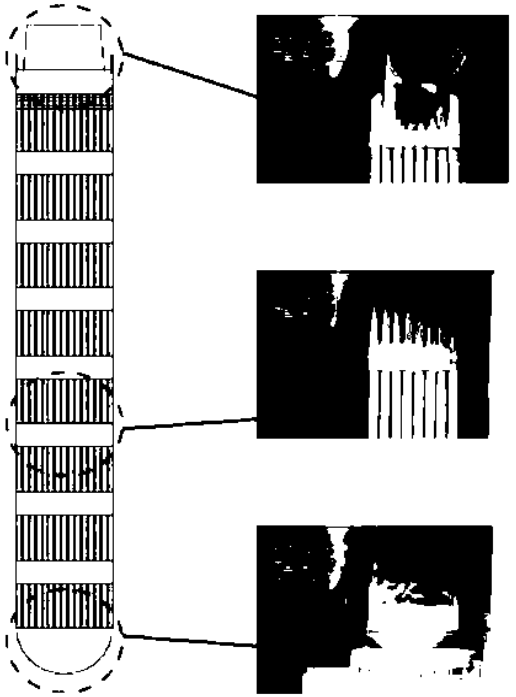
- 3/18/2011: Confirmed pool water level
- 3/24/2011: Pool cooling restored

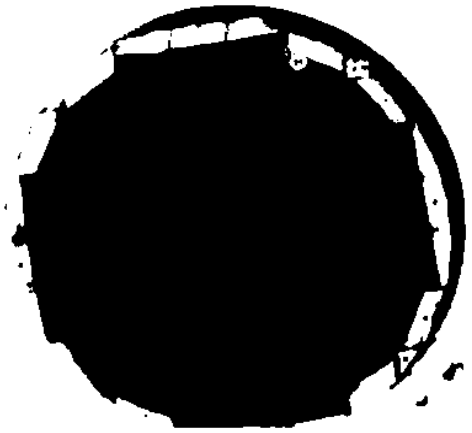
Radio Nuclide	Half Life	Concentration (Bq/cm³)	
		Common Pool	
		5/13/2011	*2/10/2011*
Cs-134	2 years	0.17	*ND*
Cs-137	30 years	1.2	*ND*
I-131	8 days	ND	*ND*

http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html

Dry Cask Storage Facility





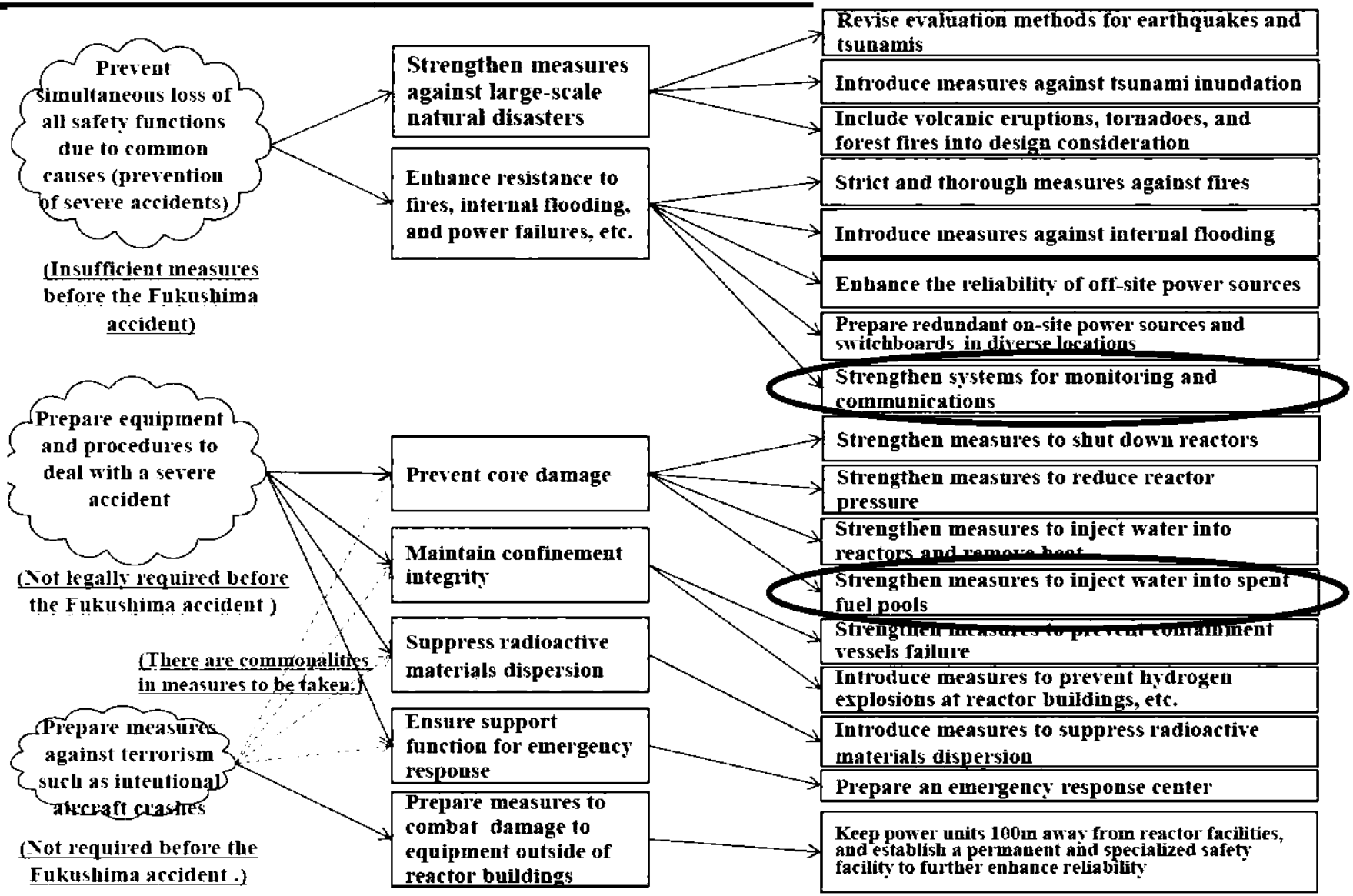


No Damage of Fuel Bundles or Basket

Inspection results of all 9 dry casks showed no abnormalities (5/30/2013)

http://www.meti.go.jp/earthquake/nuclear/pdf/130530/130530_03gg.pdf

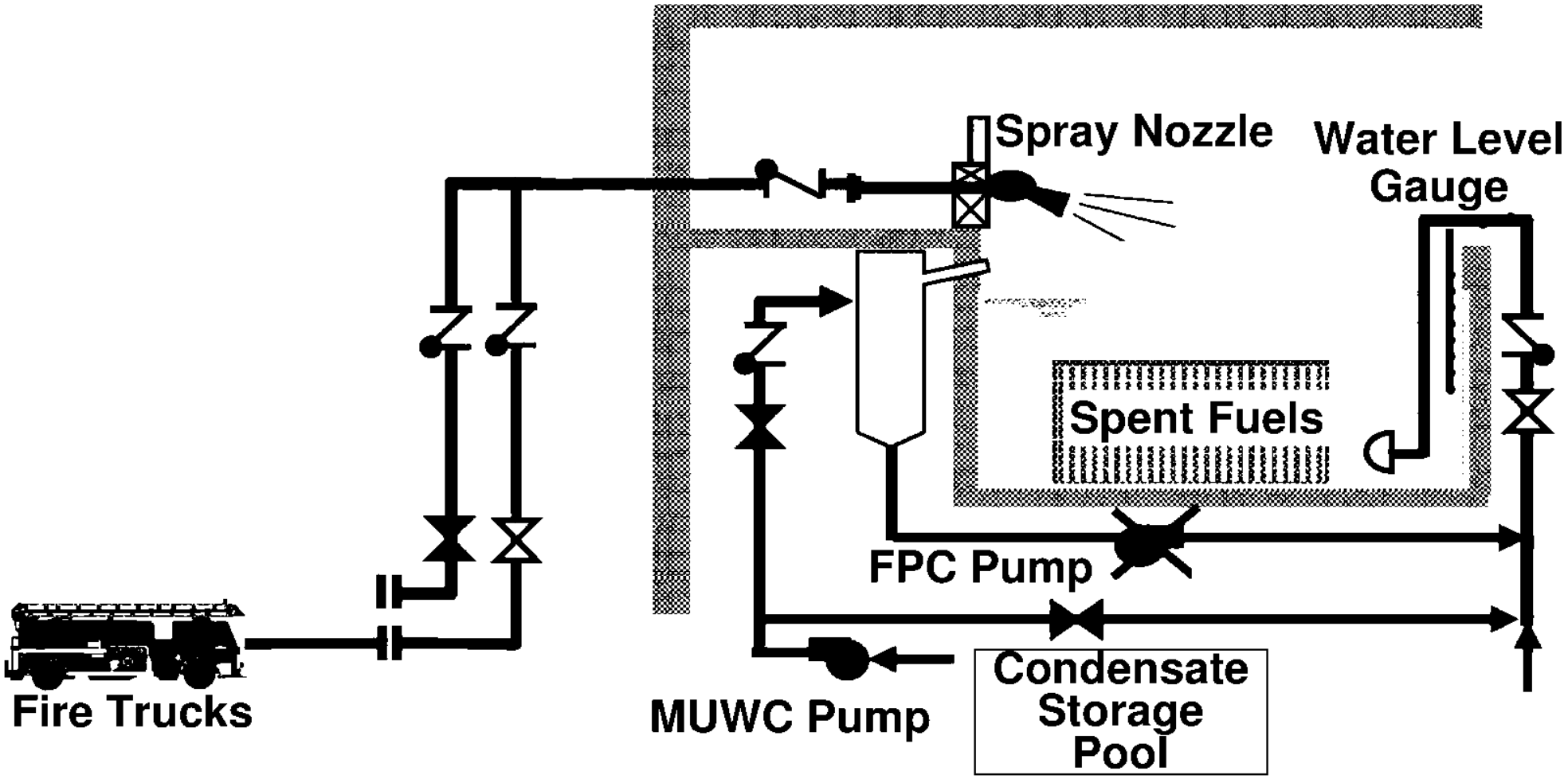
New Regulatory Requirements



http://www.nsr.go.jp/english/e_news/data/13/0912.pdf

Japan Nuclear Regulation Authority enacted new regulatory requirements effective July 2013

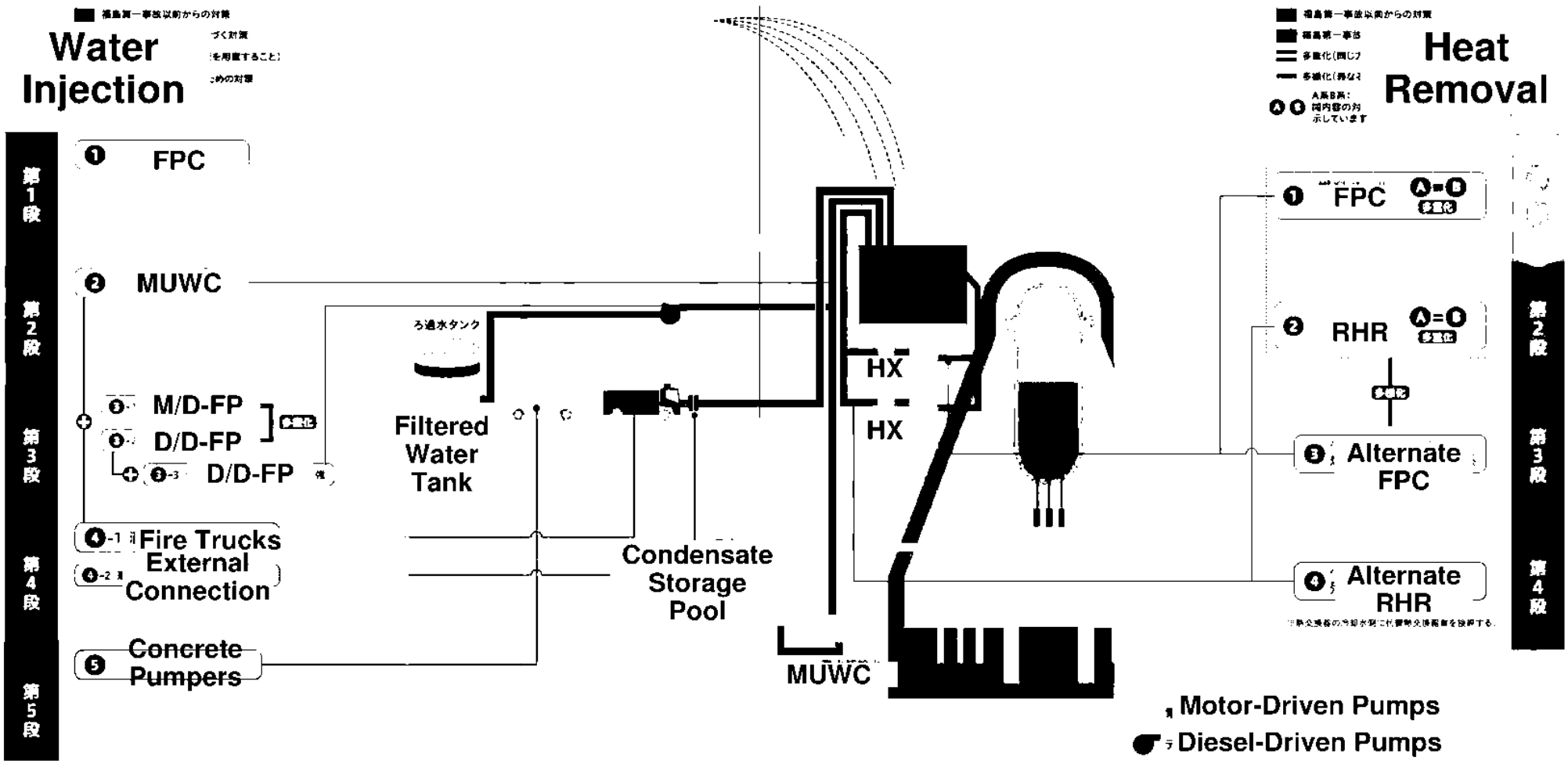
Safety Enhancements at Kashiwazaki Kariwa NPS



www.nsr.go.jp/activity/regulation/tekigousei/shinsa/data/kk67/mendan/20131015_01shiryo_01.pdf

Fixed and flexible alternate injection systems with multiple backup power and water sources

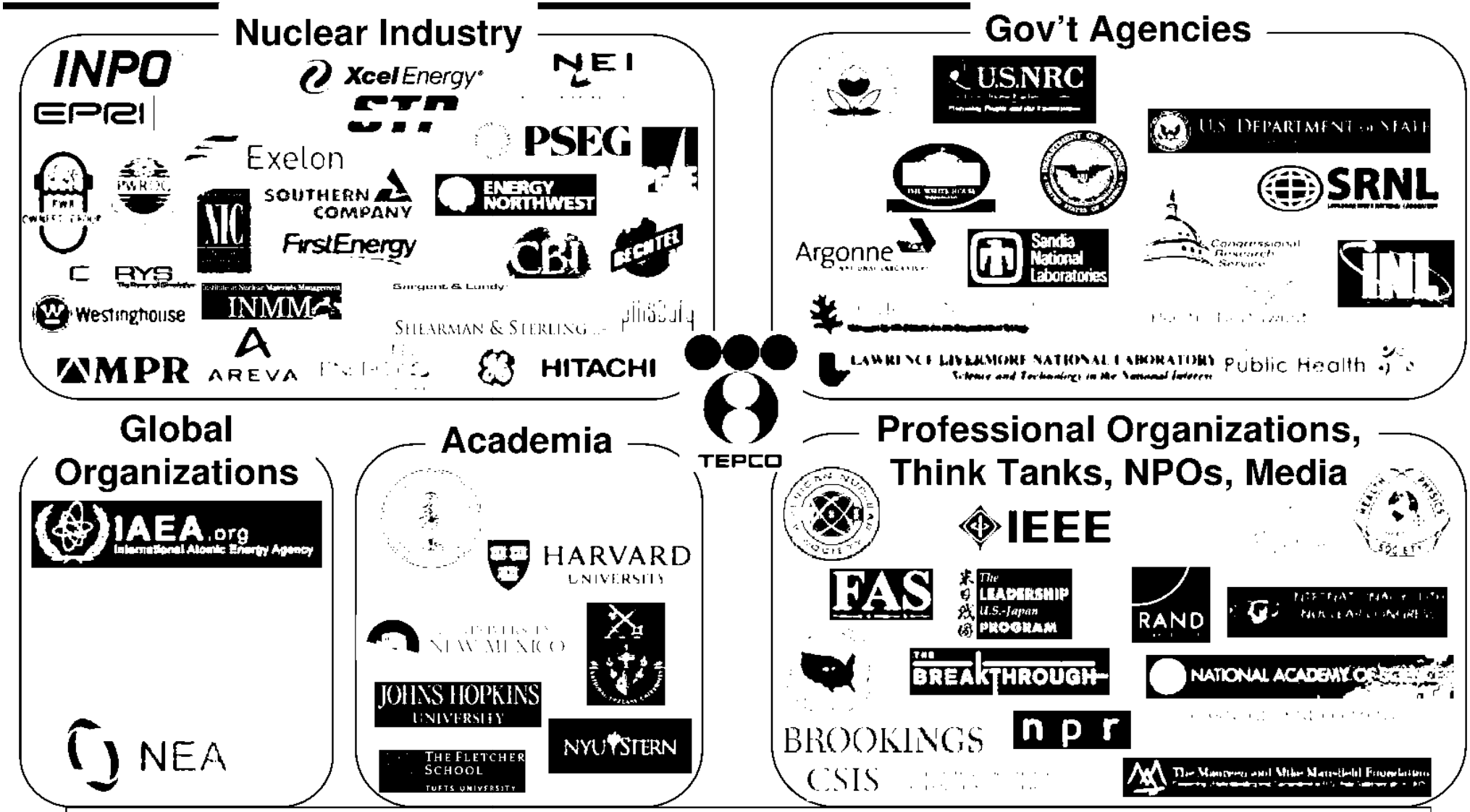
Safety Enhancements at Kashiwazaki Kariwa NPS (cont'd)



http://www.tepco.co.jp/en/nu/kk-np/safety/index-e.html

Multiple layers of defense
(only showing safety measures related to SFP)

TEPCO's Post-Accident Activities in the U.S.



Committed to sharing lessons learned; making nuclear power plants safer; carrying out decommissioning safely

→ Hosting Weekly Update Teleconferences

References

- **TEPCO Website on Decommissioning Status**
  http://www.tepco.co.jp/en/decommision/index-e.html

- **TEPCO Internal Investigation Committee Report (6/20/2012)**
  http://www.tepco.co.jp/en/press/corp-com/release/2012/1205638_1870.html
  - ✓ **Main Body**
    http://www.tepco.co.jp/en/press/corp-com/release/betu12_e/images/120620e0104.pdf
  - ✓ **Attachment**
    http://www.tepco.co.jp/en/press/corp-com/release/betu12_e/images/120620e0106.pdf

- **IRID Symposium (7/18/2014)**
  http://www.irid.or.jp/en/reports/symposium/
  - **Current Status of Fukushima Daiichi**
    http://irid.or.jp/wp-content/uploads/2014/07/Sympo_Masuda_E.pdf
  - **R&D Projects Related to Fuel Debris Retrieval**
    http://irid.or.jp/wp-content/uploads/2014/07/Sympo_SSuzuki_E.pdf

資料１－１

発電所内のモニタリング状況等について

平成27年1月30日

東京電力株式会社

東京電力

TEPCO

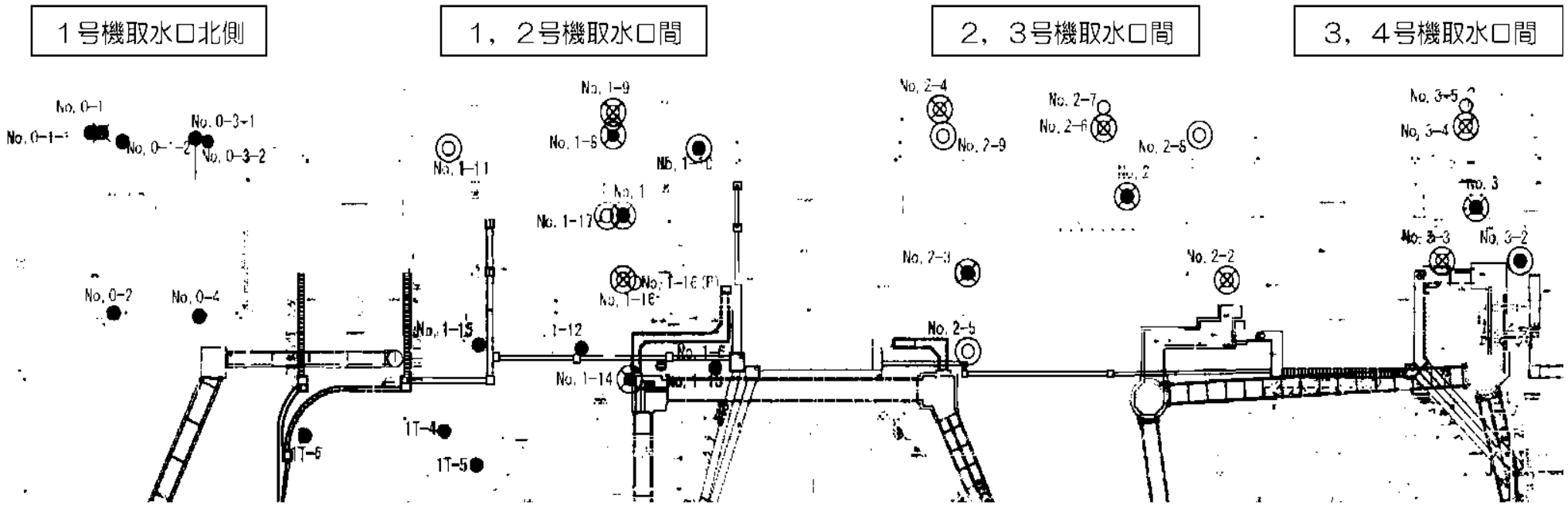
資料目次

（１）港湾内・外および地下水の分析結果について

（２）地下水バイパスの運用状況について

（１）港湾内・外および地下水の分析結果について

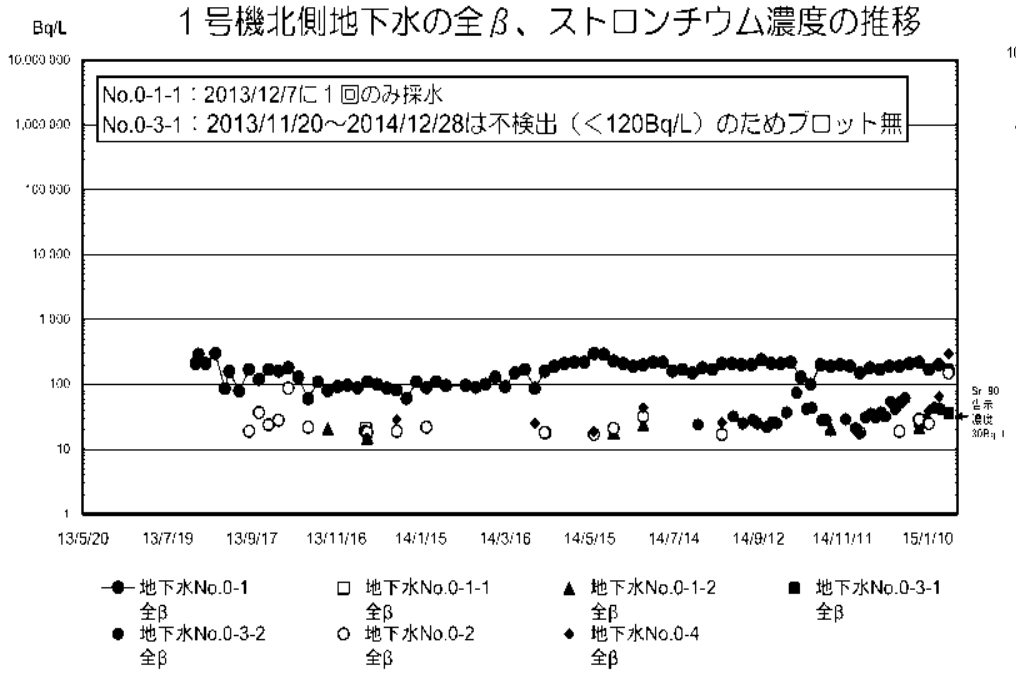
タービン建屋東側の地下水観測孔の位置

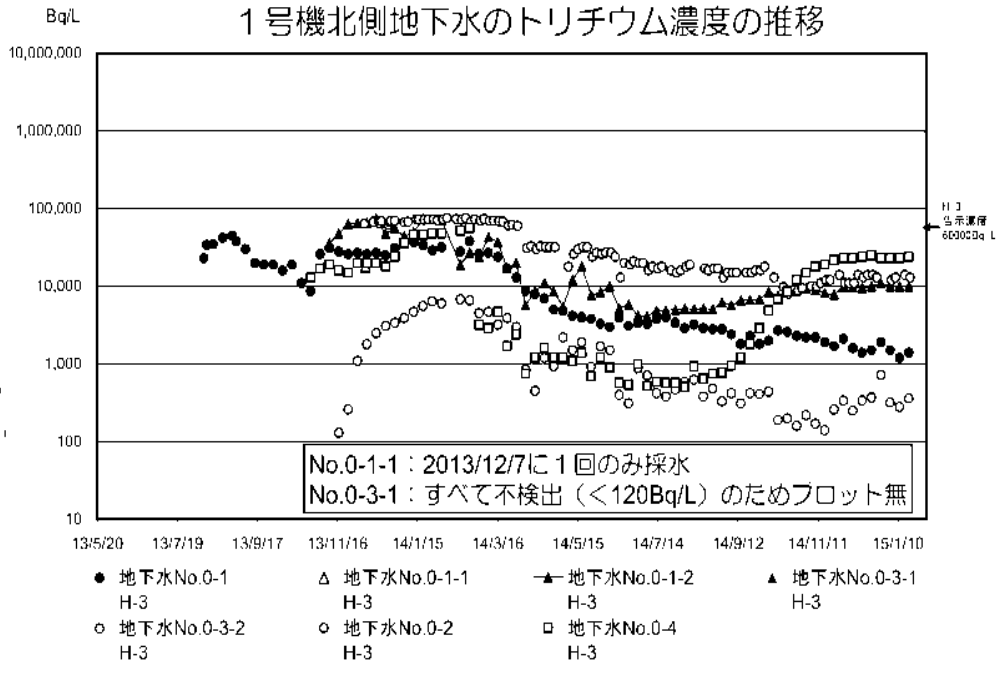


タービン建屋東側の地下水濃度の状況＜1号機取水口北側エリア＞

○エリア全体にトリチウム（H-3）濃度が高く、最も高濃度であった海側のNo.0-3-2で地下水の汲み上げを継続中（1m^3／日）。

○昨年９月以降、No.0-4のトリチウム濃度が再度上昇傾向であったが、昨年初め頃の濃度の半分程度で横ばい状態。当面監視を継続する。





タービン建屋東側の地下水濃度の状況＜1,2号機取水口間エリア＞

○ 昨年 11/10より、ウェルポイントの全β、セシウムの濃度が上昇。また、地盤改良とウェルポイントの間に位置するNo.1-8のトリチウム濃度が上昇。ウェルポイント改修及び地盤改良工事の関係で、汲み上げ量及び汲み上げ位置を変更した影響と考えられる。現在は徐々に低下。

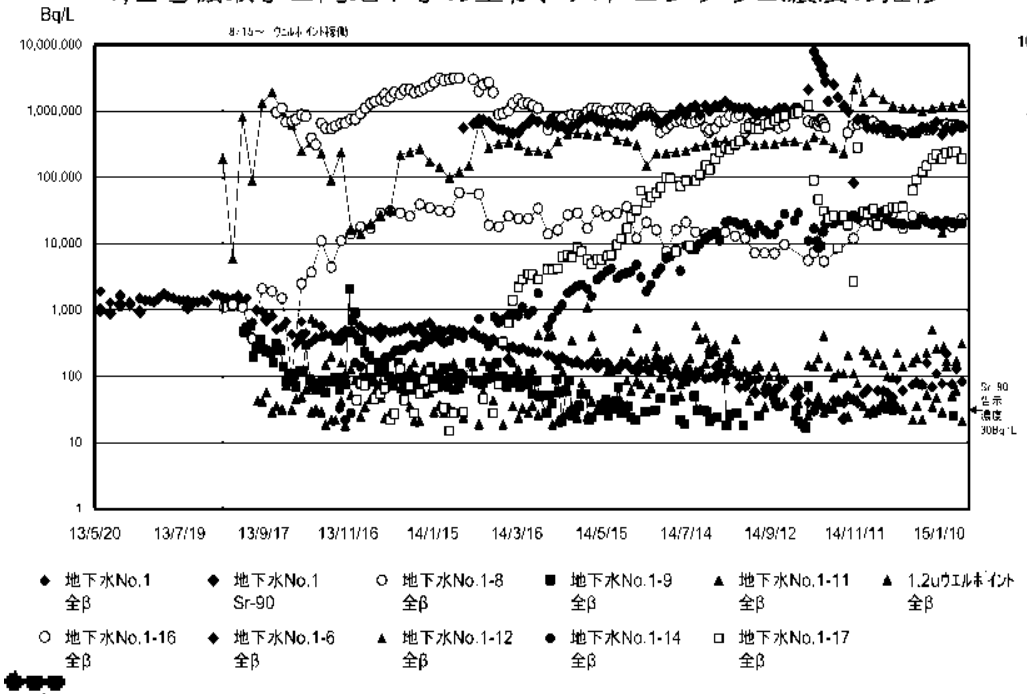
○ また、台風後に低下していたNo.1-17の全βが再度上昇。

○ 1/12に、No.1-12のセシウム、全βが急上昇（Cs-137：7.8→470、全β：260→15,000 Bq/L）したが、翌日にはほぼ上昇前の濃度に低下。上昇した濃度は、周辺の観測孔No.1-14と同程度であり、一時的に通常と異なる流れで地下水が流入した可能性がある。

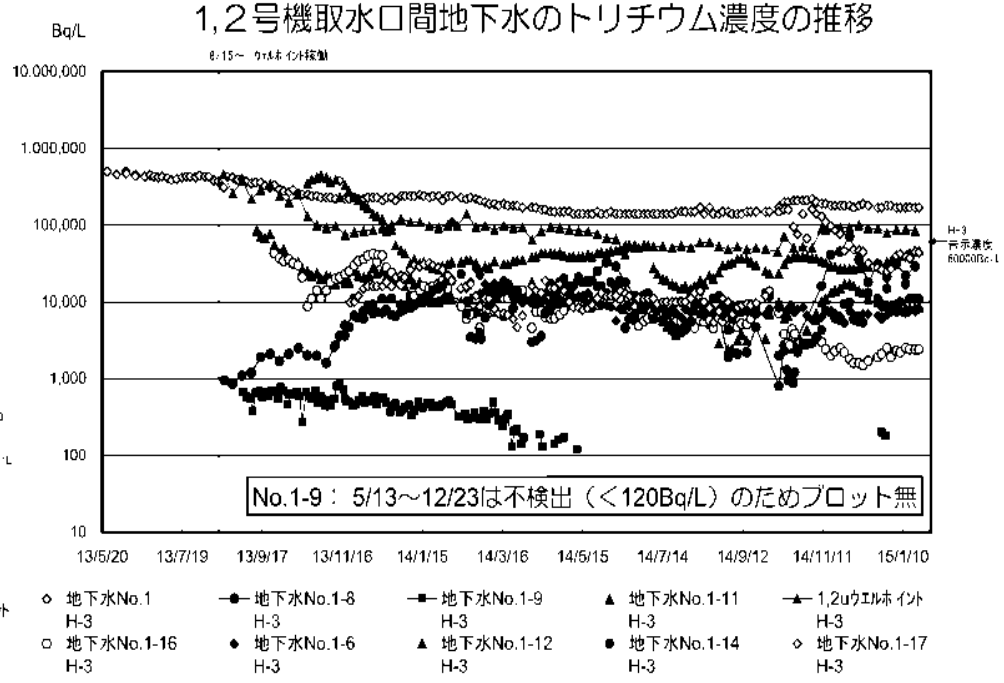
○ 地盤改良の外側に位置するNo.1-9の濃度は特に変動は無く、外部への影響は無いものと考えられる。

○ 引き続き、ウェルポイント及びNo.1-16(P)での汲み上げを継続し、外部への流出防止に努める。

1,2号機取水口間地下水の全β、ストロンチウム濃度の推移



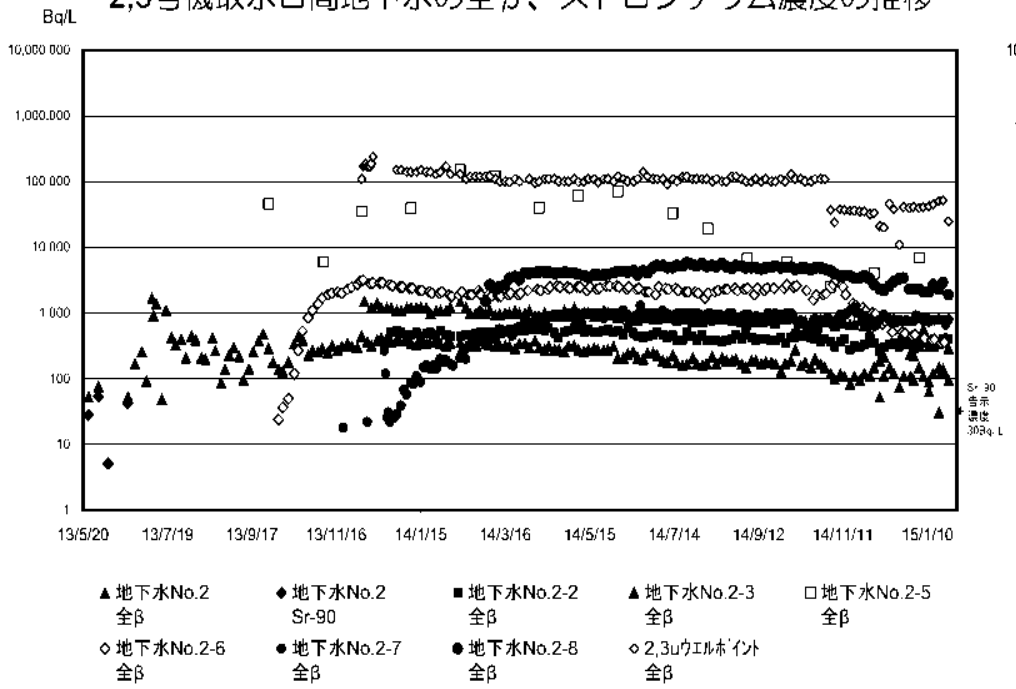
1,2号機取水口間地下水のトリチウム濃度の推移



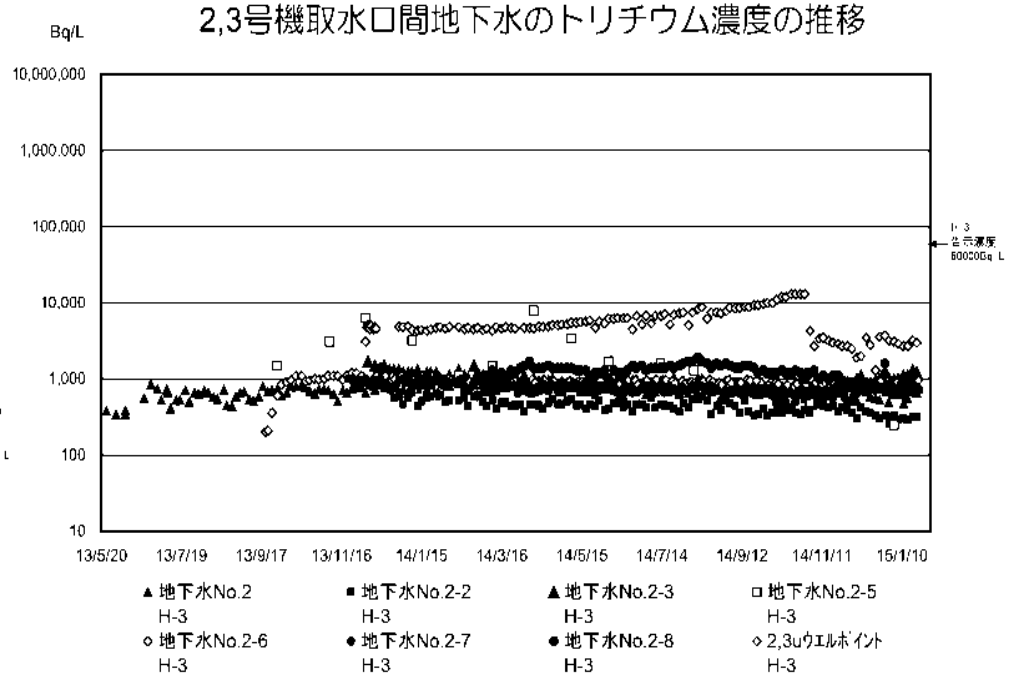
タービン建屋東側の地下水濃度の状況＜2,3号機取水口間エリア＞

- ○ 2,3号機取水口間は、北側（２号機側）で放射性物質濃度が高い状況のため、ウェルポイントによる地下水汲み上げを継続中。
- ○ １月より、ウェルポイント改良工事及び地盤改良の上部処理を施工中（次ページ参照）。
- ○ 工事による影響は見られておらず、地盤改良外側の観測孔（No.2-7）では、全β、トリチウムともに1,000Bq/L程度で横ばい状態であり十分低い状況。
- ○ その他の井戸も、放射性物質濃度は横ばい又は低下傾向で、大きな変化はみられていない。
- ○ 引き続き監視を継続し、異常が見られる場合にはウェルポイントの運用等対応を検討する。

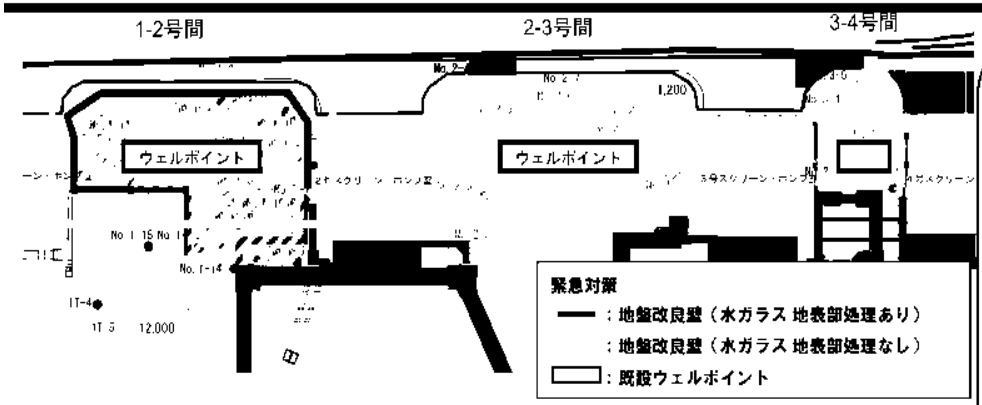
2,3号機取水口間地下水の全β、ストロンチウム濃度の推移

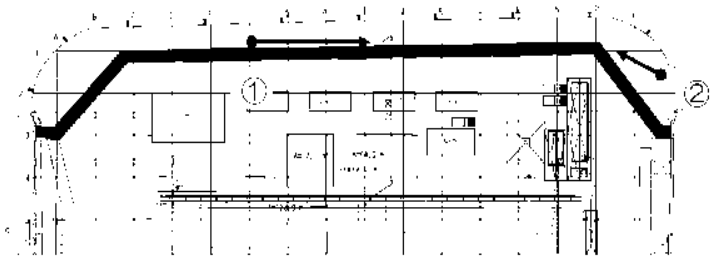


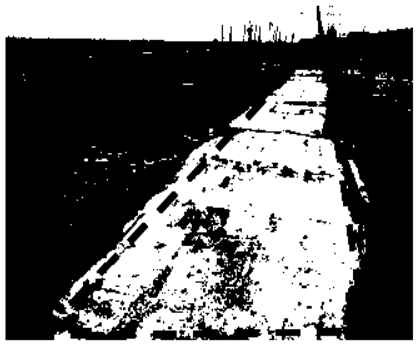
2,3号機取水口間地下水のトリチウム濃度の推移



地盤改良壁の地表処理





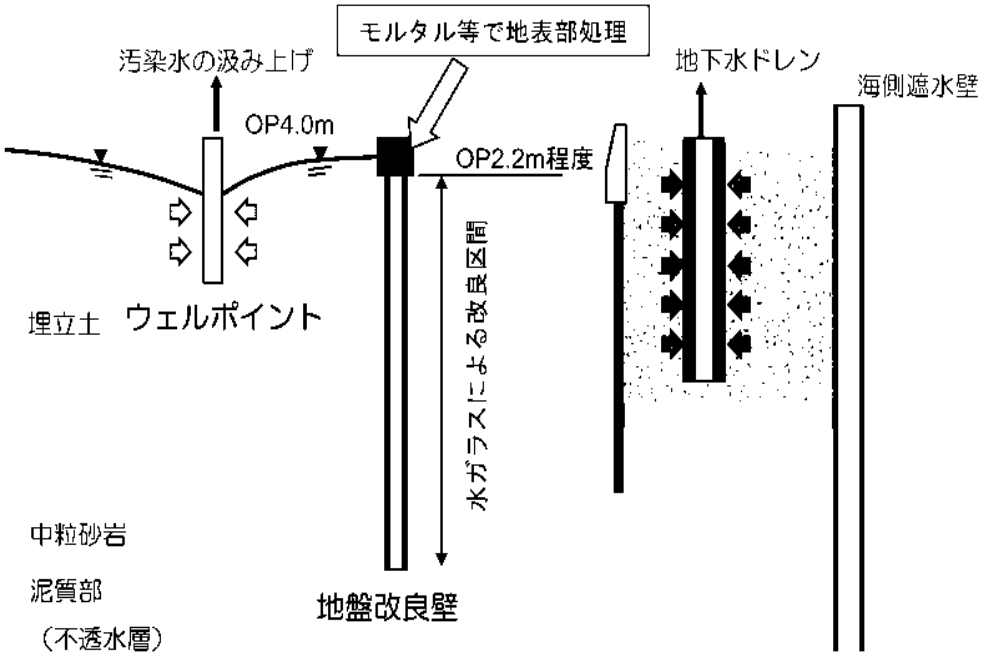


①モルタル置換完了

②モルタル置換施工

1-2号機間改良体天端から地表面までのモルタル置換作業はH26/1に完了。

1-2号間 地盤改良壁の施工状況



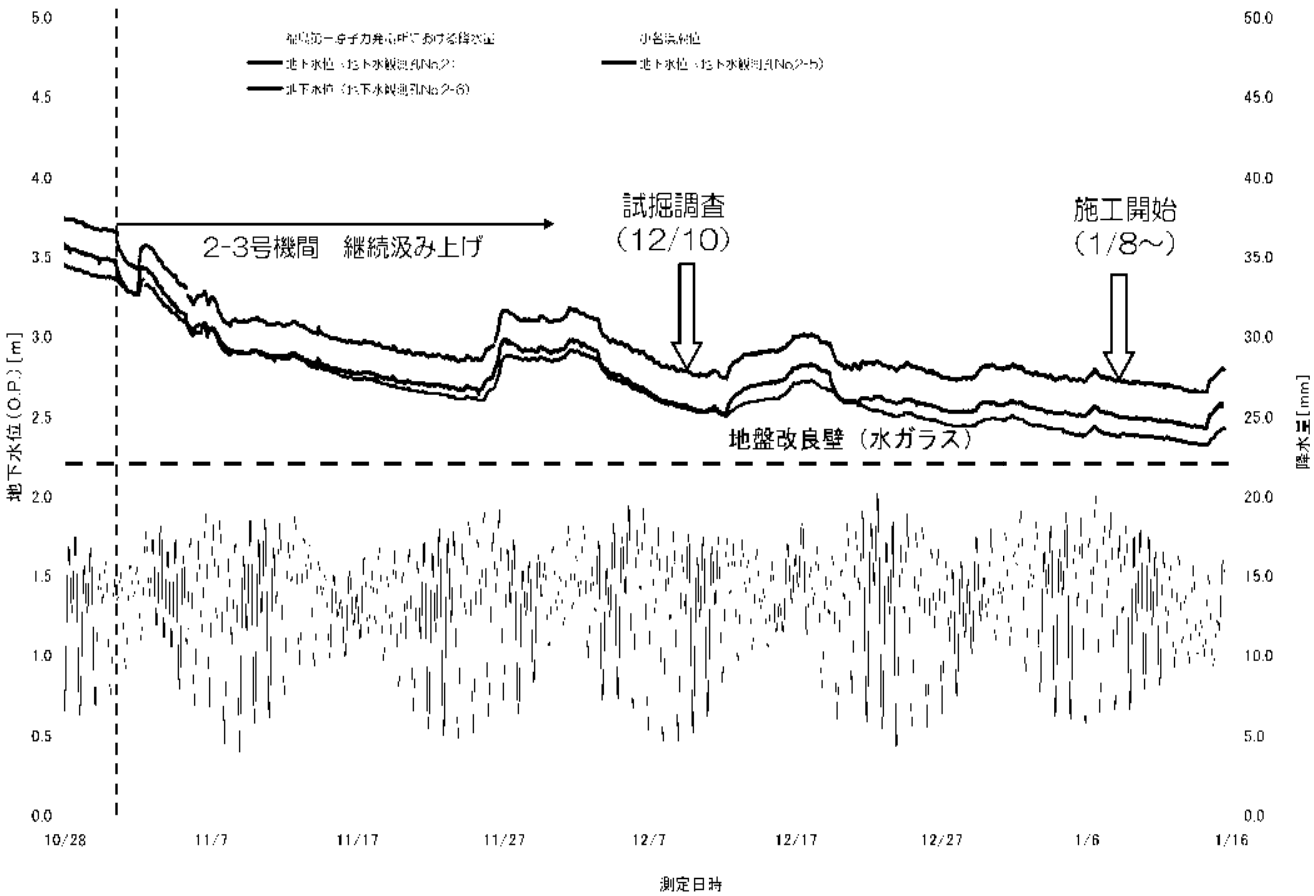
2-3号機間、3-4号機間では、地盤改良壁の天端がOP2.2m程度。地下水の越流を防止するため、1-2号機間と同様に地表部の処理を実施する。

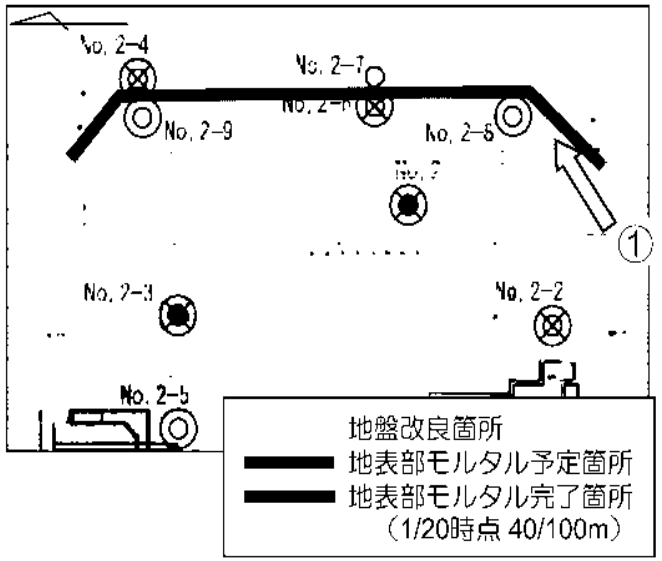
2-3号機間の施工（掘削）にあたっては、当該箇所の地下水位を低下させる必要がある。そのため、10月末より1-2号機間の地下水汲み上げ量を抑制し、2-3号機間の汲み上げ量を増加させることで地下水位を低下させている。

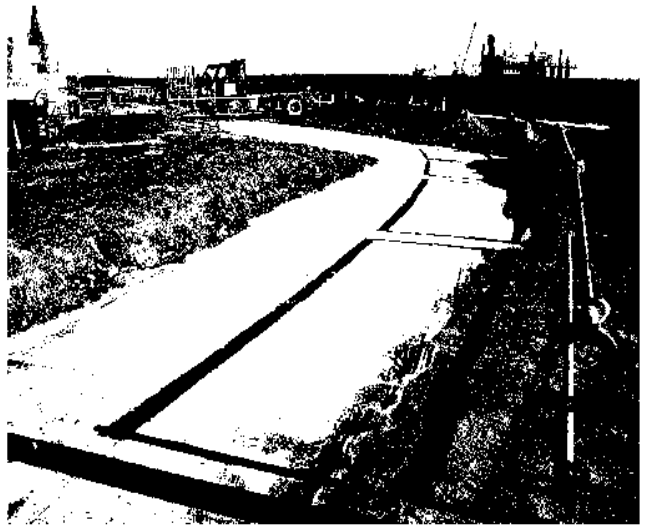
3-4号機間については、2-3号機間の施工（地盤改良壁の地表部処理、ウェルポイント改修工事）に引き続き、年度末までを目途に実施する予定。

地盤改良壁の地表処理

2,3号機間 地盤改良壁の地表処理の状況







① 地表部処理完了箇所
(H27/1/20)

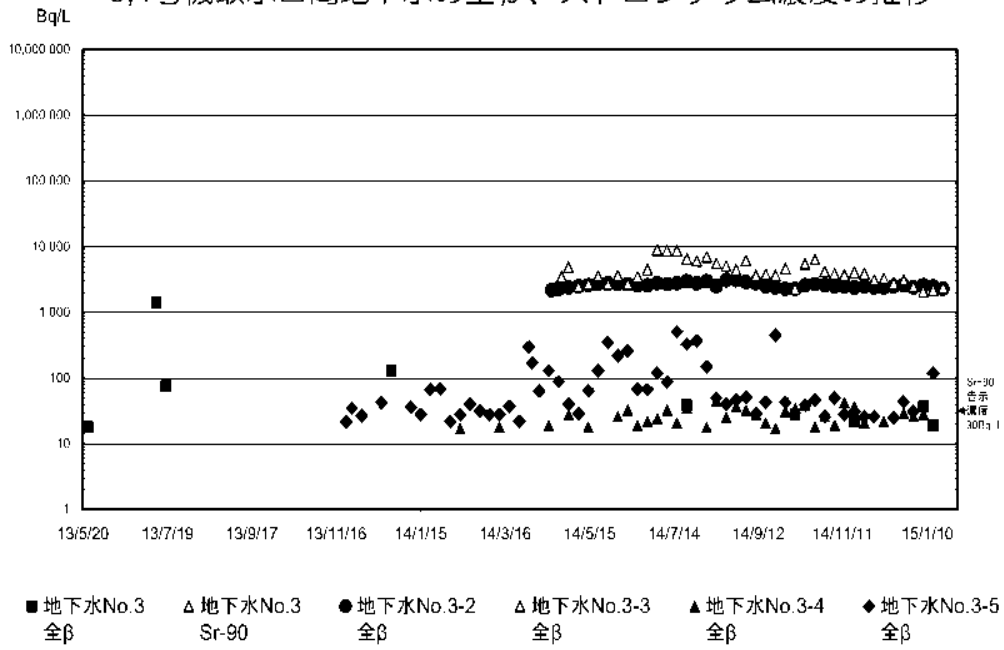
2-3号機間の地盤改良壁地表部工事他のため、ウェルポイントを連続汲み上げとして地下水位を低下させている（10月末～）。試掘調査で施工可能性を確認した後、1/8より地表部のモルタル置換を開始し、2月上旬に完了の予定。

3-4号機間の地表部処理については、2-3号機間の地盤改良壁の地表部処理ほかに引き続き、年度末を目途に実施する予定。

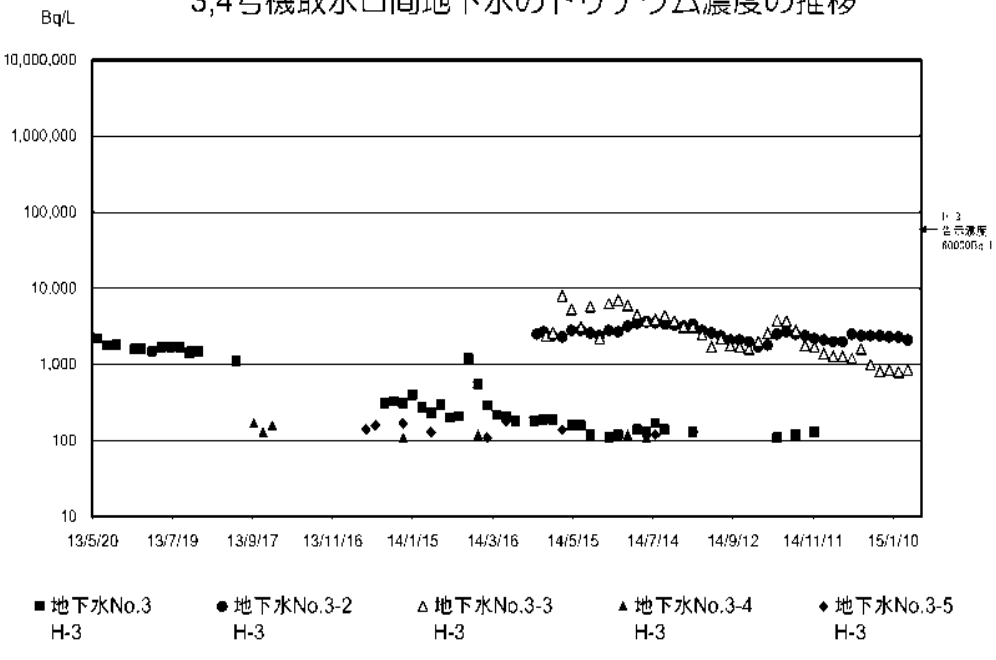
タービン建屋東側の地下水濃度の状況＜3,4号機取水口間エリア＞

○ 3．4号機取水口間は、全体的に地下水濃度は低濃度。
○ 海水トレンチの近傍に設置したNo.3-2、No.3-3は、全β、トリチウム濃度ともに高めであるが、低下傾向。
○ 現時点で、1．2号機間、2．3号機間に比べれば低濃度であり、濃度上昇は見られないが、引き続き監視を継続する。

3,4号機取水口間地下水の全β、ストロンチウム濃度の推移

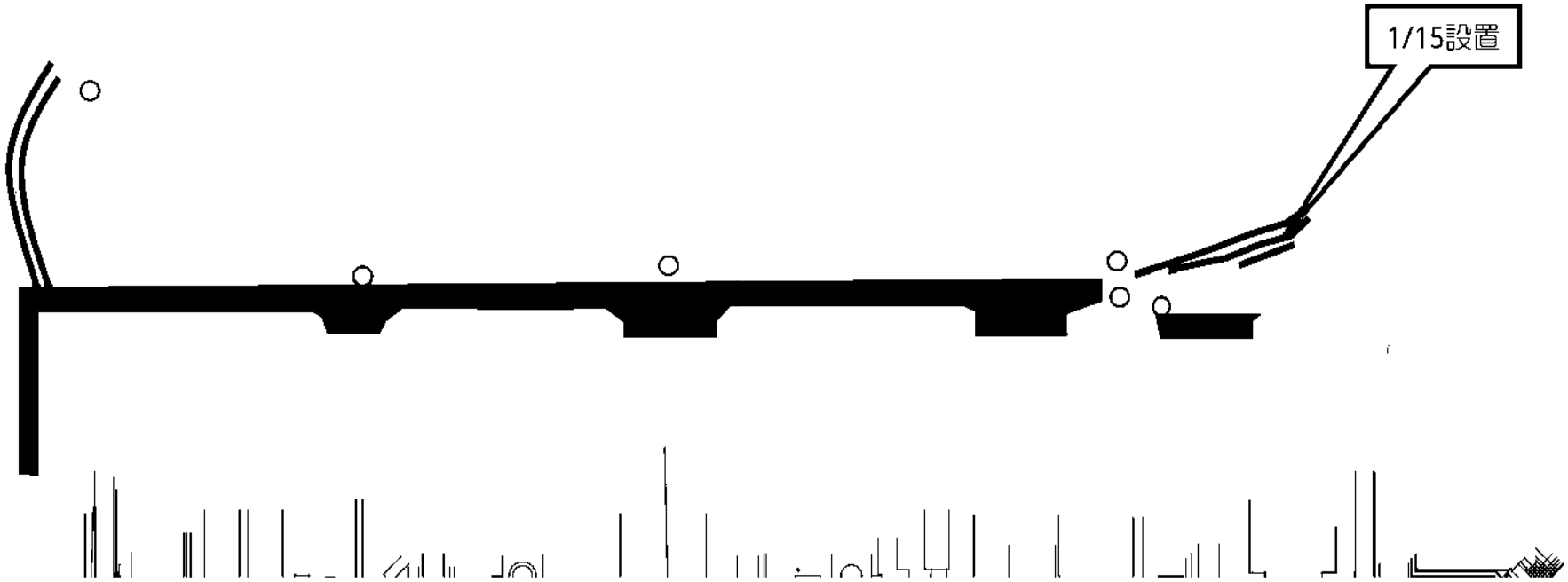


3,4号機取水口間地下水のトリチウム濃度の推移



海水のモニタリング地点図（１～４号機取水口付近）

○ 前回以降、モニタリング地点の追加、削除は無い。
○ 1/15に４号機取水口前の遮水壁開口部近傍にセシウム・ストロンチウム吸着繊維装着カーテン状ネットを設置し、海水浄化を開始。



セシウム・ストロンチウム吸着繊維による海水浄化について

目的

１～４号機取水口付近は、現在もセシウム、ストロンチウム濃度が高いレベル。

昨年度、３号機取水口前に繊維状セシウム吸着材を設置して浄化試験を実施したが、現在はストロンチウムの濃度がセシウムより高い状況。

今年度は、セシウム吸着材に加えてストロンチウム吸着材を併せて、海水中放射能濃度の高い４号機取水口付近に設置し、性能を評価。

評価結果に応じて、設置範囲の拡大等を検討。

■期待される効果

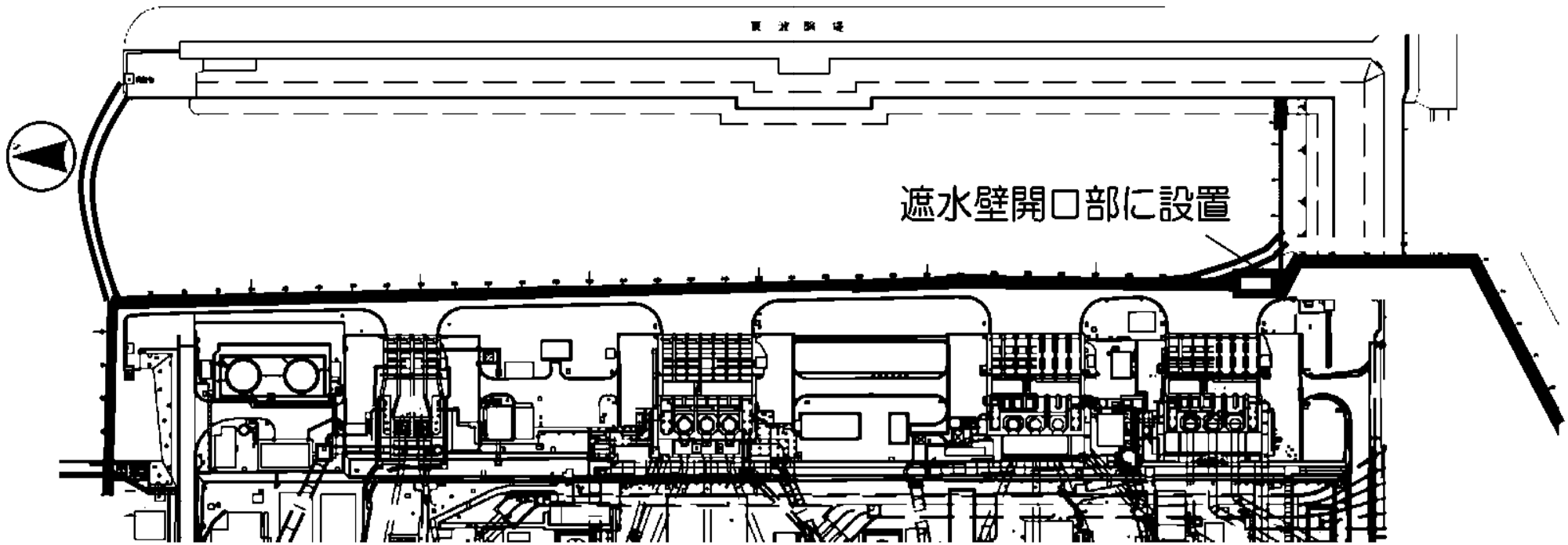
セシウムに加え、ストロンチウムの除去能力について評価し、取水路のセシウム、ストロンチウムの濃度低減につなげる。

海水中の安定化ストロンチウムと放射性ストロンチウムの吸着割合を評価

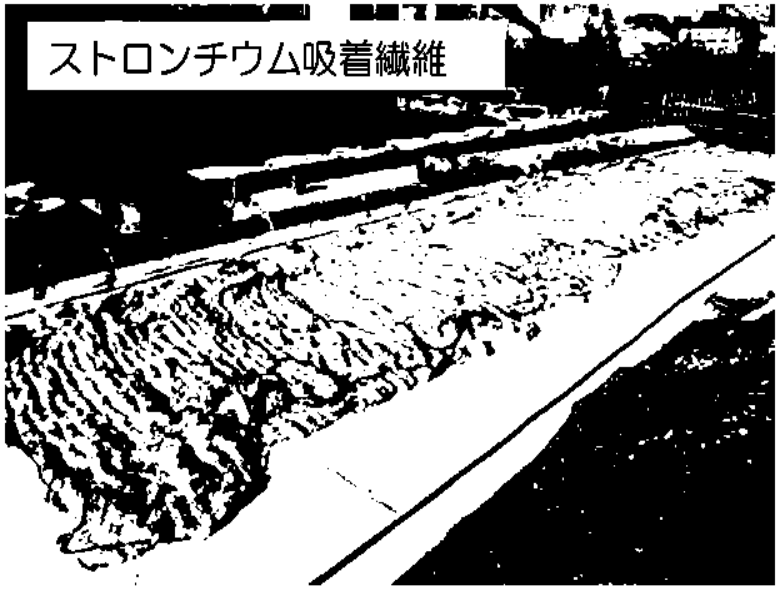
設置場所について(1/2)

・海水中放射能濃度が高く、潮汐による海水の流動が大きい、遮水壁開口部（4号機取水路前）付近に設置

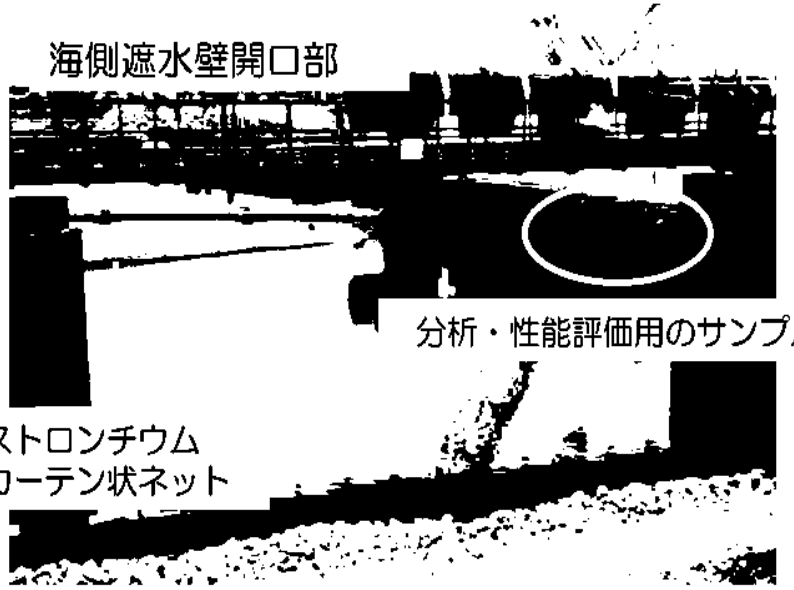
（分析・性能評価用のサンプルも併せて設置）



設置場所について(2/2)



ストロンチウム吸着繊維と
重ね合わせて固定化



分析・性能評価用のサンプル

セシウム・ストロンチウム
吸着繊維装着カーテン状ネット

海水浄化の実施スケジュール

■実施概要

H26年11月20日

・ストロンチウム吸着繊維 （簡易型、１ｍ×１ｍ） を4号機取水路前の遮水壁開口部近傍に設置

（ストロンチウム吸着繊維は実海水中への投入実績がないため先行して実施）

H26年12月～H27年1月

・セシウム・ストロンチウム吸着繊維を取り付けたカーテン状ネット（20ｍ×5ｍ）を遮水壁開口部に設置 （H26年12月: 準備、H27年1月15日: 浸漬）

・分析用として、セシウム・ストロンチウム吸着繊維単体（5m）も設置

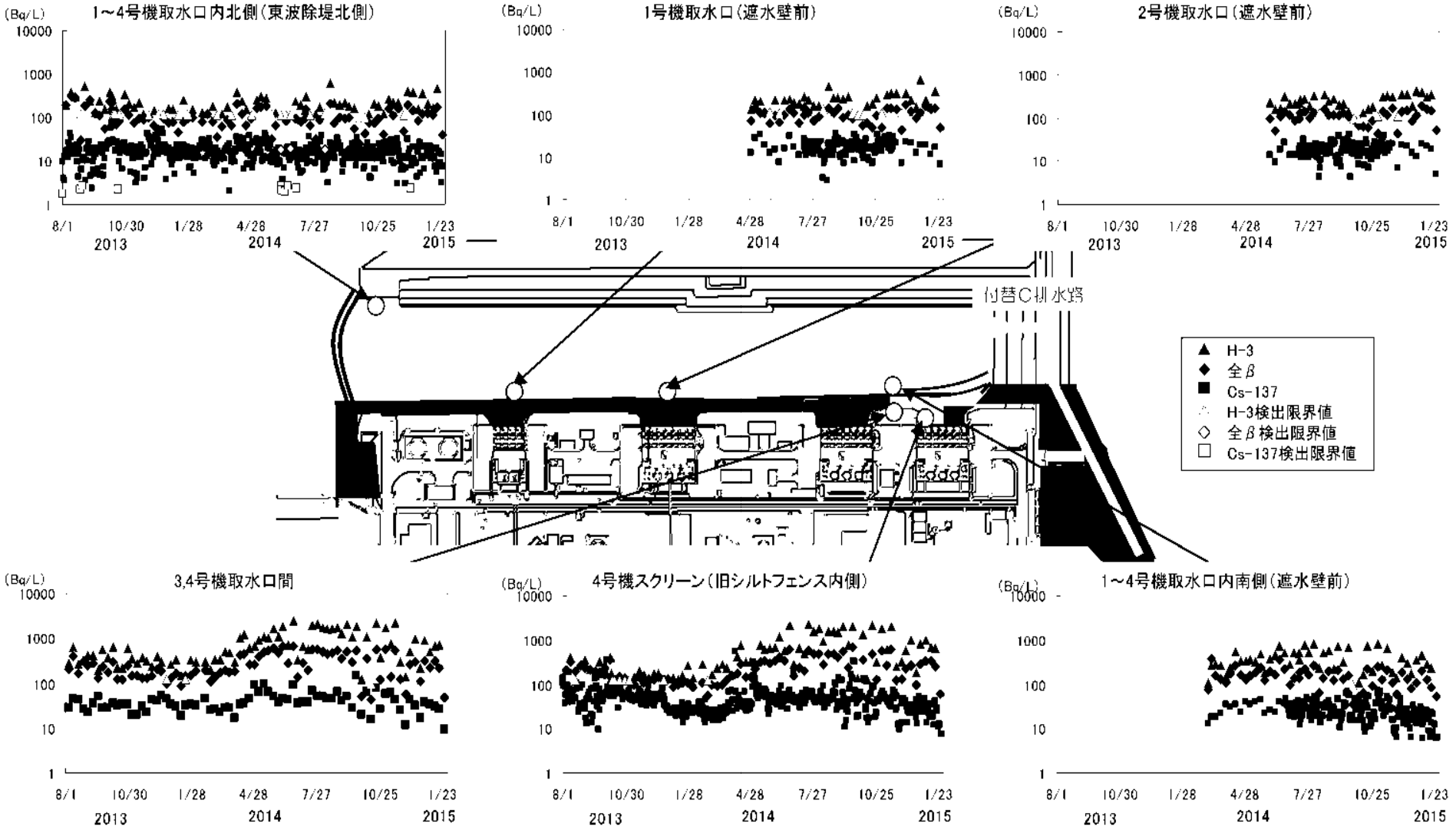
H27年1月～7月

・2週間～1ヶ月に1回引き揚げ、分析・性能評価を実施

・繊維への核種吸着量の測定等の性能評価を実施 （約 6ヶ月）

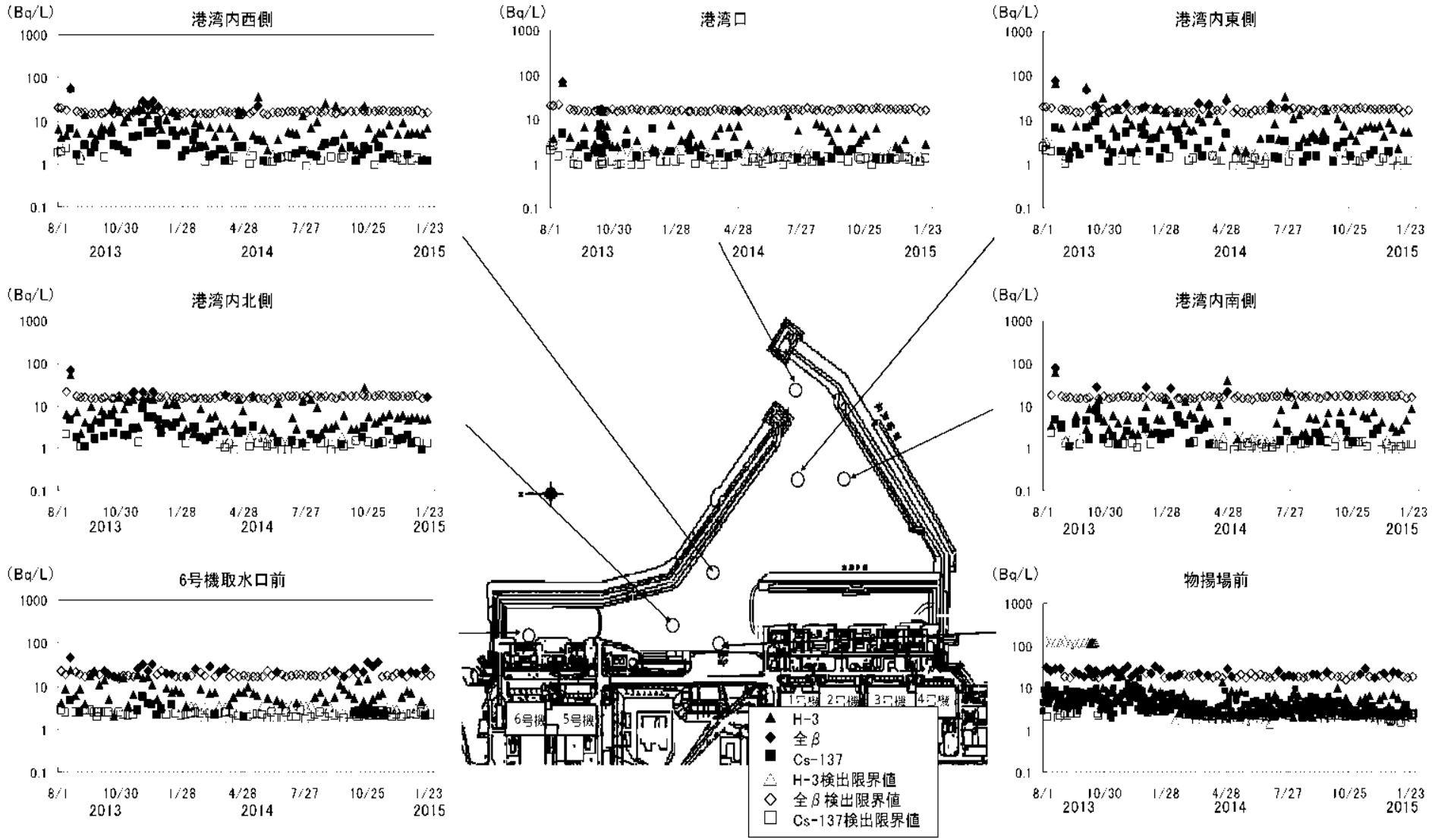
１～４号機取水口付近の海水サンプリング結果

１～４号機取水口付近の海水のセシウム濃度は、最も高濃度である４号機スクリーンでも概ね50Bq/Lを下回ってきており、横ばいから低下傾向。



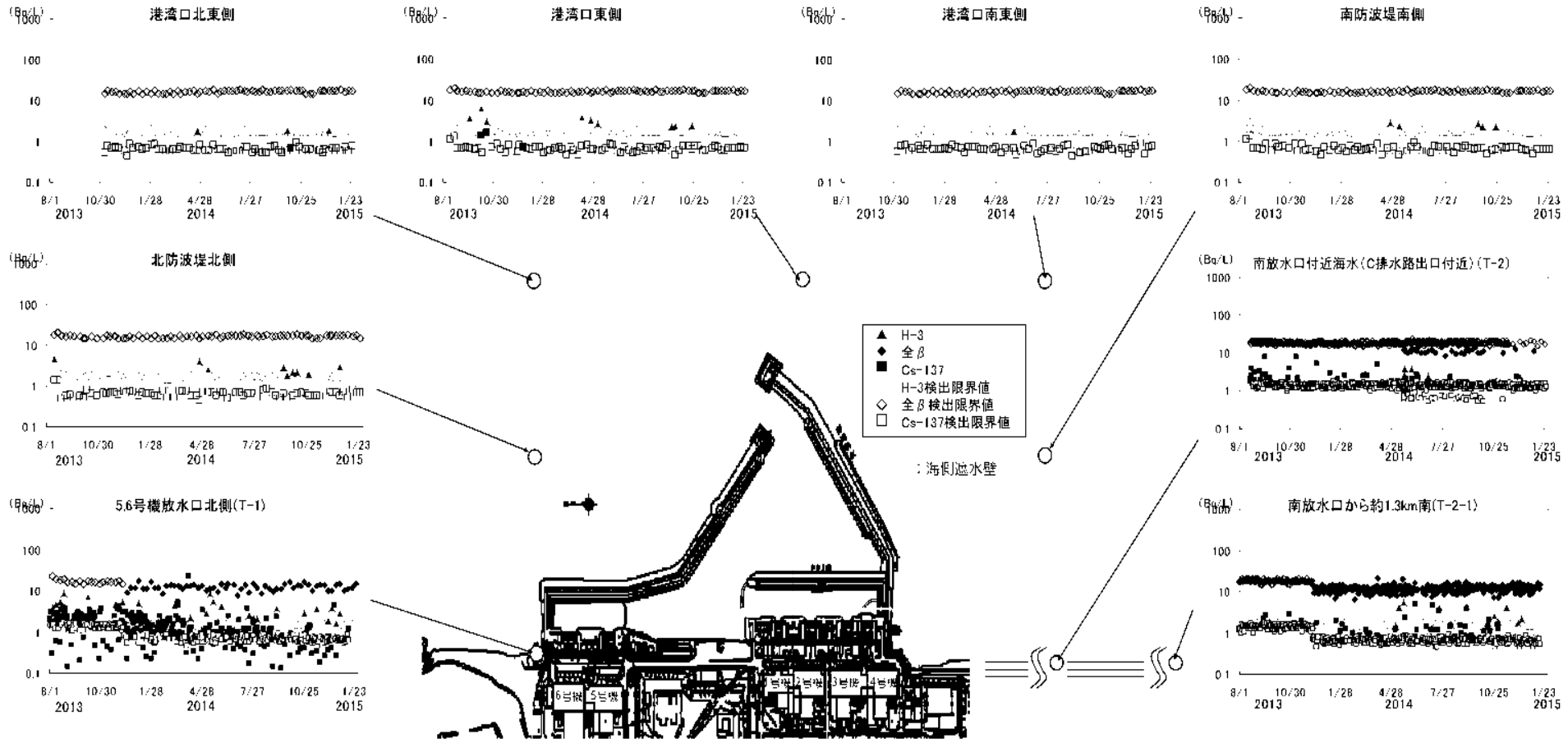
港湾内の海水サンプリング結果

概ね横ばいであるが、昨年の同時期に比べれば全体に低減傾向。



港湾外（周辺）の海水サンプリング結果

港湾外の各採取点も、全体に低濃度の横ばい状態で、濃度上昇などの特別な傾向は見られない。

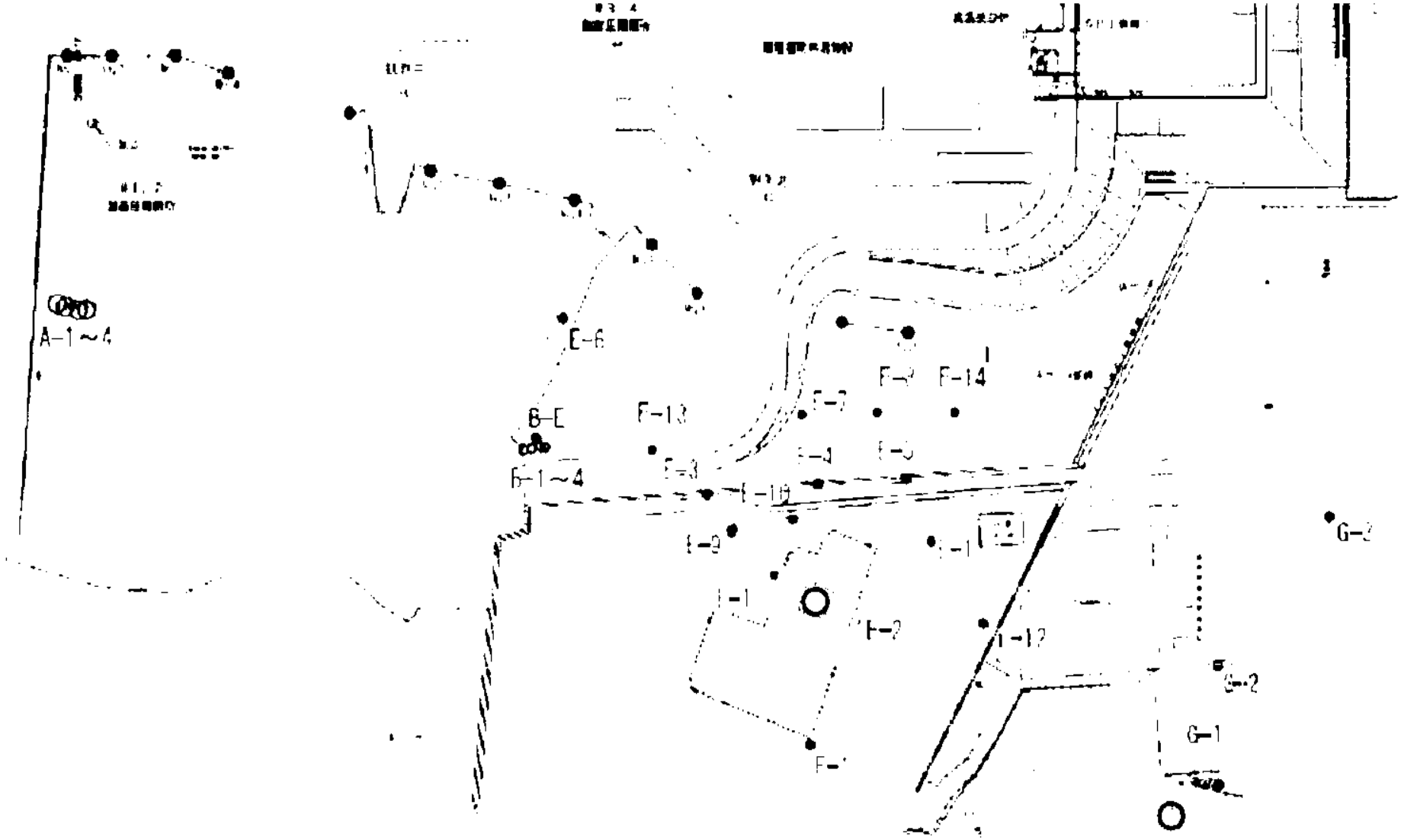


注：2013年12月以降の南北放水口付近の全β放射能の検出は、検出下限値の変更によるものである。

タンクエリア周辺の状況

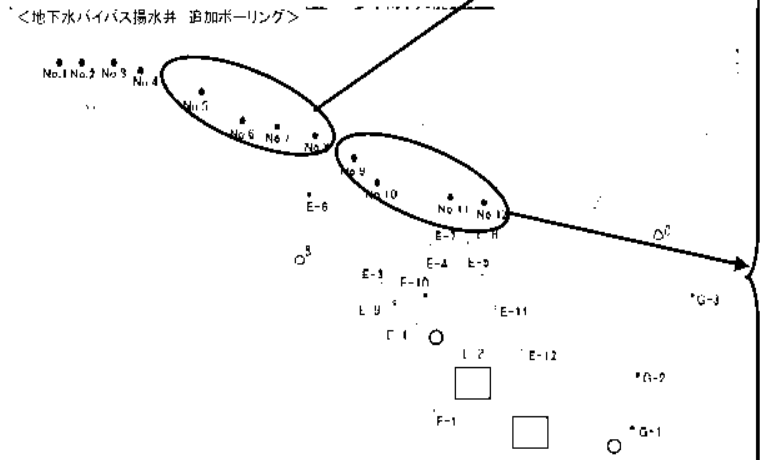
タンクエリア周辺の地下水観測孔等の位置

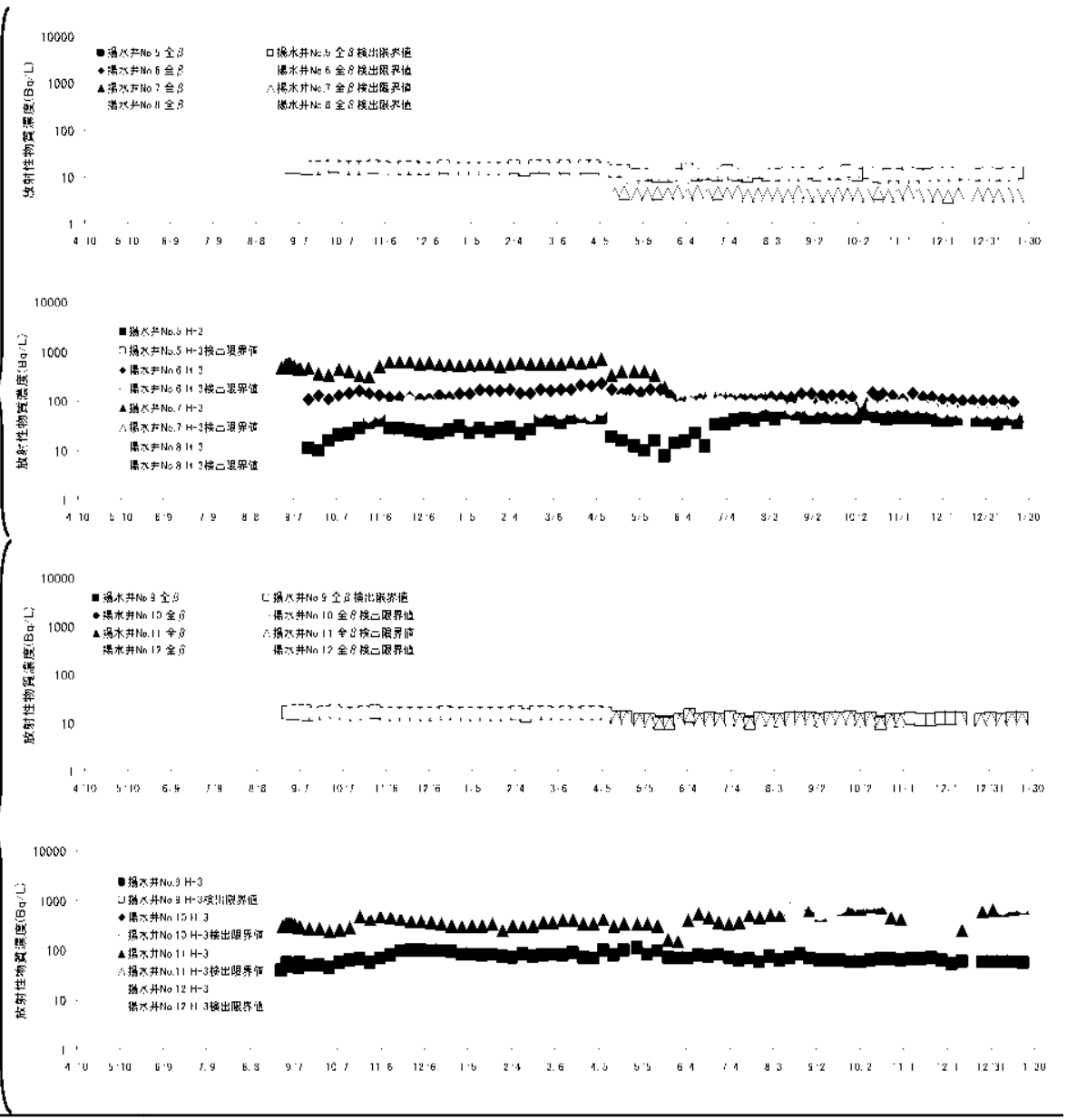
前回以降、新たな観測孔等の設置は無い。



地下水バイパス揚水井の放射能濃度推移

- 地下水バイパス揚水井No.12のトリチウム濃度は、1/19に1,200Bq/Lを検出したが、次回1/22の採水時には上昇前とほぼ同じ710Bq/Lに低下。昨年9月以降は概ね1,000Bq/L以下で推移。
- 地下水バイパスの運用開始に伴い、全体的にトリチウムの濃度変動が見られるが、他の揚水井では1,000Bq/Lを越えるものは無い。
- 全βには特に変化はない。

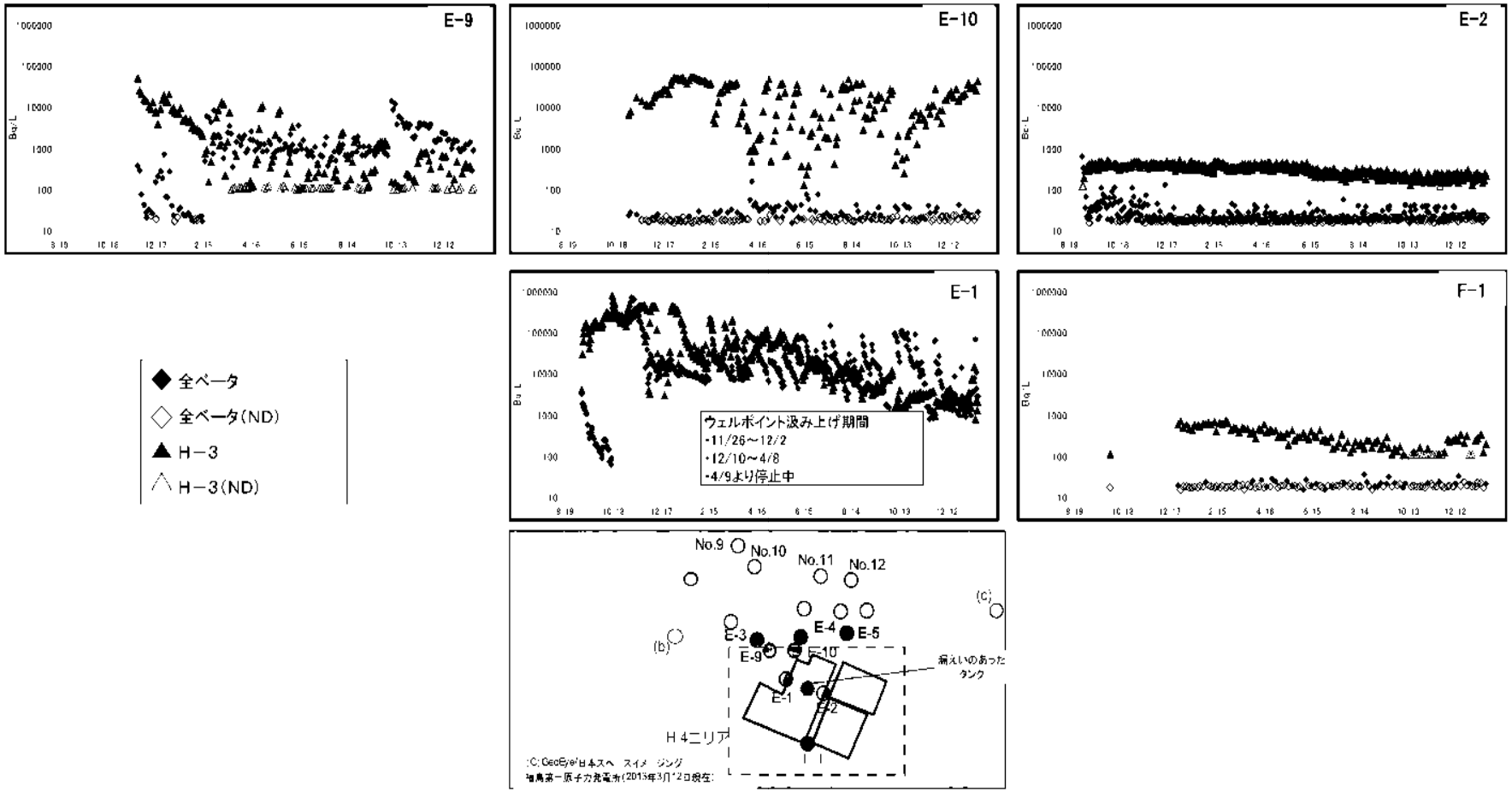




観測孔の放射能濃度推移（H4タンクエリア）

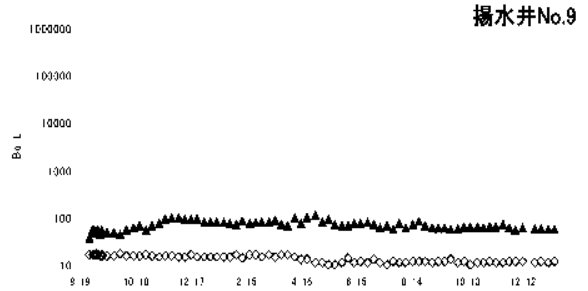
全β濃度は、漏えいした汚染水が地表を流れて直接到達したとみられるE-1、E-9で、台風の影響と思われる一時的な上昇が見られたが、現在は台風以前の濃度に戻っている。また、E-1付近からの放射性物質の拡散を確認するために追加設置したE-10は、若干の検出はみられるものの、低濃度のまま推移している。

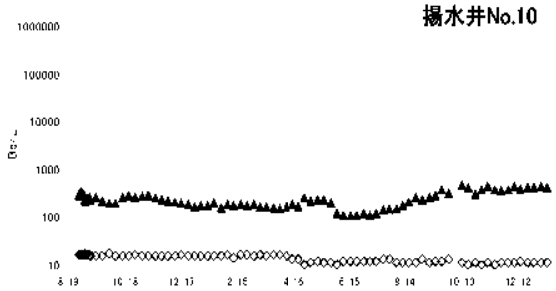
トリチウム濃度は、E-10のみ変動しつつ横ばいであるが、全体的に低下傾向を継続

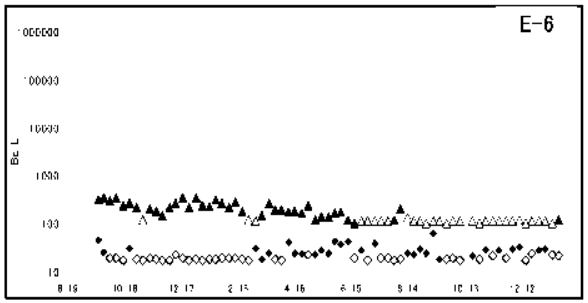


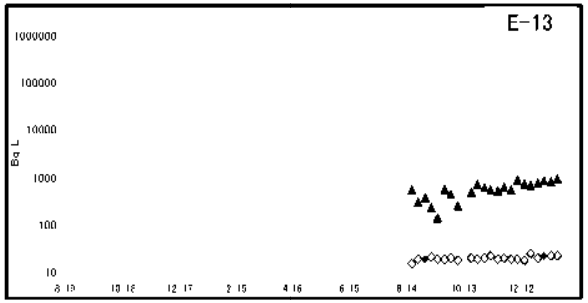
観測孔の放射能濃度推移（H4タンクエリア北東側）

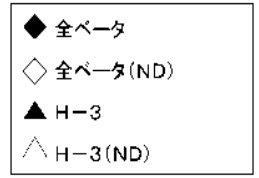
- 全β濃度は、E-3が当初若干高かったものの、既に低下。他の観測孔もほとんどが不検出。
- トリチウム濃度は、H4タンクエリアに近いE-3で一時数千Bq/Lまで上昇したが、5月以降低下。その他の観測孔、揚水井も1,000Bq/Lを超えるようなトリチウム濃度は検出されていない。
- E-3周辺のトリチウムの拡散状況を確認するために設置した観測孔E-１３は、若干上昇したものの1,000Bq/Lを下回る低いレベル。引き続き観測を継続する。

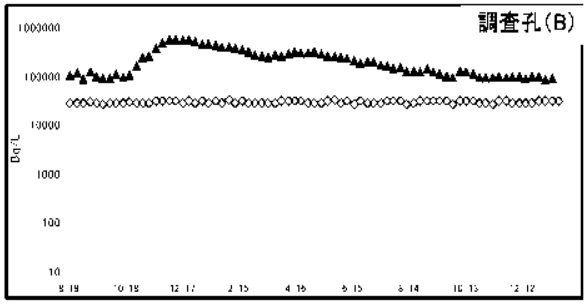


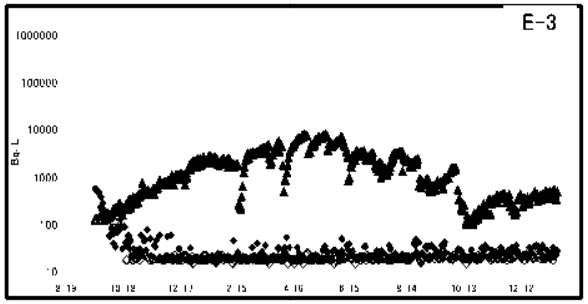


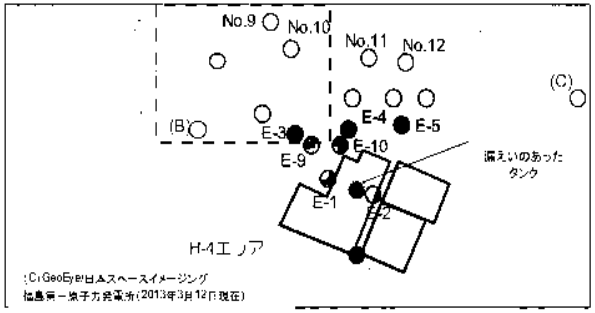






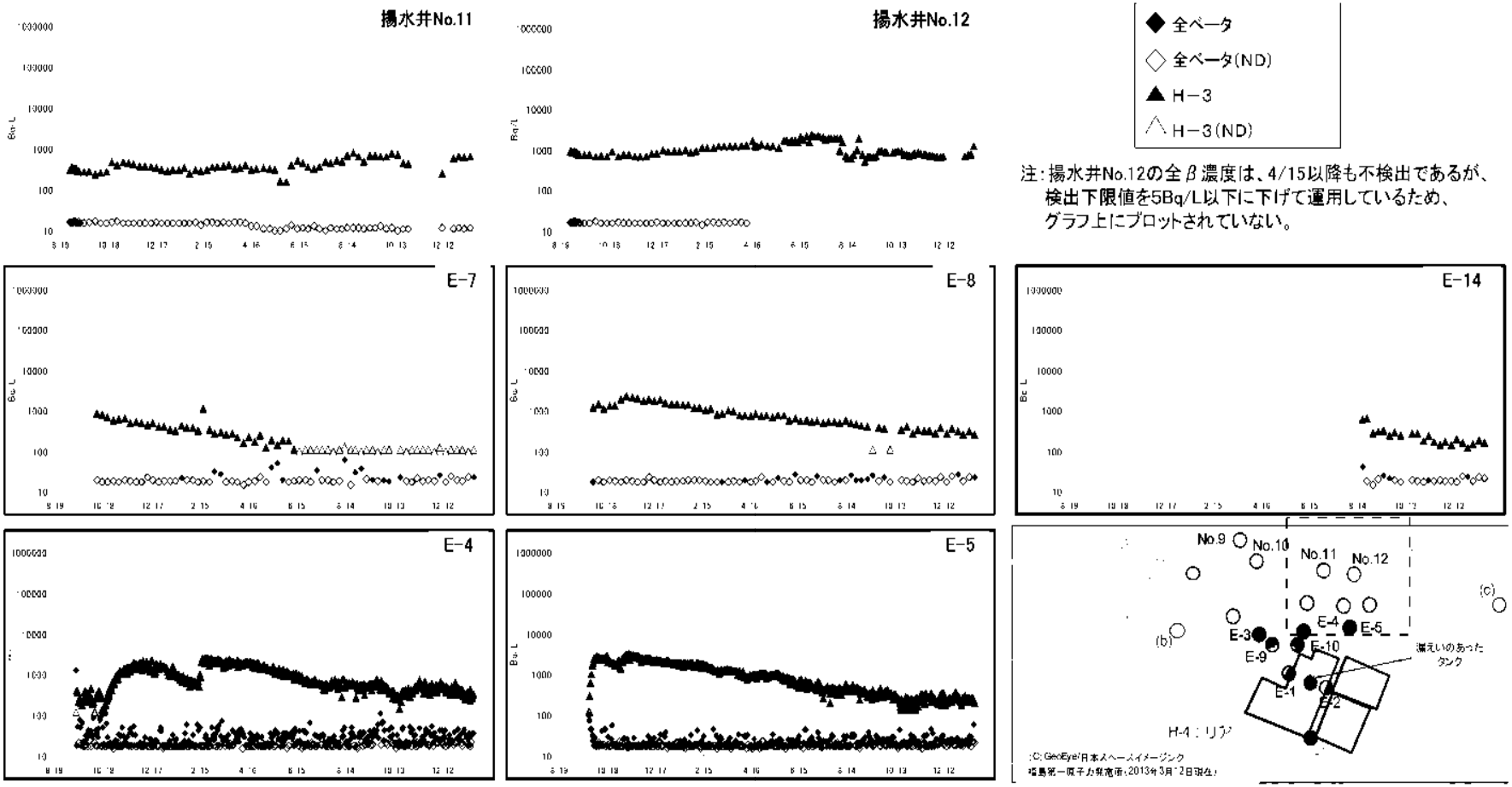






観測孔の放射能濃度推移（H4タンクエリア南東側）

- 全β濃度は、H4タンクエリアに近いE-4、E-5で検出はされるものの、横ばい状態で特に上昇傾向はみられない。その他の観測孔、揚水井ではほとんど検出されていない。
- トリチウム濃度は、一時1,000Bq/L を超えていたE-4、E-5、E-7、E-8で低下又は横ばい状況。揚水井No.12も、9月以降は概ね1,000Bq/L未満で推移。
- 南側に追加設置した観測孔E-１４のトリチウム濃度は低下傾向。
- 引き続き観測を継続する。



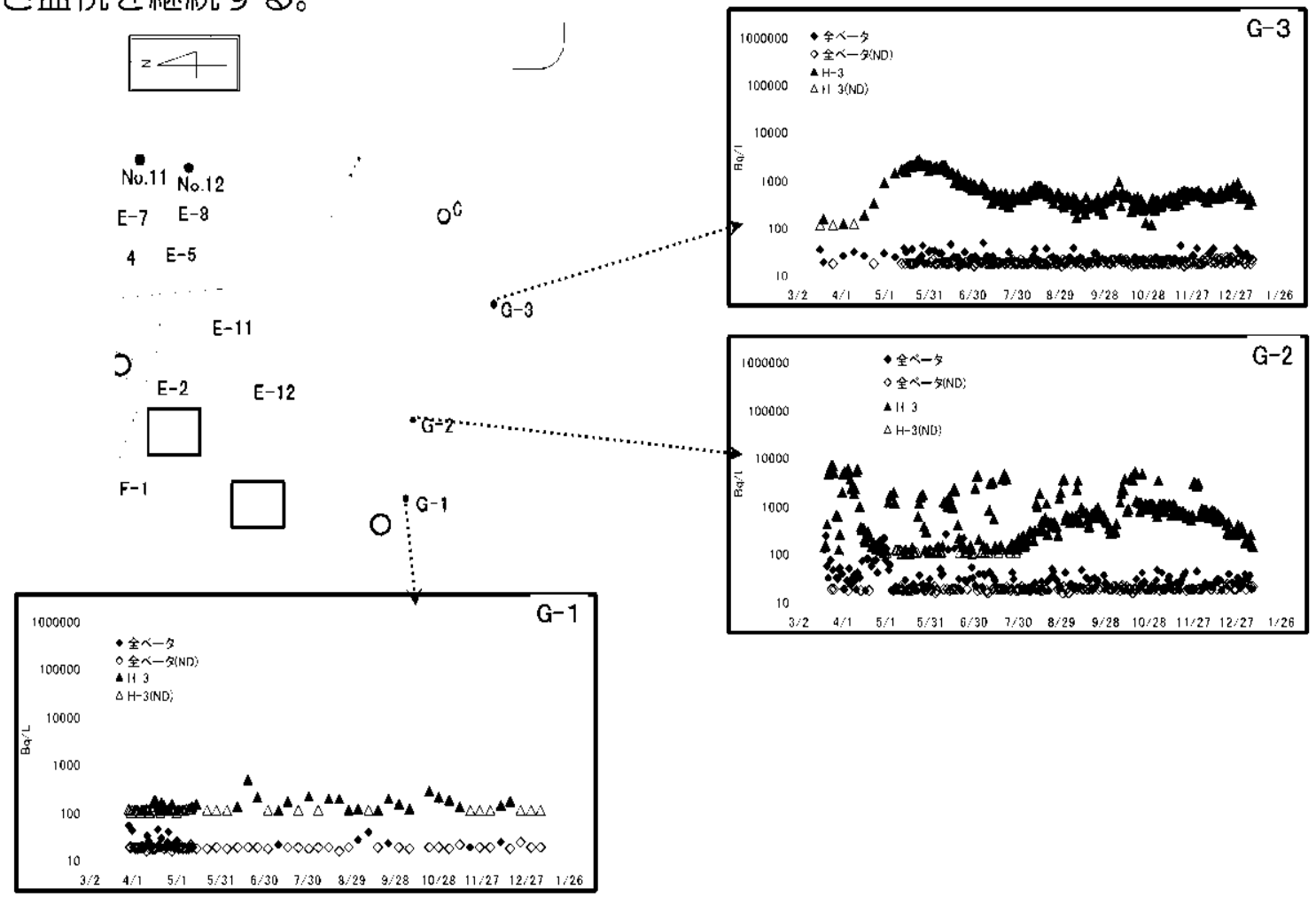
観測孔の放射能濃度推移（H6タンクエリア周辺）

漏えいタンクに近いG-1観測孔は、周辺の汚染土壌回収が早かったため、全β、トリチウムともに低濃度。特に変動はみられない。

G-2観測孔では、当初トリチウム濃度が高めで、全β濃度も100Bq/L程度で検出されたが、その後、両方とも低下。トリチウム濃度は変動が大きく、台風後も一時的に濃度が上昇。

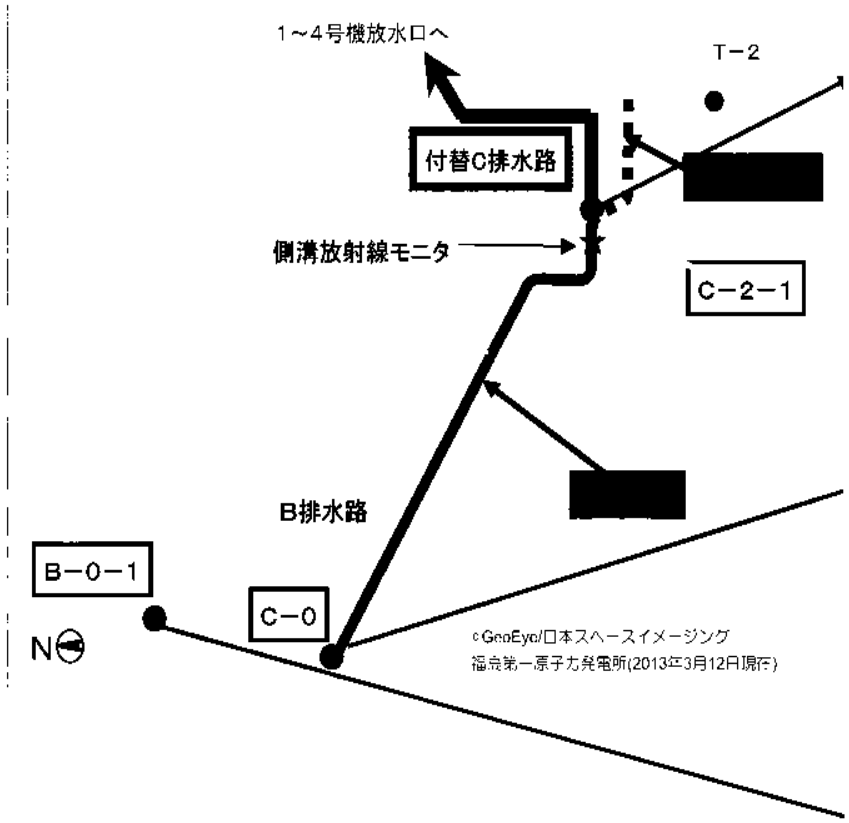
G-3観測孔では、 4月～5月にトリチウム濃度が上昇したが、その後は低下して横ばい傾向。

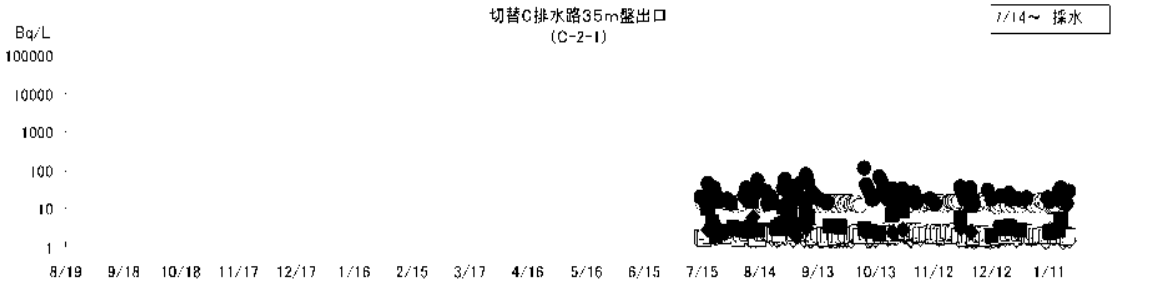
引き続き監視を継続する。

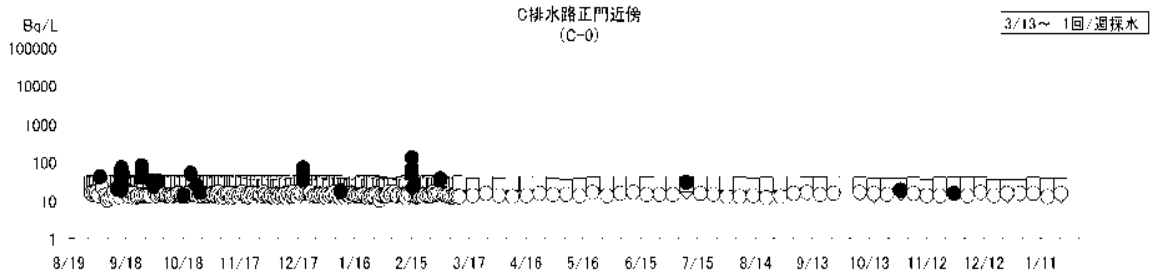


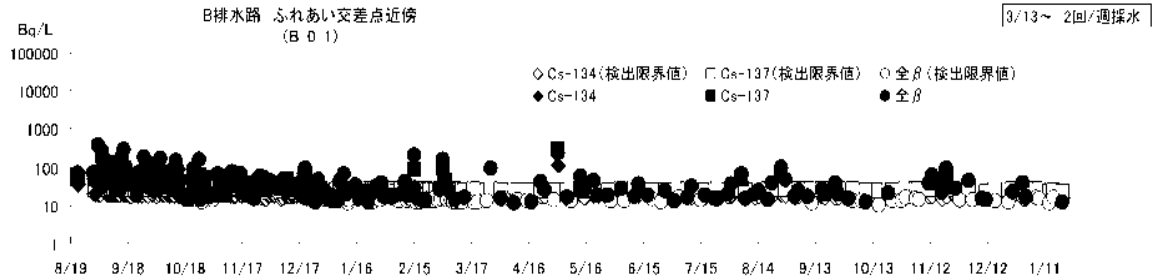
排水路の放射能濃度推移

- タンクエリア上流側のふれあい交差点近傍（B-0-1）付近では、タンク設置のための工事を実施中。降雨時には放射性物質の検出が見られる。C排水路正門近傍（C-0）はほとんど検出が無くなった。
- 切替C排水路35m盤出口（C-2-1）は、台風の際など、降雨時を中心に放射性物質が検出される状況。









（２）地下水バイパスの運用状況について

(2)-1　地下水バイパスの運用状況について

(2)-2　地下水バイパス揚水井No.10～12の状況

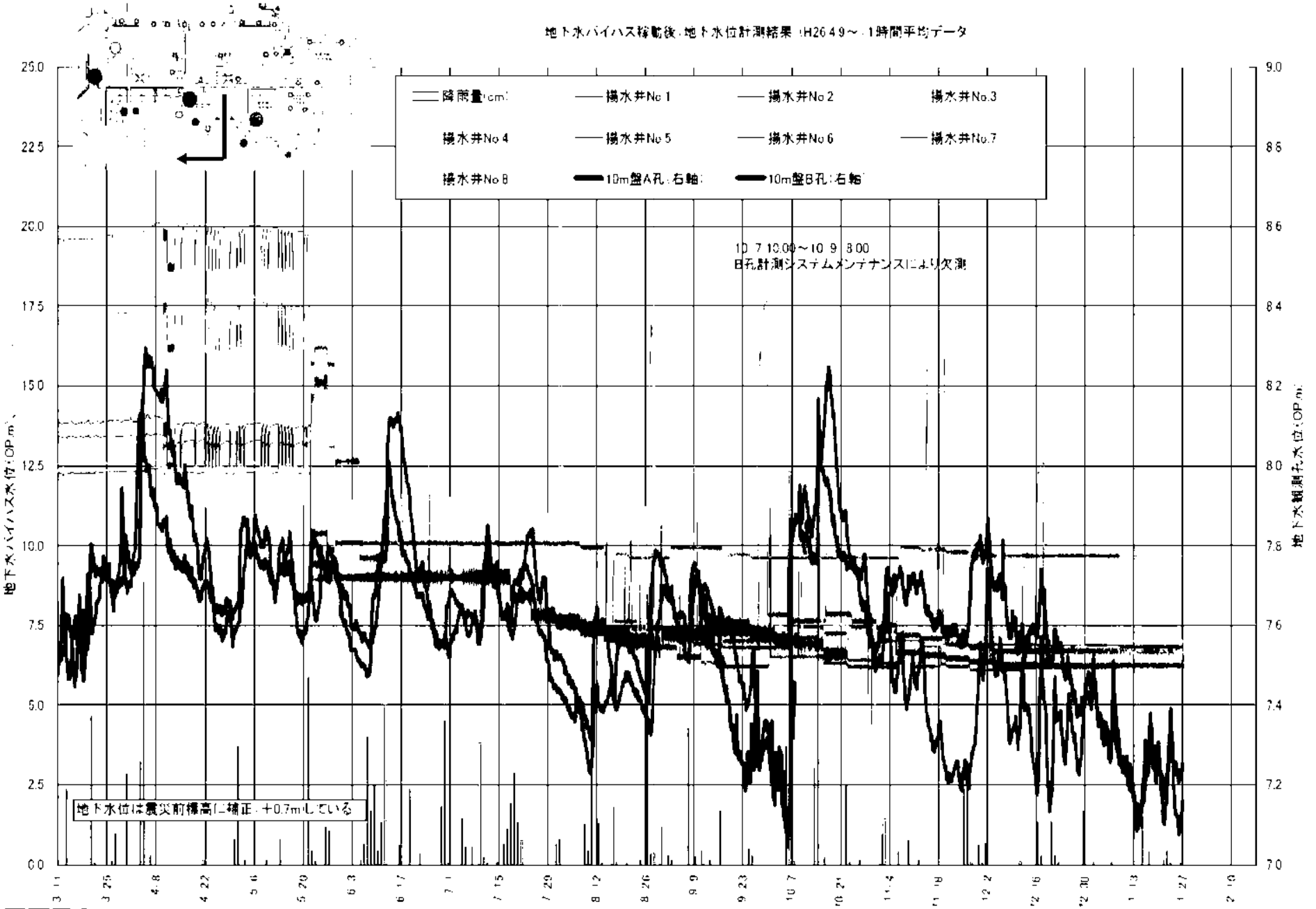
(2)-1　地下水バイパスの運用状況について

地下水バイパスは、5月21日に排水を開始し、45回目の排水を完了
排水量は、合計 73,806m³（H27.1.23現在）

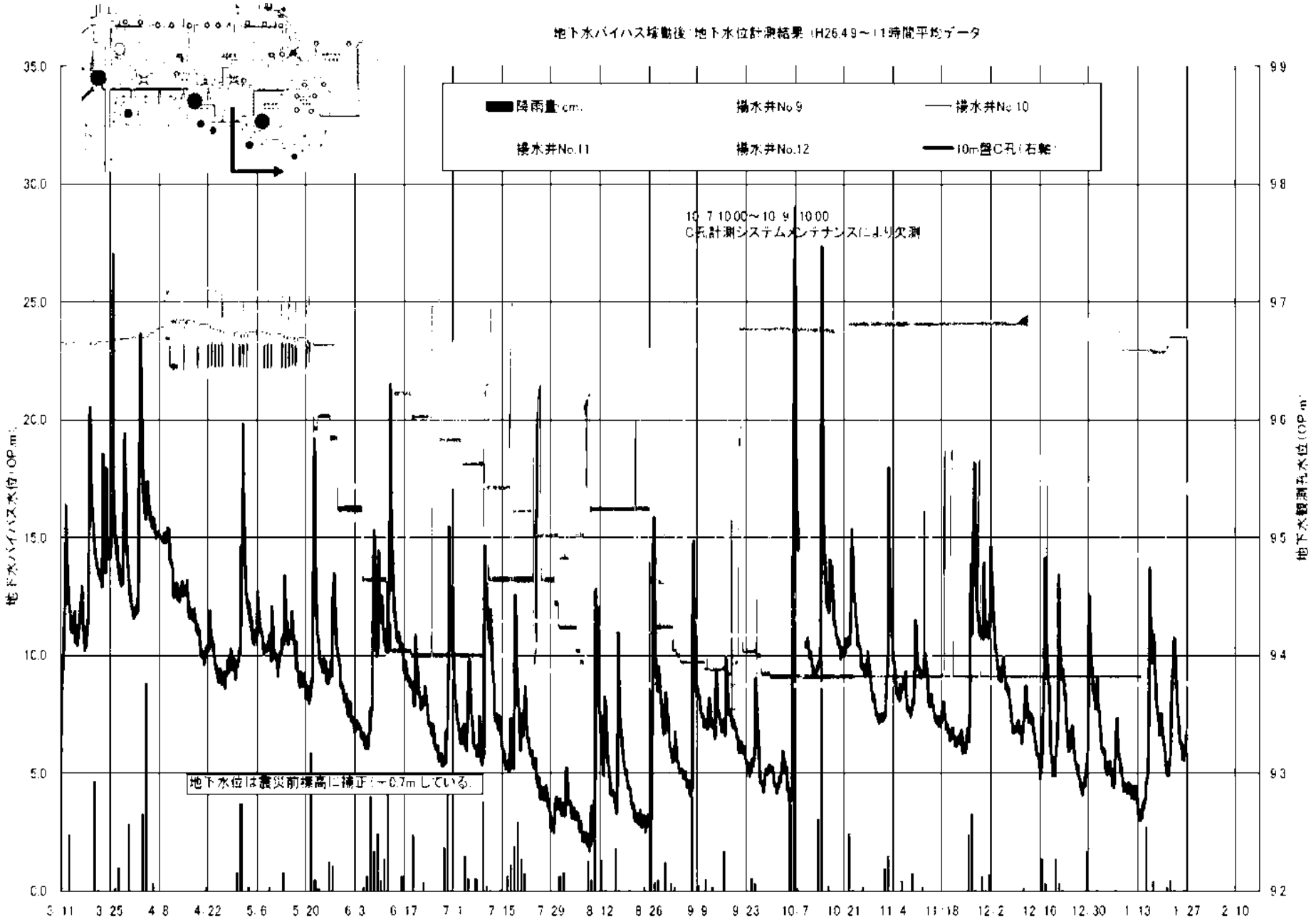
採水日	12月17日		12月23日		12月30日		1月6日		1月12日		運用目標	※1 告示濃度限度	WHO飲料水水質ガイドライン
分析機関	東京電力	第三者機関	東京電力	第三者機関	東京電力	第三者機関	東京電力	第三者機関	東京電力	第三者機関			
セシウム134（単位：Bq/L）	ND(0.67)	ND(0.67)	ND(0.63)	ND(0.86)	ND(0.70)	ND(0.76)	ND(0.56)	ND(0.71)	ND(0.76)	ND(0.63)	1	60	10
セシウム137（単位：Bq/L）	ND(0.50)	ND(0.67)	ND(0.64)	ND(0.76)	ND(0.59)	ND(0.61)	ND(0.78)	ND(0.69)	ND(0.59)	ND(0.65)	1	90	10
その他ガンマ核種（単位：Bq/L）	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	検出なし	※2 検出されないこと		
全ベータ（単位：Bq/L）	ND(0.78)	ND(0.52)	ND(0.85)	ND(0.51)	ND(0.88)	ND(0.53)	ND(0.90)	ND(0.58)	ND(0.83)	ND(0.49)	5(1)(注)		
トリチウム（単位：Bq/L）	110	110	130	120	140	140	140	150	170	160	1,500	60,000	10,000
排水日	12月29日		1月5日		1月11日		1月17日		1月23日				
排水量（単位：m3）	1,789		1,879		2,120		2,120		1,850				

＊第三者機関：日本分析センター
＊NDは検出限界値未満を表し、（ ）内に検出限界値を示す。
(注) 運用目標の全ベータについては、10日に1回程度の分析では、検出限界値を 1 Bq/Lに下げて実施。
※1 東京電力株式会社福島第一原子力発電所原子炉施設の保安及び特定核燃料物質の防護に関する規則に定める告示濃度限度（別表第2第六欄：周辺監視区域外の水中の濃度限度［本表では、Bq/cm³の表記をBq/Lに換算した値を記載］）
※2 セシウム134,セシウム137の検出限界値「1Bq/L未満」を確認する測定にて検出されないこと（天然核種を除く）。

揚水井稼働実績（揚水井Ｎｏ．１～８）

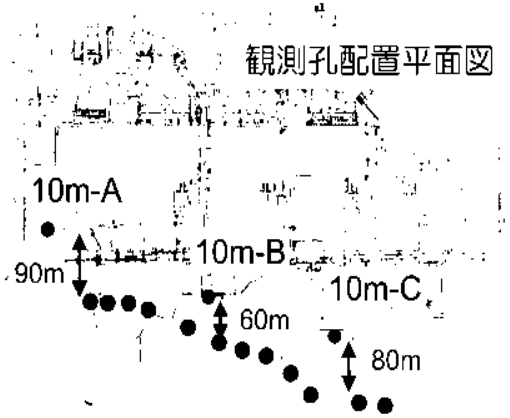


揚水井稼働実績（揚水井Ｎｏ．９～１２）



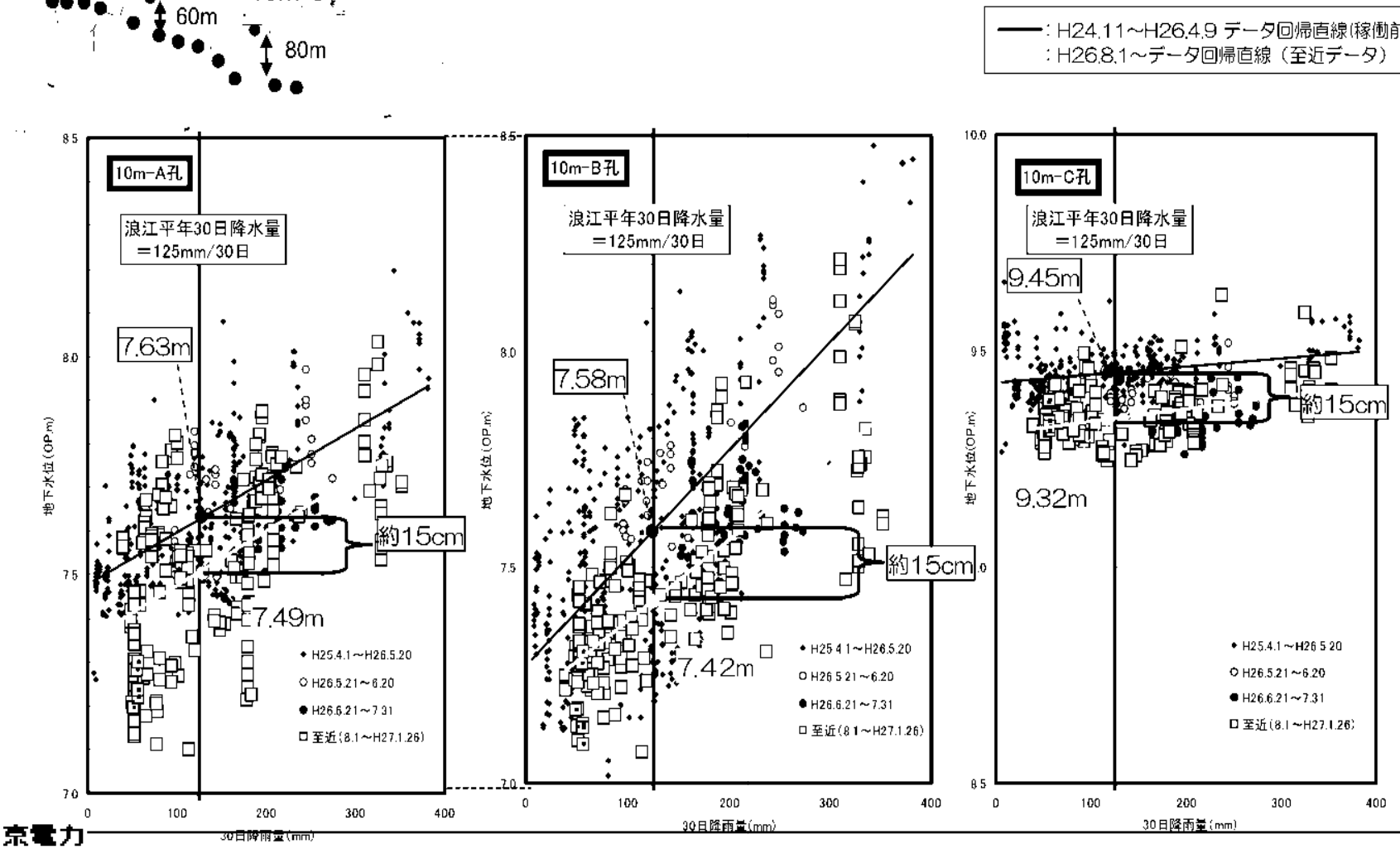
地下水バイパス稼働後における10m盤観測孔単回帰分析結果（累計雨量30日）

H27. 1.26現在



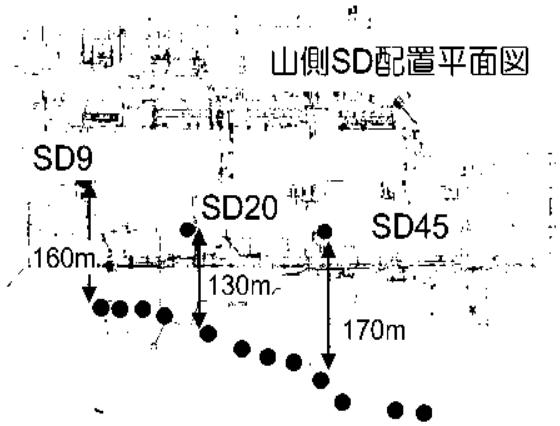
10m盤観測孔は１～２ヶ月累計雨量との相関が高いことから、30日累計雨量で地下水バイパス稼働の影響を評価した。

地下水バイパス稼働後のA～C孔全ての観測孔の地下水位において平均して10～１５cm程度の地下水位の低下が認められる。



地下水バイパス稼働後における山側SD地下水位評価結果（累計雨量60日）

H27. 1.26現在

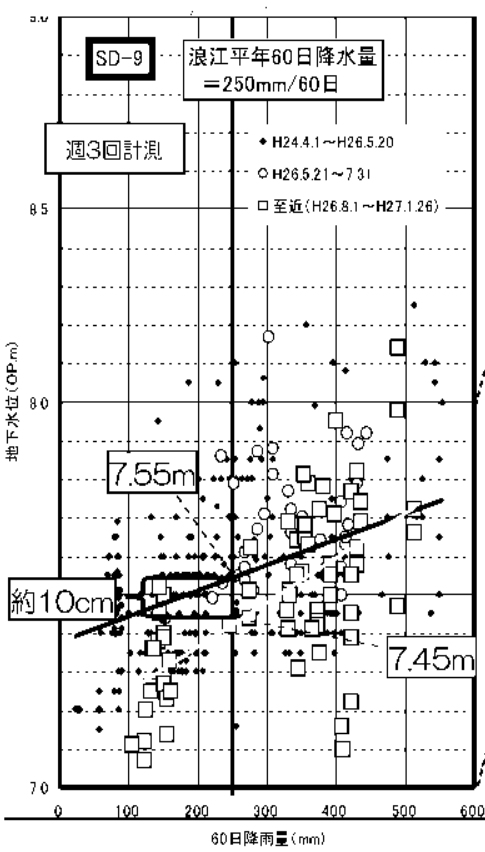


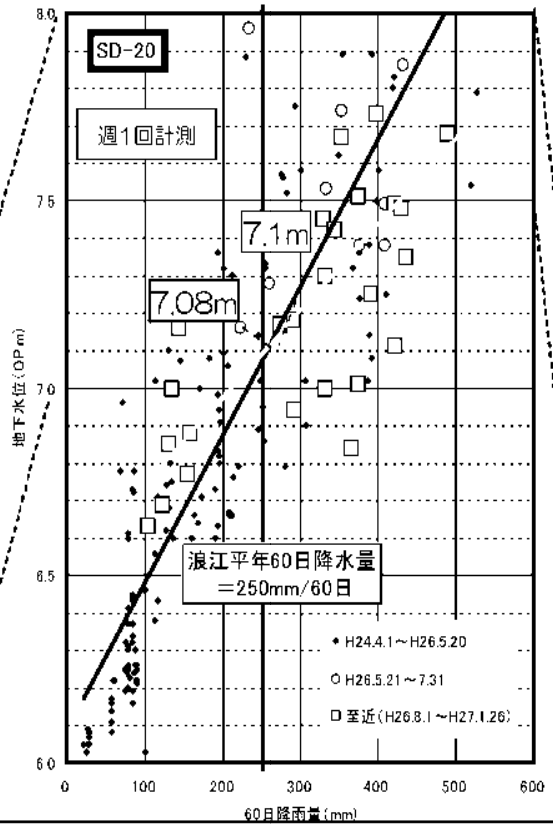
SDの地下水位は２ヶ月累計雨量との相関が高いことから、60日累計雨量で地下水バイパス稼働の影響を評価した。

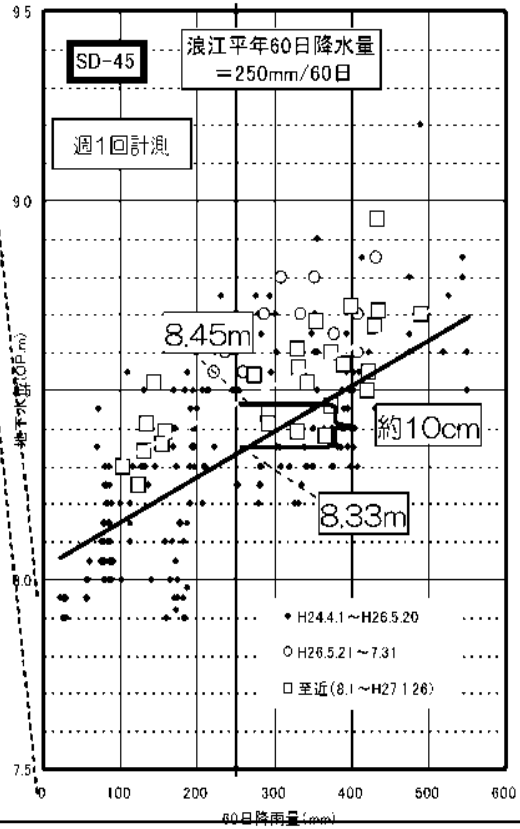
H26.8.1以降のデータが蓄積されてきたことから、回帰直線による比較を行った。

その結果、SD9においては約10cmの水位低下と評価され、SD20では同程度、SD45では、約10cm上昇していると評価された。

——　：H24.4～H26.4.9 データ回帰直線(稼働前)
：H26.8.1～データ回帰直線（至近データ）





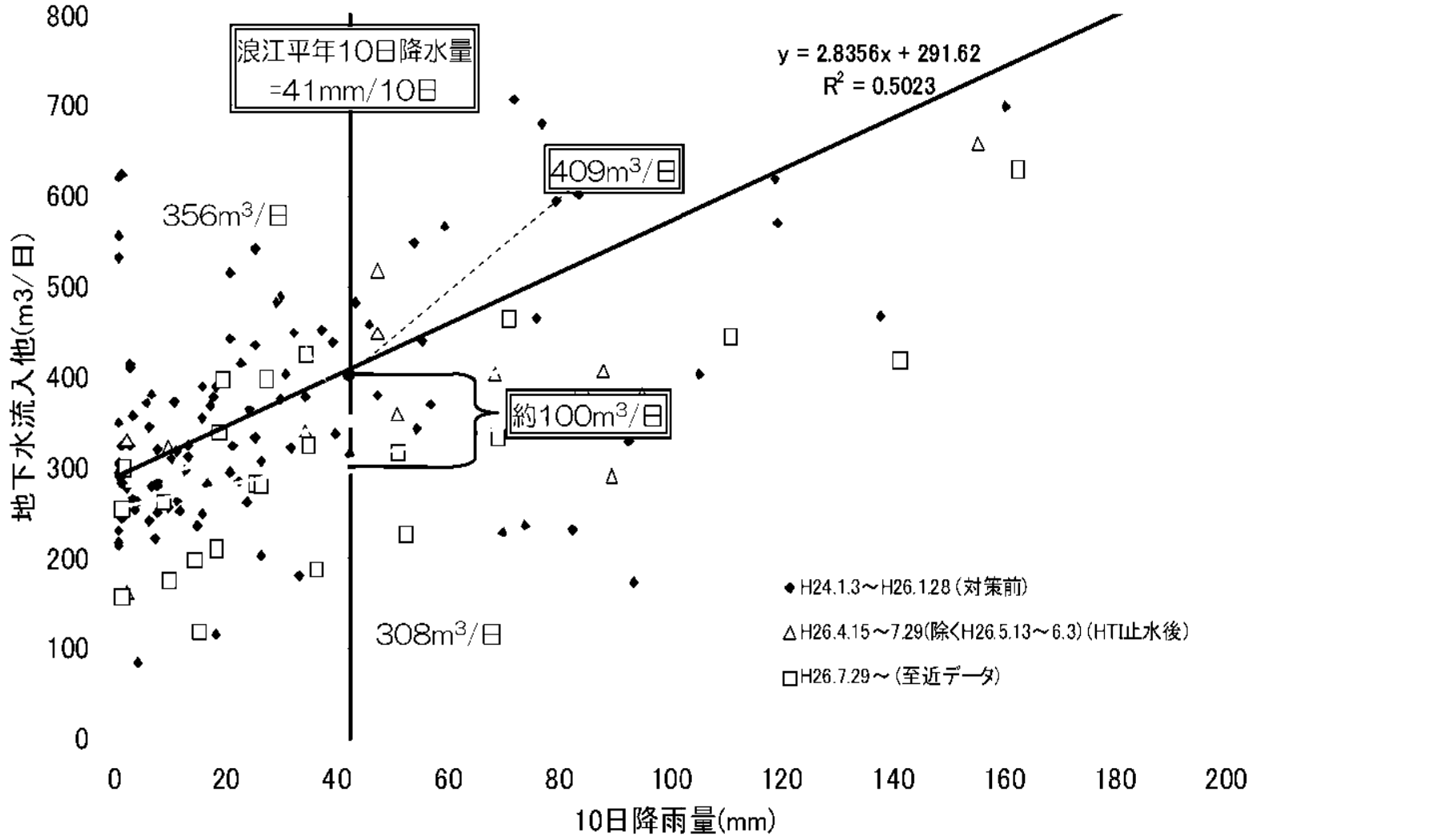


地下水バイパス稼働後における建屋流入量評価結果（累計雨量10日）

H27. 1. 22現在
雨量累計期間　集計日7:00迄の10日間

建屋への地下水流入量は１０日累計雨量との相関が高いことから、10日累計雨量で地下水バイパス稼働の影響を評価した。

高温焼却炉建屋（以下、HTI建屋）止水に加え、地下水バイパスの稼動により合計100m^3/日程度の建屋流入量の抑制が認められる。

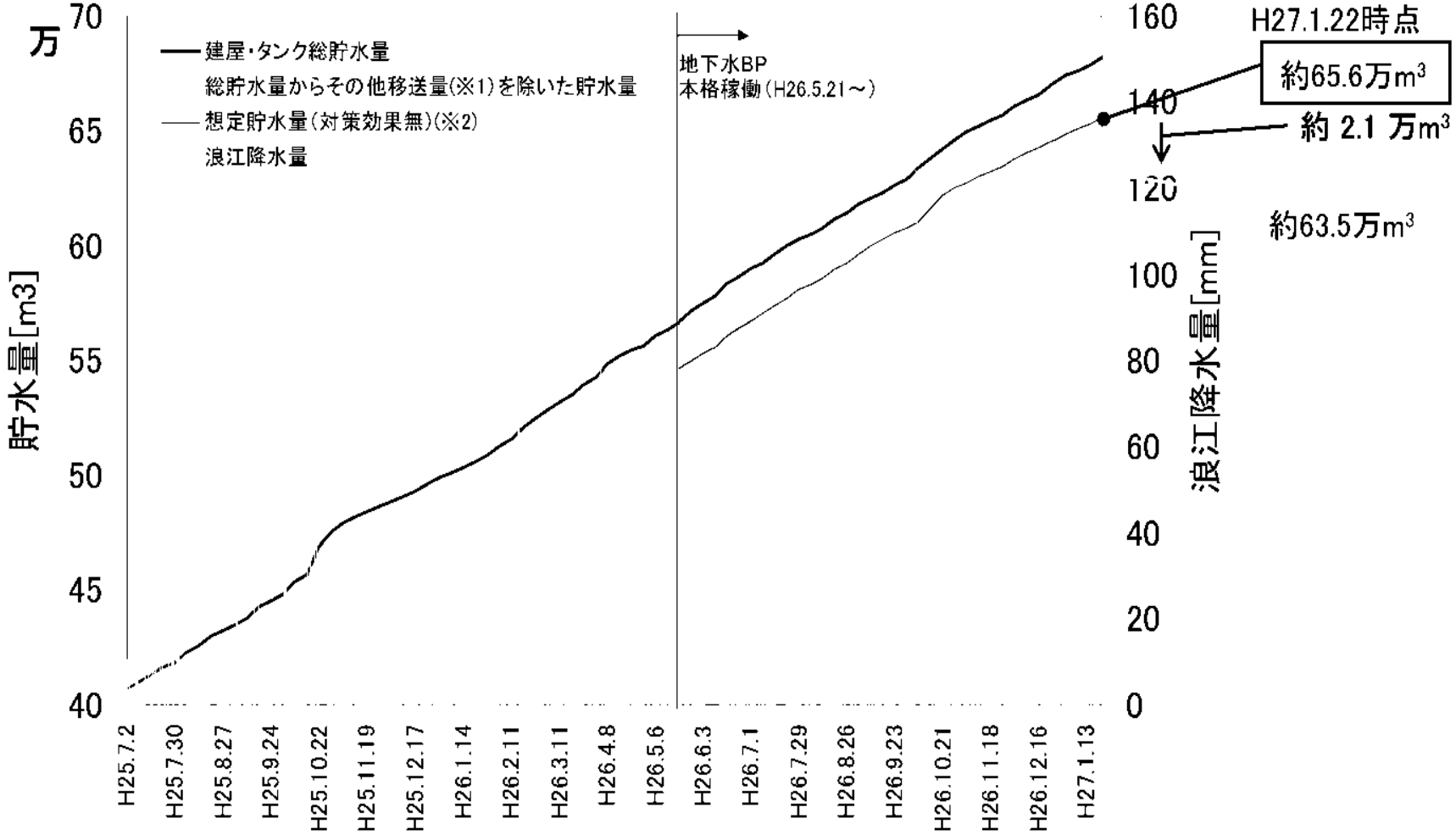


地下水バイパス稼働等による流入量抑制効果

地下水BP本格稼働(H26.5.21以降)も対策前（H24.1～H26.1）と同様の流入が継続した場合の貯水量を想定。

H26年7月頃より想定貯水量と実績貯水量に乖離が確認され始めている。

想定貯水量と実績貯水量の比較から、HTI建屋止水に加え地下水バイパスの稼動により、これまでの累計で約2.1万m^3（1,000m^3タンク21基分）の流入抑制効果があったと評価。

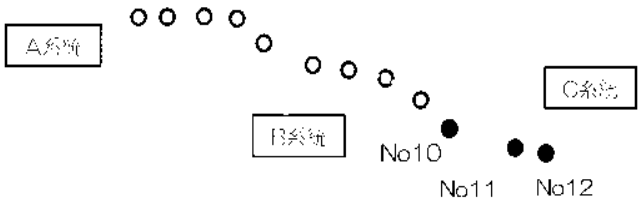


※1：ウェルポイントからの汲み上げ、多核種除去設備薬液注入、トレンチへの氷投入

※2：H26.5.21以降の流入量を対策前の回帰式（下記）にて日々流入したと仮定。

[流入量]＝2.8356×[10日累計雨量]＋291.62

(2)-2　地下水バイパス揚水井No.10～12の状況 (1)



2015/1/26現在

揚水井No	1	2	3	4	5	6
水位計交換	済	済	済	済	済	済
浮遊物	なし	なし	なし	なし	なし	なし
稼働状況	○	○	○	○	○	○

揚水井No	7	8	9	10	11	12
水位計交換	済	済	済	済	済	済
浮遊物	なし	なし	なし	あり	あり	あり
稼働状況	○	○	○	－ 清掃中	○ 清掃済	○ 清掃済

通常の点検作業等により計画的に停止するケースは稼働状況に考慮しない

(C) GeoEye/日本スペースイメージング

○ 揚水井No.11
- H26年9月中旬頃から、地下水バイパスの揚水井No.11系統の流量が低下傾向。
- H26年10月15日、揚水を停止し、揚水ポンプを引き揚げたところ、揚水ポンプ吸込口に地下水中に認められていた浮遊物が一様に付着しており、このことが流量低下の原因であることが判明。

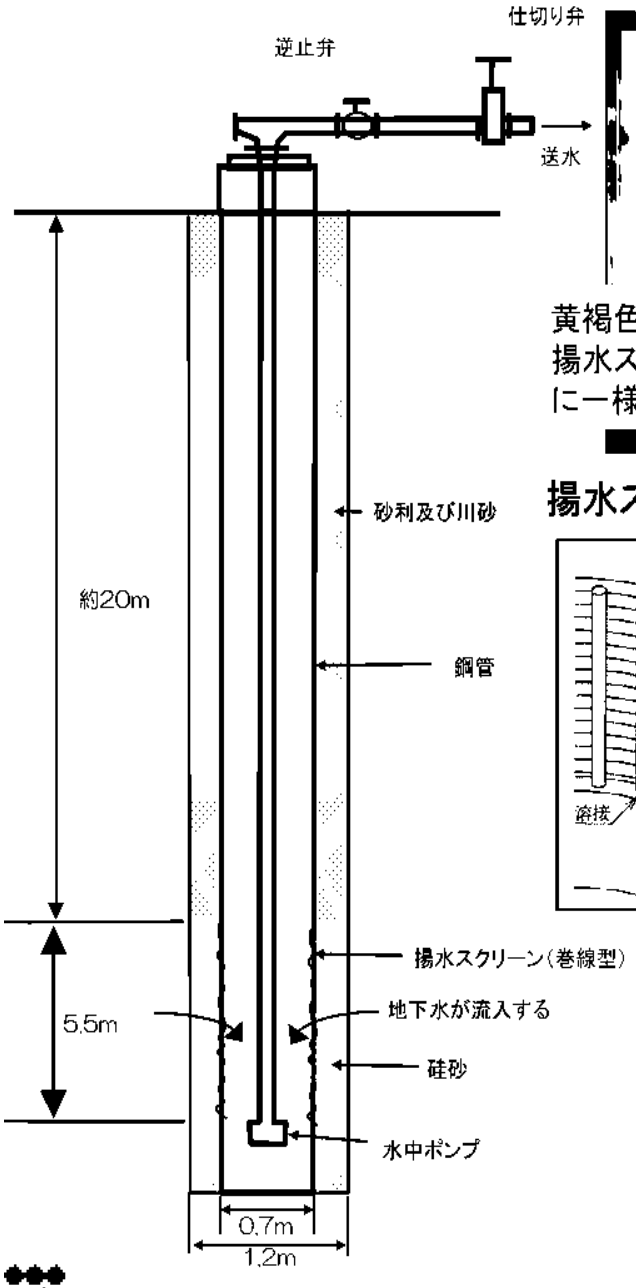
地下水バイパス揚水井No.10～12の状況 (2)

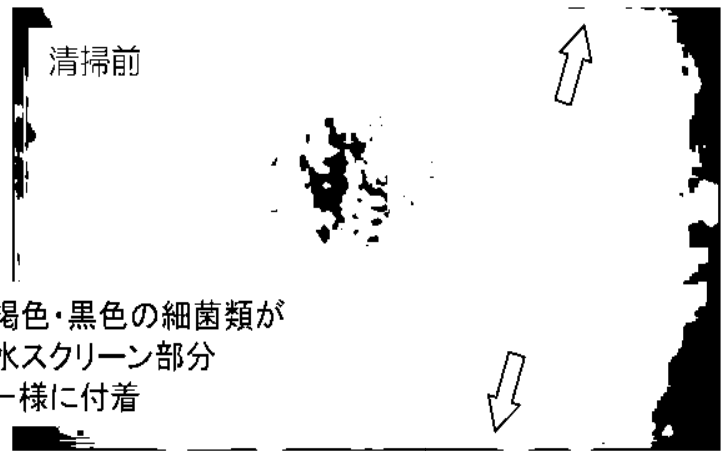
○ 揚水井No.11 (続き)
- 地下水観察の結果、この浮遊物は、トンネル等に一般的に存在する細菌類(鉄酸化細菌等) と判明。
- 引き揚げた揚水ポンプは、点検・清掃を実施。
- 揚水井内部の観察では、壁面に一様に細菌類が付着していたため、清掃を実施。
- 細菌類を滅菌する薬剤を試験的に導入し、 H26年12月９日、揚水再開。

○ 揚水井No.12
- H26年10月下旬頃から、地下水バイパスの揚水井No.12系統の流量が低下傾向。
- H26年12月12日、揚水を停止し、揚水ポンプの引き揚げ、状況を確認。
- 揚水井No.11と同様に、揚水ポンプを点検・清掃するとともに、揚水井内部壁面の清掃を実施。
- 細菌類を滅菌する薬剤を試験的に導入。
- H27年1月６日、 揚水再開。

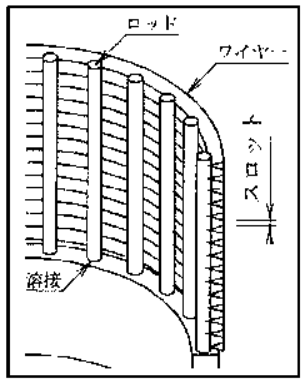
○ 揚水井No.10
- H26年11月下旬頃から、地下水バイパスの揚水井No.10系統の流量が低下傾向。
- H27年1月13日、揚水を停止し、揚水ポンプ、揚水井内部壁面の清掃を実施中。
- H27年２月上旬、揚水再開予定。

揚水井No.10の清掃について





揚水スクリーン部分



- 揚水井No.11と同様、揚水スクリーン部分に黄褐色・黒色の細菌類が一様に付着していたが、清掃により、元の壁面が見えるまでに回復

- 細菌類を滅菌する薬剤は、揚水井No.11と同様に、常時、地下水に浸漬されるよう、揚水ポンプ上端部に設置
(揚水井No.12についても、清掃後に設置)

今後の予定

- H27年1月上旬頃から、再度、揚水井No.11の系統の流量が低下してきているため、2月上旬～揚水ポンプ、揚水井内部壁面の清掃を実施予定。

- 細菌類の生息と関連する地下水中の溶存酸素量等についても、追加で分析予定。

- 他の揚水井についても、状況を注視し、揚水井内部観察を実施するなど、早めの水平展開を図る。

資料１－２

１号機建屋カバー解体に向けた飛散防止剤散布と調査結果について［前回指摘事項への回答］

平成27年1月30日

東京電力株式会社

東京電力 TEPCO

はじめに

前回（平成26年12月19日）説明事項

最大風速10.2m/s、瞬間最大風速20.0m/sを確認

調査期間中の建屋カバー内のダスト濃度は、調査着手前と同等、かつ、オペレーティングフロア上ダストモニタ警報値5.0×10^{-3}Bq/cm^{3}に対し十分低いことを確認

前回の指摘事項

今回の調査では、カバーの外で吹いている風が中のダストの吹き上げ等にどのように影響するかを明らかにしていくこと

今回説明事項

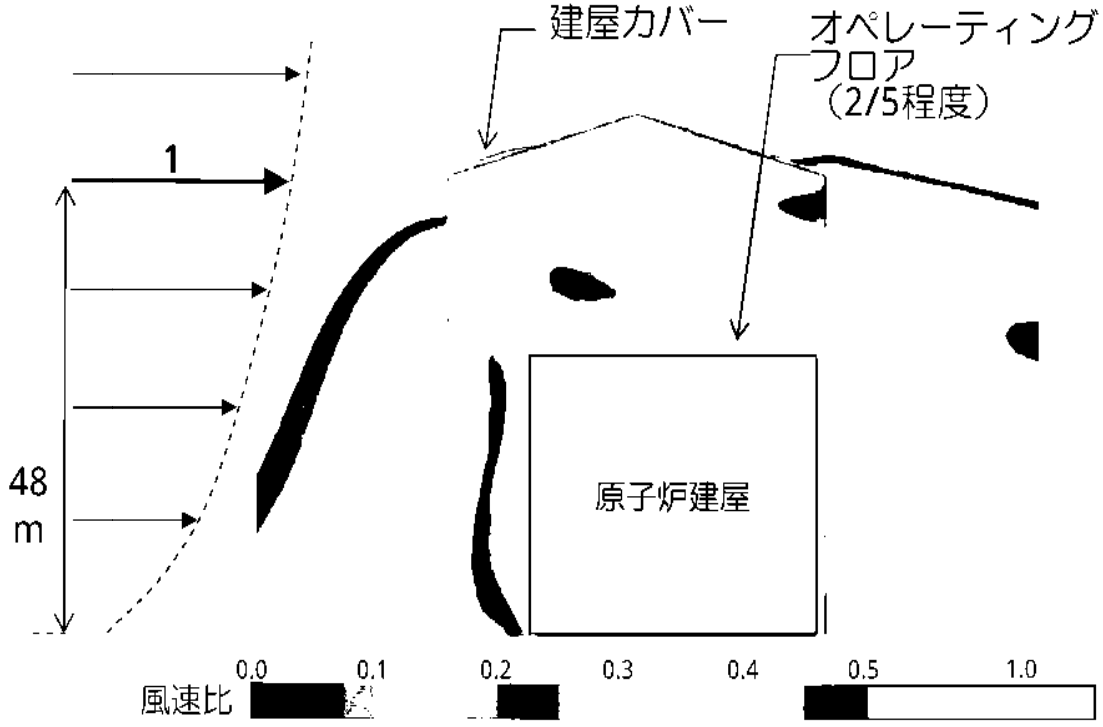
シミュレーション解析にて、10～12月の調査時に建屋カバー内に吹き込んだ風速を評価（次頁以降参照）

オペレーティングフロアの風速の評価

屋根パネルを2枚外した状態で、オペレーティングフロアに吹き込む風速をシミュレーション解析した結果、10～12月の調査時の建屋カバー内に吹き込んだ風の速さは、建屋カバー外の風の速さに対し、2/5程度だったと評価

オペレーティングフロアの 評価風速

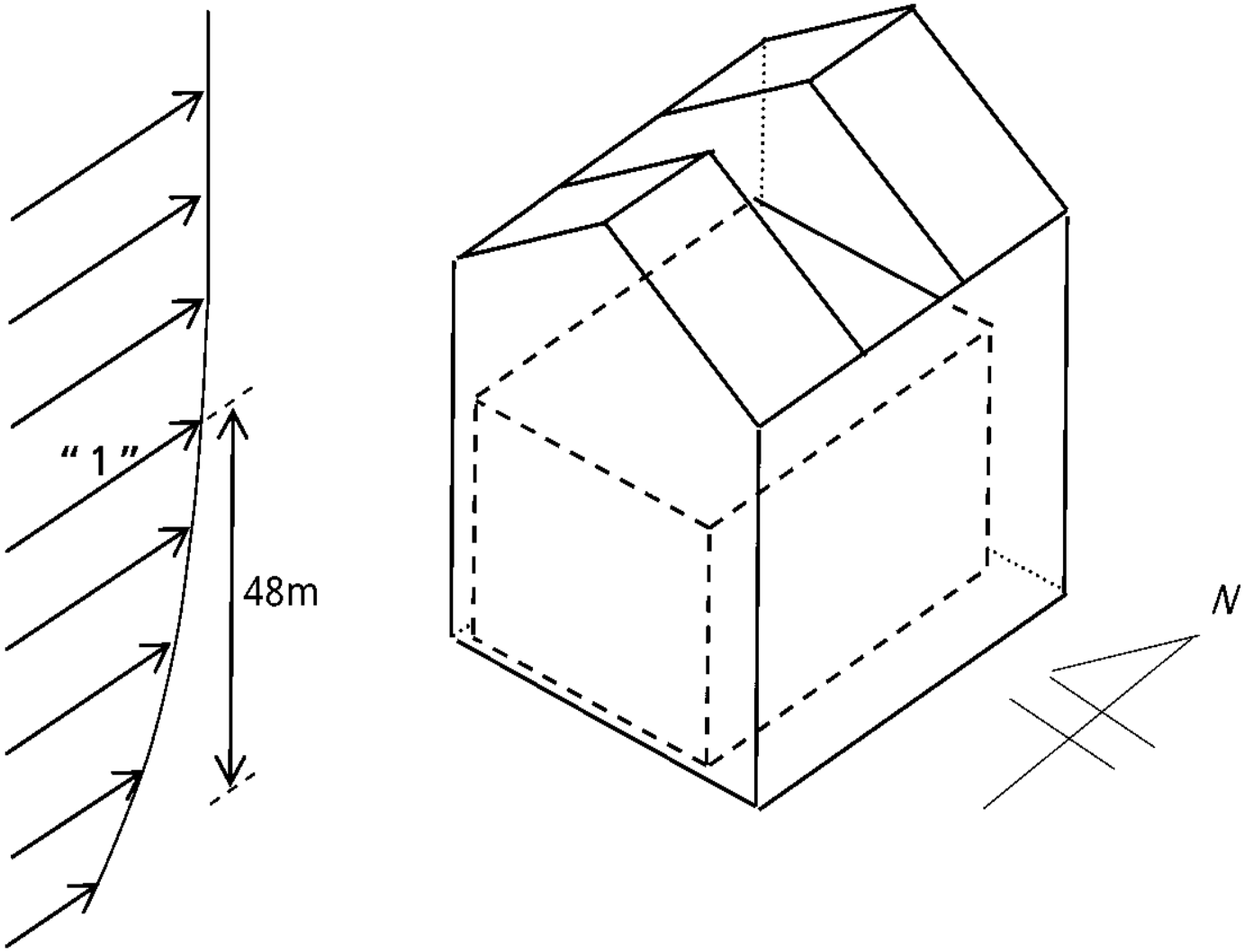
位置	風速比（解析値）
建屋カバー外（地上48m）	1
オペレーティングフロア（ 屋根パネルを2枚外した状態）	2/5程度



シミュレーション解析結果（東風）

【参考】シミュレーションモデルのイメージ

風向は東西南北の4方向



風速シミュレーションモデルイメージ（南風）

【参考】オペレーティングフロアの空気中の放射性物質濃度について（結果）

前回資料1-3の再掲

■オペレーティングフロアの10/17（作業着手前）～12/5（屋根戻し完了翌日）までの「空気中の放射性物質濃度と風速の推移」をP7以降に示す

■各作業における空気中の放射性物質濃度
- オペレーティングフロアダスト濃度設定値※（5.0×10^{-3}Bq/cm^3）に比べ低い値で推移した。
- 屋根パネル取り外し～屋根パネル戻しまでの間でオペレーティングフロアダスト濃度設定値を超えることはなかった。
- 今回実施した全ての作業においてオペレーティングフロア空気中の放射性物質濃度の上昇はなかった。

項　目	測定対象期間	オペレーティングフロア上の空気中の放射性物質濃度	備　考
作業着手前（穴あけ、飛散防止剤散布前）	10/17～10/22	2.1×10^{-6}Bq/cm^3～7.2×10^{-5}Bq/cm^3	
屋根パネルを穿孔した飛散防止剤散布	10/22～10/29	1.4×10^{-6}Bq/cm^3～4.4×10^{-5}Bq/cm^3	
屋根パネル取り外し(南3)	10/30～10/31	2.0×10^{-6}Bq/cm^3～3.5×10^{-5}Bq/cm^3	屋根取り外し:10/31
屋根パネル取り外し(北3)	11/ 1 ～11/10	2.0×10^{-6}Bq/cm^3～3.2×10^{-5}Bq/cm^3	屋根取り外し:11/10
屋根パネル2枚取り外し以降	11/11～12/4	6.3×10^{-7}Bq/cm^3～2.7×10^{-5}Bq/cm^3	屋根戻し:12/4
屋根パネル戻し完了以降	12/5	4.9×10^{-6}Bq/cm^3～2.0×10^{-5}Bq/cm^3	

※ 敷地境界モニタリングポスト近傍のダストモニタ警報値より設定した公衆被ばくに影響を与えないように設定した値

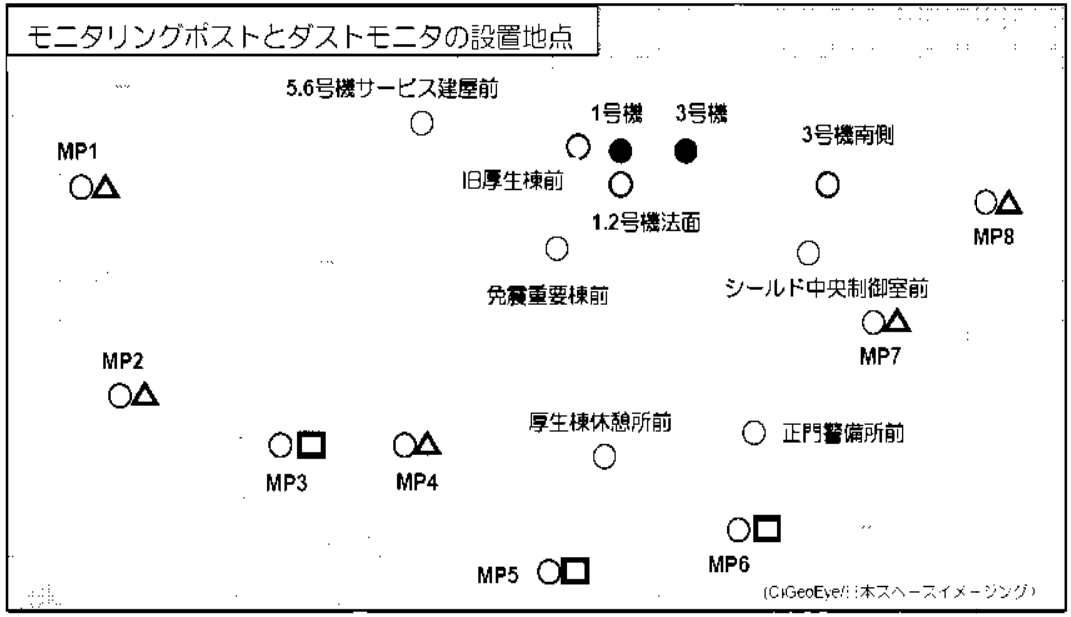
【参考】オペレーティングフロアの空気中の放射性物質濃度について（結果）

前回資料1-3の再掲

■空気中の放射性物質濃度と風速の関係

・屋根パネル取り外し後の強風時においてもオペレーティングフロア空気中の放射性物質濃度に上昇はなかった。また，構内各種ダストモニタ・モニタリングポストについても上昇や有意な変動がなく推移した。

項目	日時	空気中の放射性物質濃度 (Bq/cm3)	風速(m/s)	備考
オペレーティングフロア空気中の放射性物質濃度が最大時	H26/10/24 7:49	4.4×10^{-5}	0.9	-
最大風速(10分間平均)時	H26/11/3 8:20	4.9×10^{-6}	10.2	最大風速時における瞬間最大風速 20.0m/s



【凡例】

敷地境界のモニタリングポスト　：○（有意な変動：＋2μSv/h以上の変動）

1号機原子炉建屋のダストモニタ：●（設定値：5×10^{-3}Bq/cm^3）

3号機原子炉建屋のダストモニタ：●（設定値：5×10^{-3}Bq/cm^3）

建屋周辺のダストモニタ　：○（設定値：1×10^{-4}Bq/cm^3）

構内のダストモニタ　：○（設定値：1×10^{-4}Bq/cm^3）

敷地境界付近のダストモニタ　：△（設定値：1×10^{-5}Bq/cm^3）

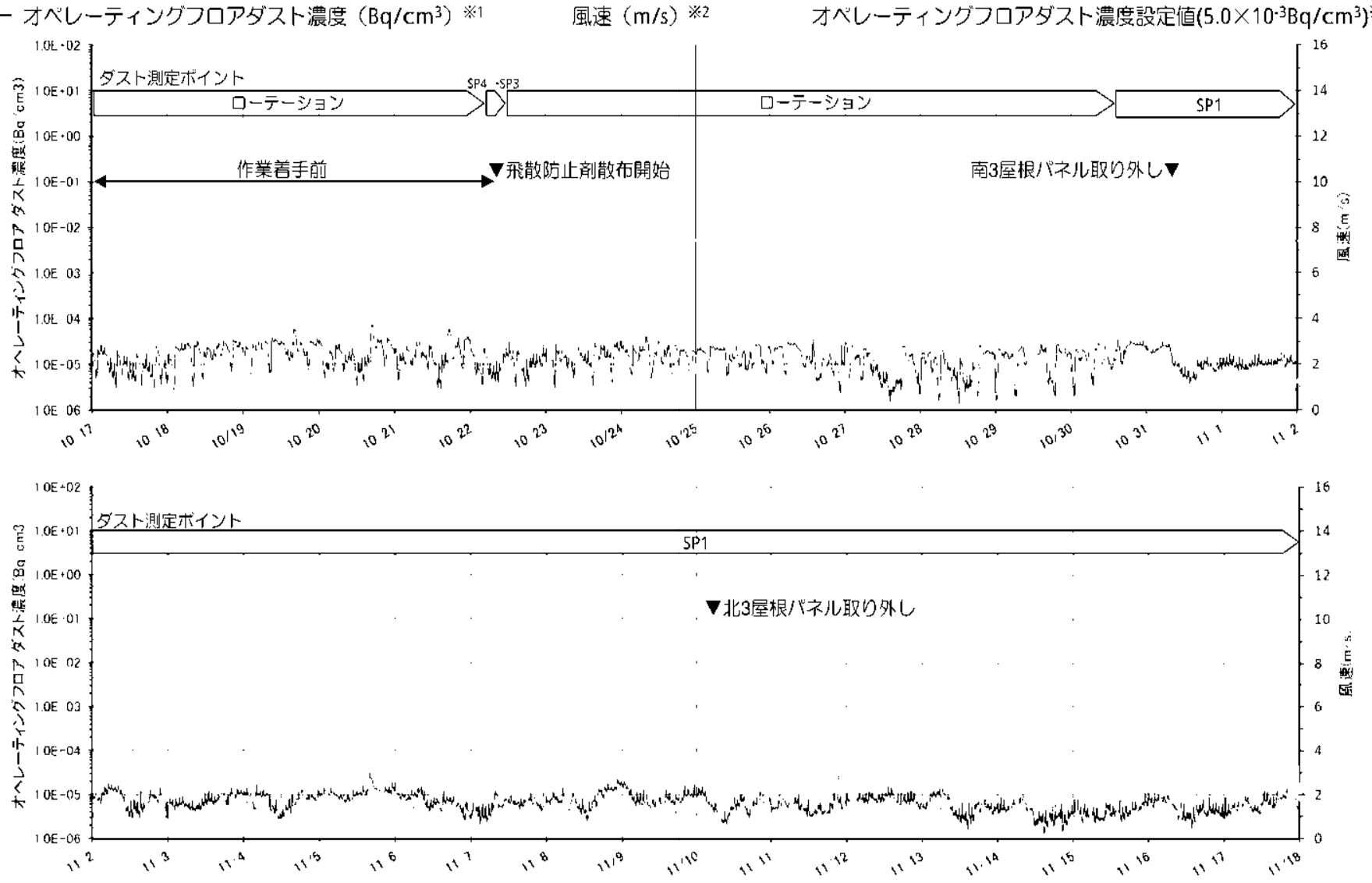
敷地境界付近のダストサンプラ　：□

■敷地境界付近のダストサンプラは、H26年度中にダストモニタに変更予定

【参考】オペレーティングフロアの空気中の放射性物質濃度について

前回資料1-3の再掲

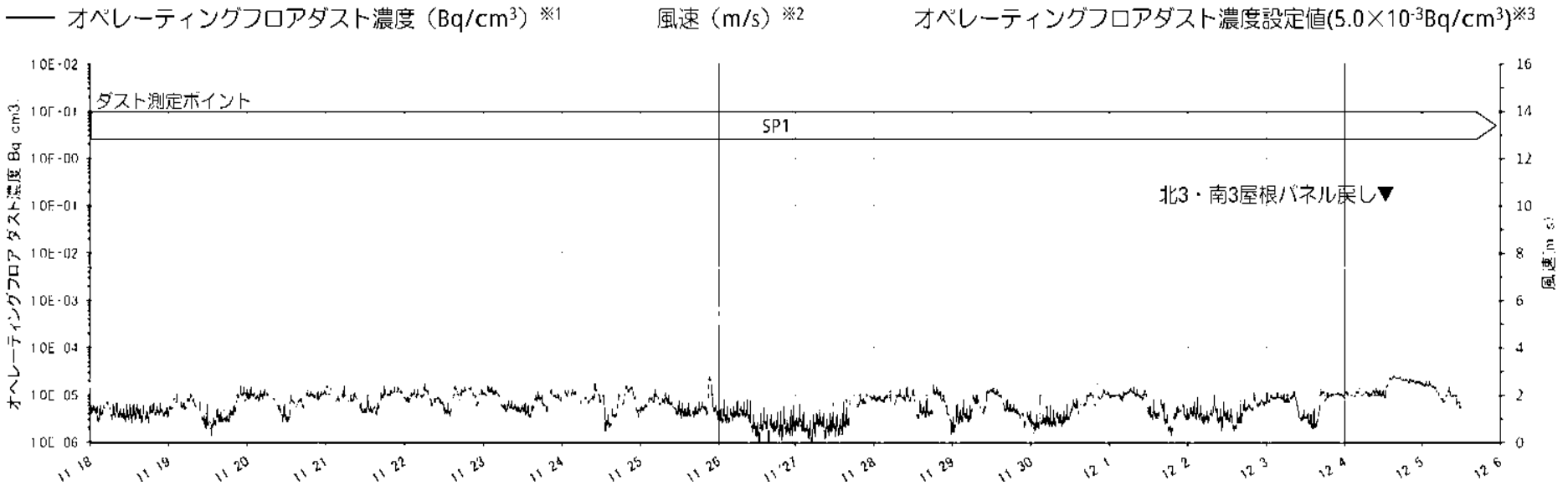
オペレーティングフロアの空気中の放射性物質濃度推移と風速の推移



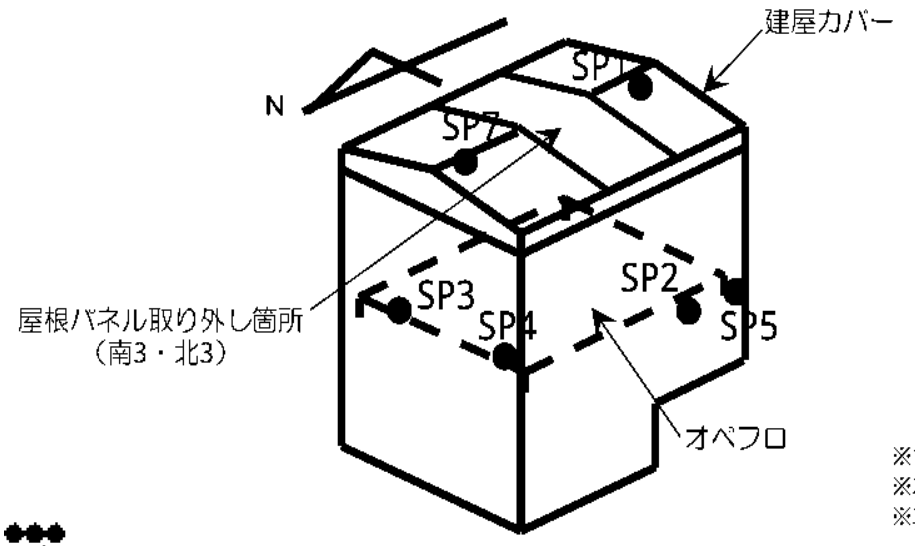
※1オペレーティングフロアダスト濃度0～20分値については有効値ではないため削除
※2福島第一原子力発電所構内露場にて観測した値(10分間の平均風速)
※3 敷地境界モニタリングポスト近傍のダストモニタ警報値より設定した公衆被ばくに影響を与えないように設定した値

【参考】オペレーティングフロアの空気中の放射性物質濃度について

前回資料1-3の再掲



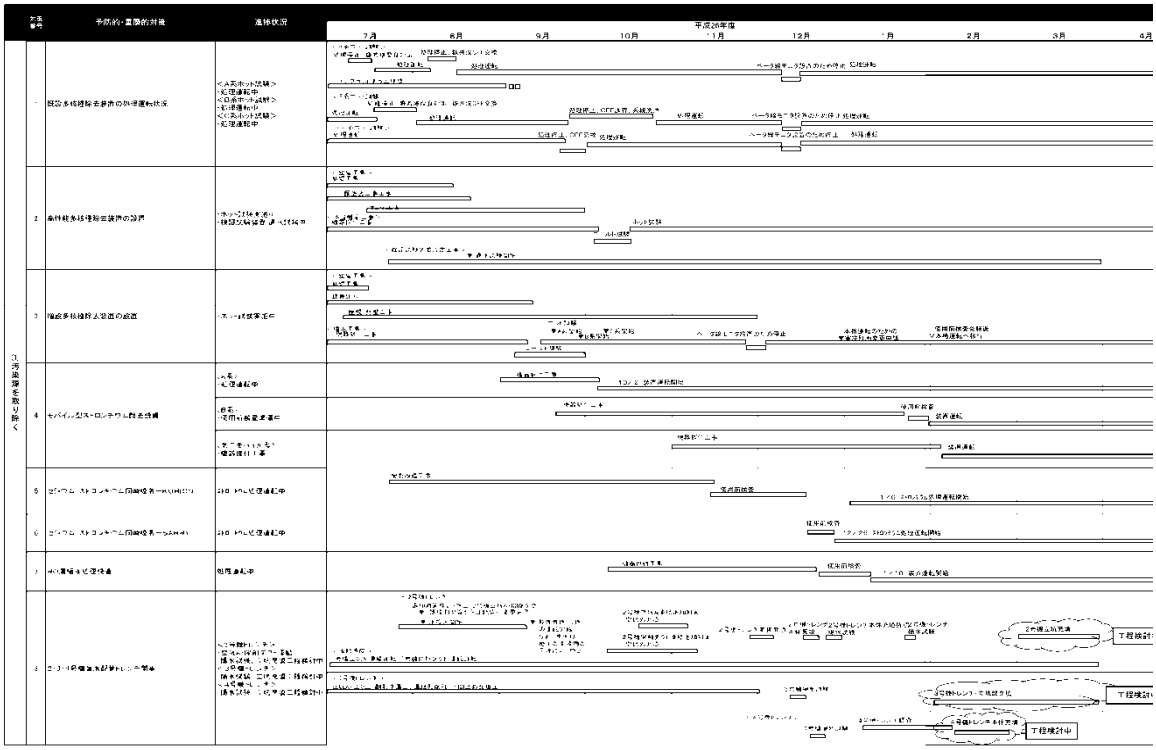
1号機建屋カバー内ダストモニタのサンプリング箇所



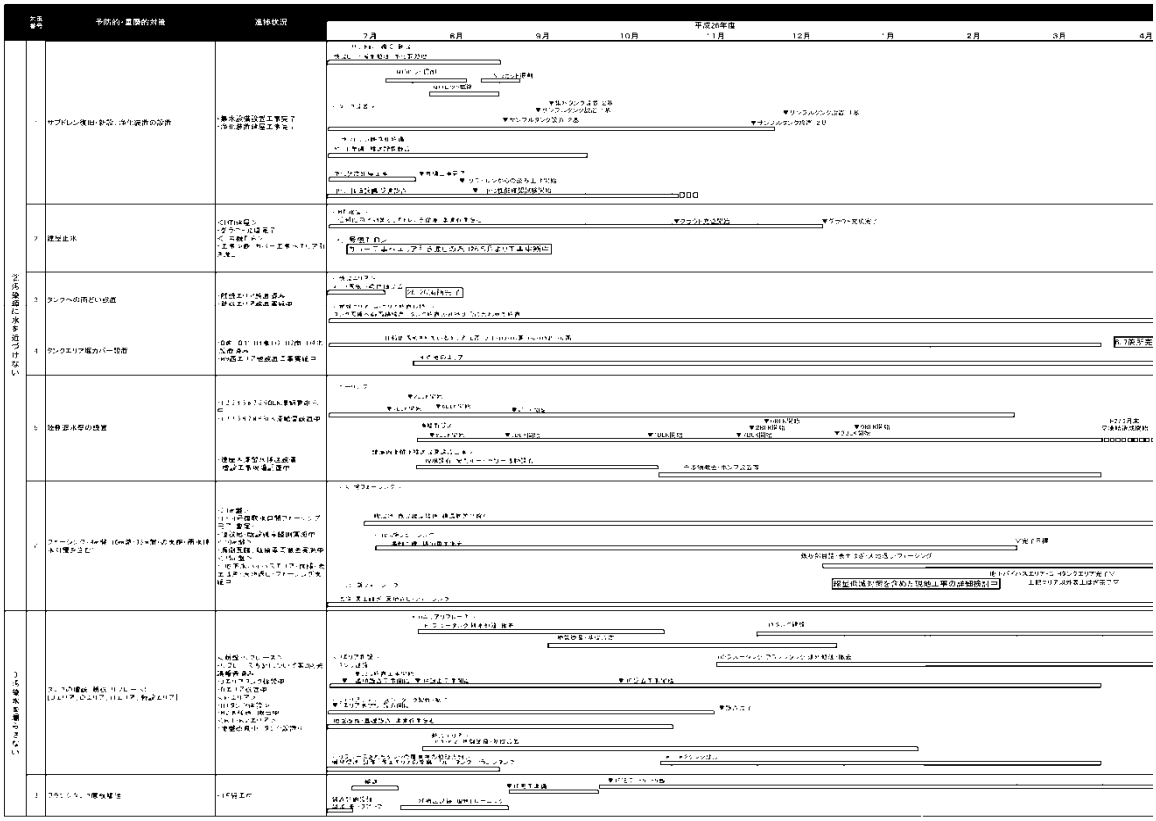
	サンプリング箇所	オペフロ面からの高さ
SP1	使用済燃料プール天井部	＋約19m
SP2	原子炉建屋オペフロ面開口部	+約0.5m
SP3	カバー北東コーナー	+約0.5m
SP4	カバー北西コーナー	+約0.5m
SP5	カバー南西コーナー	+約0.5m
SP7	カバー排気系フィルター入口	+約23m

※1オペレーティングフロアダスト濃度0～20分値については有効値ではないため削除
※2福島第一原子力発電所構内露場にて観測した値(10分間の平均風速)
※3 敷地境界モニタリングポスト近傍のダストモニタ警報値より設定した公衆被ばくに影響を与えないように設定した値

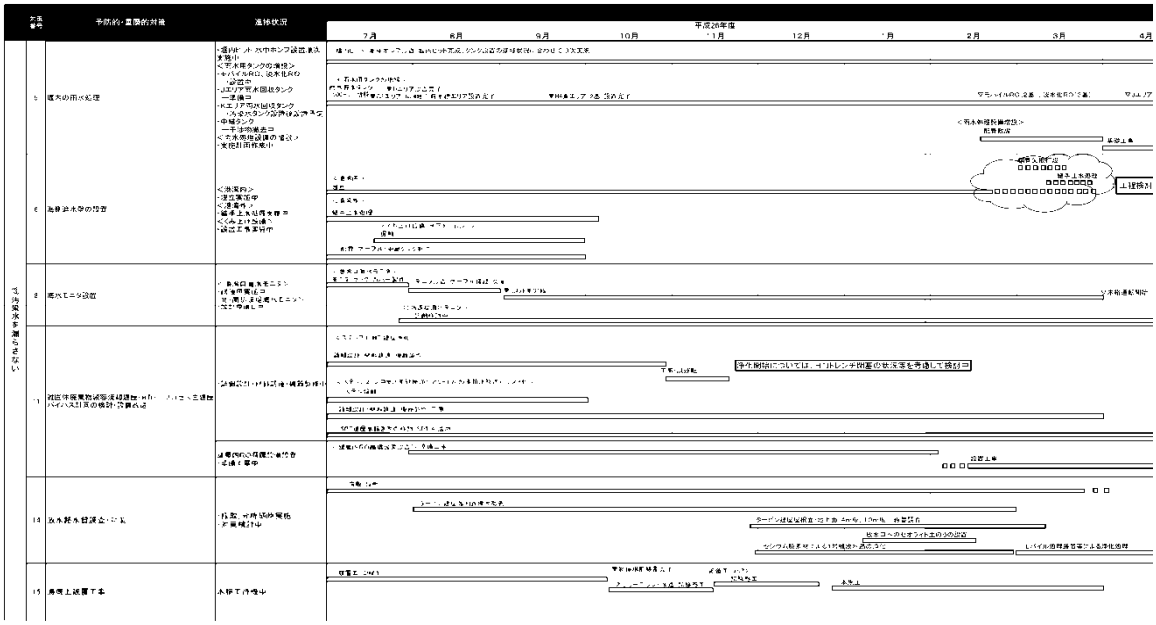
東京電力福島第一原子力発電所汚染水対策の対応
廃炉・汚染水対策現地調整会議　課題に対する管理表


対応番号
予防的・重層的対策
進捗状況
平成25年度
7月
8月
9月
10月
11月
12月
1月
2月
3月
4月
(1)汚染源を取り除く
1
2
3
4
5
6
7
8
<AREVA試験>
・処理運転中
<東芝等の試験>
・前処理中
<AREVA試験>
・処理運転中
・処理運転中
・処理運転中

東京電力福島第一原子力発電所汚染水対策の対応
廃炉・汚染水対策現地調整会議　課題に対する管理表



東京電力福島第一原子力発電所汚染水対策の対応
廃炉・汚染水対策現地調整会議　課題に対する管理表



1～4号機用汚染水貯蔵タンクエリア別タンク対策実施状況（H27.1.29現在）

※空欄は実施時期調整中

	エリア	鋼材による堰嵩上げ		堰高さの適正化			外周堰・浸透防止			雨樋	堰カバー	堰内ピットポンプ
		堰設置	被覆	名称 工法	内堰	被覆	名称	外周堰	被覆			
既設タンクエリア	B北	完了	完了	<B> コンクリ	完了	完了	<B>	完了	完了	完了	完了	完了
	B南	完了	完了							完了	完了	
	C東	完了	完了	<C> コンクリ	完了	完了	<C>	完了	完了	完了	工事中 （一部完了）	完了
	C西	完了	完了							完了	工事中 （一部完了）	完了
	E	完了	完了	<E> 鋼材	完了	完了	<E>	完了	完了	完了	工事中 （一部完了）	完了
	H1東	完了	完了	<H1> 鋼材	完了	完了	<H1>	完了	完了	完了	リプレースの為中止	完了
	H2北	完了	完了	<H2> 鋼材	完了	完了	<H2>	完了	完了	完了	リプレースの為中止	完了
	H2南	完了	完了							完了	完了	完了
	H3	完了	完了	<H3> 鋼材	完了	完了	<H3>	完了	完了	完了	完了	完了
	H4北	完了	完了	<H4A> 鋼材	完了	完了	<H4>	完了	完了	完了	完了	完了
	H4東	完了	完了							完了	完了	完了
	H4	完了	完了	<H4B> 鋼材	完了	完了				完了	リプレースの為中止	完了
	H5	完了	完了	<H5> 鋼材	完了	完了	<H5>	完了	完了	完了	工事中 （一部完了）	完了
	H6	完了	完了	<H6> 鋼材	完了	完了	<H6>	完了	完了	完了	H27.2月末 完了予定	完了
	H8北	完了	完了	<H8> 鋼材	完了	完了	<H8>	完了	完了	完了	完了	完了
	H8南	完了	完了							完了	完了	完了
	H9西	完了	完了	<H9> 鋼材	完了	完了	〈H9〉	完了	完了	完了	完了	完了
	H9東	完了	完了							完了	完了	完了
	G3東	完了	完了	<G3A> コンクリ	完了	完了	<G3-G5>	完了	完了	完了	H27.2月末 完了予定	完了
	G3西	完了	完了	<G3B> コンクリ	完了	完了				完了	工事中 （一部完了）	完了
	G3北	完了	完了	<G4> コンクリ	完了	完了				完了	工事中 （一部完了）	完了
	G4南	－	完了							完了	完了	完了
	G4北	－	完了							完了	H27.2月末 完了予定	完了
	G5	－	完了	<G5> コンクリ	完了	完了				完了	H27.2月末 完了予定	完了
	G6南	完了	完了	<G6> コンクリ	完了	完了	<G6>	完了	完了	完了	H27.2月末 完了予定	完了
	G6北	完了	完了							完了	完了	完了

	エリア	仮堰設置	堰高さの適正化			外周堰・浸
		仮堰25cm	名称 工法	内堰	被覆	名称
増設・リプレースタンクエリア	D	逐宜実施 （インサービス毎）	<D> コンクリ			<D>
	G7	完了	<G7> コンクリ	完了	完了	<G7>
	J1（東）	完了	<J1東> コンクリ	完了	完了	<J1東>
	J1（中）	完了	<J1中> コンクリ	完了	完了	<J1中>
	J1（西）	完了	<J1西> コンクリ	完了	完了	<J1西>
	J2	逐宜実施 （インサービス毎）	<J2> コンクリ			<J2>
	J3	逐宜実施 （インサービス毎）	<J3> コンクリ			<J3>
	J4	逐宜実施 （インサービス毎）	<J4> コンクリ			<J4>
	J5	逐宜実施 （インサービス毎）	<J5> コンクリ			<J5>
	J6	逐宜実施 （インサービス毎）				
	K1（北）	逐宜実施 （インサービス毎）				

4,000tノッチタンク群と地下貯水槽の雨水処理状況

	地下貯水槽		
	No. 4 （m^3）	No. 7 （m^3）	ノッチ
6月24日	1,490	1,870	
7月29日	1,070	1,310	
8月26日	630	810	
9月29日	150	500	
10月28日	80	350	
11月25日	0 （11/3完了）	100	
12月22日	－	※1　60 （12/5完了）	
1月26日	－	－	

※：1,000tノッチタン

※1：No.7地下貯水槽は12／5に既設ボ

No.①-1～3

各多核種除去設備の運転状況

東京電力
TEPCO

1.多核種除去設備のホット試験開始以降の運転実績

■ ホット試験開始日

A系統：H25.3.30　B系統：H25.6.13　C系統：H25.9.27

■ 設備稼働率（H26.1以降）　定格処理量：750m^3／日

稼働率（%）		運転概況（主なもの）
H26年1月	42	クレーンインバータ故障、B系統腐食確認点検
H26年2月	60	B系統腐食確認点検、A系統ブースターポンプインバータ故障
H26年3月	46	B系統CFF交換、CFFリークによる全系統停止
H26年4月	35	A系統・B系統CFF交換
H26年5月	39	A系統・C系統CFF交換、C系統腐食確認点検
H26年6月	59	C系統CFF交換、C系統腐食確認点検
H26年7月	61	A系統腐食確認点検、B系統CFF交換
H26年8月	57	A系統・B系統CFF交換
H26年9月	59	C系統CFF交換
H26年10月	51	B系統CFFリーク原因調査・CFF交換
H26年11月	76	計画外停止なし
H26年12月	49	CFF硝酸洗浄、ベータ線モニタ設置等、計画外停止なし
H27年1月※	61	CFF硝酸洗浄、計画外停止なし

※1/1～1/28

■処理実績（H27.1.22現在）

処理水貯槽貯蔵量　：約196,000m^3

2.高性能多核種除去設備のホット試験開始以降の運転実績

■ ホット試験開始日
H26.10.18

■ 設備稼働率　定格処理量：500m^3／日

稼働率（%）		運転概況
H26年10月	22	間欠運転
H26年11月	13	間欠運転
H26年12月	59	処理運転
H27年1月※	52	性能維持確認しながら処理運転継続、計画外停止なし

※1/1～1/28

■処理実績（H27.1.22現在）
処理水貯槽貯蔵量　：約18,000m^3

■ 現在、各吸着塔における除去性能の確認を行いつつ、処理運転を継続中

3.増設多核種除去設備のホット試験開始以降の運転実績

■ ホット試験開始日

A系統：H26.9.17　B系統：H26.9.27　C系統：H26.10.9

■ 設備稼働率（３系列運転H26.10.9以降）　定格処理量：750m^3／日

稼働率（%）		運転概況
H26年10月	83	RO制御系改造等、計画外停止なし
H26年11月	78	CFF洗浄等、計画外停止なし
H26年12月	55	CFF硝酸洗浄、ベータ線モニタ設置等、計画外停止なし
H27年1月※	75	CFF硝酸洗浄、計画外停止なし

※1/1～1/28

■処理実績（H27.1.22現在）

処理水貯槽貯蔵量　：約64,000m^3

■ 本格運転に向けた準備が整ったことから、ホット試験結果を踏まえた実施計画変更申請済み（H26.12.25）

No.①-4～7

汚染水浄化処理設備の進捗状況

東京電力 TEPCO

1. モバイル型ストロンチウム除去装置(A系統)

設備概要

汚染水処理設備の処理済水を貯留する設備（タンク）のうち，逆浸透膜装置の廃液を貯留するRO濃縮水貯槽は，高濃度の放射性ストロンチウムを含むため，モバイル型ストロンチウム除去装置により放射性ストロンチウム濃度を低減する。

G4南タンク，G6南タンクのRO濃縮水を処理する計画。

処理能力：300m^3/日

除去能力：Srを10～1,000分の1へ低減（目標）

運転状況

運転開始：H26年10月2日

G4南エリア処理実施中

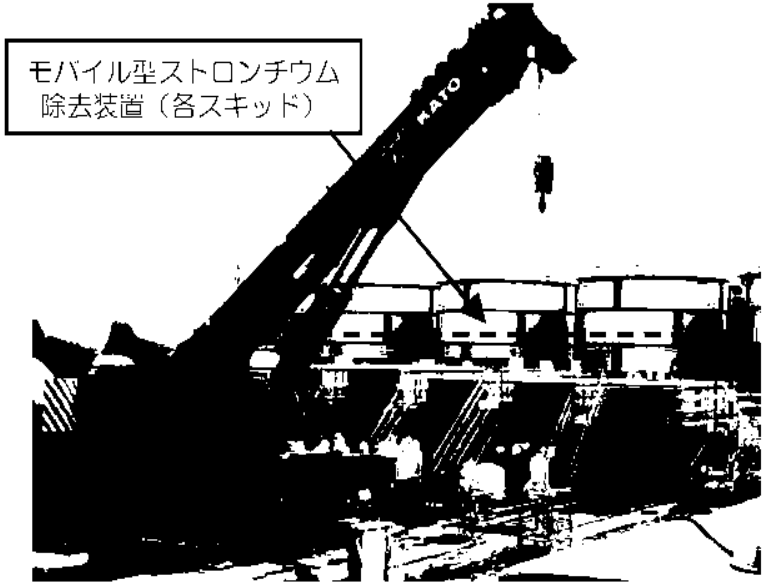
処理実績（H27.1.29現在）：

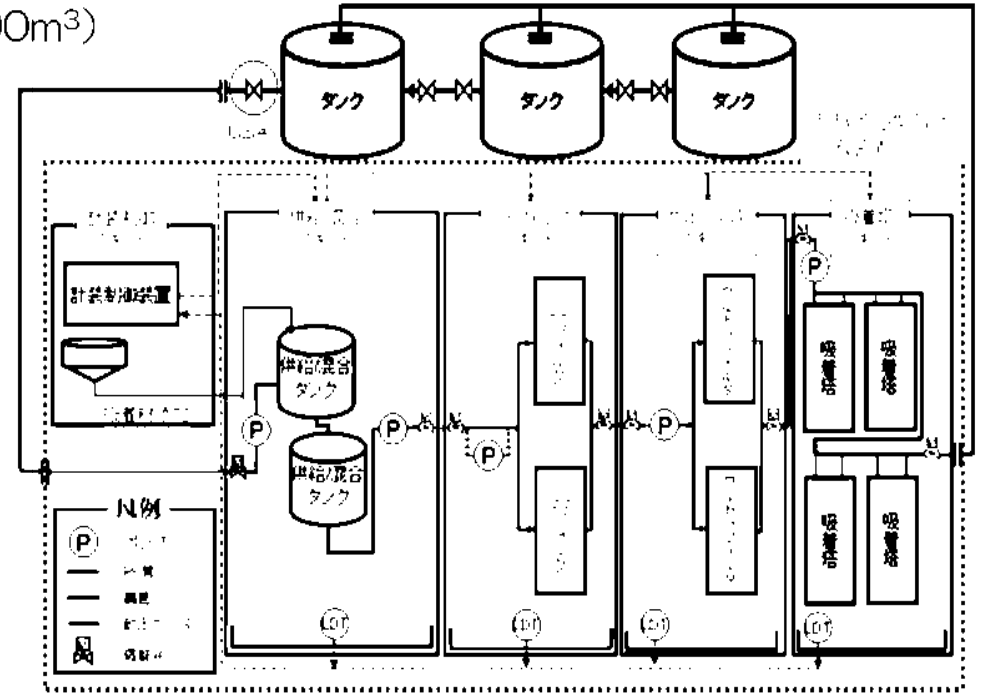
浄化処理量　処理済み 約4,000m^3（A群タンク）

処理中　約4,000m^3（B群タンク）

（G4南 A～C群タンク合計約14,000m^3）

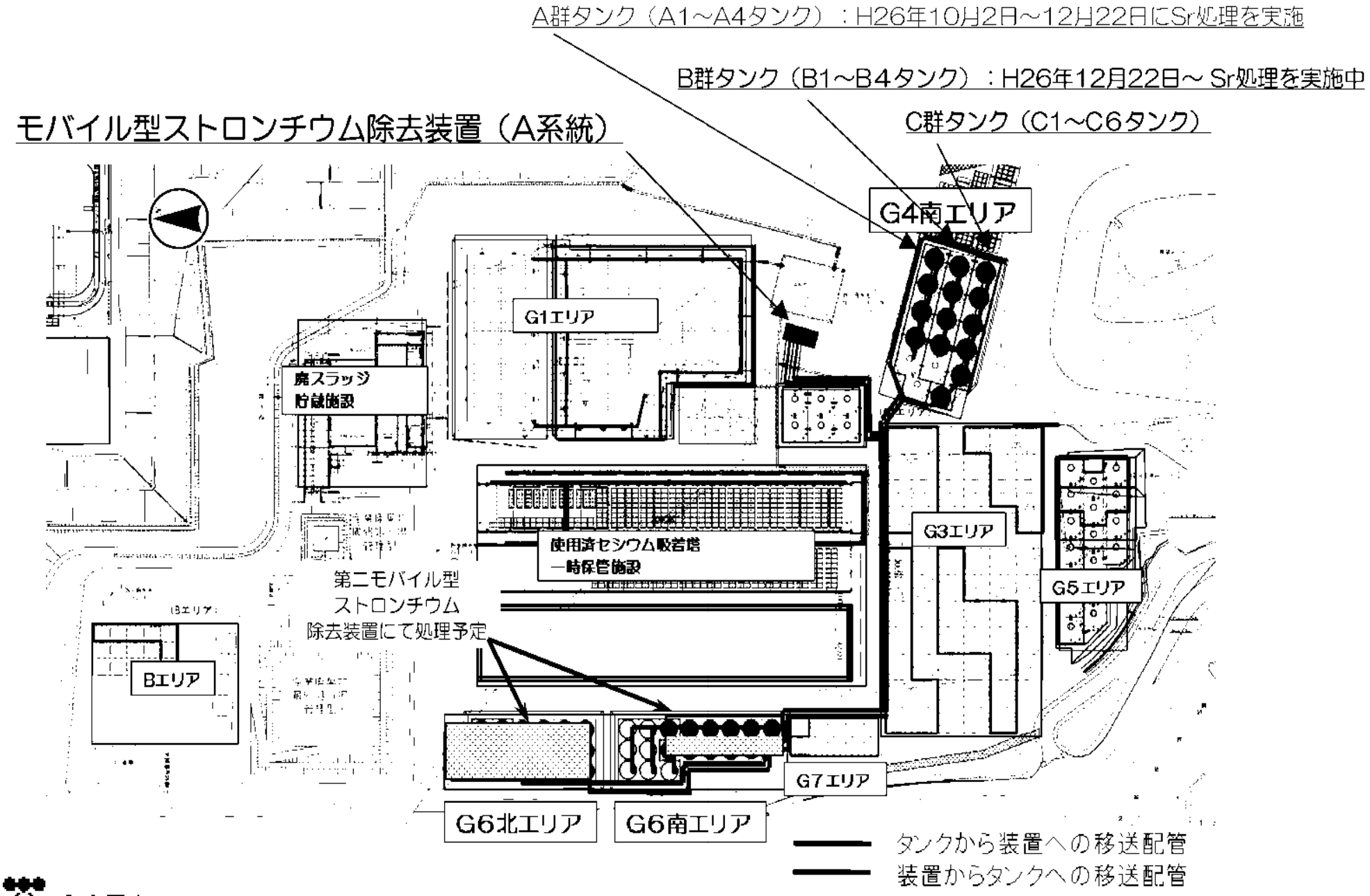
除去実績：10～100分の１程度





装置概要図

【配置概要図】モバイル型ストロンチウム除去装置（A系統）



2. モバイル型ストロンチウム除去装置（B系統）

設備概要

A系統と同様の装置構成により，RO濃縮水貯槽の放射性ストロンチウム濃度を低減する。

H5北タンクのRO濃縮水を処理する計画。

処理能力：300m^3/日

除去能力：Srを10～1,000分の1へ低減（目標）

工程

実施計画認可：

H26年12月12日

現地工事：

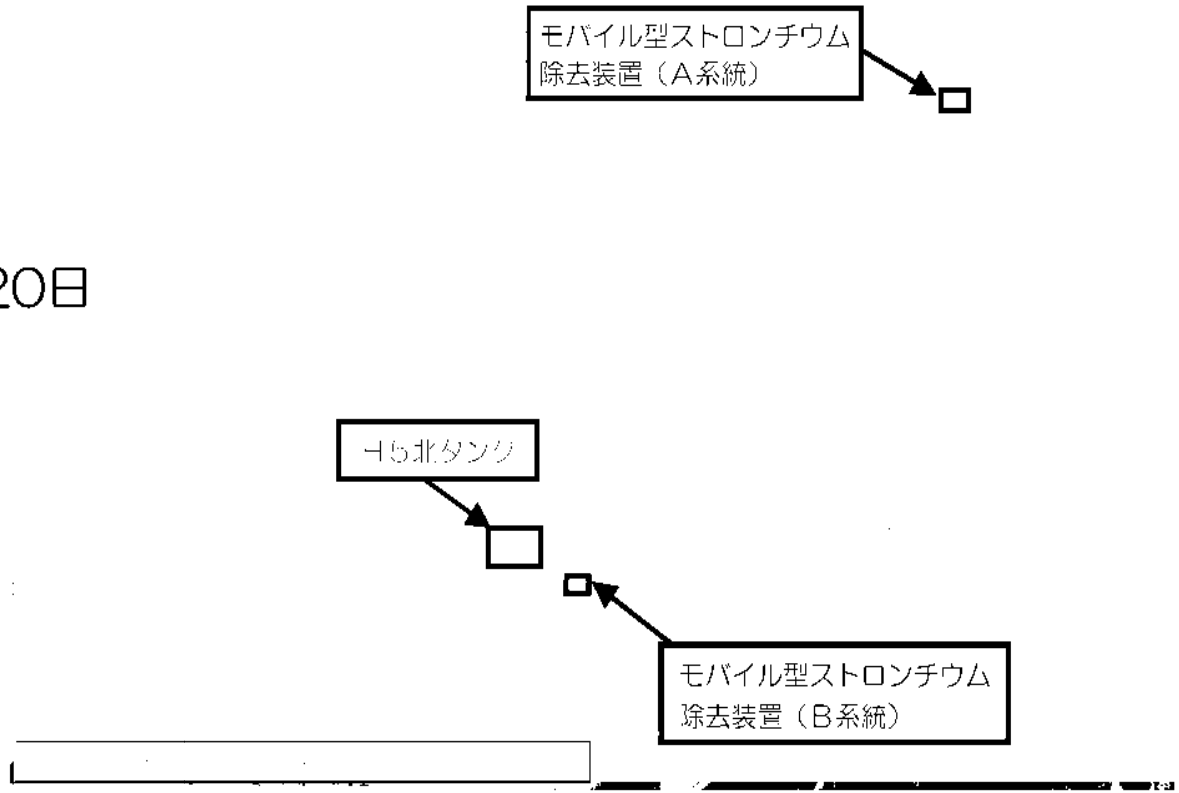
H26年11月中旬～H27年1月20日

使用前・溶接検査：

H27年1月20～23日

処理運転

H27年2月上旬～（予定）



装置設置エリア及び対象処理タンク

3. 第二モバイル型ストロンチウム除去装置

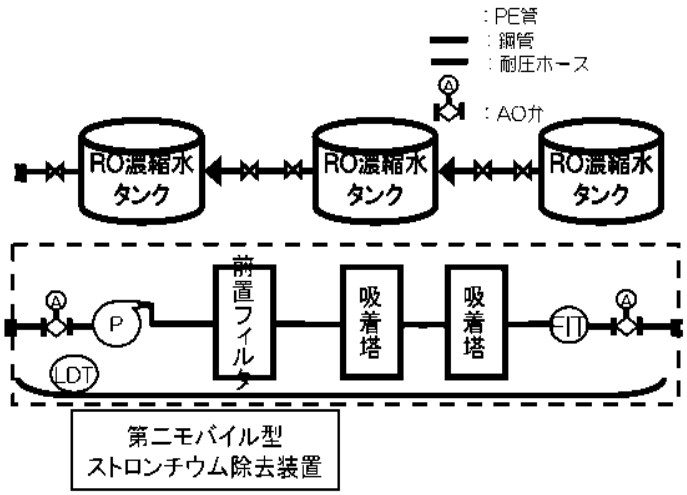
設備概要

モバイル型ストロンチウム除去装置A，B系統と同様，RO濃縮水貯槽の放射性ストロンチウム濃度を低減する。

C_A、C_B、G6_A/B、G6_C/Dタンクの RO濃縮水を処理する計画。

処理能力：480m^3/日/ユニット
（4ユニット設置）

除去能力：Srを10～1000分の1へ低減
（目標）



装置概要図

工程

実施計画変更手続き中（※1）

現地工事：

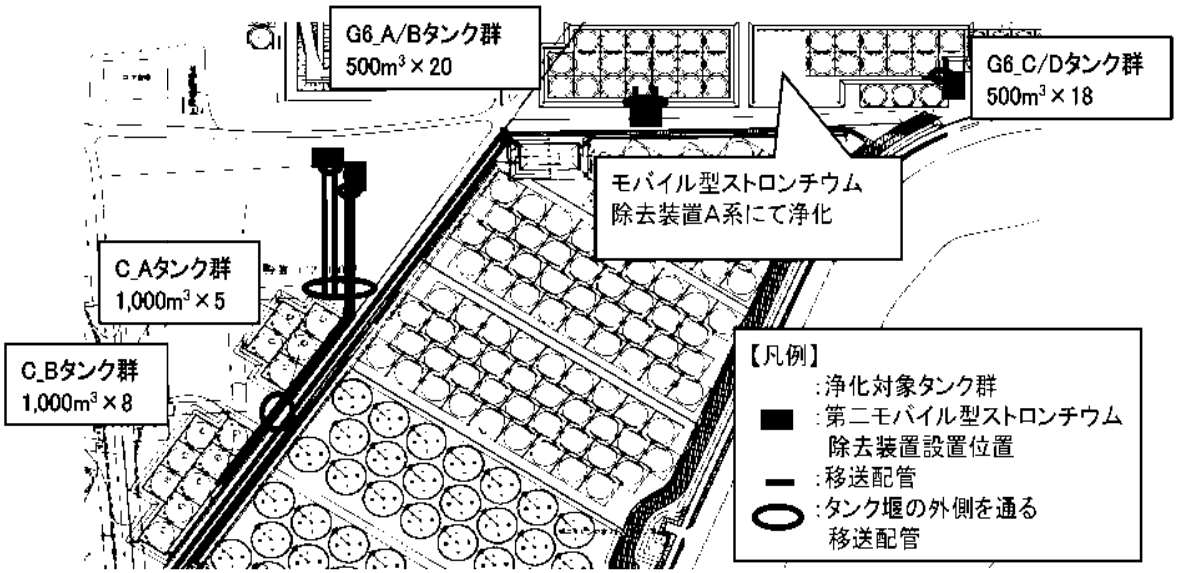
H26年11月上旬～H27年2月上旬

使用前・溶接検査：

H27年2月上旬～（予定）

処理運転：H27年2月中旬～（予定）

（※1）H26年12月12日変更申請実施



装置設置エリア及び対象処理タンク

4. セシウム吸着装置でのストロンチウム除去

設備概要

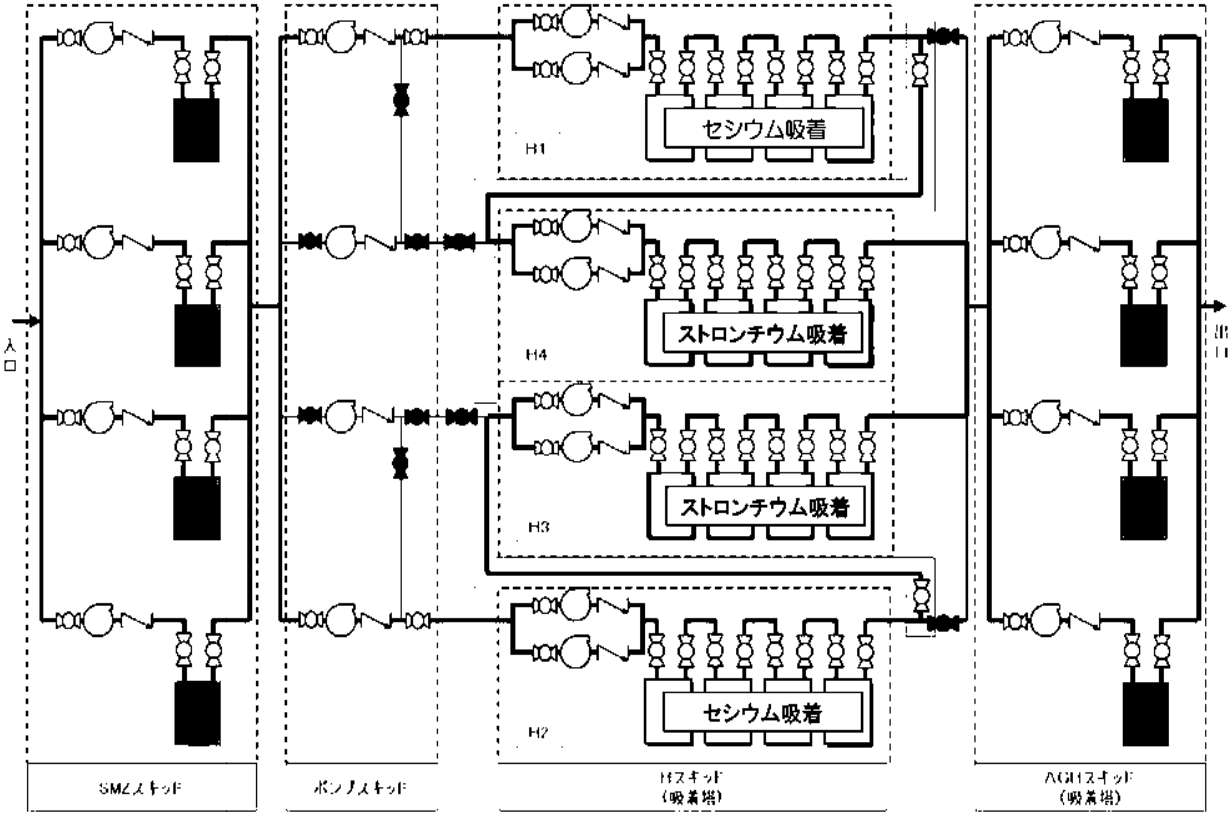
セシウム吸着装置において，新たにSr吸着塔を装荷し，CsとともにSrを除去する。
Cs吸着塔とSr吸着塔の２段階で処理するため，Cs/Sr同時吸着用配管（連絡配管）を設置する。
処理能力：600m^3/日
除去能力：Srを100～1,000分の１へ低減（目標）

工程

実施計画認可：
H26年11月7日
連絡配管使用前検査：
H26年11月11～12日
（H26年11月20日終了証交付）
吸着塔使用前・溶接検査：
H26年12月３～８日
（H26年12月11日終了証交付）

運転状況：
処理運転：H27年1月6日～
除去実績：100分の１程度

※ Sr処理水の貯蔵
セシウム吸着装置、第二セシウム吸着装置による処理水は、H27年1月19日より、Sr処理水として貯蔵を開始



装置概要図　　：連絡配管

5. 第二セシウム吸着装置でのストロンチウム除去

設備概要

第二セシウム吸着装置のCs吸着塔に変えてCs/Sr同時吸着塔を装荷し、Csとともに　Srを除去する。
初期運用時は、２種類の同時吸着塔をそれぞれA系・B系に２塔ずつ装荷するとともに同時吸着塔の後段にはCs吸着塔２塔を装荷して、Cs濃度を確実に低減する 。
なお、本格運用時は、A系・B系に同時吸着塔を3塔ずつ装荷する計画。
処理能力：1,200m^3/日
除去能力：Srを100～1,000分の1へ低減（目標）

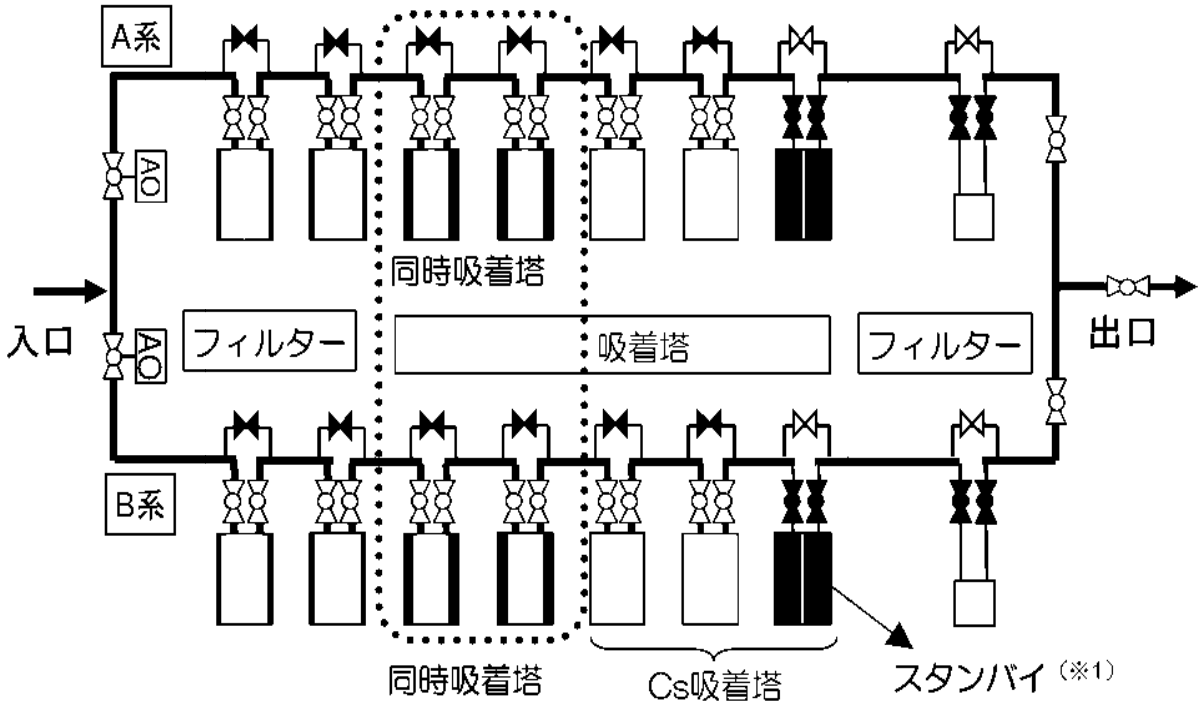
工程

実施計画認可：H26年12月10日
吸着塔使用前・溶接検査：
H26年12月16～22日
（H26年12月25日終了証交付）

運転状況

処理運転：H26年12月26日～
除去実績：100分の1程度

※ Sr処理水の貯蔵
セシウム吸着装置、第二セシウム吸着装置による処理水は、H27年1月19日より、Sr処理水として貯蔵を開始



吸着塔配列（初期運用時）

（※1）水質の変動に備えてCs吸着塔１塔をスタンバイとする。

6. RO濃縮水処理設備

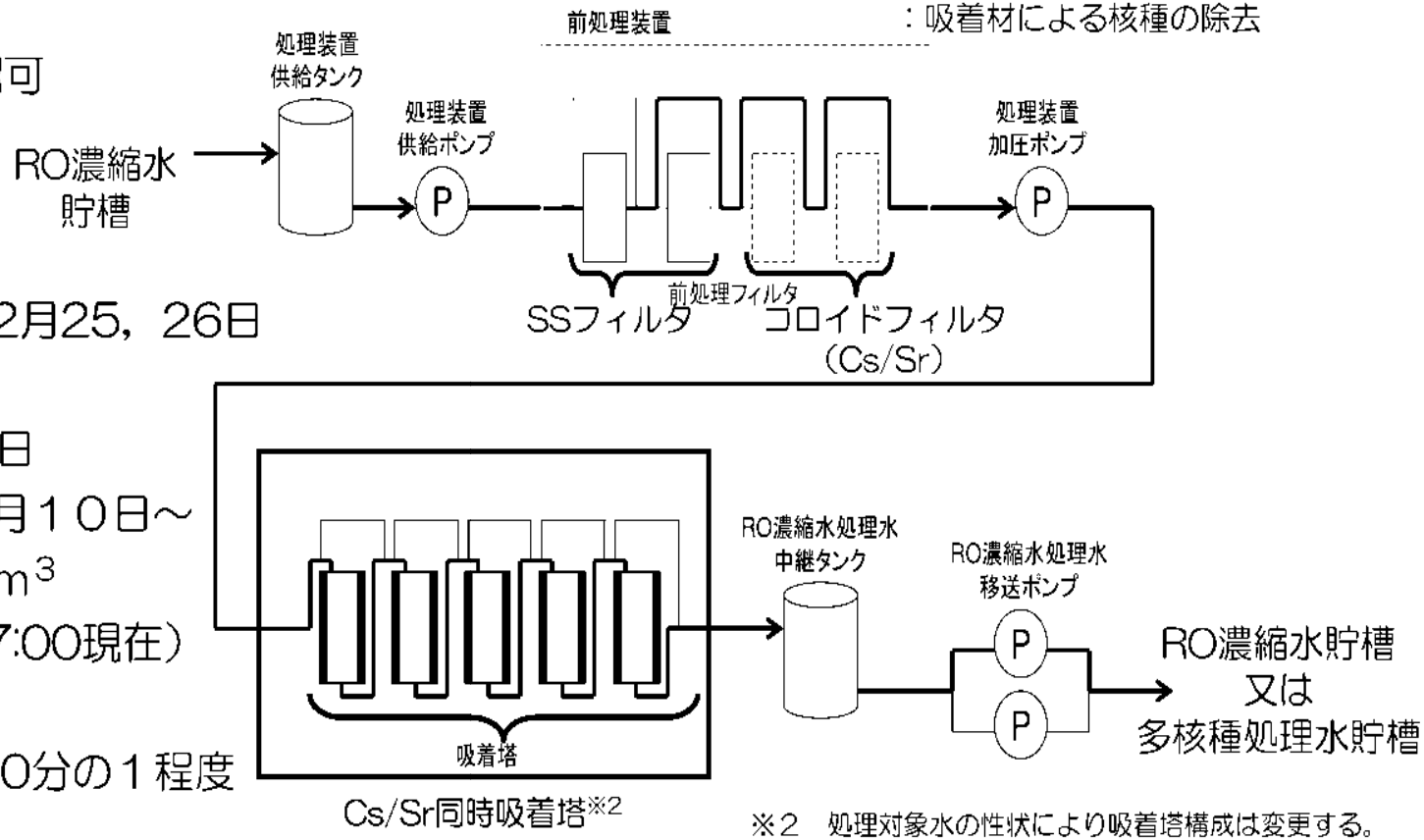
設備概要

RO濃縮塩水を前処理装置と核種除去装置にて処理後，再びタンクへと貯留する。
本設備で処理した水については，最終的に多核種除去設備等にて処理を行う。
処理能力：500～900m^3/日
除去能力：Srを100～1,000分１へ低減（目標）

①前処理装置
：フィルタ処理による浮遊物質の除去
②核種除去装置
：吸着材による核種の除去

工程

実施計画変更：
H26年12月22日認可



溶接検査：H26年12月25，26日
使用前検査：
H27年1月6日～9日
処理開始：H27年1月１０日～
処理量　約11,300m^3
（1/29　7:00現在）
除去実績：100～
10,000分の１程度

※２　処理対象水の性状により吸着塔構成は変更する。
なお、Cs/Sr同時吸着塔は少なくとも3 塔通水する。

【参考】汚染水のリスク低減策

モバイル型ストロンチウム除去装置

【A系】処理運転中
【B系】2月上旬～処理運転（予定）
【第二】実施計画を申請中(12/12申請)
処理能力：300m^3/日×2系、480m^3/日×4台
除去能力：ストロンチウムを1/10～1/1,000へ低減

多核種除去設備

現在ホット試験中
処理能力：250m^3/日×3系列
除去能力：62核種を告示濃度限度未満へ

増設多核種除去設備

現在ホット試験中
処理能力：250m^3/日以上×3系列
除去能力：62核種を告示濃度限度未満へ

セシウム吸着装置でのストロンチウム除去

処理運転中
処理能力：600m^3/日
除去能力：ストロンチウムを1/100～1/1,000へ低減

多重的なリスク低減策

高性能多核種除去設備

現在ホット試験中
処理能力：500m^3/日以上
除去能力：62核種を告示濃度限度未満へ

第二セシウム吸着装置でのストロンチウム除去

処理運転中
処理能力：1,200m^3/日
除去能力：ストロンチウムを1/100～1/1,000へ低減

RO濃縮水処理設備

処理運転中
処理能力：500～900m^3/日
除去能力：ストロンチウムを1/100～1/1,000へ低減

★多重的な対策により、汚染水のリスク低減を図る。

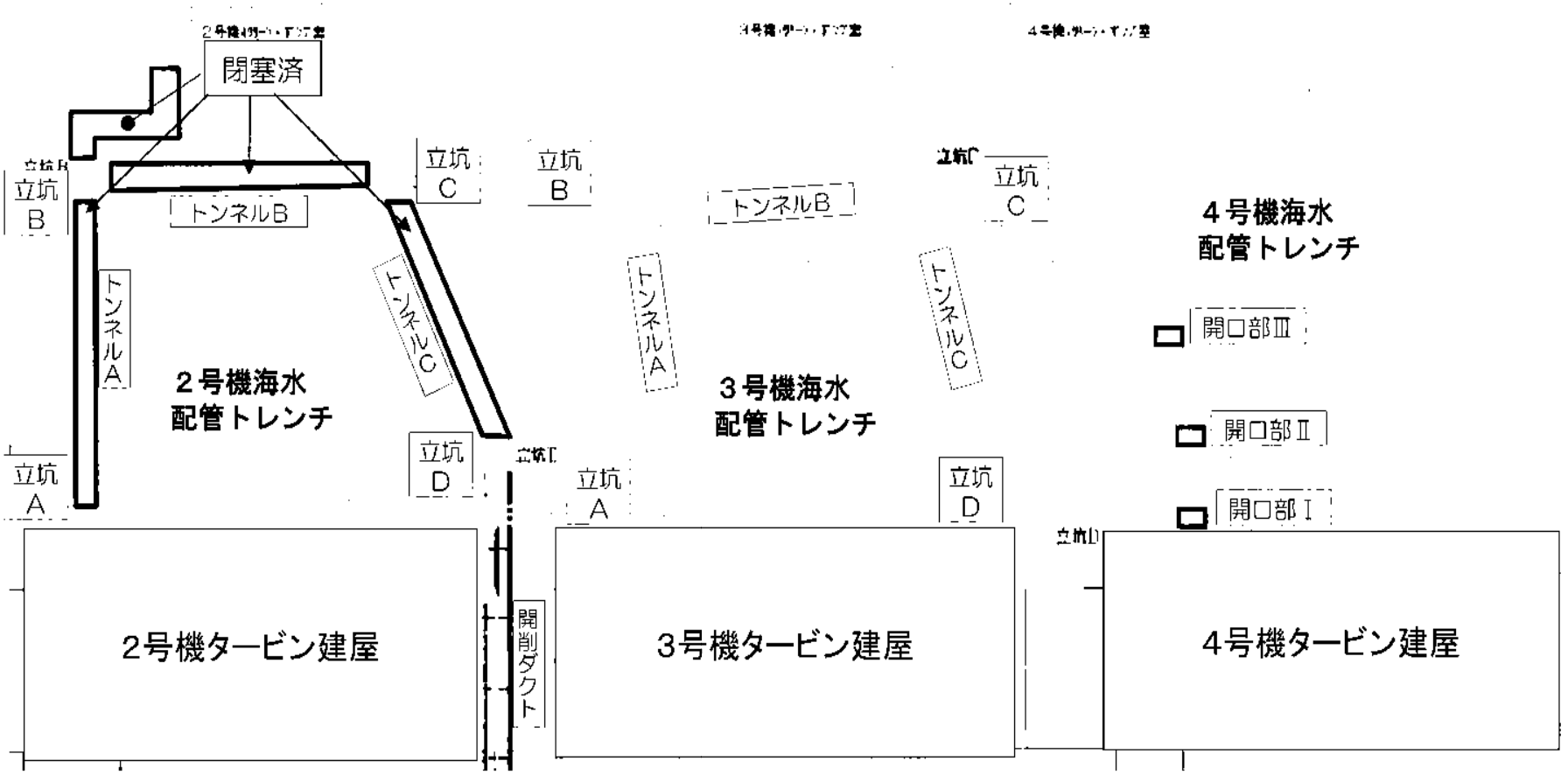
No.①-8

1、2、3、4号機海水配管トレンチ
止水・閉塞工事の進捗状況について

東京電力
TEPCO

1. 海水配管トレンチ止水・閉塞工事の進捗状況

■位置図



■進捗状況（平成27年1月30日現在）

号機	2号機	3号機	4号機
状況	・12/18 トンネル部閉塞充填完了 ・1/20 揚水試験（2回目） ・立坑閉塞検討中	・トンネル部充填準備完了 ・充填開始日調整中	・T／B接続部及び開口部Ⅰ調査中 ・開口部Ⅱ充填準備中
残滞留水量	約2,500m^3	約6,000m^3	約700m^3
充填量	約2,500m^3	0m^3	0m^3

2.（1） 2号機：海水配管トレンチ・トンネル閉塞の施工手順

充填孔・ポンプ設置孔の削孔、水位計の設置

※一部の孔の削孔はトンネルA天井部充填までに実施

トンネルA、B、C一般部充填　※トンネルの中・下部を一般部とする

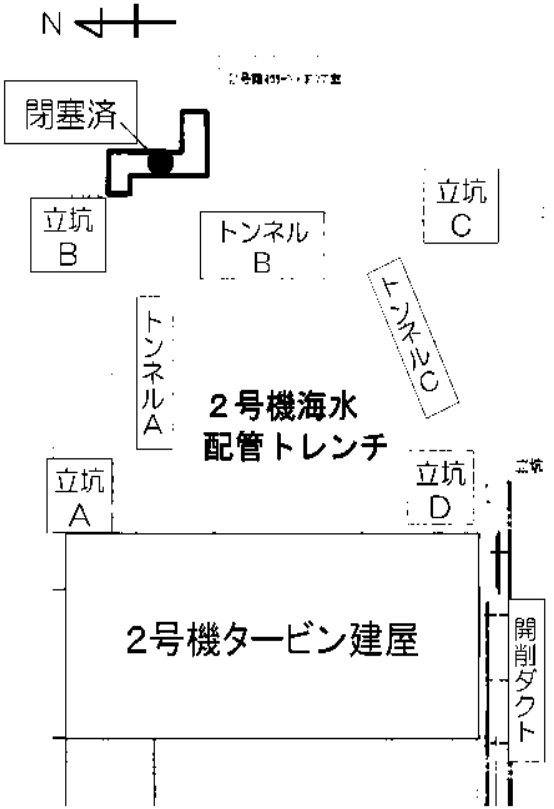
数回にわけて水抜きと充填を繰り返し

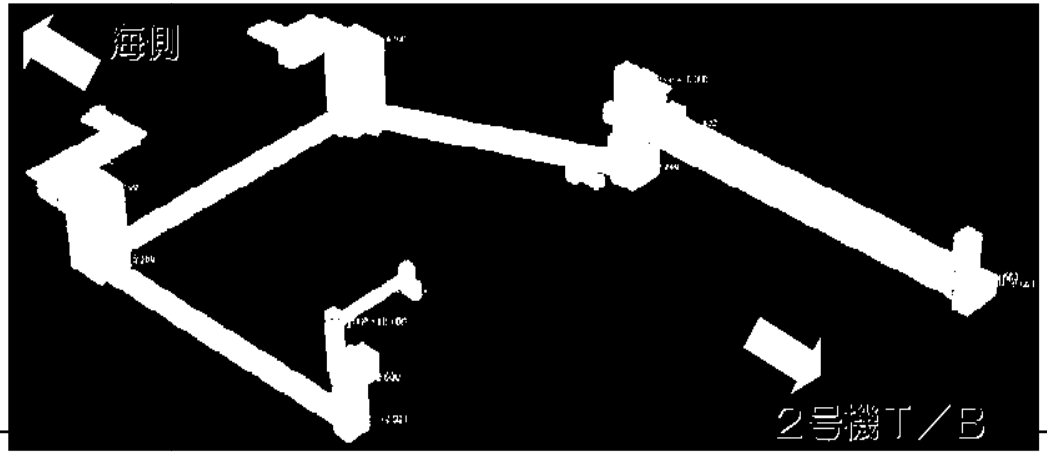
トンネルA、B、C天井部充填　12/18完了

揚水試験による充填状況の確認　12/24、1/20実施

立坑A、D、開削ダクトの閉塞

立坑B、Cの閉塞

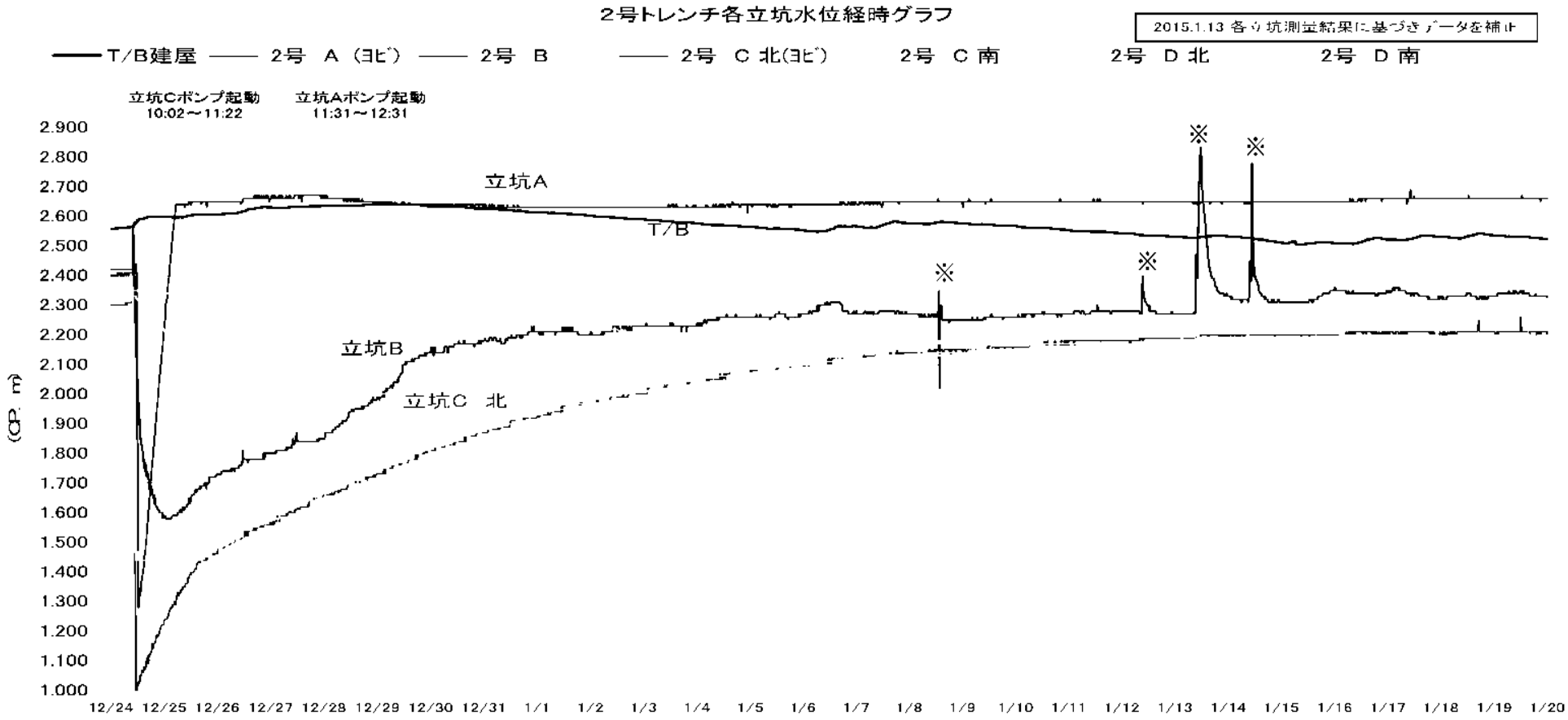




鳥瞰図（北西から臨む）

2.(2) 2号機:揚水試験(1回目)における水位変化

12/18にトンネル部の充填が完了。12/24に揚水試験（１回目）を実施。トレンチ内水位計の水準測量は完了。
揚水試験（１回目）後、現在の水位は立坑B、C、DがO.P.+2.1～2.2mに収束。
立坑A－B間（トンネルA）の連通量は、ごくわずかと推定。
立坑B－C間（トンネルB）及び立坑C－D間（トンネルC北・南）については、連通の可能性が高い。



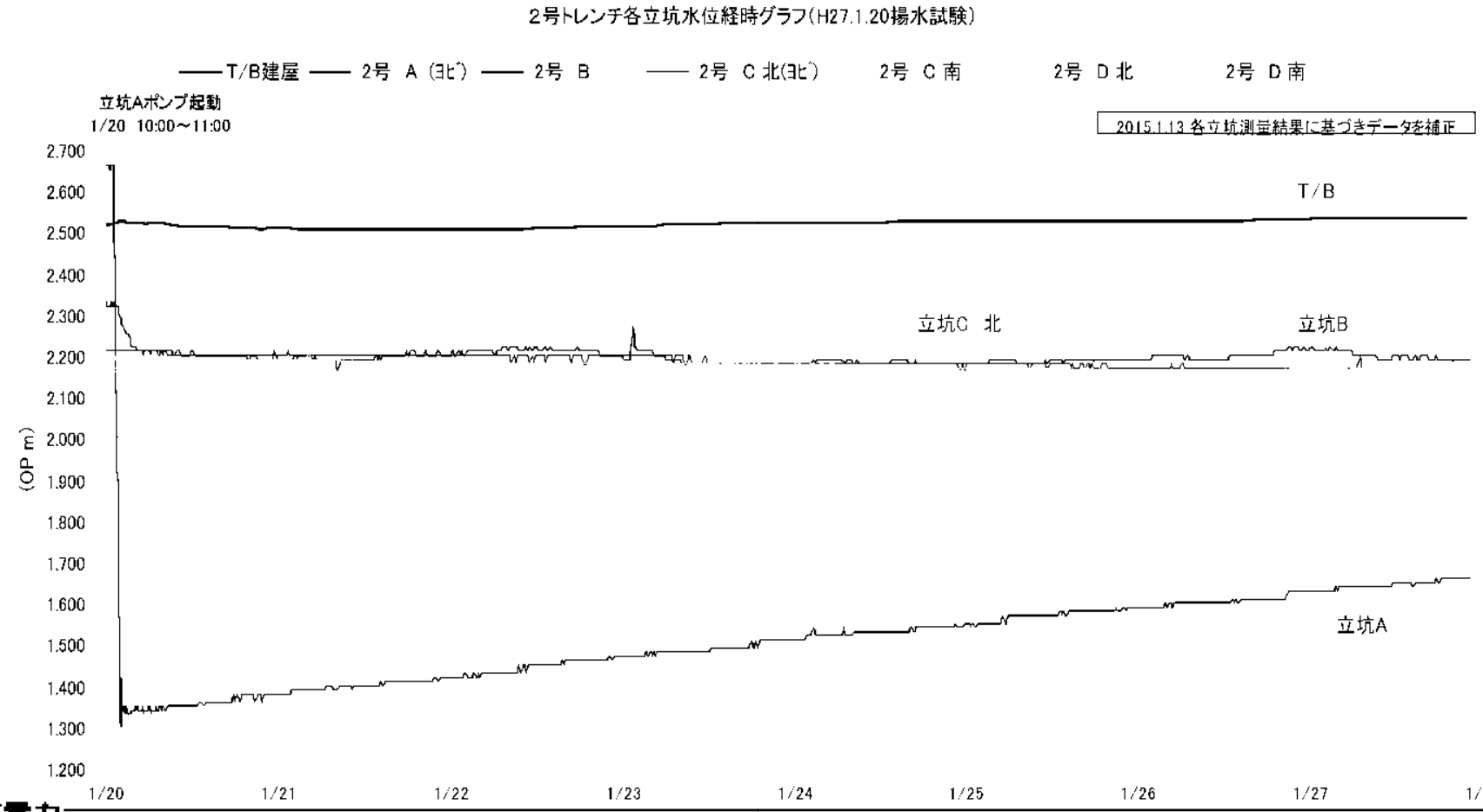
※削孔に伴う注水及びコア回収のため、一時的に水位が変化

2.(3) 2号機:揚水試験(2回目)における水位変化

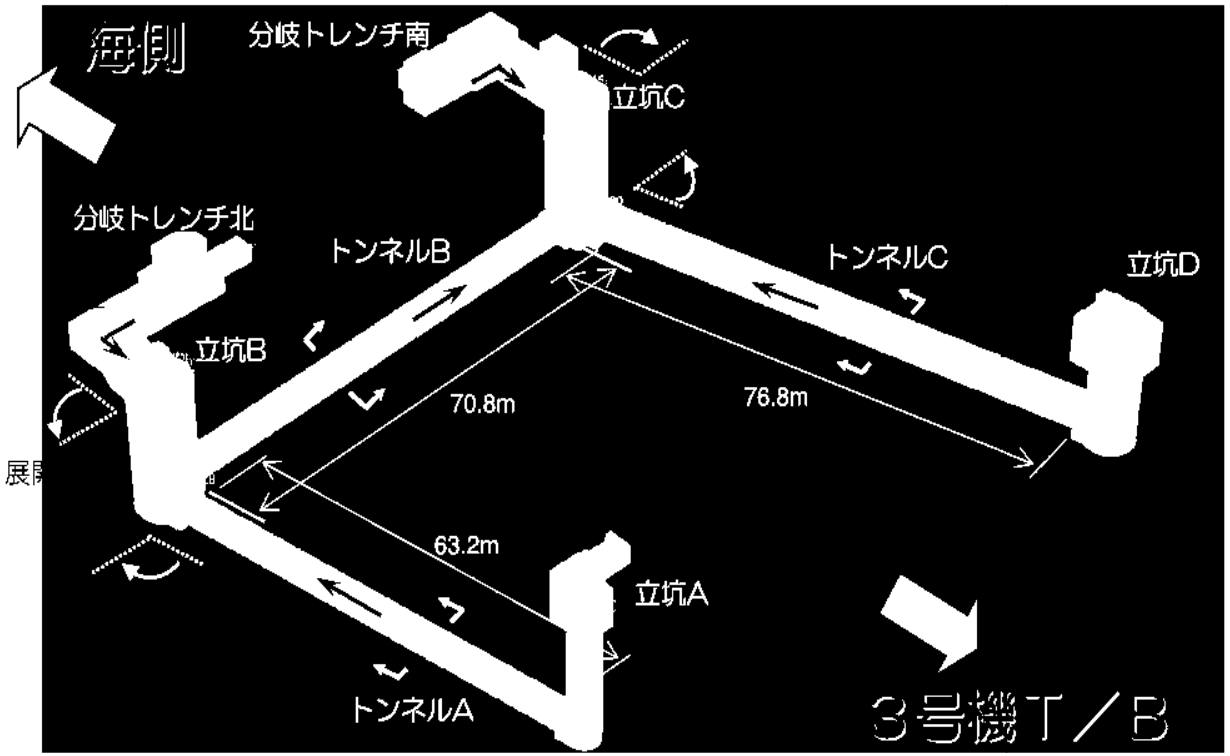
1/20に揚水試験（２回目）を実施。

立坑Ａの水位を低下させた後、立坑Ｂの水位も低下（２時間で▲約７cm）。水位変化や各立坑の位置関係から、トンネルＡの連通量は、１回目と同様、ごくわずかと推定。

揚水試験（２回目）後、立坑Ａの水位が戻っていないことから、Ｔ／Ｂ建屋と立坑Ａの連通部の凍結が進行したものと想定。（同様に、T/B建屋と立坑Dの水位から、Ｔ／Ｂ建屋と開削ダクトの連通部も凍結が進んでいると想定）



3.（1） 3号機：海水配管トレンチの概要

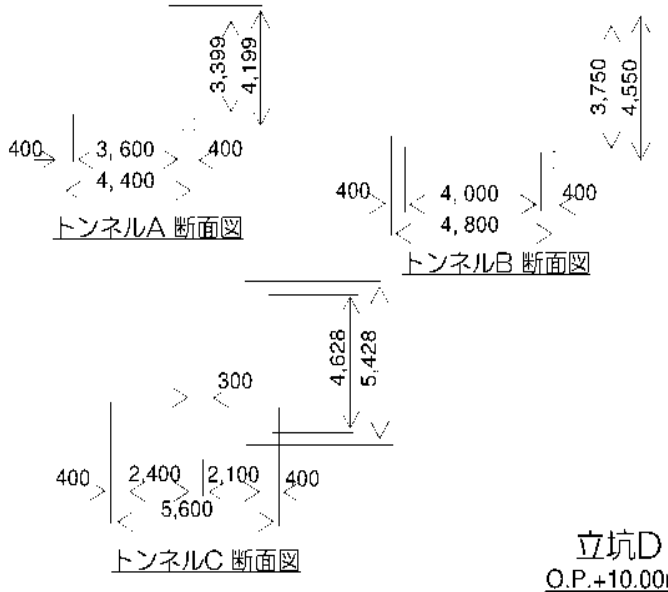


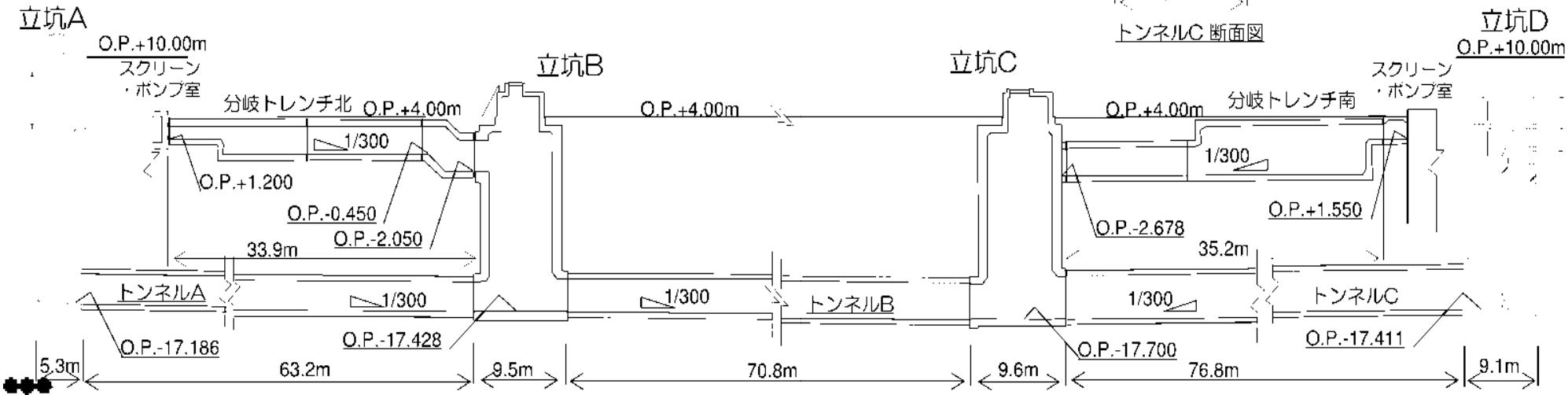
鳥瞰図（北西から臨む）

２号機海水配管トレンチとの相違点

・立坑内の砕石は無し

・T／Bとの連通は立坑D側のみ
（立坑A側は、配管貫通部の下端がO.P.約＋4mであり、T／Bの水位より高い）



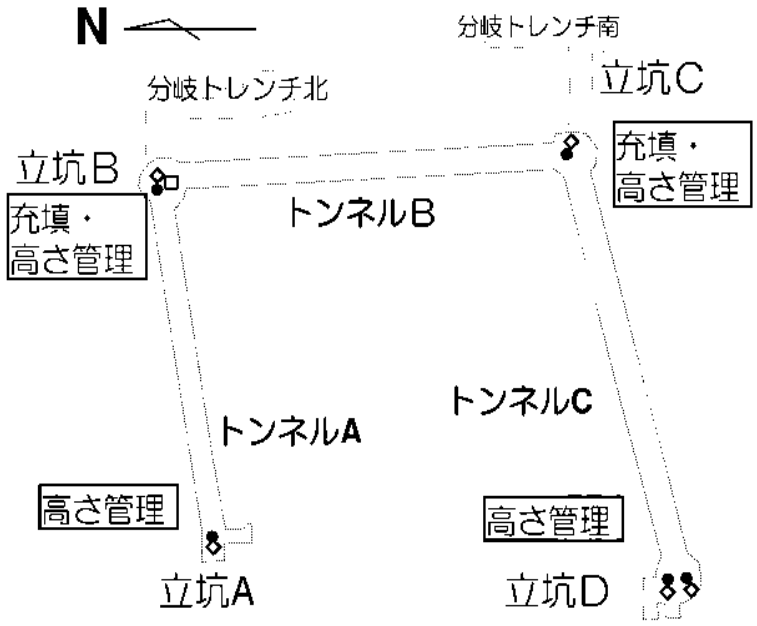


東京電力

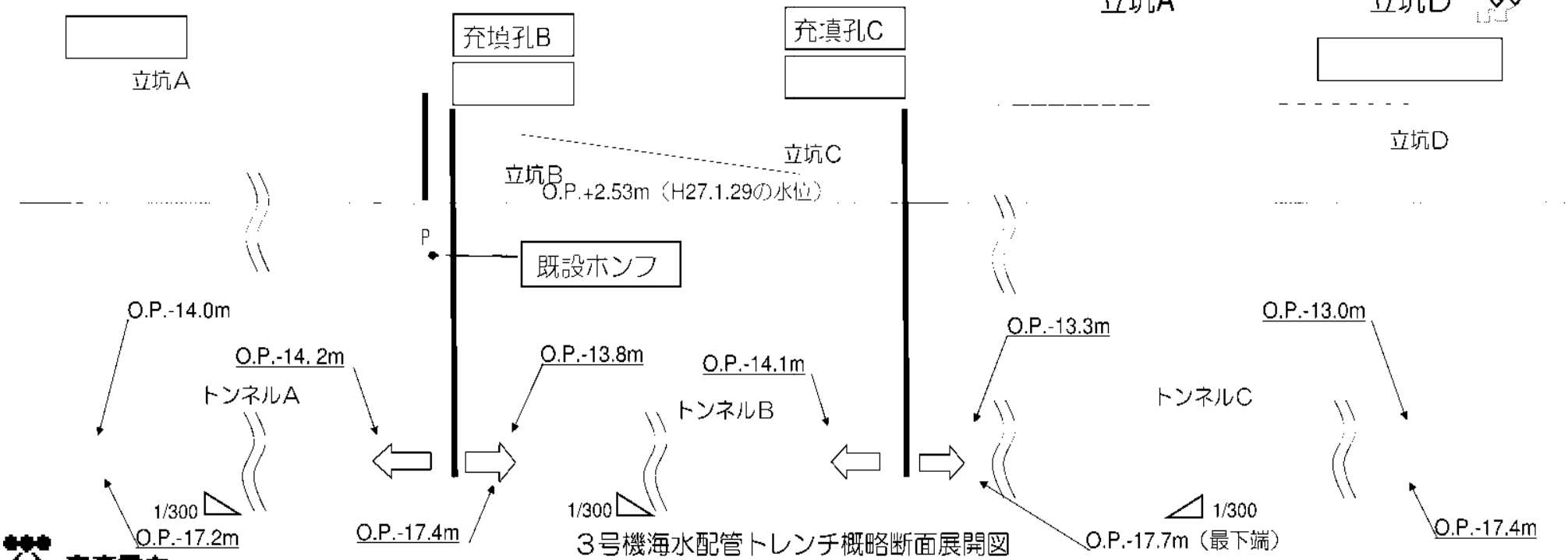
３号機海水配管トレンチ及び立坑展開図

3.(2) 3号機:海水配管トレンチ(トンネル一般部)の充填方法

トンネル一般部は、充填孔B及び充填孔Cに投入管を設置（底版または既打設面から約10cm上）し、閉塞材料を投入。これを繰り返し、天井部手前まで充填。



※図に記載の充填孔･観測孔･ポンプは設置が完了しているもの。
※図中の各充填孔･観測孔･ポンプにおいて枠で囲まれているものは、本ステップにおいて使用するもの。



3号機海水配管トレンチ概略断面展開図

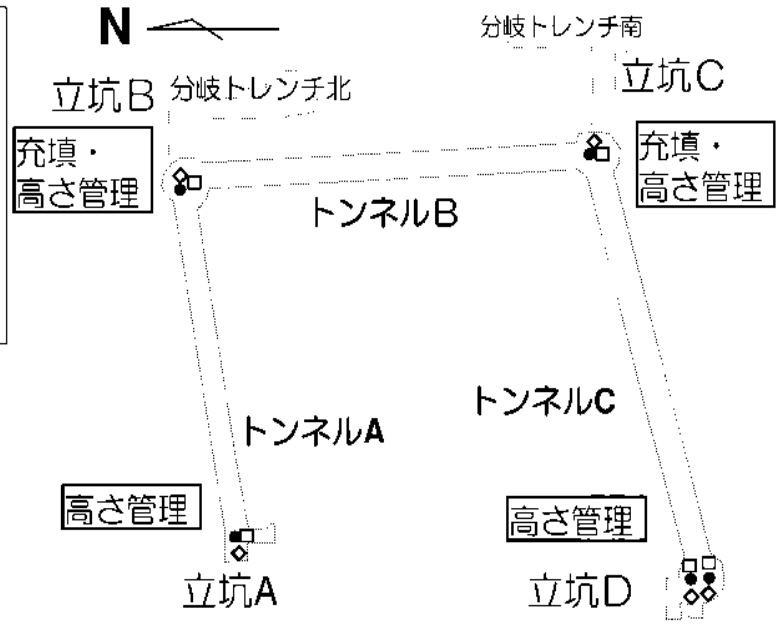
3.(3) 3号機:海水配管トレンチ(トンネル天井部①)の充填方法

充填孔Bおよび充填孔Cに投入管を設置（筒先を既打設面から約10cm上）し、閉塞材料を投入。

■充填高さは、観測孔A、B、Cにおいて、O.P.－13.8m～－13.3mとなるよう打設量を調整。

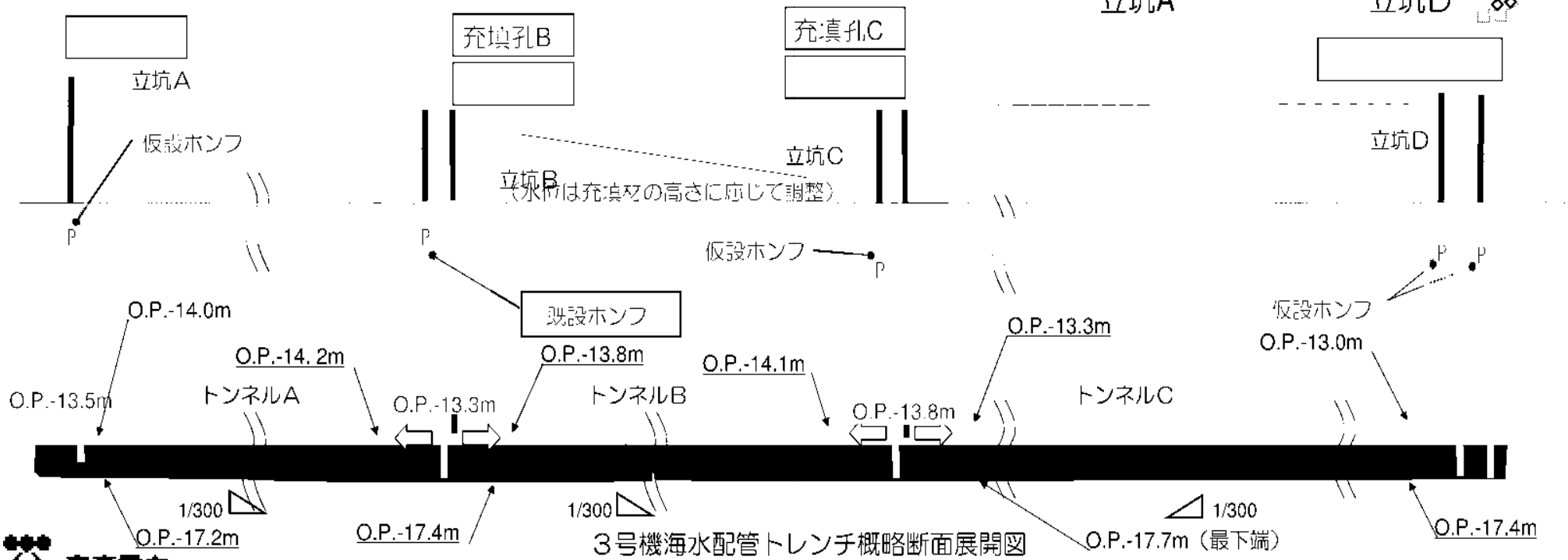
■併せて、投入側及び到達側の水位が同程度となるように管理。

（■の項目は、２号機の充填における知見を反映）



※図に記載の充填孔･観測孔･ポンプは設置が完了しているもの。

※図中の各充填孔･観測孔･ポンプにおいて枠で囲まれているものは、本ステップにおいて使用するもの



3号機海水配管トレンチ概略断面展開図

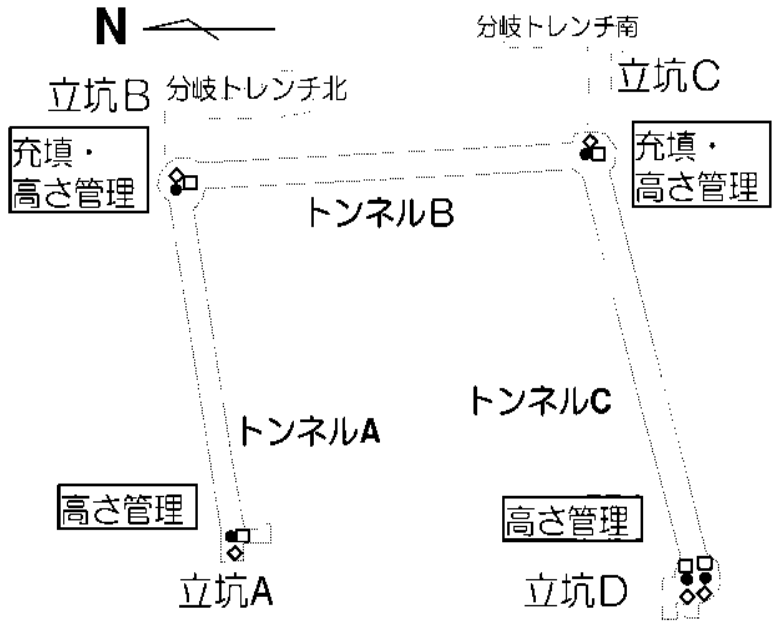
3.(4) 3号機:海水配管トレンチ(トンネル天井部②)の充填方法

充填孔Cに投入管を設置（筒先を既打設面から約10cm上）し、閉塞材料を投入。

■充填高さは、観測孔C、DにおいてO.P.－12.8m～－12.5mとなるよう打設量を調整。

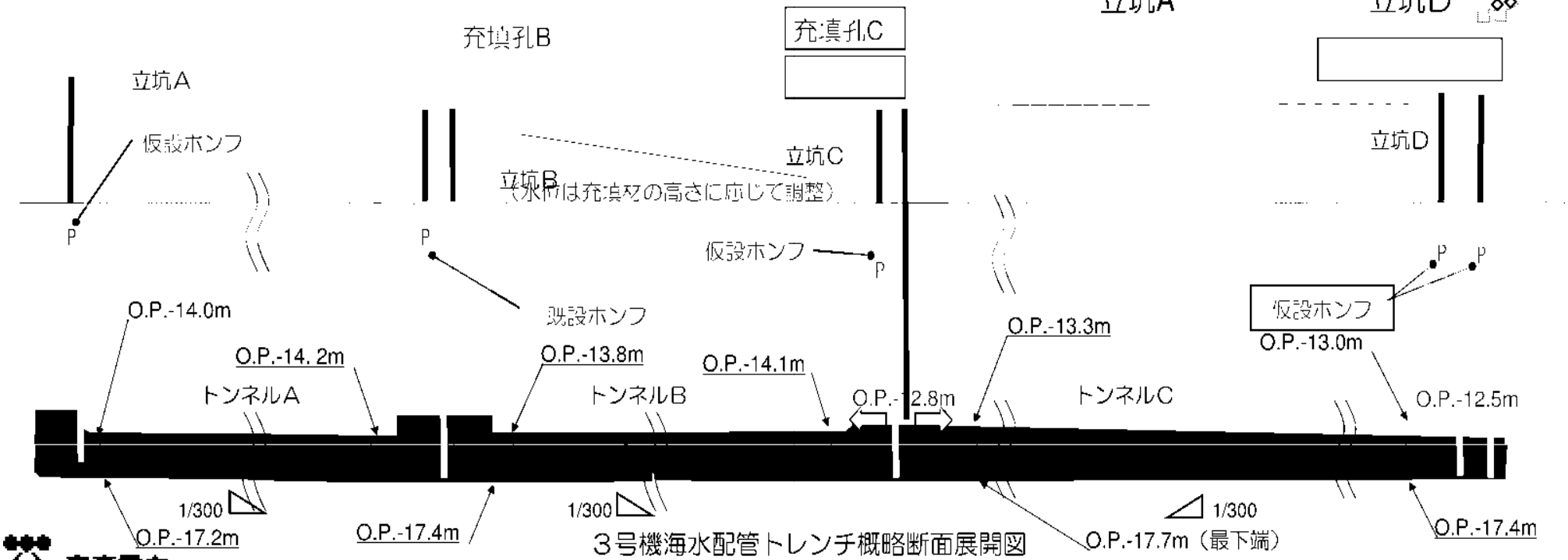
■併せて、投入側及び到達側の水位を同程度となるように管理。

（■の項目は、２号機の充填における知見を反映）



※図に記載の充填孔･観測孔･ポンプは設置が完了しているもの。

※図中の各充填孔･観測孔･ポンプにおいて枠で囲まれているものは、本ステップにおいて使用するもの



３号機海水配管トレンチ概略断面展開図

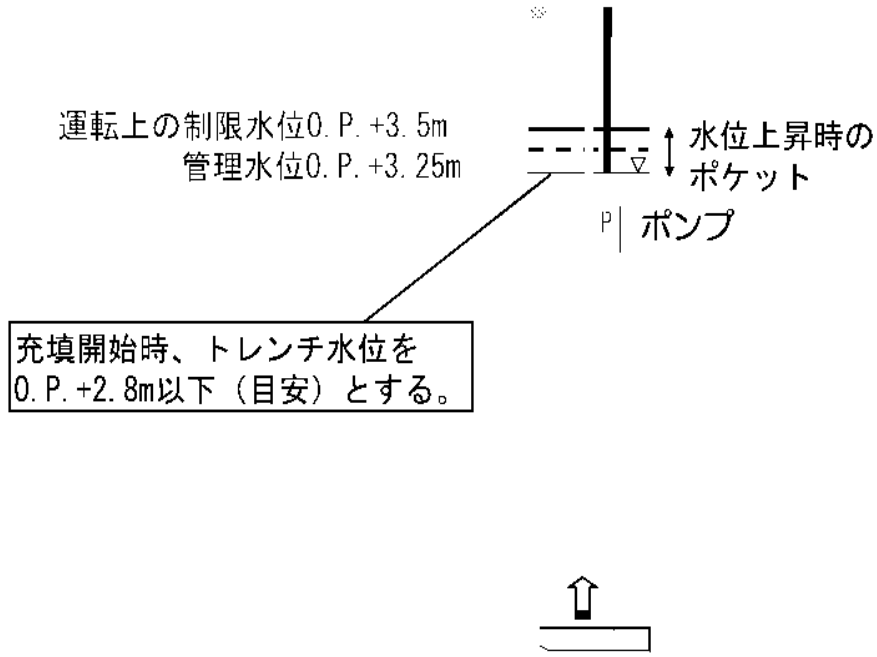
東京電力

充填済み

3.(5) 3号機:海水配管トレンチ(トンネル部)の充填計画、水位管理

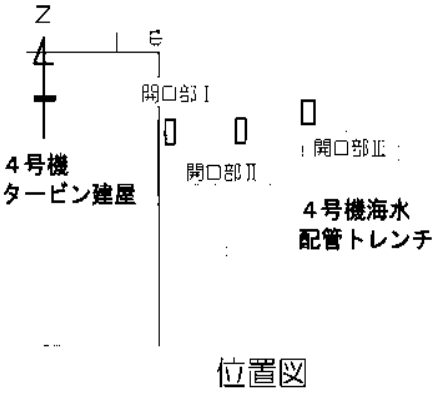
【充填計画】
トンネル部充填にかかる準備作業は完了。充填開始日については、調整中。
トレンチ内滞留水の塩化物イオン濃度が18,000ppmと高いことから、１週間あたりの充填量を上限350m^{3}とする。
上記充填量の場合、天井部充填は３月下旬予定であるが、随時、水質確認をしながら、充填量を確定させる。

【水位管理】
運転上の制限（保安規定）であるO.P.+3.5mを超えないように下記の通りの施工サイクル及び水位管理を行う。
① 充填開始前までにトレンチ水位を、O.P.+2.8m以下を目安に低下させる。
② 充填中（8:00～12:00予定）は、トレンチ水位を監視（30分毎）し、O.P.+3.0mを超え、その後、水位上昇が継続し、O.P.+3.25m を超える恐れのある場合、トレンチ移送ポンプを起動させ、トレンチ水位の低下を図る。
③ ②に引き続きトレンチ水位が上昇し、O.P.+3.25mに達した場合は、即時、充填を中断する。



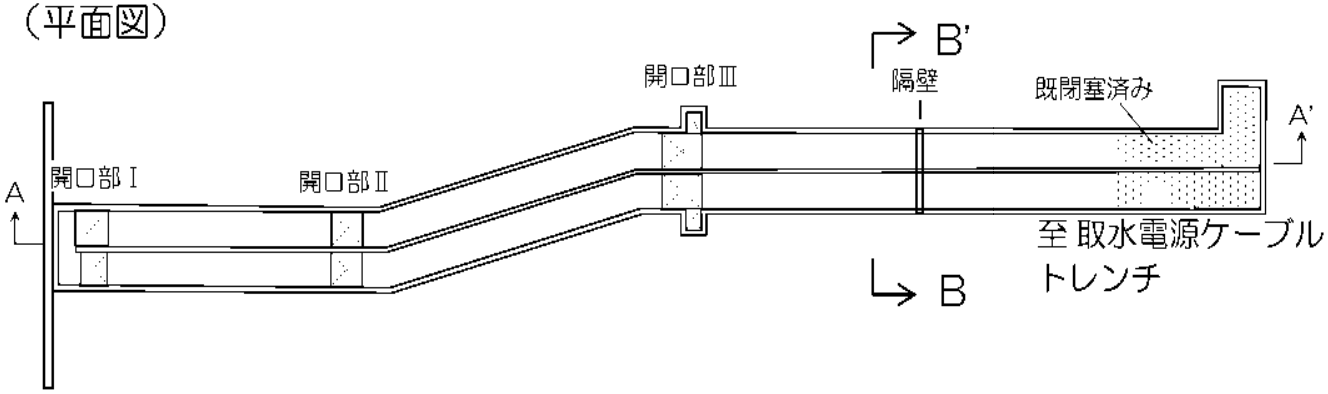
4.（1）4号機:海水配管トレンチの構造

４号機海水配管トレンチの全長は約80m。トンネル部分は2.2m×2.1m×２連のボックスカルバート構造であり、開口部Ⅲの位置が最底部。
開口部Ⅰ・Ⅱ・Ⅲともに、２連ダクト部分より上はひとつの断面になっている。
＃１～３放水路を跨ぐ部分には隔壁があり、東西で仕切られている。
隔壁より東側の箇所（取水電源ケーブルトレンチ部分含む）は既に一部閉塞済み。
なお、トレンチ内の滞留水は約700m^{3}と推定。

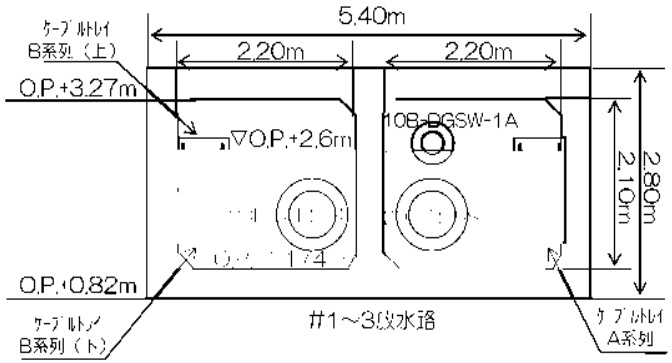


位置図

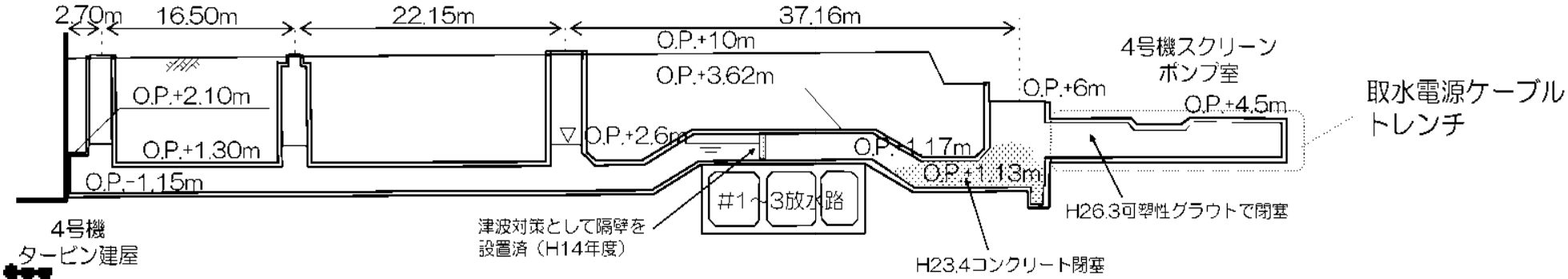
（平面図）



（B-B'断面図）

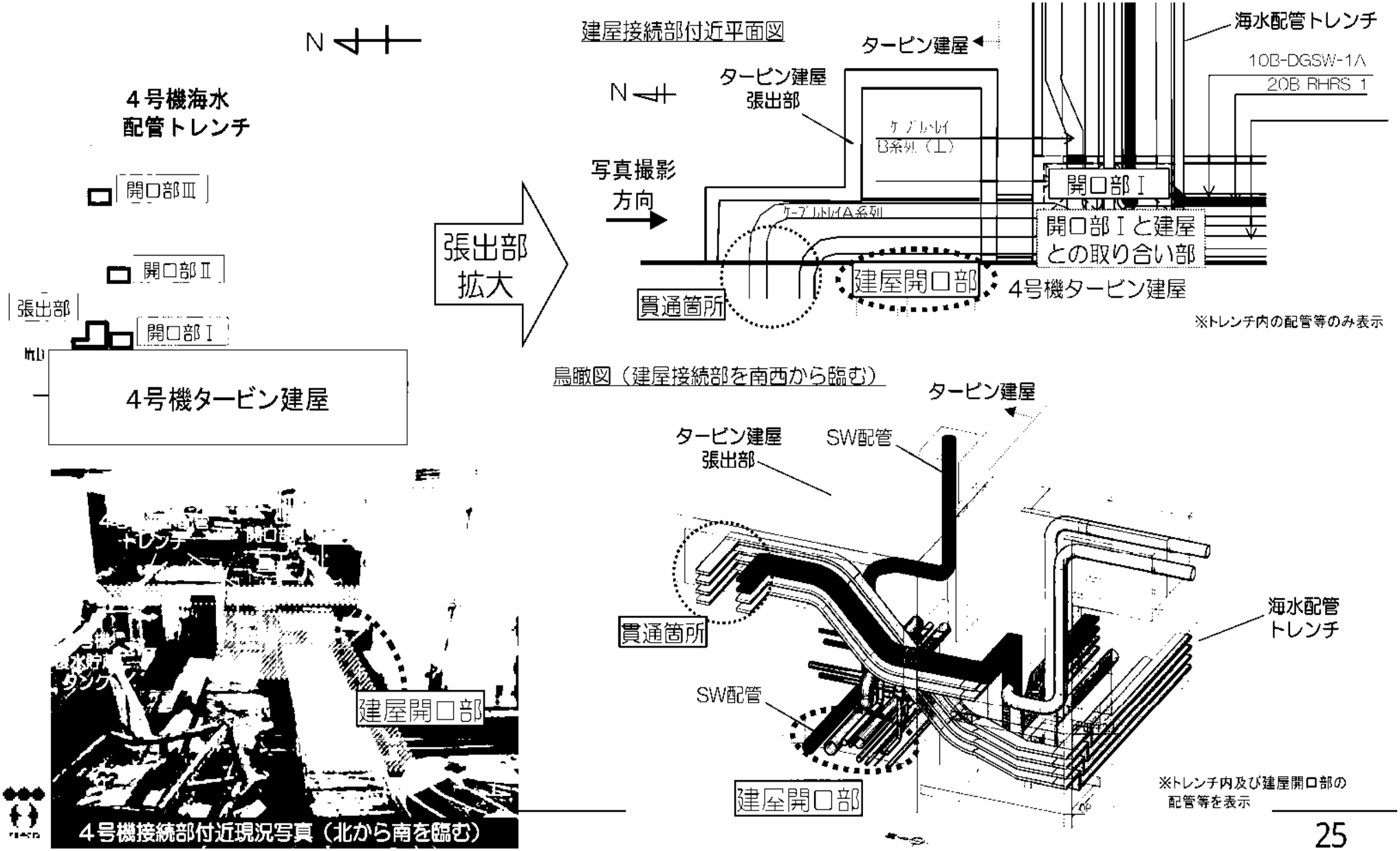


（A-A'断面図）



4.(2) 4号機:建屋・トレンチ接続部の状況

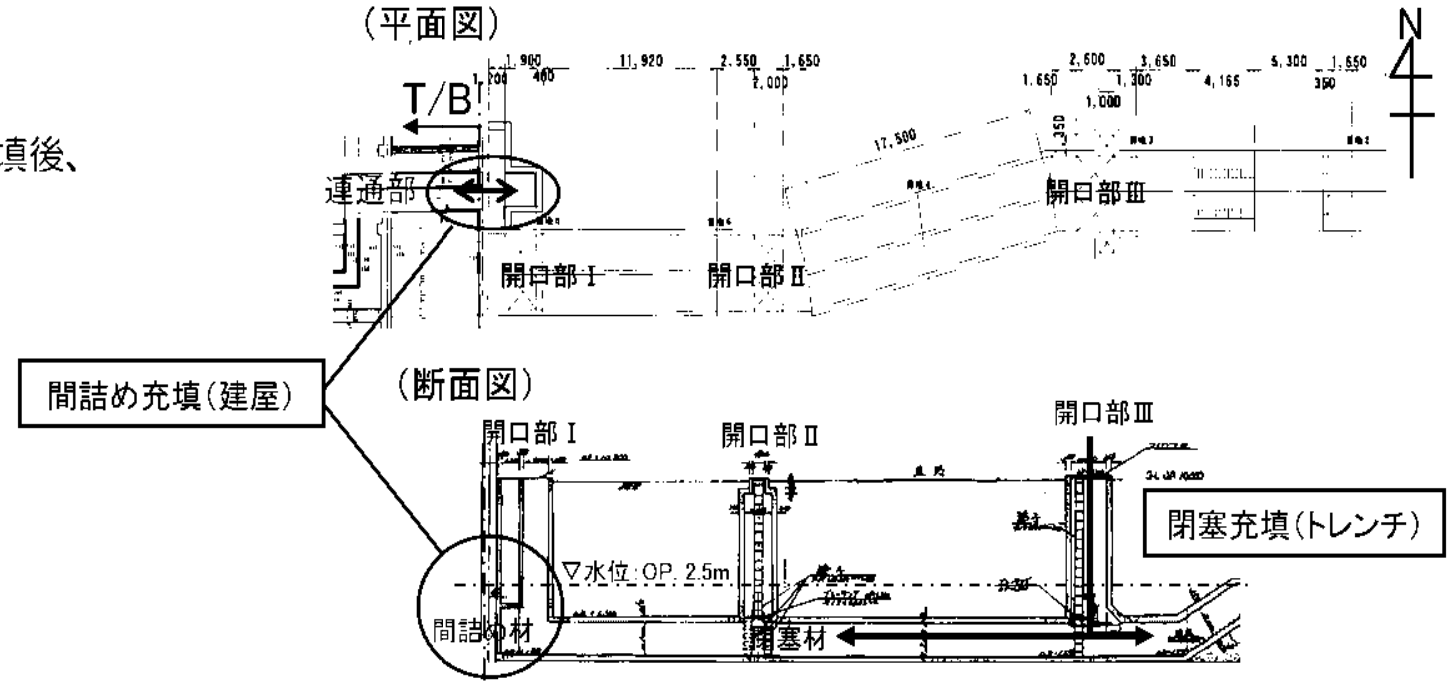
■赤枠で示す箇所（T／B地下）に開口があり、トレンチに収納されていないSW配管等が設置されていることを確認。



4.(3) 4号機:建屋・トレンチの間詰め・閉塞(案)

■建屋側遮水 &開口部Ⅰ－Ⅲ間閉塞案

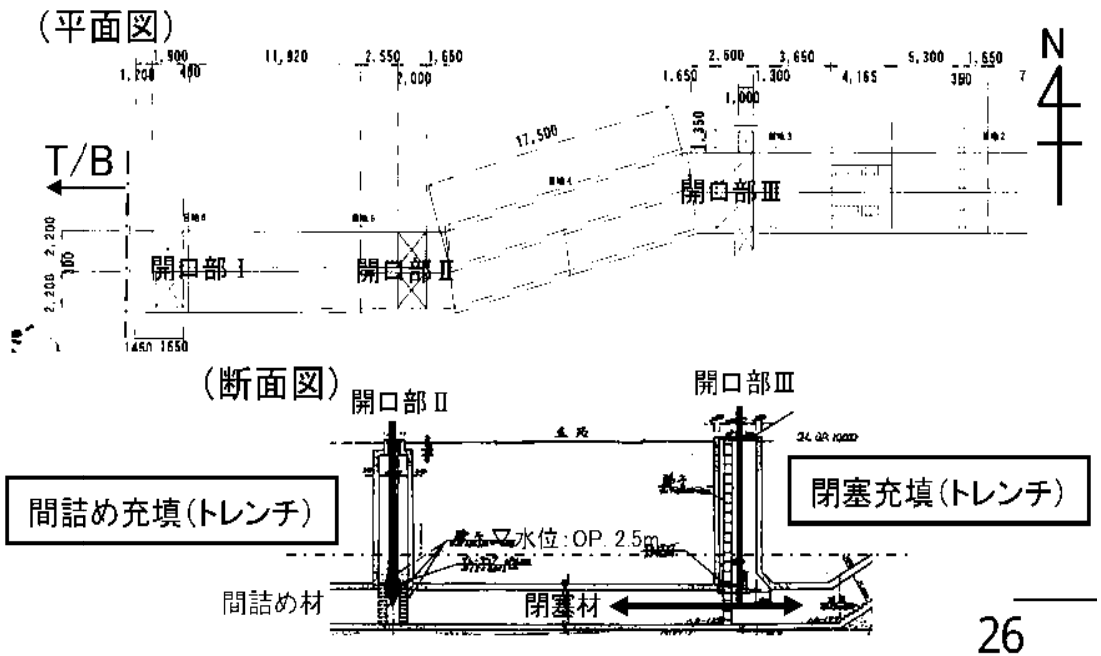
T/B張出部付近にて間詰め充填後、開口部Ⅰ－Ⅲ間を閉塞する。



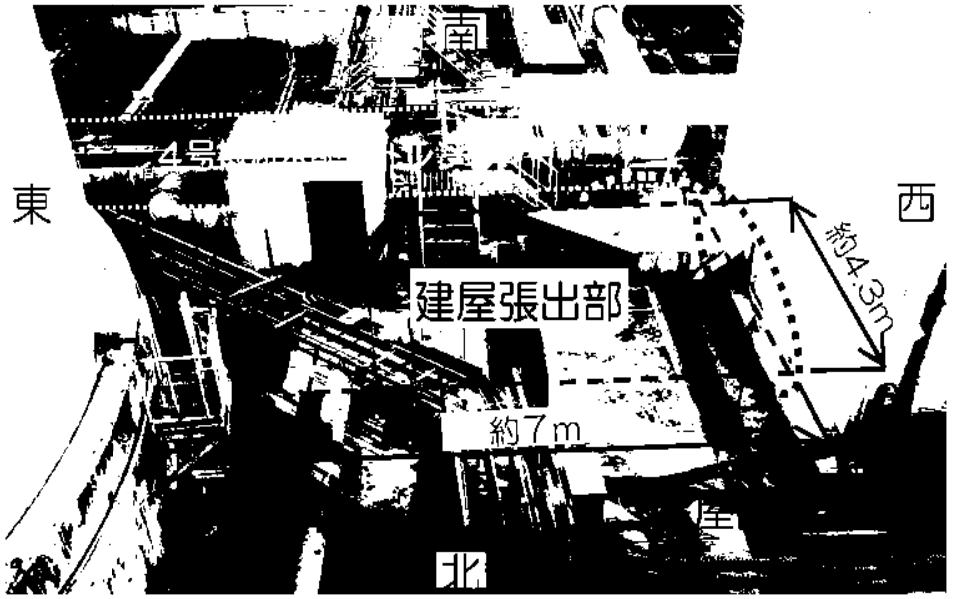
■開口部Ⅱ－Ⅲ間閉塞案

開口部Ⅱにおいて間詰め充填後、開口部Ⅱ－Ⅲ間を閉塞する。

開口部Ⅱ－Ⅲ間の閉塞後、Ⅰ－Ⅱ間の閉塞を行うが、その成立性も併せて確認する必要あり。



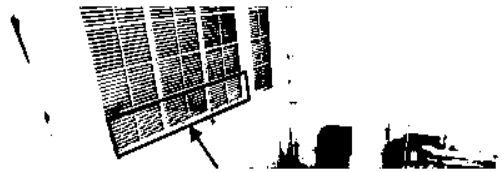
4.(4) 4号機:建屋・トレンチ接続部の調査内容(1/2)



事前調査①

建屋外壁部・床スラブにコア削孔等、または外壁部のガラリを撤去し水中カメラ等により、建屋開口部の内部確認を行う

(東から撮影)



(北東から撮影)

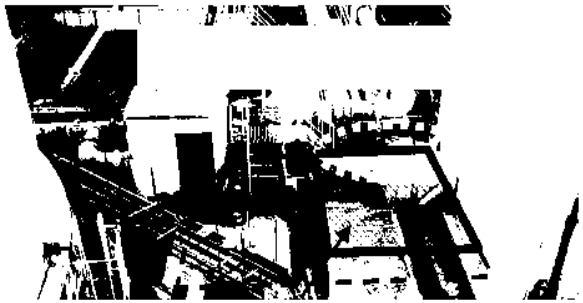
事前調査②

既設設備と干渉しない箇所において、張出部のコンクリート天端にコア削孔を行い水中カメラ等により、張出部の内部確認を行う

(北から撮影)

事前調査③

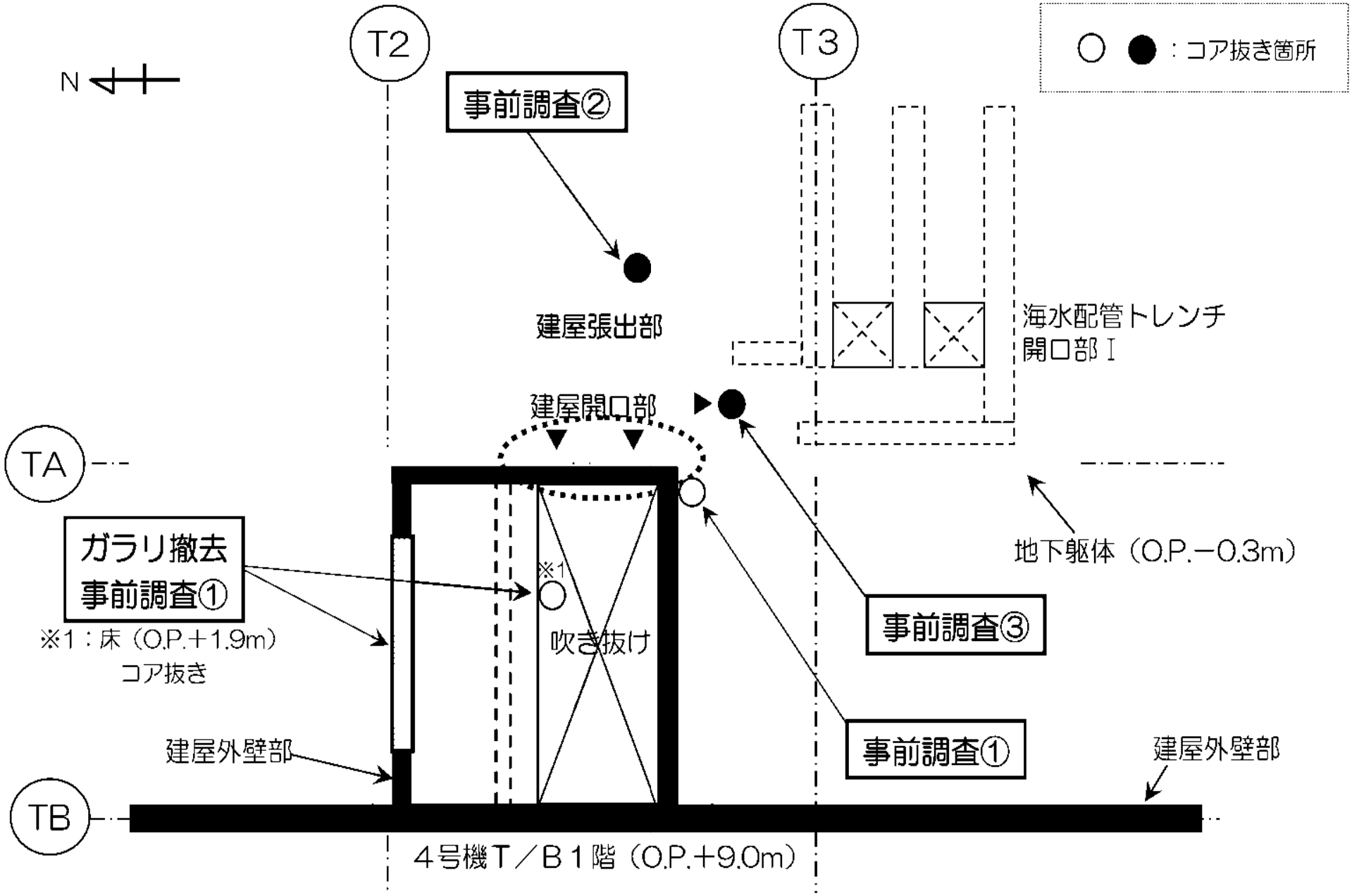
張出部のコンクリート天端にコア削孔を行い水中カメラ等により、建屋・トレンチ接続部の内部確認を行う



設備撤去後、張出部・コア削孔

(北から撮影)

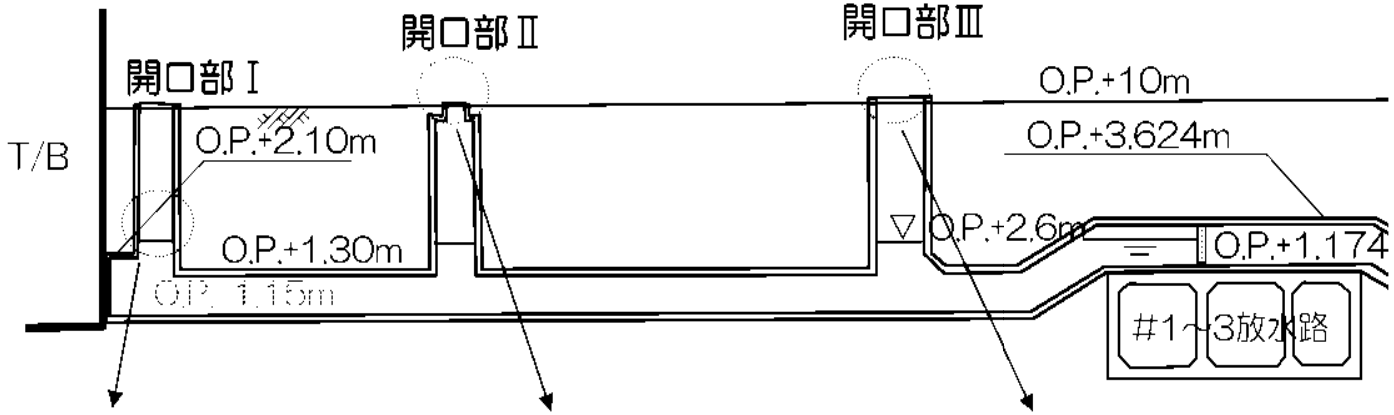
4.(5) 4号機:建屋・トレンチ接続部の調査内容(2/2)

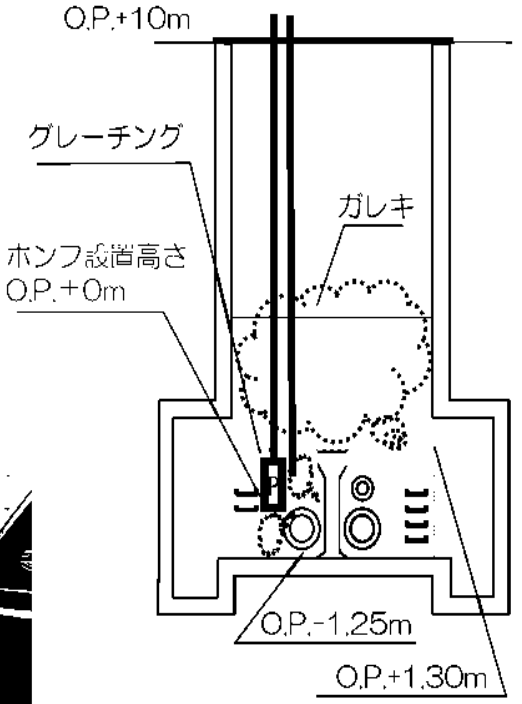


4号機T／B・トレンチ接続部平面図

4.(6) 4号機:トレンチ開口部の調査状況(1/2)

開口部３ヶ所の調査を実施。
その結果、開口部Ⅰは津波により流入したと思われるガレキが確認され、ポンプを設置するには、それらを撤去する必要があることが判明。
開口部Ⅱは、資材・砕石等を撤去し、マンホールの位置を確認。開放して内部を調査（次頁に詳述）。
開口部Ⅲは、水中ポンプを底盤から1m上まで降ろせることを確認。ポンプをO.P.約±0mの位置に設置完了。引き続き、材料投入管を底部まで降ろすことができるか確認中。





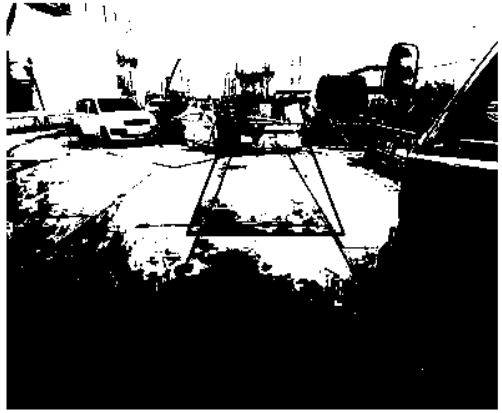
開口部Ⅲポンプ設置状況

開口部Ⅰ

上部から撮影

開口部Ⅱ※

開口部Ⅲ※

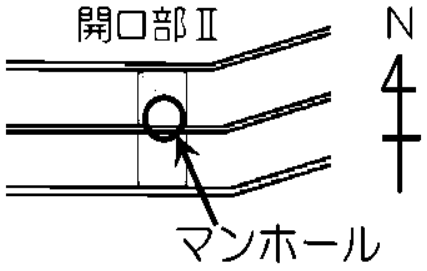


※緑色のハッチングは開口部の想定位置。写真は、カメラ・ポンプ挿入前に撮影。

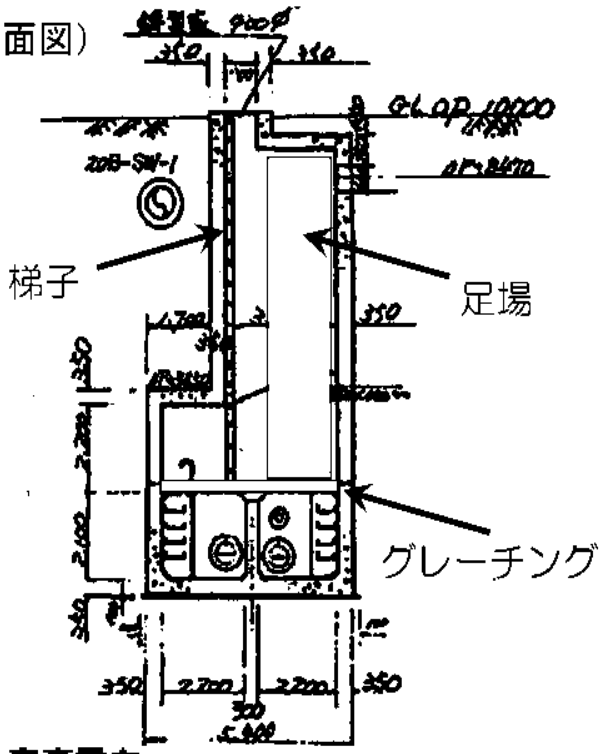
4.（7） 4号機:トレンチ開口部の調査状況(2/2)

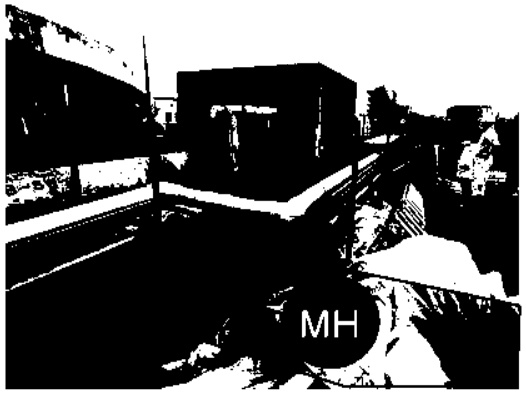
開口部Ⅱは、支障物のうち一部グレーチングの撤去完了。空間線量率は、開口部Ⅱのマンホール（MH）直上で約0.35mSv/h。
材料投入管を底部まで降ろすことができるか確認中。

（平面図）



（断面図）





開口部Ⅱ　地上部状況
（着手前）

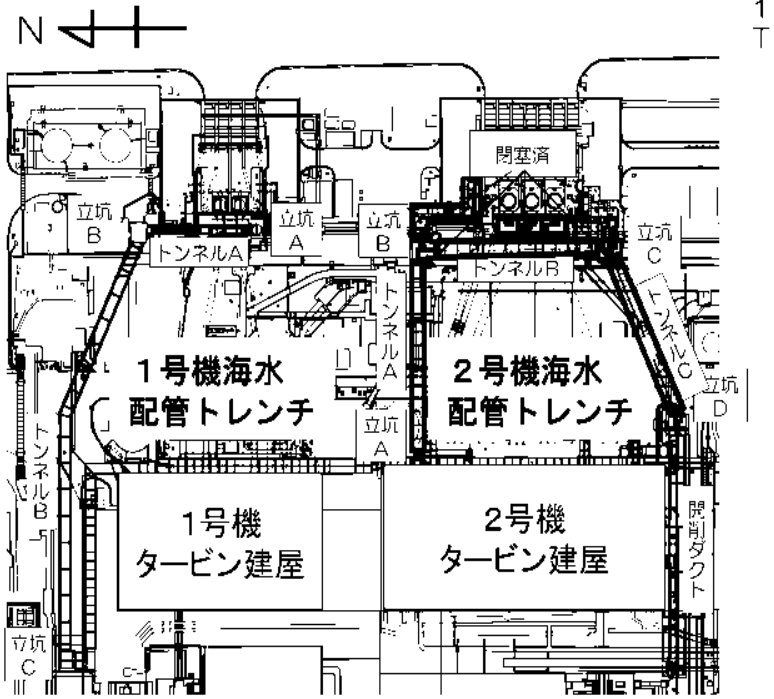
開口部Ⅱ　マンホール開口状況

マンホール内部の状況

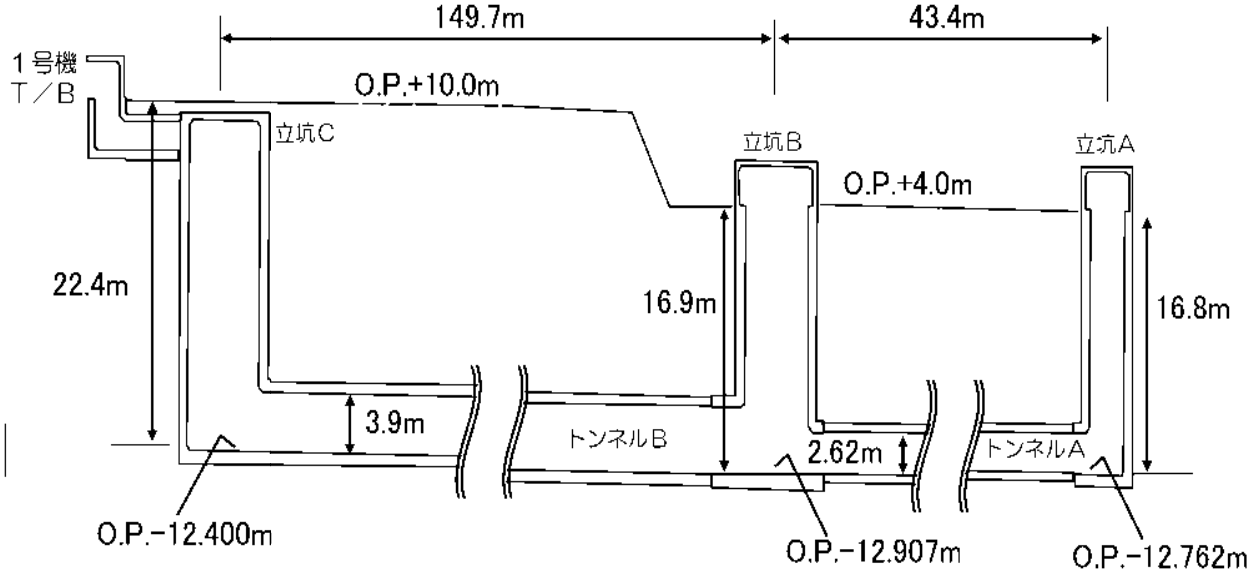
カメラ調査状況

5. 1号機:海水配管トレンチの概要

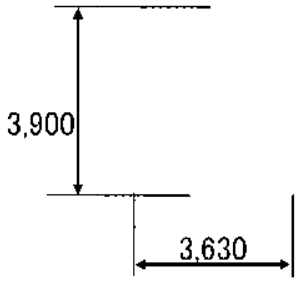
１号機海水配管トレンチの全長は約190m。トンネル部の形状は、幅：約2.6～3.6m×高さ：約2.6～3.9mの馬蹄形断面であり、立坑Bが最底部。
H25.12調査時点で、トレンチ内滞留水量は約2,500m^3、放射性物質濃度（Cs）は150Bq/L。
１号機Ｔ／Ｂとトレンチの接続部高さはO.P.＋10mであり、建屋内滞留水はトレンチへ漏洩していない。



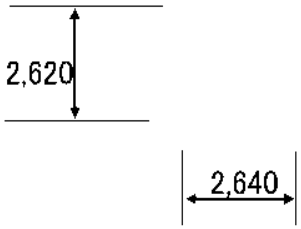
位置図



１号機海水配管トレンチ縦断図

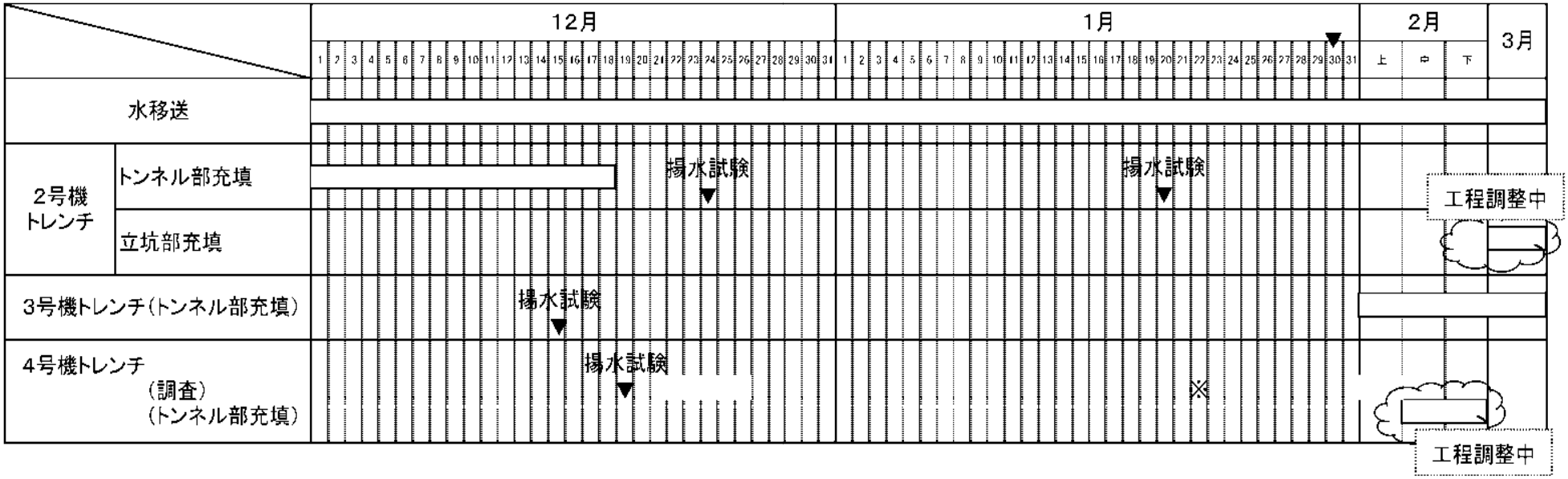


トンネルB断面図



トンネルA断面図

6. トレンチ閉塞のスケジュール



※ H27.1.21～ 安全総点検に伴う作業中断

No.②-1

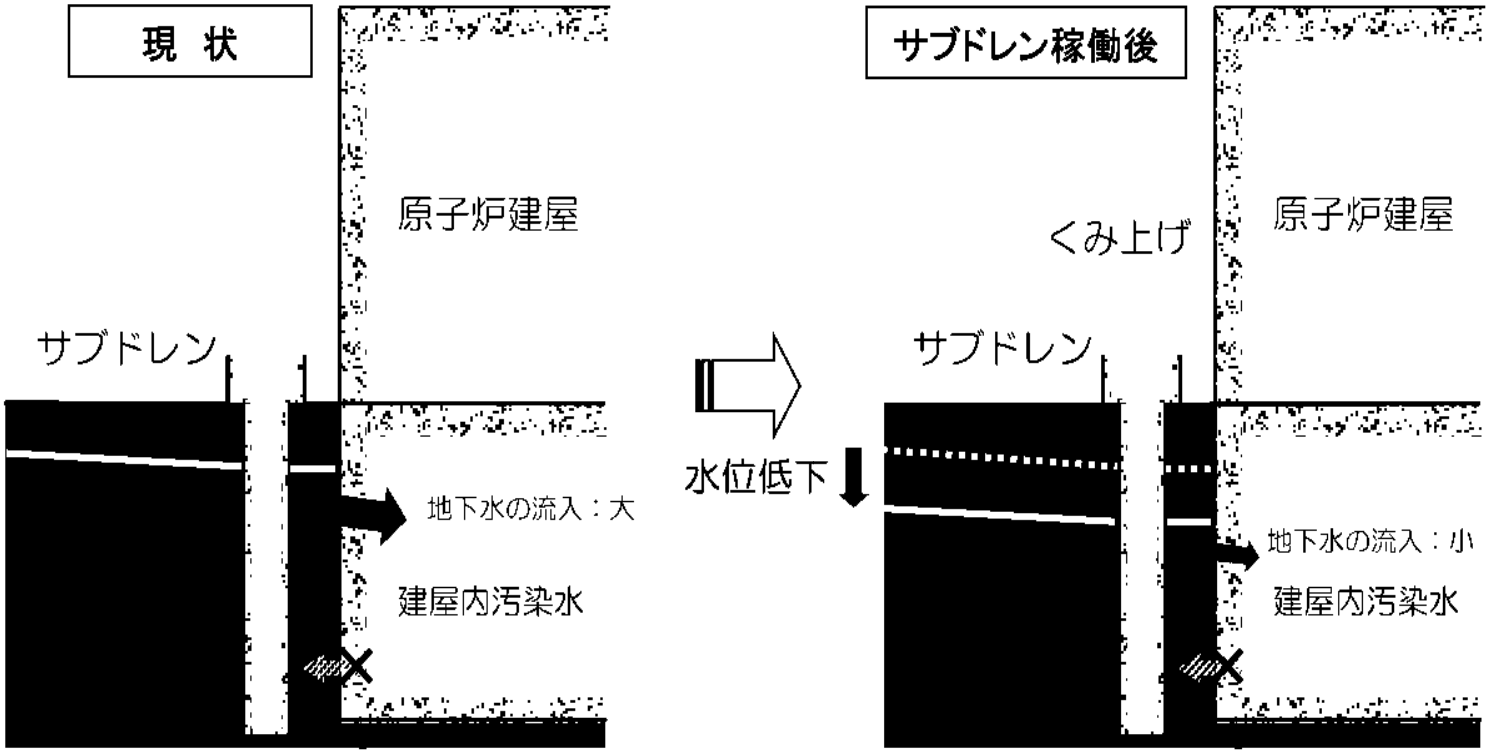
サブドレン他水処理施設について

東京電力 TEPCO

1. サブドレンくみ上げによる地下水流入抑制

■サブドレンの稼働により、建屋周辺の地下水位を低下させることが可能。
■特に建屋山側では、周辺地下水位と建屋内汚染水の水位差は約4～5m程度であることが確認されており、サブドレンによる地下水のくみ上げにより、現在約300m^3/日程度の地下水流入量に対し、約150m^3/日程度の低減効果が見込まれる。

地下水流入量の低減により、敷地内に保有する高濃度汚染水の発生量抑制につながる。

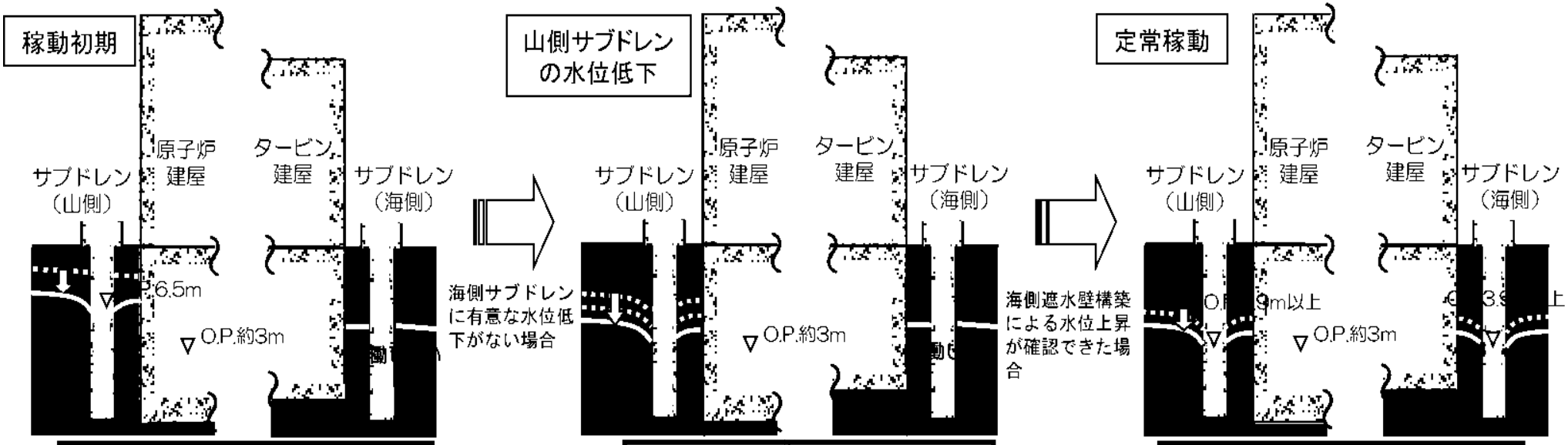


建屋流入量：約300m^3/日

建屋流入量：約150m^3/日低減

2. サブドレン稼働に伴う安全の確保について

- 建屋山側に位置するサブドレンは，建屋海側に位置するサブドレン水位が有意な変動を生じさせない範囲で，段階的に下げていく。
- 海側遮水壁構築による建屋海側に位置するサブドレン等の水位上昇が確認されるまでは，建屋海側に位置するサブドレンは稼働させない。建屋山側に位置するサブドレンはポンプ停止位置（L値）を0.P.6.5mに設定し，建屋海側に位置するサブドレンの水位変動を一定期間（1週間程度）確認する。その際，建屋海側に位置するサブドレンに有意な水位低下がないこと，建屋滞留水との十分な水位差が確保されていること，建屋滞留水の移送先受け入れ容量が十分であることが確認できれば，建屋滞留水の流出リスクがないと判断し，設定値を下げる。以降，同様に建屋滞留水の流出リスクがないことを確認しながら、段階的に設定値を下げる。
- 海側遮水壁構築による海側サブドレンの水位上昇が確認できた後は，建屋山側に位置するサブドレン及び建屋海側に位置するサブドレンのポンプ停止位置（L値）を0.P.3.9mを下限値として，水位変動を確認しながら稼働する。



山側ｻﾌﾞﾄﾞﾚﾝ	O.P.6.5m
海側ｻﾌﾞﾄﾞﾚﾝ	稼動させない

山側ｻﾌﾞﾄﾞﾚﾝ	段階的に低下
海側ｻﾌﾞﾄﾞﾚﾝ	稼動させない

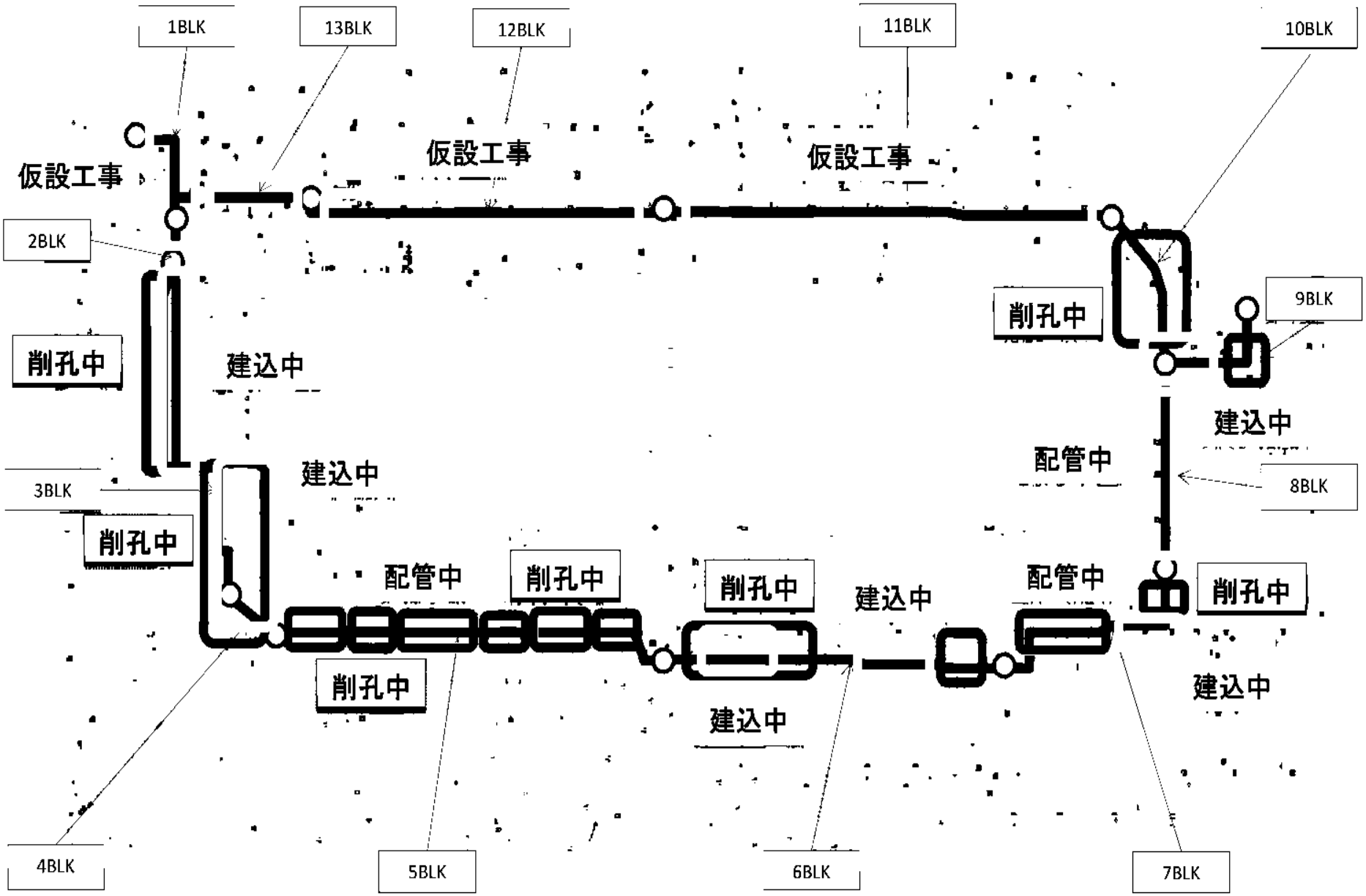
山側ｻﾌﾞﾄﾞﾚﾝ	O.P.3.9m以上
海側ｻﾌﾞﾄﾞﾚﾝ	O.P.3.9m以上

No.②-5-1

陸側遮水壁工事の進捗状況について

東京電力 TEPCO

1. 陸側遮水壁工事の進捗状況(ブロック別作業状況)



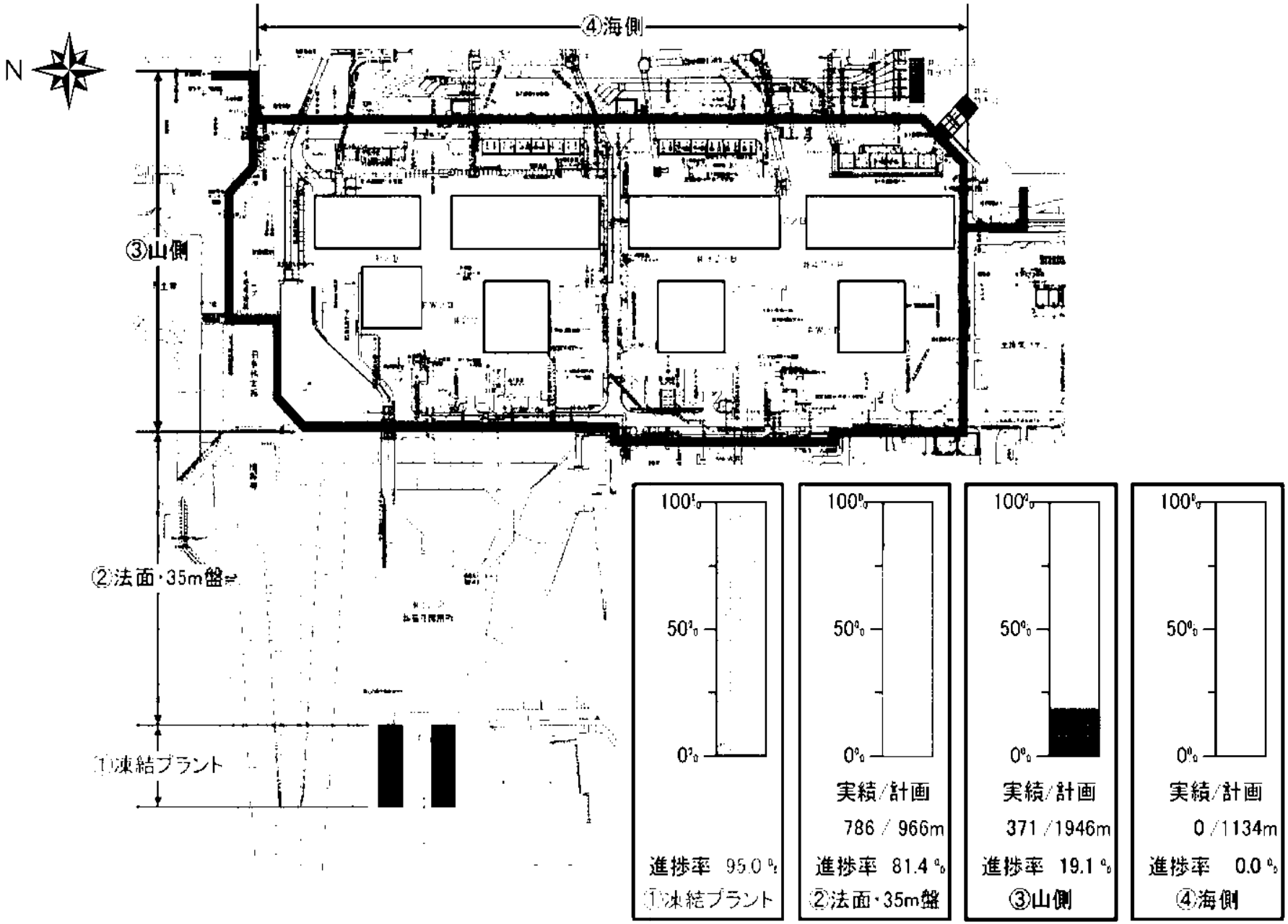
2. 陸側遮水壁工事の進捗状況(ブロック別削孔・建込・貫通進捗)

【H27.1.29現在】

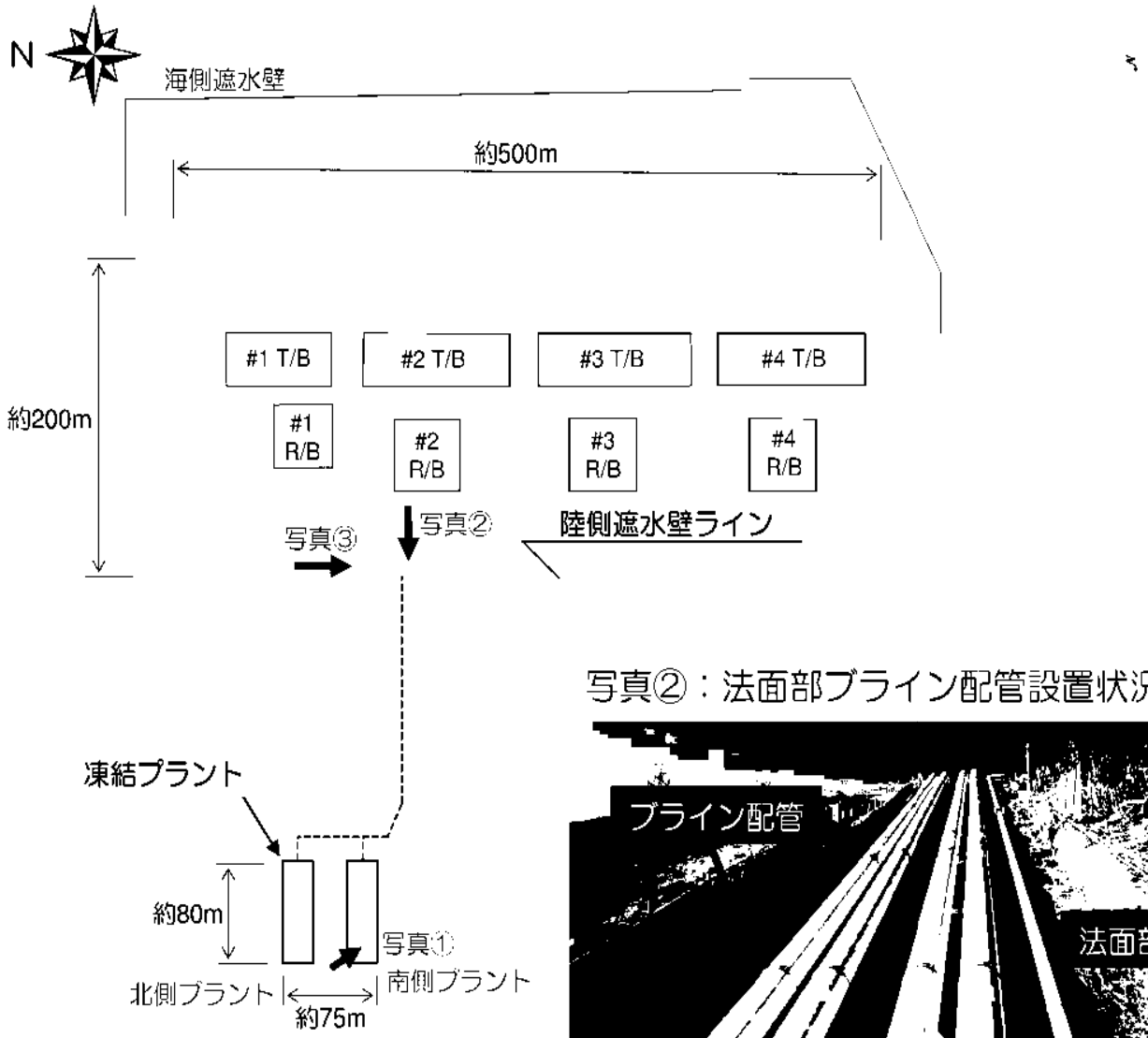
ブロック		種別	設計本数	削孔 実績	削孔 進捗	建込 実績	建込 進捗	スタンドパイプ 実績	スタンドパイプ 進捗	貫通 設計本数	貫通 実績	貫通 進捗
山側	1BLK	凍結管	75 本	75 本	100.0%	75 本	100.0%	—	—	—	—	—
		測温管	16 本	16 本	100.0%	16 本	100.0%	—	—	—	—	—
		計	91 本	91 本	100.0%	91 本	100.0%	—	—	—	—	—
	2BLK	凍結管	19 本	19 本	100.0%	18 本	94.7%	—	—	—	—	—
		測温管	5 本	5 本	100.0%	5 本	100.0%	—	—	—	—	—
		計	24 本	24 本	100.0%	23 本	95.8%	—	—	—	—	—
	3BLK	凍結管	196 本	192 本	98.0%	104 本	53.1%	—	—	—	—	—
		測温管	42 本	42 本	100.0%	21 本	50.0%	—	—	—	—	—
		計	238 本	234 本	98.3%	125 本	52.5%	—	—	—	—	—
	4BLK	凍結管	31 本	31 本	100.0%	本	0.0%	—	—	7 本	6 本	85.7%
		測温管	6 本	6 本	100.0%	本	0.0%	—	—	—	—	—
		計	37 本	37 本	100.0%	0 本	0.0%	—	—	7 本	6 本	85.7%
	5BLK	凍結管	221 本	194 本	87.8%	164 本	74.2%	—	—	23 本	8 本	34.8%
		測温管	44 本	41 本	93.2%	33 本	75.0%	—	—	3 本	0 本	0.0%
		計	265 本	235 本	88.7%	197 本	74.3%	—	—	26 本	8 本	30.8%
	6BLK	凍結管	190 本	144 本	75.8%	30 本	15.8%	—	—	19 本	7 本	36.8%
		測温管	41 本	34 本	82.9%	7 本	17.1%	—	—	—	—	—
		計	231 本	178 本	77.1%	37 本	16.0%	—	—	19 本	7 本	36.8%
	7BLK	凍結管	125 本	115 本	92.0%	74 本	59.2%	—	—	14 本	11 本	78.6%
		測温管	27 本	26 本	96.3%	16 本	59.3%	—	—	1 本	0 本	0.0%
		計	152 本	141 本	92.8%	90 本	59.2%	—	—	15 本	11 本	73.3%
	8BLK	凍結管	104 本	100 本	96.2%	93 本	89.4%	—	—	—	—	—
		測温管	21 本	21 本	100.0%	19 本	90.5%	—	—	—	—	—
		計	125 本	121 本	96.8%	112 本	89.6%	—	—	—	—	—
	9BLK	凍結管	73 本	67 本	91.8%	36 本	49.3%	—	—	7 本	3 本	42.9%
		測温管	14 本	13 本	92.9%	8 本	57.1%	—	—	1 本	0 本	0.0%
		計	87 本	80 本	92.0%	44 本	50.6%	—	—	8 本	3 本	37.5%
	山側計	凍結管	1,034 本	937 本	90.6%	594 本	57.4%	—	—	70 本	35 本	50.0%
		測温管	172 本	163 本	94.8%	92 本	53.5%	—	—	5 本	0 本	0.0%
		計	985 本	906 本	92.0%	522 本	53.0%	—	—	75 本	35 本	46.7%
海側	10BLK	凍結管	75 本	3 本	4.0%	本	0.0%	18 本	24.0%	10 本	0 本	0.0%
		測温管	15 本	本	0.0%	本	0.0%	3 本	20.0%	—	—	—
		計	90 本	3 本	3.3%	0 本	0.0%	21 本	23.3%	10 本	0 本	0.0%
	11BLK	凍結管	225 本					本	0.0%	40 本	0 本	0.0%
		測温管	45 本	準備作業中		準備作業中		本	0.0%	2 本	0 本	0.0%
		計	270 本					0 本	0.0%	42 本	0 本	0.0%
	12BLK	凍結管	159 本					本	0.0%	29 本	0 本	0.0%
		測温管	32 本	準備作業中		準備作業中		本	0.0%	2 本	0 本	0.0%
		計	191 本					0 本	0.0%	31 本	0 本	0.0%
	13BLK	凍結管	56 本					本	0.0%	9 本	0 本	0.0%
		測温管	13 本	準備作業中		準備作業中		本	0.0%	1 本	0 本	0.0%
		計	69 本					0 本	0.0%	10 本	0 本	0.0%
	海側計	凍結管	515 本	3 本	0.6%	0 本	0.0%	18 本	3.5%	88 本	0 本	0.0%
		測温管	105 本	0 本	0.0%	0 本	0.0%	3 本	2.9%	5 本	0 本	0.0%
		計	620 本	3 本	0.5%	0 本	0.0%	21 本	3.4%	93 本	0 本	0.0%
合計		凍結管	1,549 本	940 本	60.7%	594 本	38.3%	18 本	1.2%	158 本	35 本	22.2%
		測温管	321 本	204 本	63.6%	125 本	38.9%	3 本	0.9%	10 本	0 本	0.0%
		計	1,870 本	1,144 本	61.2%	719 本	38.4%	21 本	1.1%	168 本	35 本	20.8%

①1/29(木)現在、削孔が1,144(61.2%)本完了しており、概ね計画通り進捗(削孔本数については、試掘結果により変更となることがある)。
②海側貫通施工(海水配管トレンチ他を除く)の実施計画申請中。

3. 陸側遮水壁工事の進捗状況（凍結プラント進捗図）



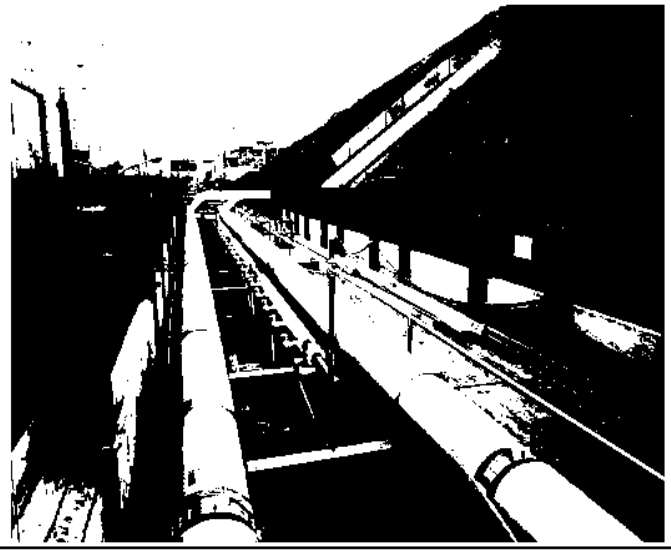
4. 陸側遮水壁工事の進捗状況(凍結プラント進捗状況)



写真①：冷凍機設置完了・試運転待ち

写真②：法面部ブライン配管設置状況

写真③：５BLKブライン配管設置状況



No.②-5-2

建屋内滞留水移送装置増設工事の進捗
及び被ばく低減対策について

東京電力
TEPCO

1. 滞留水移送装置増設工事の概要

目的

地下水位低下に伴う建屋内滞留水の水位制御のため、原子炉建屋等に滞留水移送装置を新規設置

設置目標

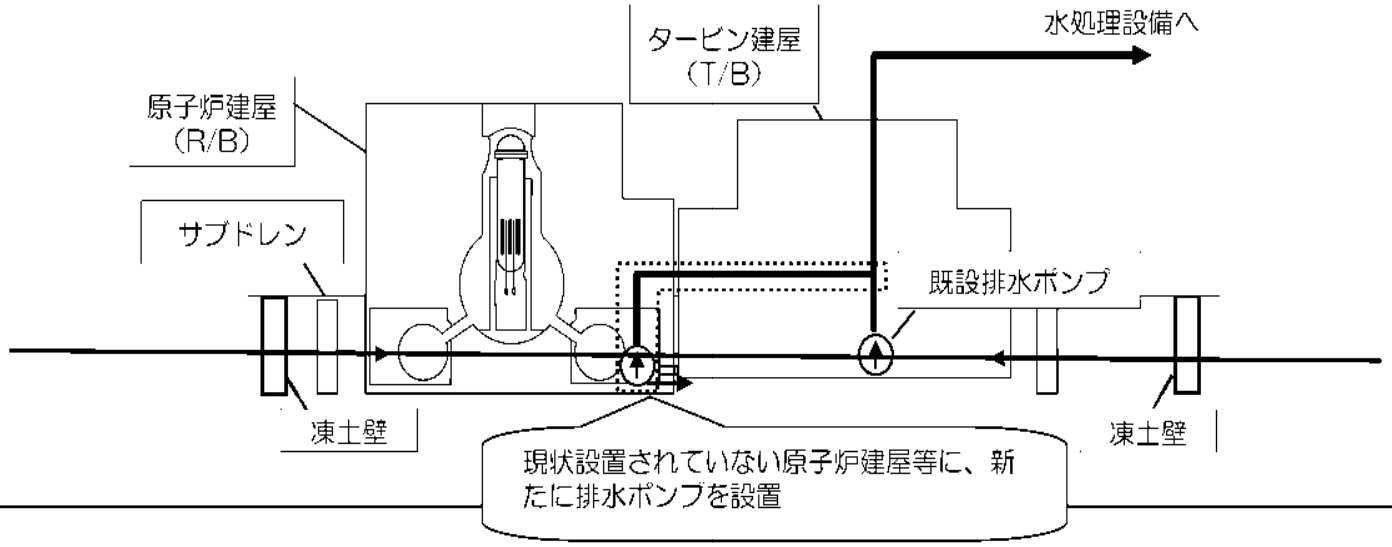
平成27年3月末

従来設備からの主な改善点

移送ポンプを従来設置されていない建屋にも配置することで、建屋毎の水位制御の応答性を向上させる。

監視用の滞留水水位計を従来設置箇所から範囲を広げて設置することで、建屋内水位の監視機能向上を図る。

従来、現場の手動操作で管理していた水位制御を自動化し、制御性を向上させると共に、被ばく低減を図る。



2. 滞留水移送装置増設工事工程

項目			H26年度 9月	10月	11月	12月	1月	2月	3月	H27年度 4月	備考
干渉物撤去		計画									（1号）27件/30件（2号）48件/53件 （3号）37件/53件（4号）27件/27件
		実績									
穿孔作業		計画									（1号）19箇所/24箇所（2号）33箇所/68箇所 （3号） 4箇所/66箇所（4号）30箇所/34箇所
		実績									
据付工事	ポンプ	計画									
		実績									
	配管	計画									
		実績									
	水位計	計画									
		実績									
使用前検査		計画									
		実績									

1/16日現在

3. 当該工事における被ばく低減対策

○ 被ばく低減対策

①工学的対策

・除染（吸引又は拭き取り）
・遮へい（衝立遮へい、部分遮へい）
・遠隔装置による作業
・配管・ケーブル等のリルートによる、高線量エリア作業の回避
・工法改善（低線量下で内作し運搬）

②管理的対策

・高線量エリアでの作業、または工学的対策が困難な作業エリアに於いては、タングステンベストの着用を検討
・アクセスルート及び待機エリアの設定

○ 当該工事における被ばく計画線量

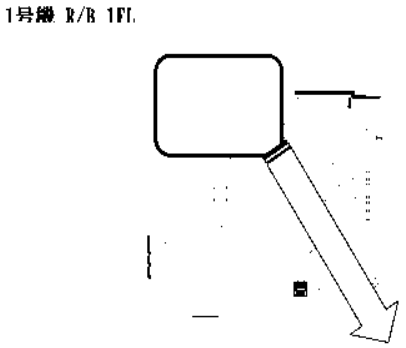
① 1/4号機滞留水移送設備設置
計画値：１１．３人･Sv

② 2/3号機滞留水移送設備設置
計画値：２５．０人･Sv

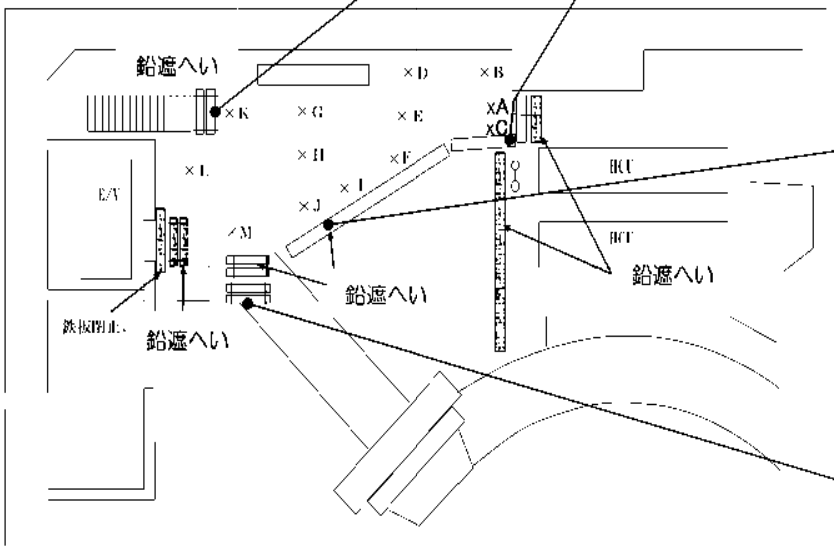
○ 今後とも、計画線量と実績線量の比較評価を行い、更なる被ばく低減を図りながら工事を進める予定

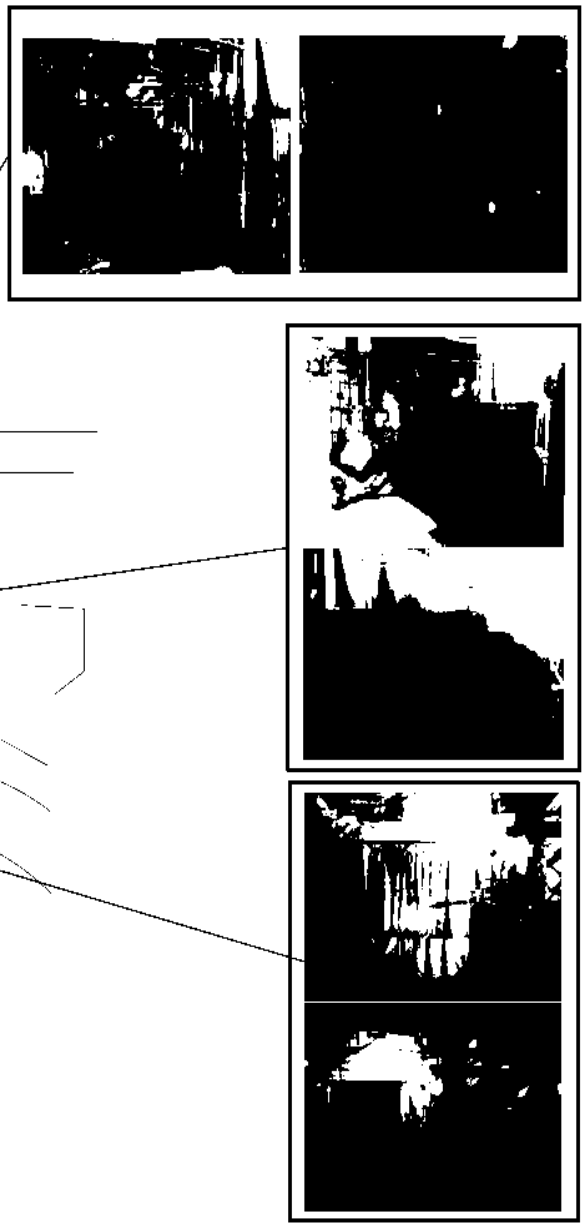
4. 当該工事における被ばく低減対策例1

2. 北西エリア遮へい設置



	遮蔽前	遮蔽後
×A	2.6	1.2
×B	1.2	0.80
×C	2.3	0.90
×D	1.5	1.2
×E	1.6	1.0
×F	1.3	0.90
×G	1.4	1.0
×H	1.7	1.0
×I	1.4	0.60
×J	1.7	1.0
×K	1.3	1.2
×L	1.5	1.1
×M	2.1	1.3
幾何平均	1.62	1.20





1号機 R/B 1FL 北西エリア北側HCU近傍(上作業エリア)

エリア遮蔽前（幾何平均）　・・・1.62mSv/h

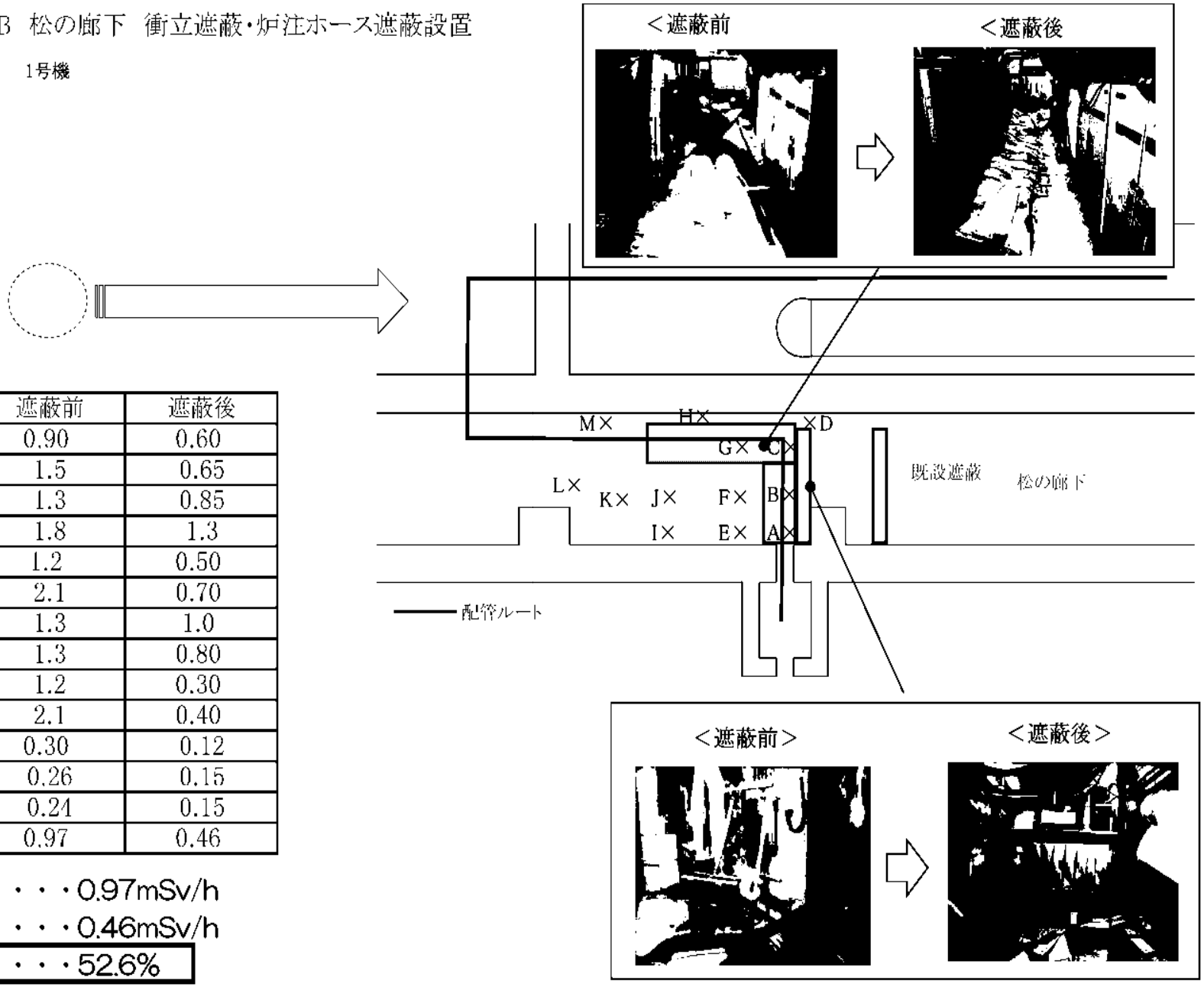
エリア遮蔽後（幾何平均）　・・・1.20mSv/h

低減率　・・・25.9%

5. 当該工事における被ばく低減対策例2

1号機T/B　松の廊下　衝立遮蔽・炉注ホース遮蔽設置

N　1号機



	遮蔽前	遮蔽後
×A	0.90	0.60
×B	1.5	0.65
×C	1.3	0.85
×D	1.8	1.3
×E	1.2	0.50
×F	2.1	0.70
×G	1.3	1.0
×H	1.3	0.80
×I	1.2	0.30
×J	2.1	0.40
×K	0.30	0.12
×L	0.26	0.15
×M	0.24	0.15
幾何平均	0.97	0.46

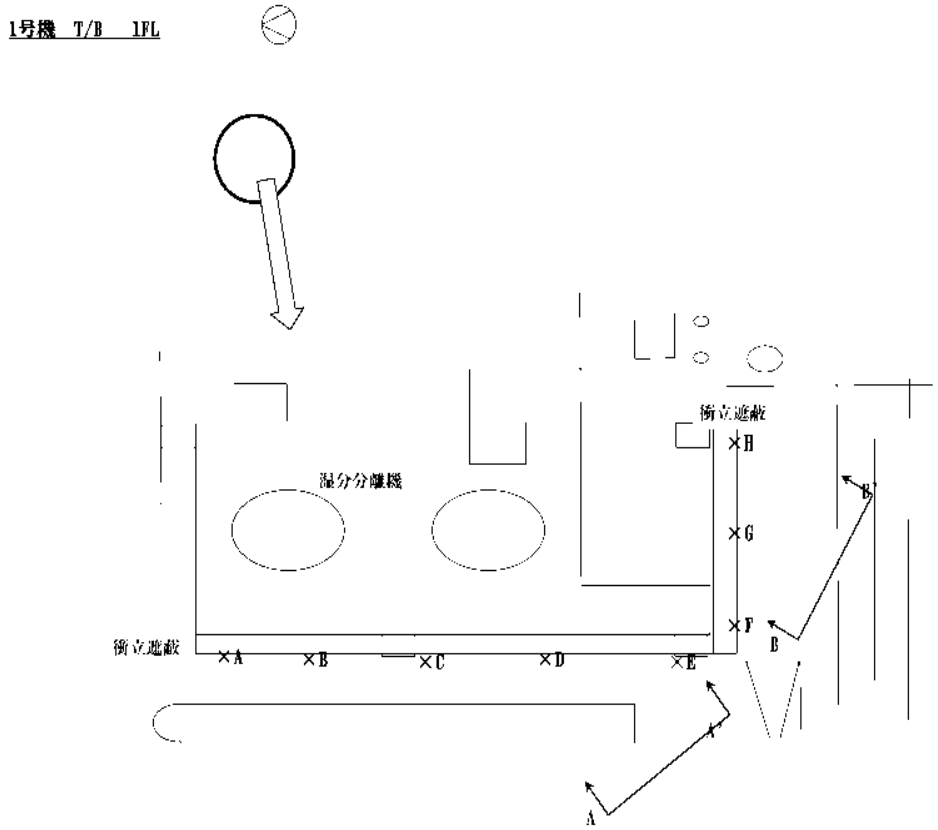
遮蔽前　・・・0.97mSv/h

遮蔽後　・・・0.46mSv/h

低減率　・・・52.6%

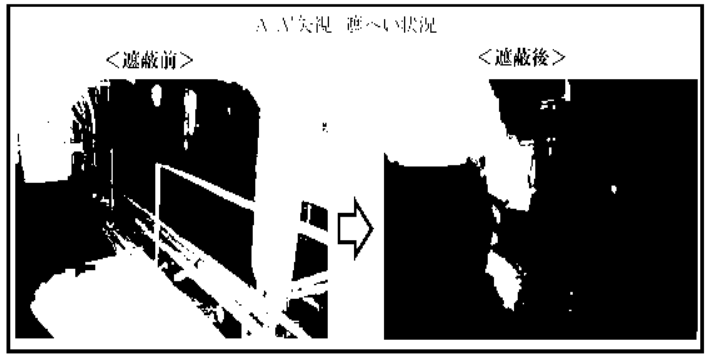
6. 当該工事における被ばく低減対策例3

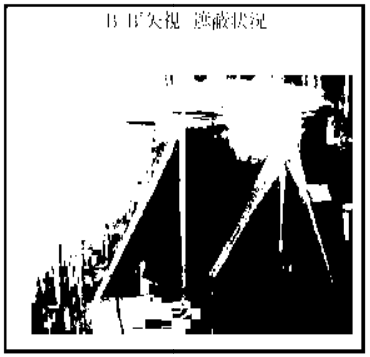
1号機T/B 湿分分離器 開口部遮蔽



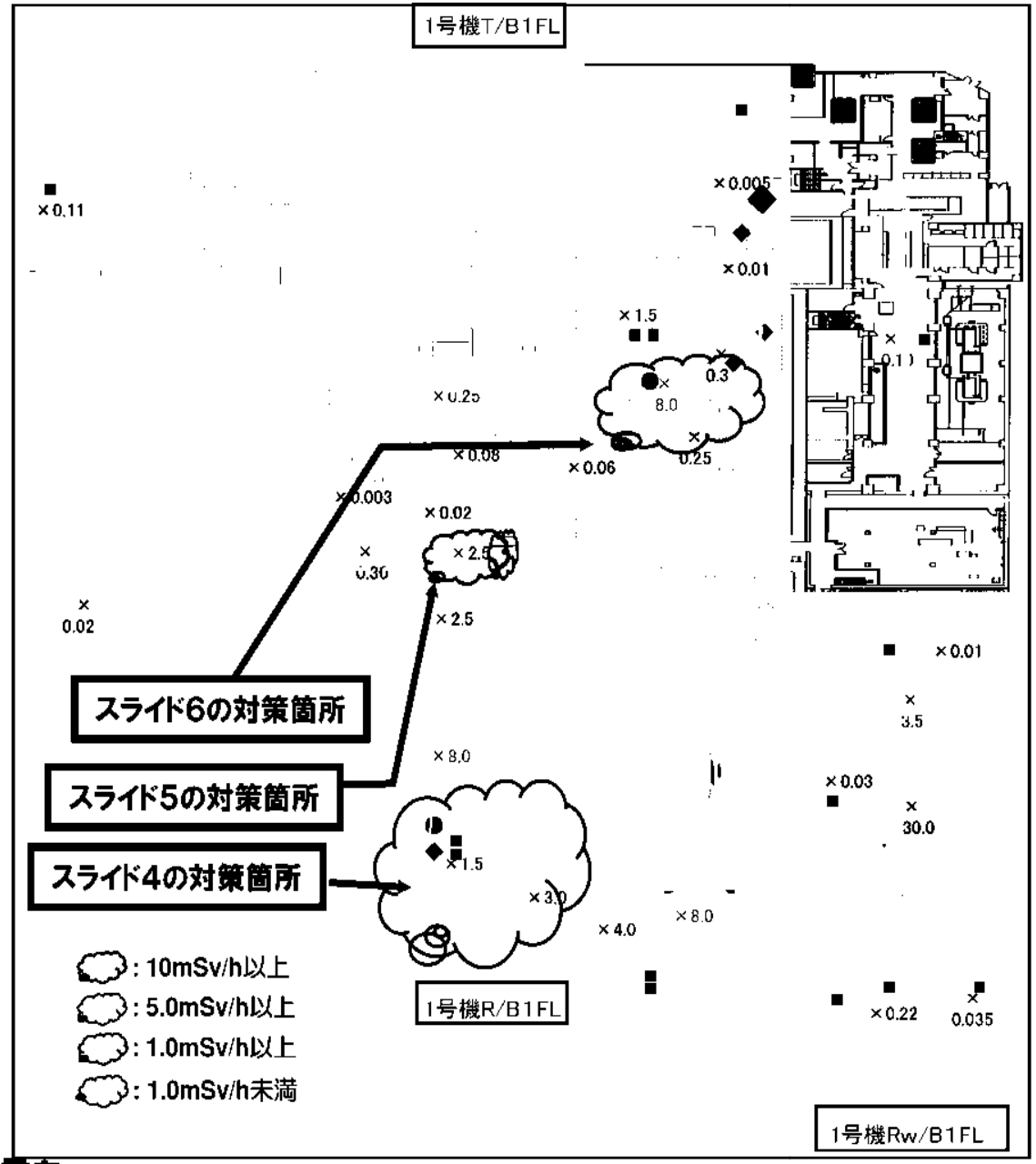
測定ポイント	遮へい前	遮へい後
×A	2.8	0.35
×B	3.0	0.35
×C	3.0	0.35
×D	2.6	0.25
×E	1.3	0.15
×F	2.5	0.30
×G	0.50	0.20
×H	0.30	0.16

遮蔽前 ・・・ 1.54mSv/h
遮蔽後 ・・・ 0.25mSv/h
低減率 ・・・ 83.8%





【参考】作業概要及び雰囲気線量(1号機)



凡例
- ●:移送ポンプ
- ■:水位計
- ◆ 弁ユニット
- :配管
- :アクセス通路
- :待機エリア

単位:mSv/h

	R/B	T/B	RW/B	合計
移送ポンプ	2台	2台	−	4台
水位計	6台	5台	5台	16台
弁ユニット	1台	4台	−	5台
配管敷設	1式	1式	1式	1式

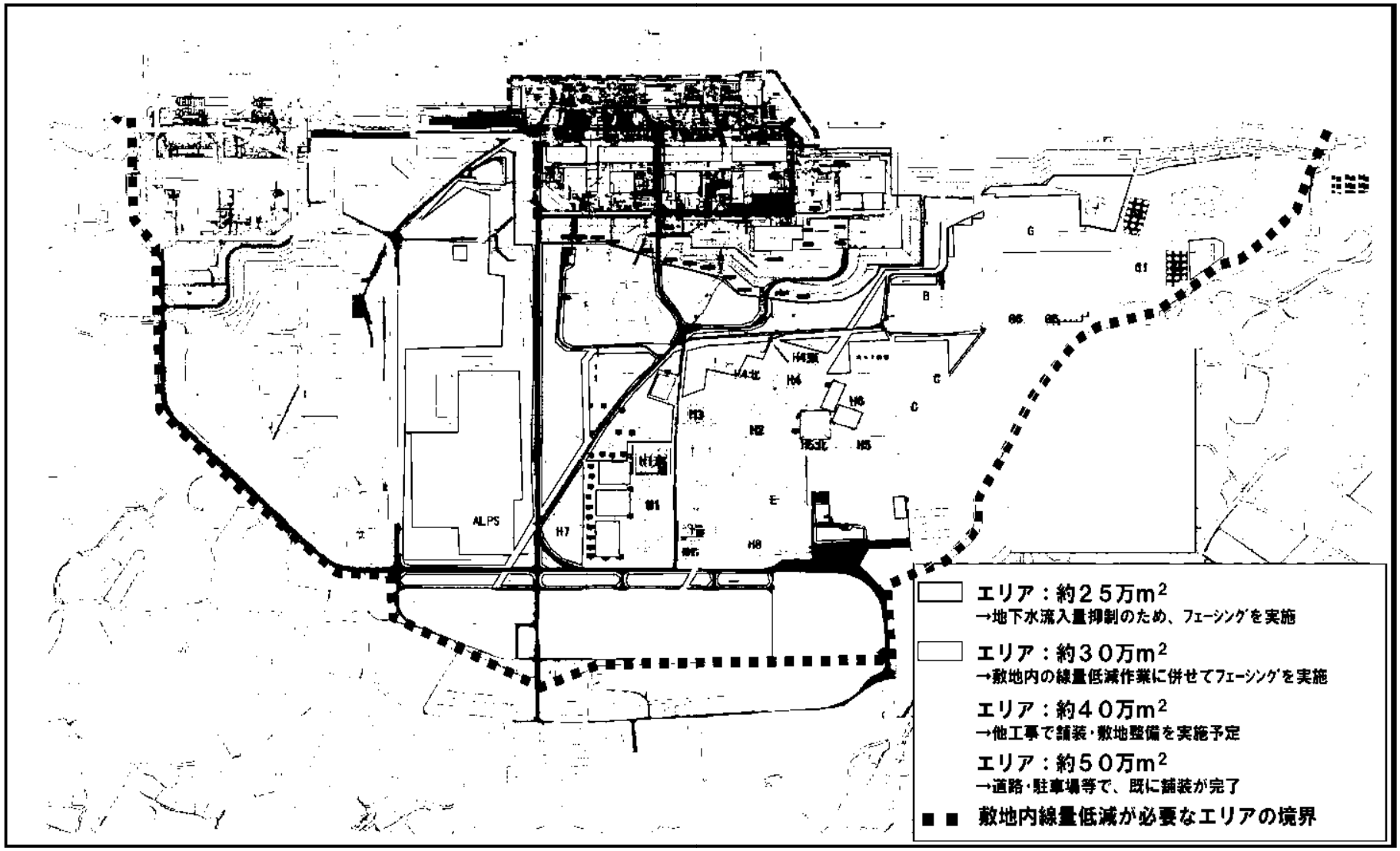
No.②-6

発電所敷地内のフェーシング等進捗状況について

東京電力
TEPCO

1. フェーシングの目的と範囲

構内の地表面をアスファルト等で覆い，線量低減並びに雨水の地下浸透を抑制し建屋への地下水流入量の低減を図る。

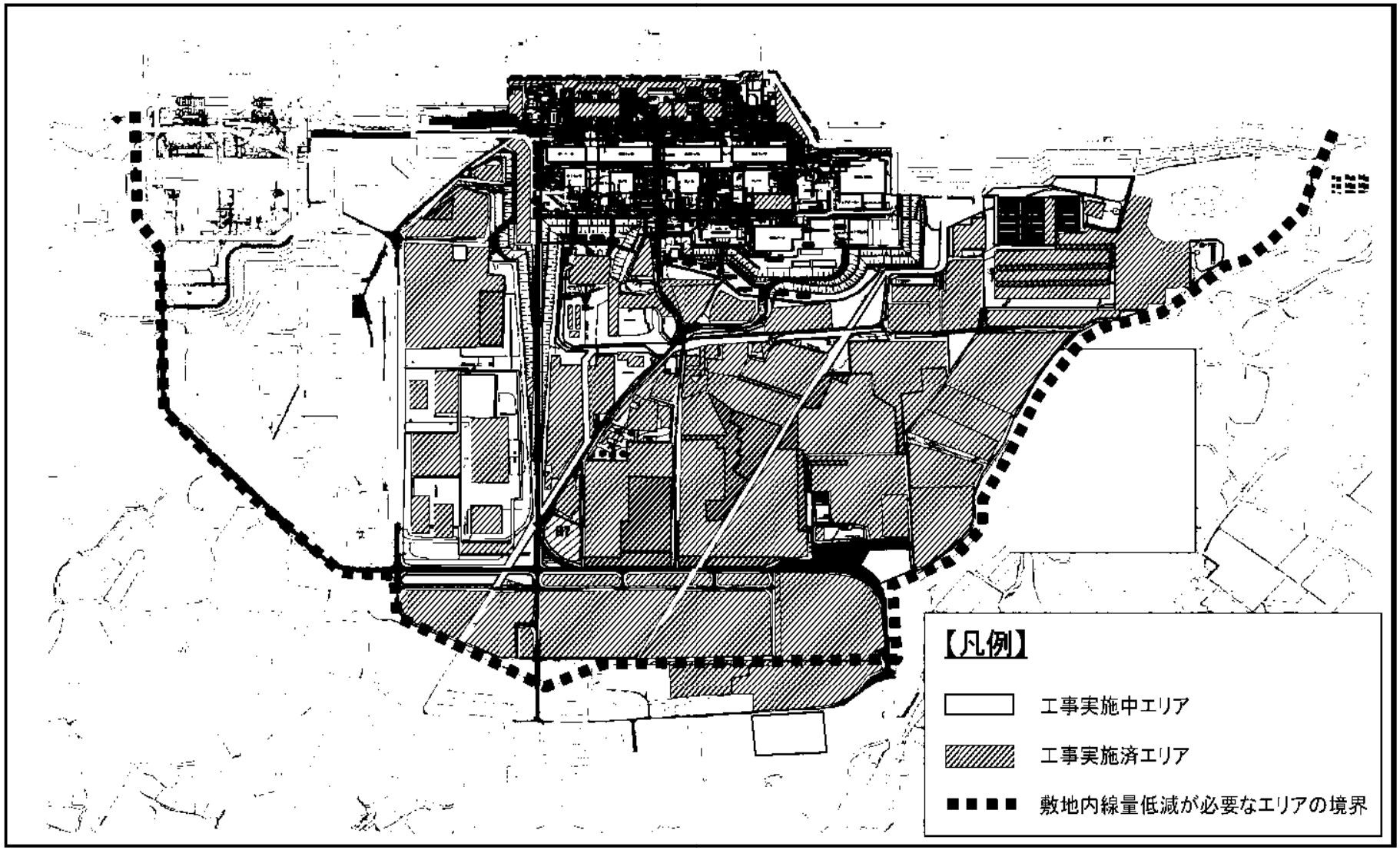


2. 敷地内線量低減の進捗状況(平成27年1月)

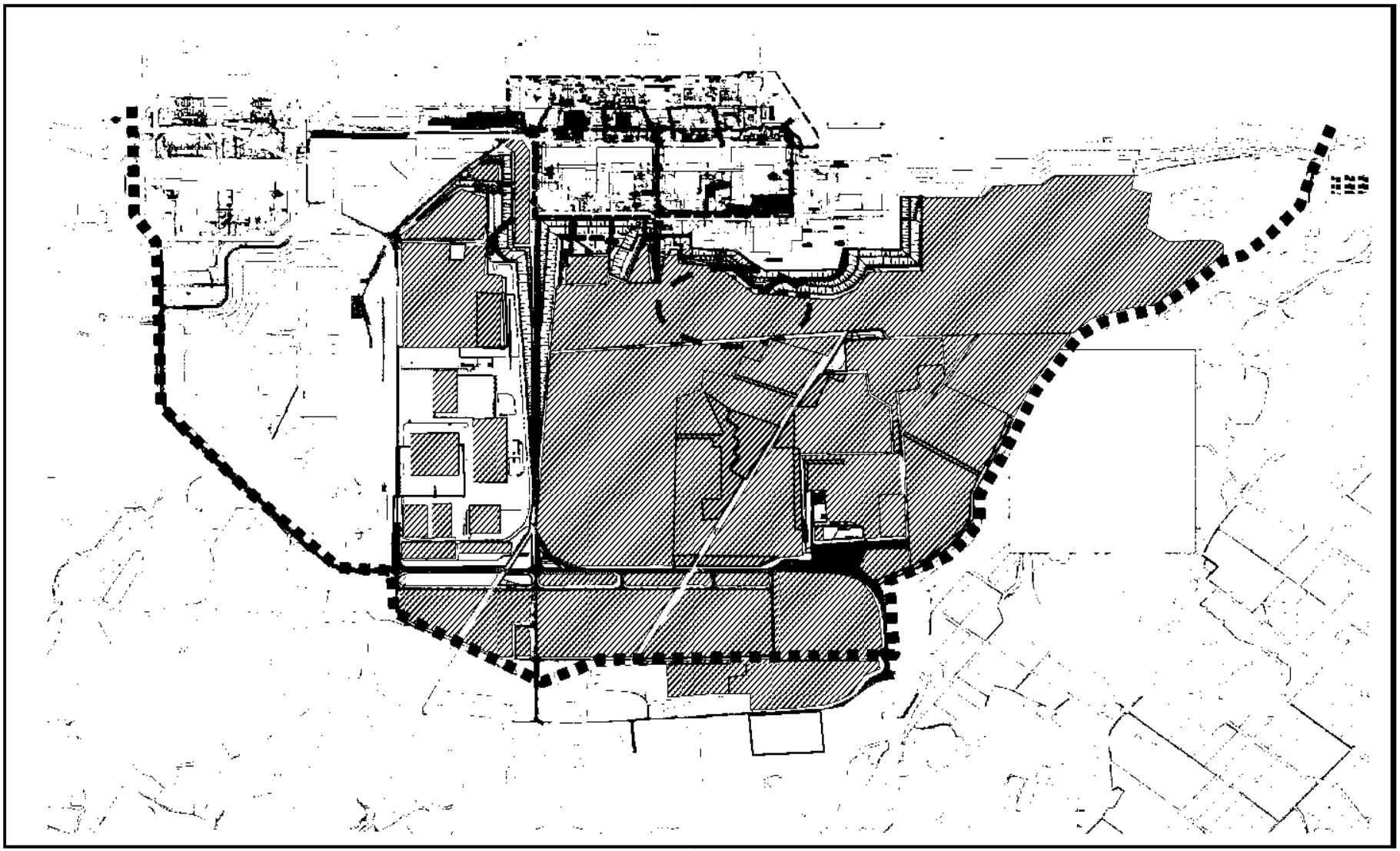
フェーシング工事			H25年度	H26年度							H27年度	
			下	上	10	11	12	1	2	3	上	下
フェーシング工事	Ⅰ	①O.P.+4mフェーシング ・1～4号機取水口間 ・埋立地・既設護岸陸側 ②O.P.+10mフェーシング ・瓦礫・破損車両撤去 ・フェーシング	▽H26年1月 H26年3月▽	▽H26年5月 ▽H26年5月 ▽H26年7月 1～4号周辺破損車輌撤去	海側瓦礫、破損車輌撤去				▽H27年2月		▽H27年3月	▽H27年12月 鉄板部目詰・表土はぎ・天地返し・フェーシング
	Ⅱ～Ⅳ	③O.P.+35mフェーシング ・地下水バイパスエリア ・1～4号山側法面エリア ・Gタンクエリア ・Hタンクエリア ・西側エリア：企業棟周辺 ・北側エリア：免震棟周辺	▽H26年2月	▽H26年9月 ▽H26年8月 ▽H26年9月 ▽H26年10月 ▽H26年9月							▽H27年3月 ▽H27年7月 ▽H27年3月 ▽H27年3月	▽H27年12月 ▽H27年12月
		④排水路新設					▽H26年12月					▽H27年12月
構内道路清掃				▽H26年8月		▽H26年10月						H28年3月▽
構内道路整備								▽H27年1月				
構内排水路清掃	・K系排水路 ・A～C系排水路					▽H26年11月	▽H26年12月 ▽H26年12月				▽H27年3月	

3. フェーシング全体進捗状況(平成27年1月実績)

エリア面積　145万m²　　**進捗率　約62%**



4. 35m盤フェーシング（平成27年3月予定）



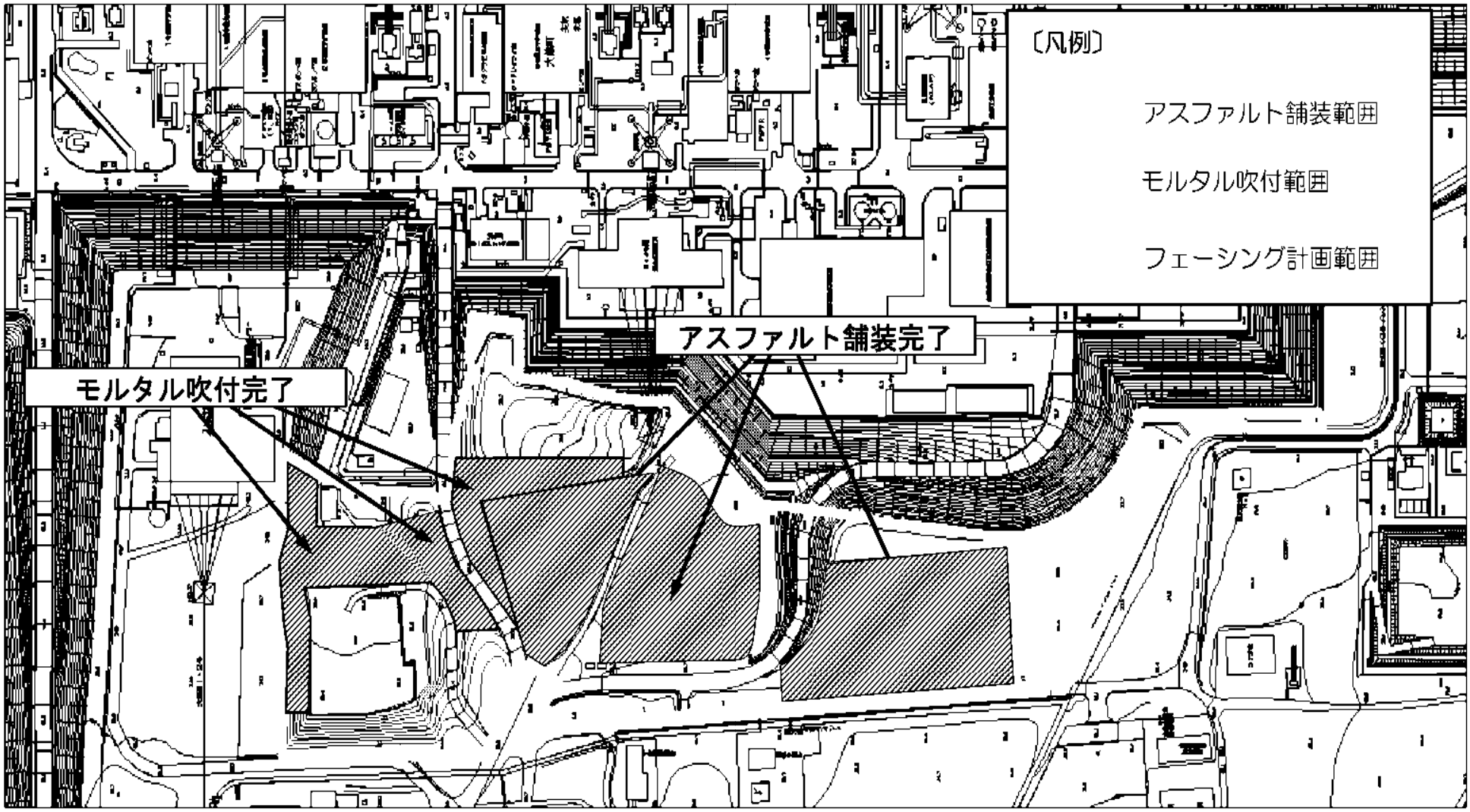
凡例

工事実施中エリア

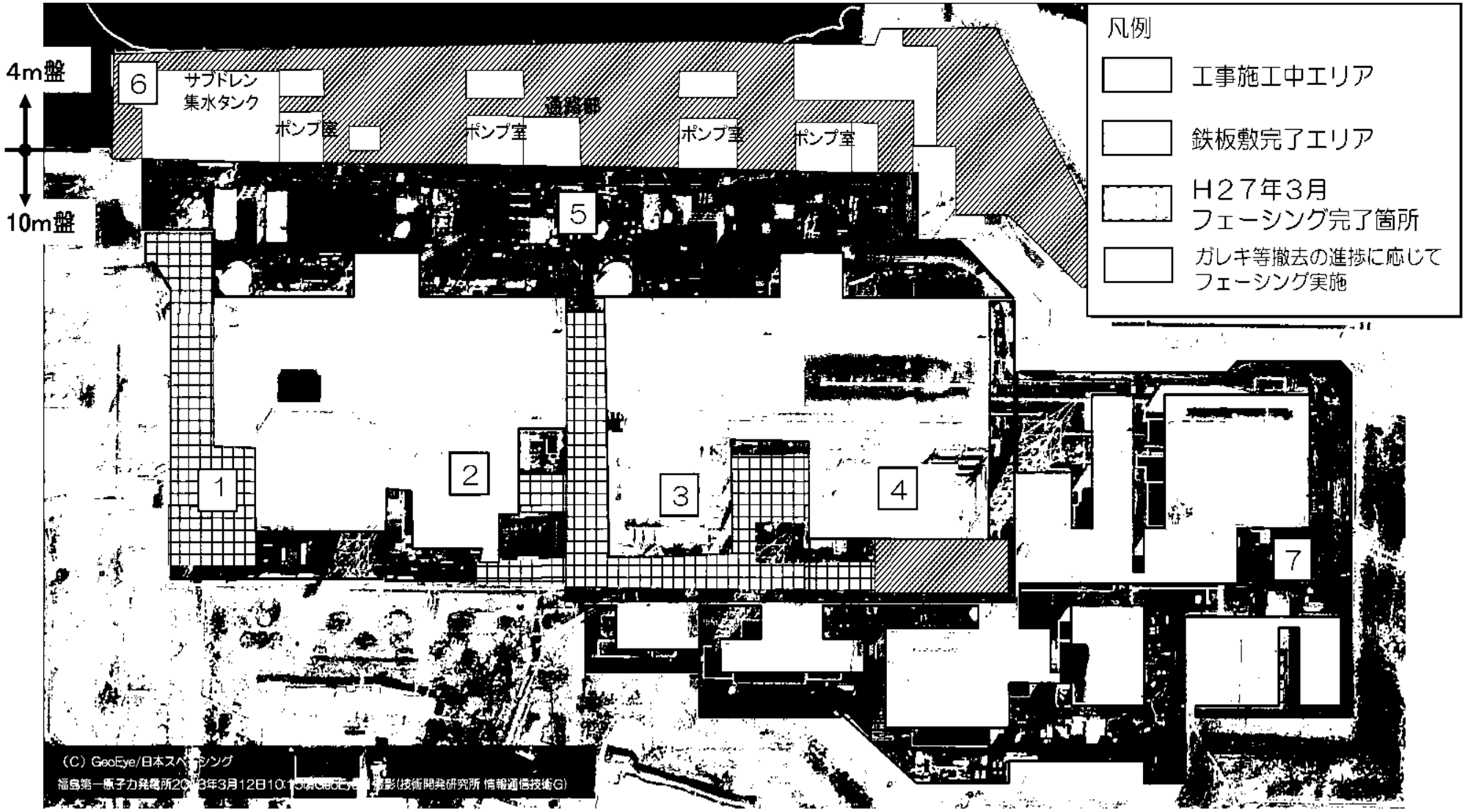
H27年3月フェーシング完了箇所

H27年1月進捗状況報告箇所

5. 35m盤フェーシング進捗状況（平成27年1月実績）

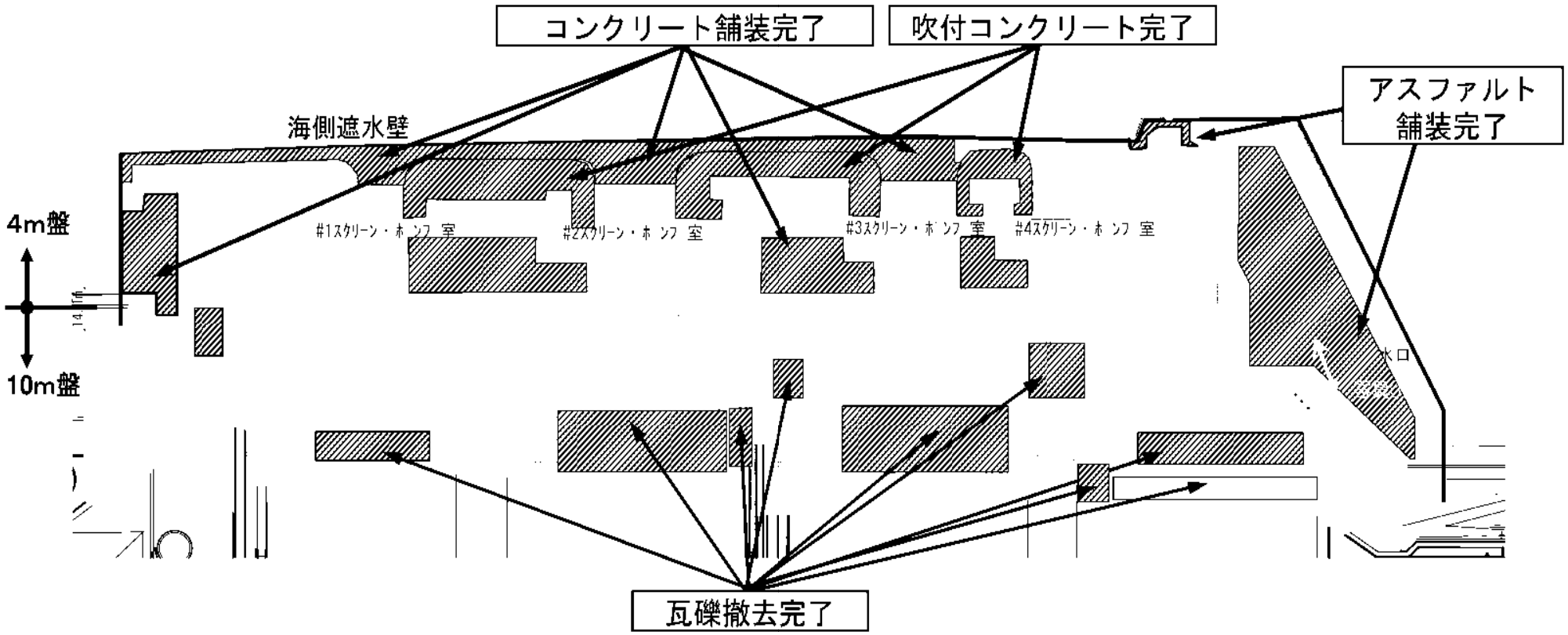


6. 4m・10m盤フェーシング進捗状況（平成27年3月予定）



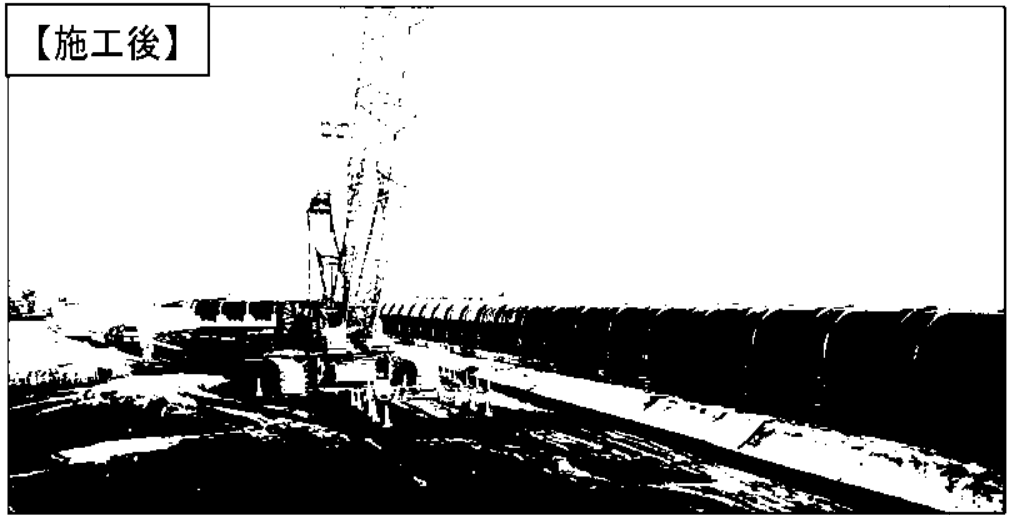
1	1号機周辺エリア	4	4号機周辺エリア	7	共用ラドエリア
2	2号機周辺エリア	5	タービン海側エリア		
3	3号機周辺エリア	6	4m盤エリア		

7．4m・10m盤フェーシング進捗状況（平成27年1月実績）

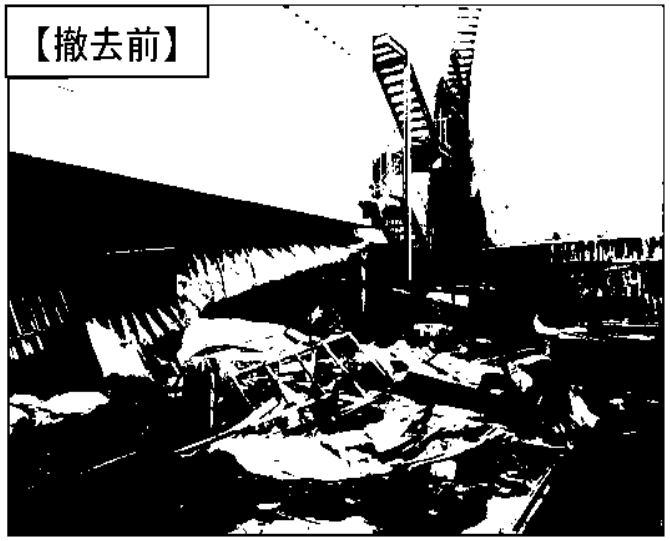


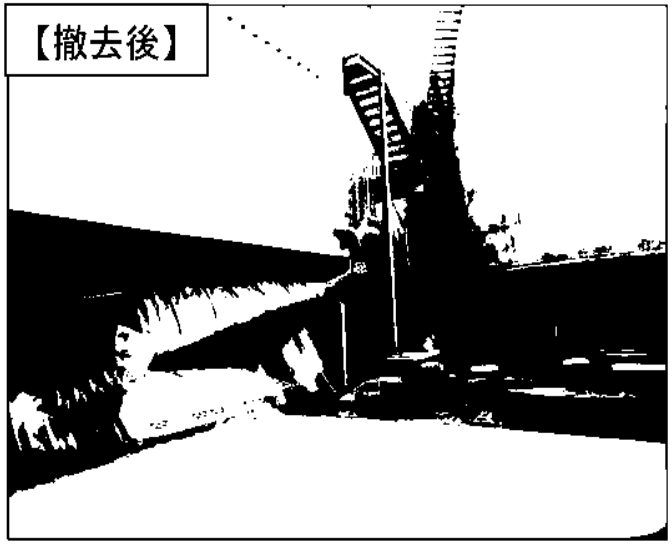
8. 4m・10m盤フェーシング進捗状況（平成27年1月実績）

【写真①】4m盤アスファルト舗装施工状況（1～4号機放水口周辺）

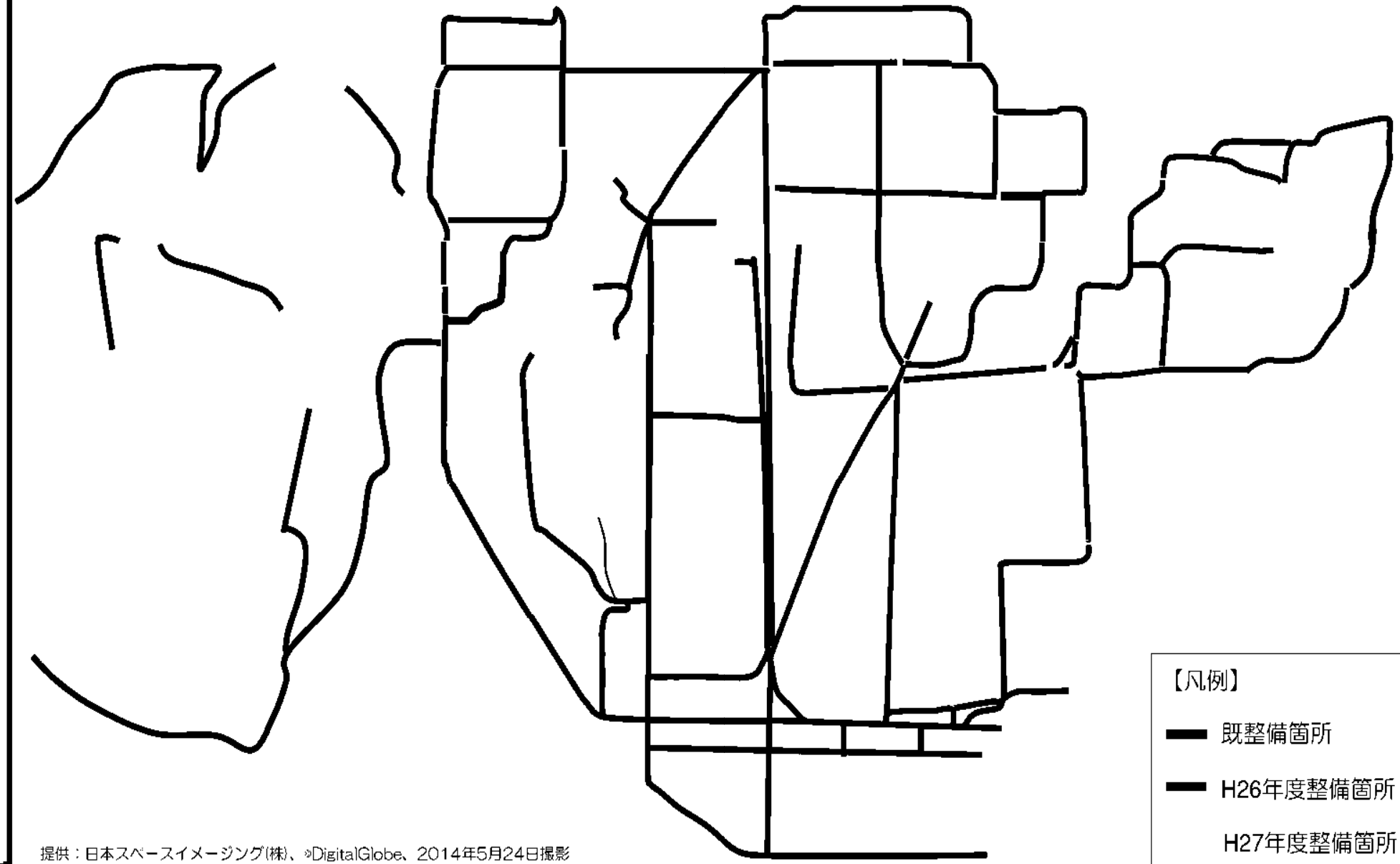


【写真②】4号機T／B海側周辺瓦礫撤去状況



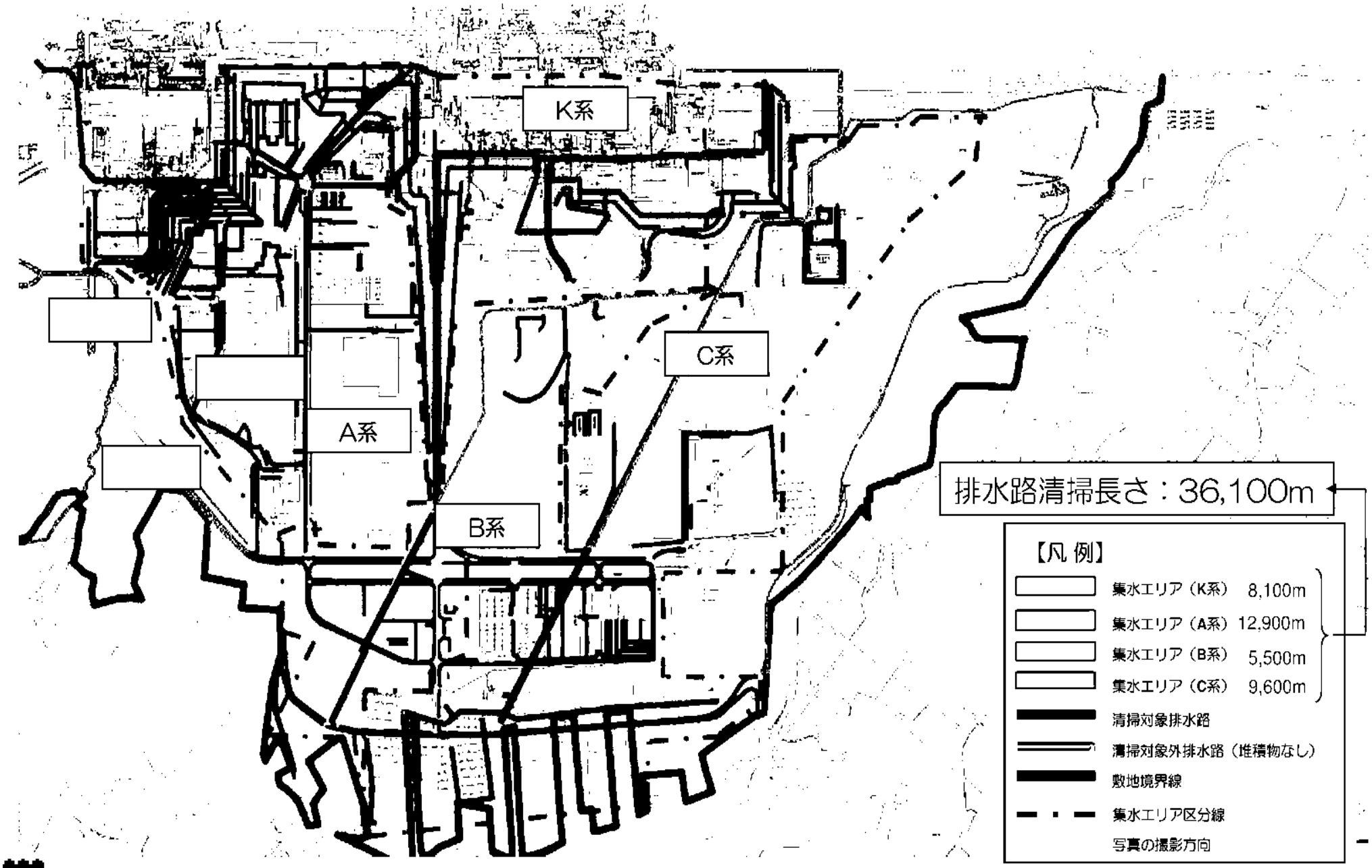


9. 構内道路整備計画図



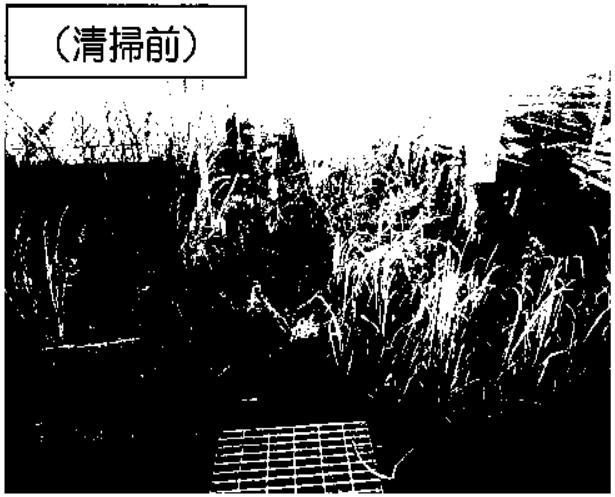
提供：日本スペースイメージング(株)、©DigitalGlobe、2014年5月24日撮影

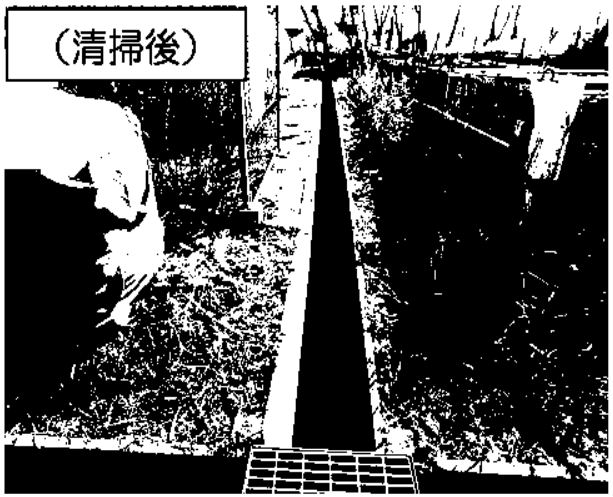
10. 構内排水路清掃計画図



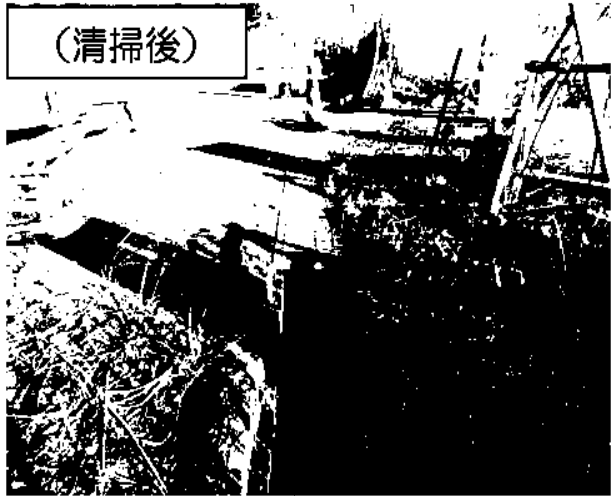
11. 構内排水路清掃実施状況(A系排水路)

【写真①】危険物保管ヤード南西側溝

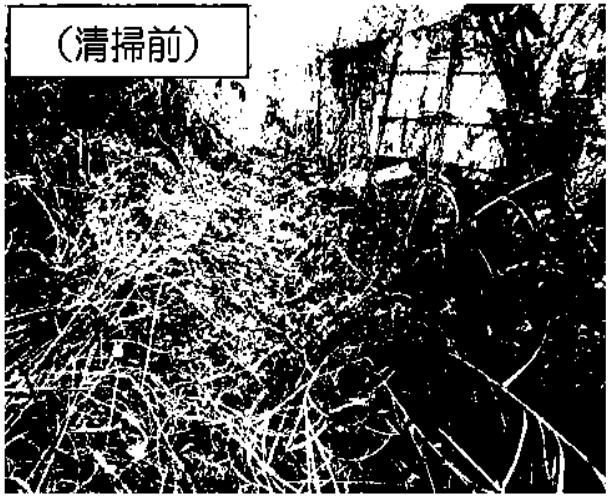


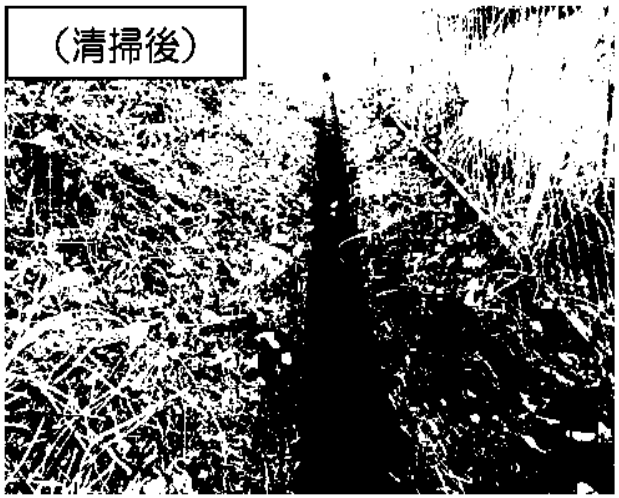


【写真②】危険物保管ヤード西側側溝

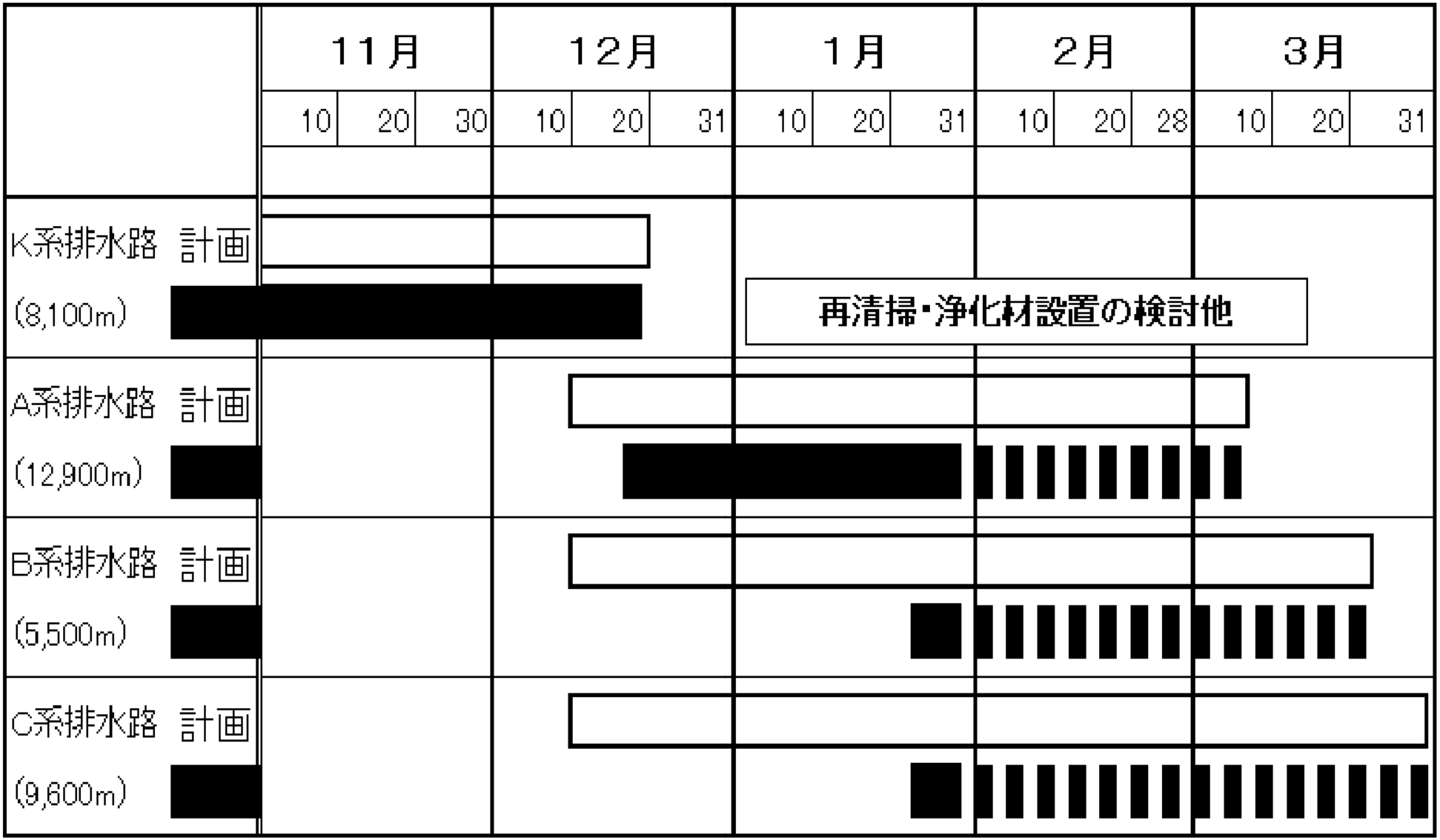


【写真③】固体廃棄物建屋北側側溝



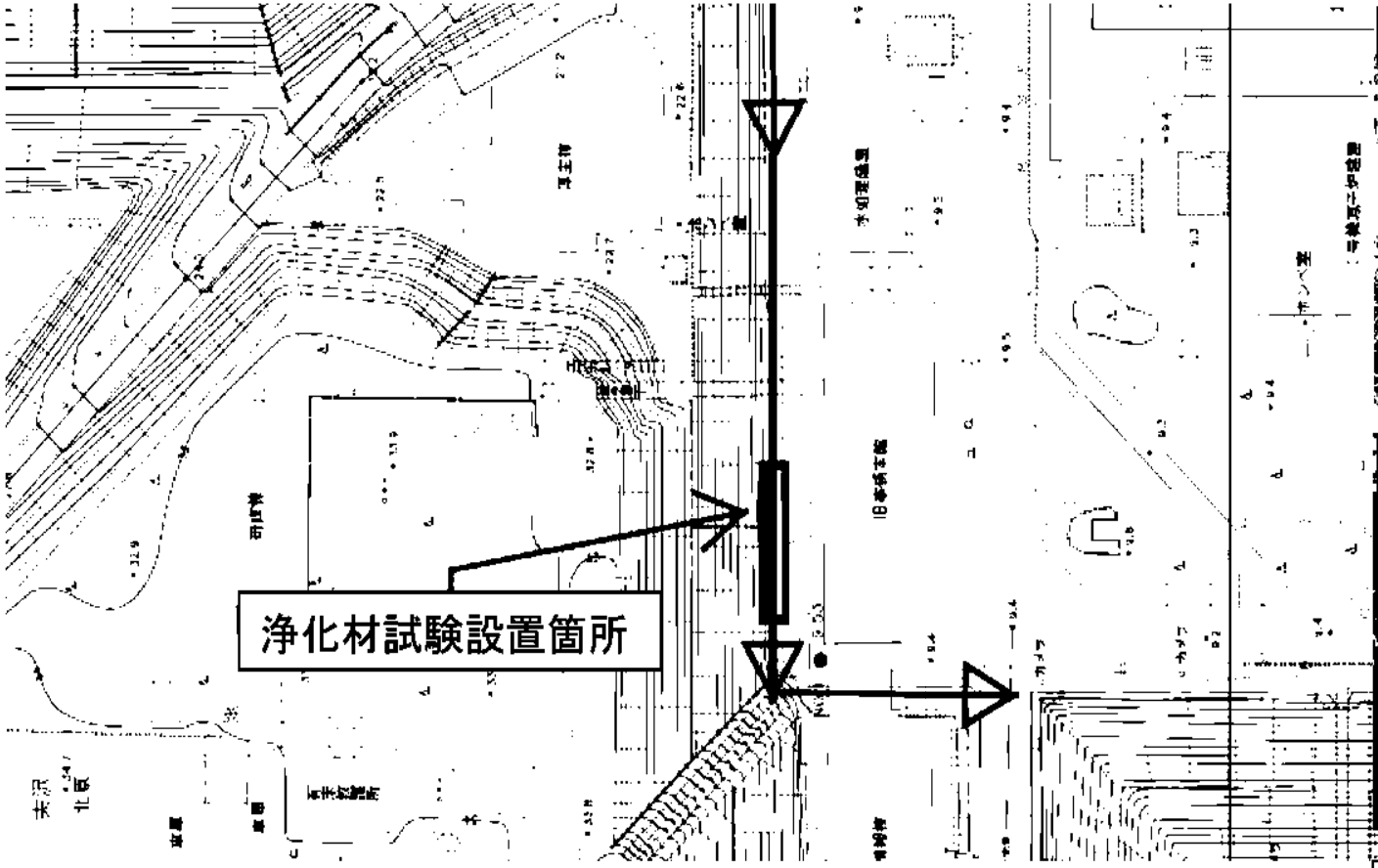


12. 構内排水路清掃工程表

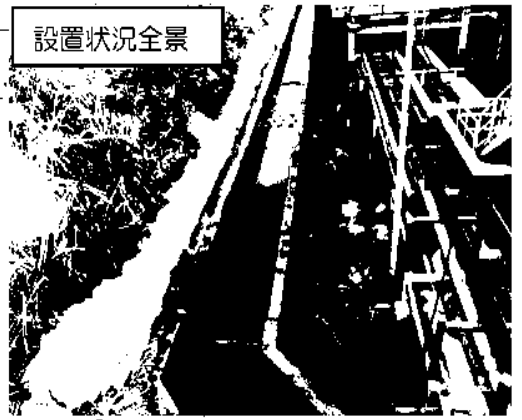


13. 浄化材試験設置状況(K系排水路)

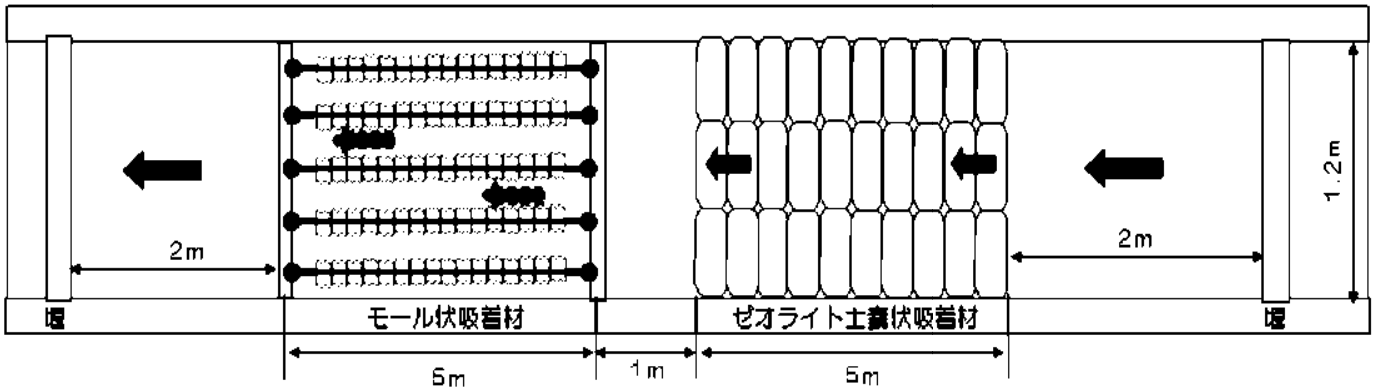
平成27年1月14日設置



設置状況全景



モール状吸着材設置状況



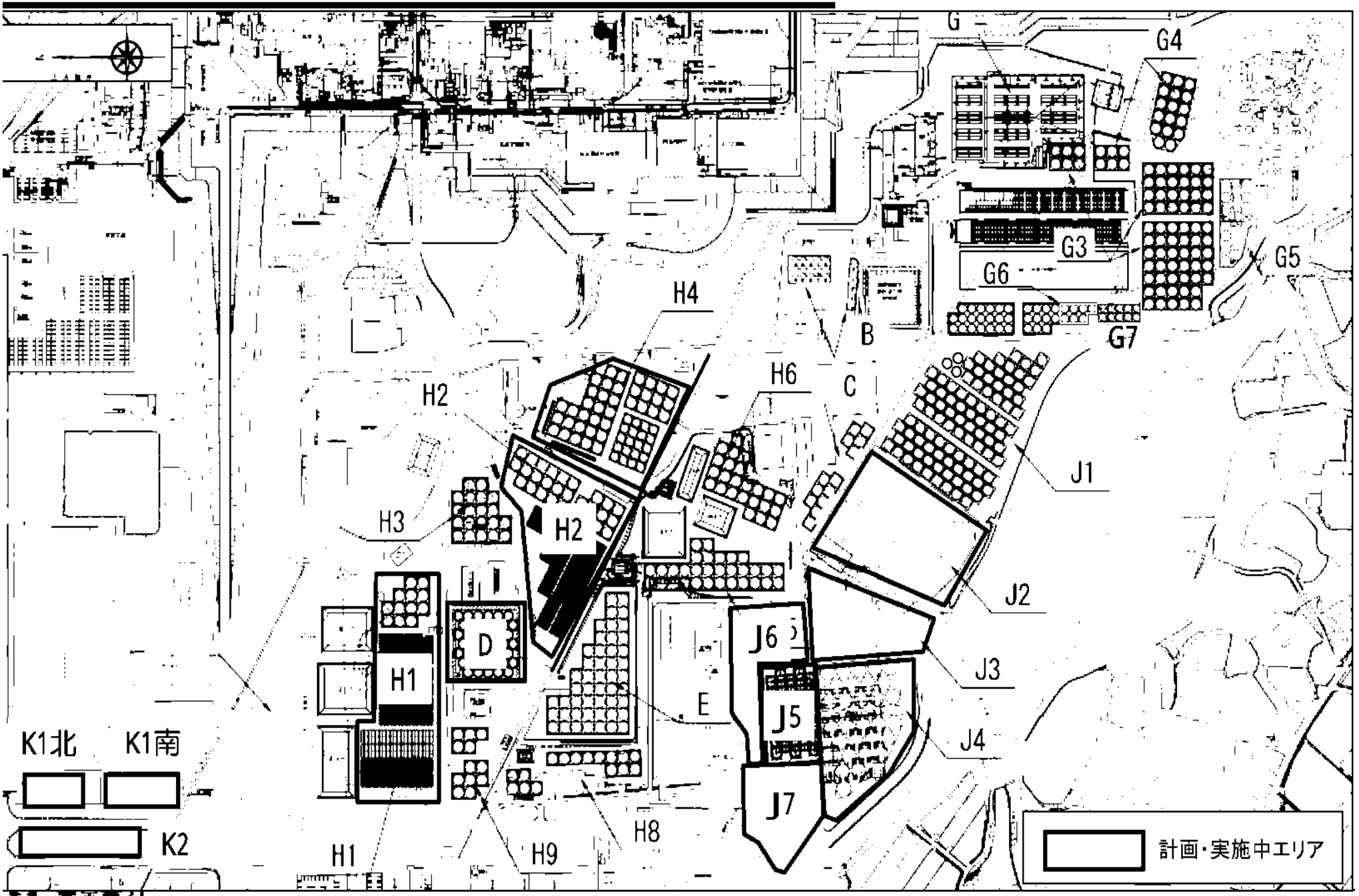
ゼオライト土嚢設置状況

No.③-1

タンク建設進捗状況

東京電力 TEPCO

1. タンクエリア図


G
G4
G3
G5
G6
G7
B
C
H4
H6
H2
H3
H2
J1
J2
J3
J4
J5
J6
J7
D
H1
E
K1北
K1南
K2
H1
H9
H8
計画・実施中エリア

2-1. タンク工程(新設分)

			平成26年度										平成27年度								H27.1の見込／計画基数
			6月	7月	8月	9月	10月	11月	12月	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月以降	
新設タンク	Jエリアタンク建設	J2/3 現地溶接型	12月19日進捗・見込				14.4	24.0	12.0	19.2	26.4	28.8	28.8									
			基数				6	10	5	8	11	12	12									
			1月進捗見込				14.4	24.0	12.0	14.4	9.6	21.6	21.6	21.6	14.4							
			基数				6	10	5	6	4	9	9	9	6							31基／64基
		J5 完成型	12月19日進捗・見込		9.9	3.7	0.0	8.6	9.9	11.1												
			基数		3	3	0	7	8	9												
			1月進捗見込		9.9	3.7	0.0	8.6	9.9	11.1												
			基数		3	3	0	7	8	9												35基／35基
		J4 現地溶接	12月19日進捗・見込					11.6	17.4	17.4	14.5	17.4	14.5									完成型
			基数					4	6	6	5	6	5									0基／5基
			1月進捗見込					11.6	17.4	17.4	11.6	17.4	11.6	6.2								現地溶接型
			基数					4	6	6	4	6	4	5								20基／30基
	J6エリア 現地溶接型		12月19日進捗・見込							15.6	14.4	8.4	7.2									
			基数							13	12	7	6									
			1月進捗見込							15.6	3.6	13.2	13.2									
			基数							13	3	11	11									16基／38基
	J7 現地溶接型		12月19日進捗・見込			伐採・地盤改良・基礎設置						12.0	14.4	9.6	9.6	4.8						
			基数									10	12	8	8	4						
			1月30日見直										4.8	20.4	13.2	12.0						
			基数										4	13	11	10						0基／42基
	K1北エリア 現地溶接型		12月19日進捗・見込						12.0		2.4											
			基数						10		2											
			1月進捗見込						12.0			2.4										
			基数						10			2										10基／12基
	K1南エリア 完成型		12月19日進捗・見込						2.4	4.8	4.8											
			基数						2	4	4											
			1月進捗見込								12.4											
			基数								10											0基／10基
	K2エリア 完成型		12月19日進捗・見込		準備工	地盤改良・基礎設置			8.0	8.0	12.0											
			基数						8	8	12											
			1月進捗見込								24.0	4.0										
			基数								24	4										0基／28基

太数字：タンク容量（単位：千m3）

作業スペース&隣接ヤードとの取り合い検討の結果
現地溶接タンク30基＋完成型タンク5基
に計画変更

詳細配置・隣接ヤードの取り合い
検討完了による工程確定

1月進捗見込みは、1週間現場休止を見込んだタンク数量をしめしている。今後休止期間の影響を再度検討の上、計画を見直す

2-2. タンク工程(リプレース分)

			平成26年度										平成27年度								H27.1の見込／計画基数
			6月	7月	8月	9月	10月	11月	12月	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月以降	
リプレースタンク	H1エリア 完成型	12月19日進捗・見込			地盤改良・基礎設置						タンク											
					残水・撤去				18.8	18.8	16.3	17.5	16.3	10.0	10.0							
		基数			▲20				8	▲12 15	13	14	13	8	8							
		1月進捗見込			タンク撤去・地盤改良・基礎設						38.8	23.8	12.5	3.8	0.0	10.0	10.0					
		基数			▲20						▲12 31	19	10	3		8	8					0基／79基
	H2ブルータンク 現地溶接型	1月30日見直							地盤改良・基礎設置							9.6	9.6	9.6	9.6	9.6	28.8	
									残水・撤去				タンク									
	撤去(千m3)	基数									▲10					4	4	4	4	4	12	
	H2フランジタンク (type1;23基) 現地溶接型	1月30日見直							地盤改良・基礎設置													
									残水・撤去													
	撤去(千m3)										▲28											
	H4フランジタンク (Type1;22基) 完成型	1月30日見直										地盤改良・基礎設置										
											残水・撤去						タンク			20.0	40.0	
		基数																		20	40	
		撤去(千m3)										▲22	▲26									

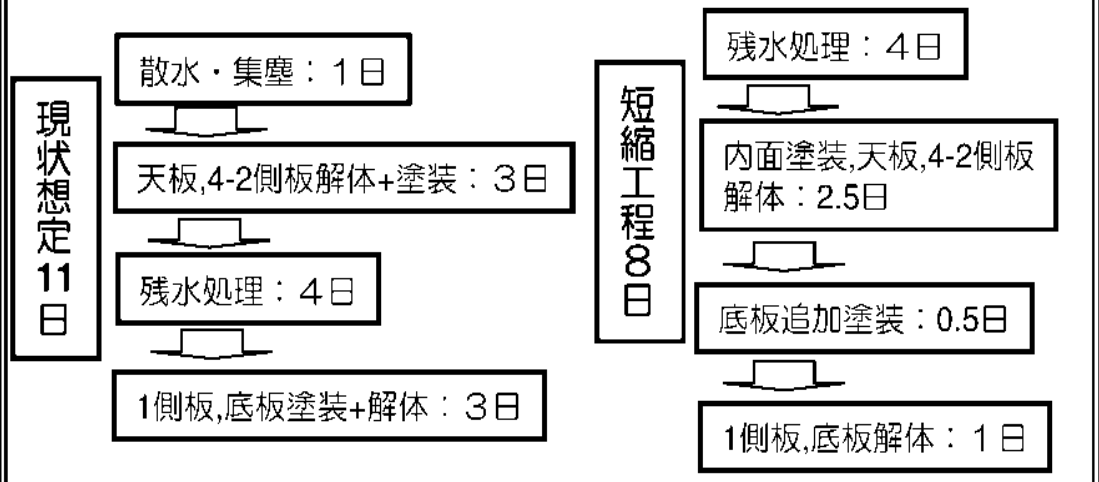
H1,2,4のタンク設置工程は、既設タンクの撤去開始時期により変更の可能性有り
基数についても、今後の詳細検討により変更の可能性有り

◆フランジタンクの解体の工程短縮検討の方向性

- ー残水処理日数の短縮
- ー放射性物質拡散防止塗装の効率化
- ークレーン設置台数の追加
- ー残水処理班の増強
- ーダスト管理の合理化

◆H4リプレースについては、H25.8のタンク漏洩に関連して汚染土壌の調査、回収が想定され、工程遅延リスクがある

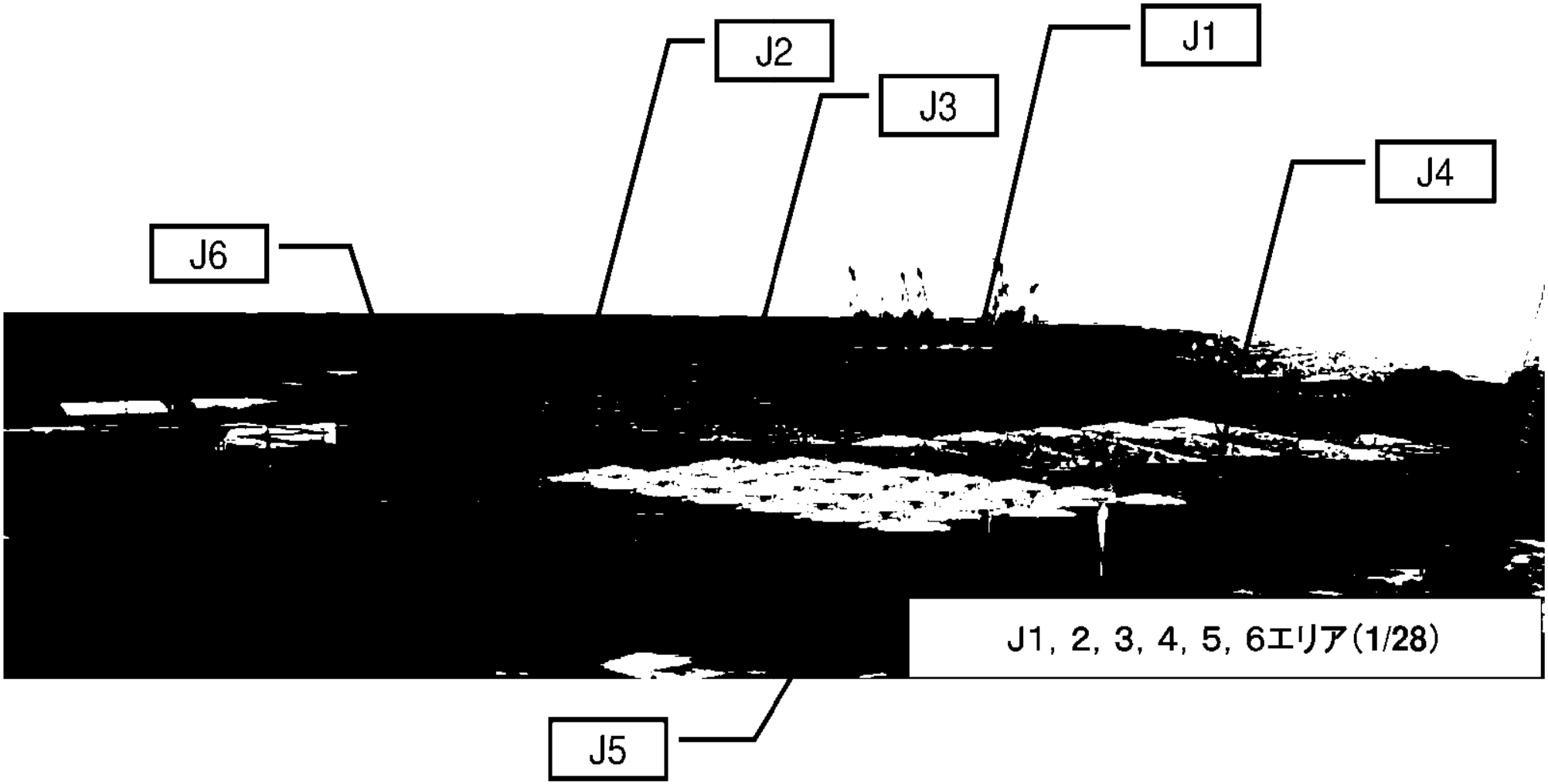
【工程短縮案の例】



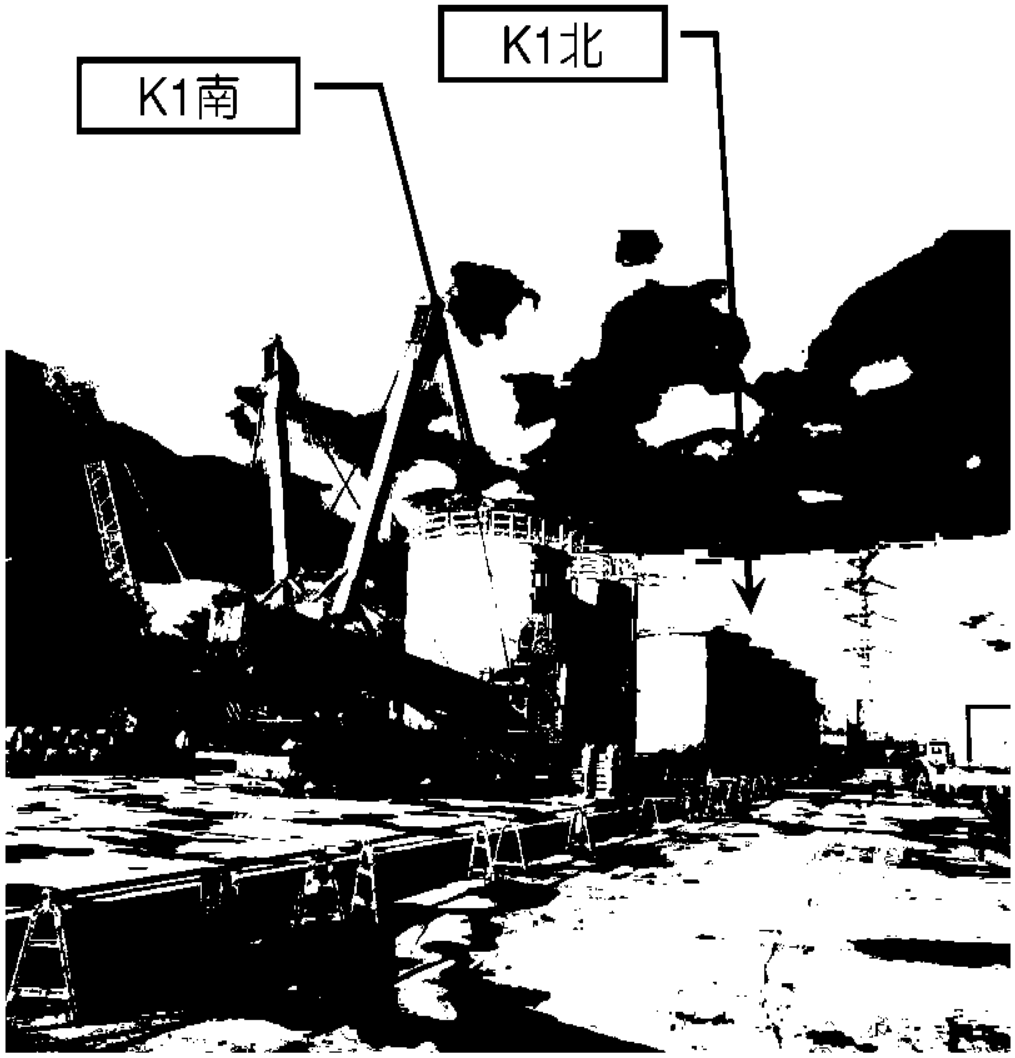
2-3. タンク建設進捗状況

エリア	12月 進捗	1月 見込	全体状況	対策
J2/3	6基 （2減）	4基 （7減）	レール落下災害防止対策として、タンク組立と仮堰工事を同時に実施することを自粛してきたことから、タンク組立時間が短縮となったため、生産減が発生	他工事との時間割を見直し、タンク組立時間を延長して2月以降は月産9基を目指す
J4	6基	4基 （1減）	J4の最後3基の設置スペース並びに隣接J7ヤードとの取り合い検討の結果、現地溶接型32基の計画から現地溶接型30基＋完成型5基の計画へ変更	
J5	9基	－	全量完了	
J6	13基	3基 （9減）		
J7	－	－	地盤改良・基礎構築・フェンス移設工事ほかを実施中	
K1北	10基	－	残り2基の基礎構築中	
K1南	0基 （2減）	0基 （4減）	海象の悪化により、水切り工程遅延	
K2	0基 （8減）	0基 （8減）	基礎工事実施中。タンク設置中。 実施計画補正申請による、供給開始日の見直し	
H1	0 （8減）	0基 （15減）	許認可対応に伴う供給開始の見直し。フランジタンク解体をダスト管理を入念にして実施するため工程遅延要素あり。タンク解体着手延期	フランジタンク解体については実績を積みながら、解体作業サイクルタイムの短縮を検討
H2	－	－	ブルータンク内貯留水（濃縮廃液）10,000m3のDタンクへの送水を完了。 フランジタンク解体のダスト管理を入念に実施するため工程遅延要素あり。 タンク解体着手延期	
H4	－	－	フランジタンク解体のダスト管理を入念に実施するため工程遅延要素あり	
その他	1月発生した雨水受けタンクにおける墜落災害に伴う構内工事休止により全体的に工事遅延が発生している状況			

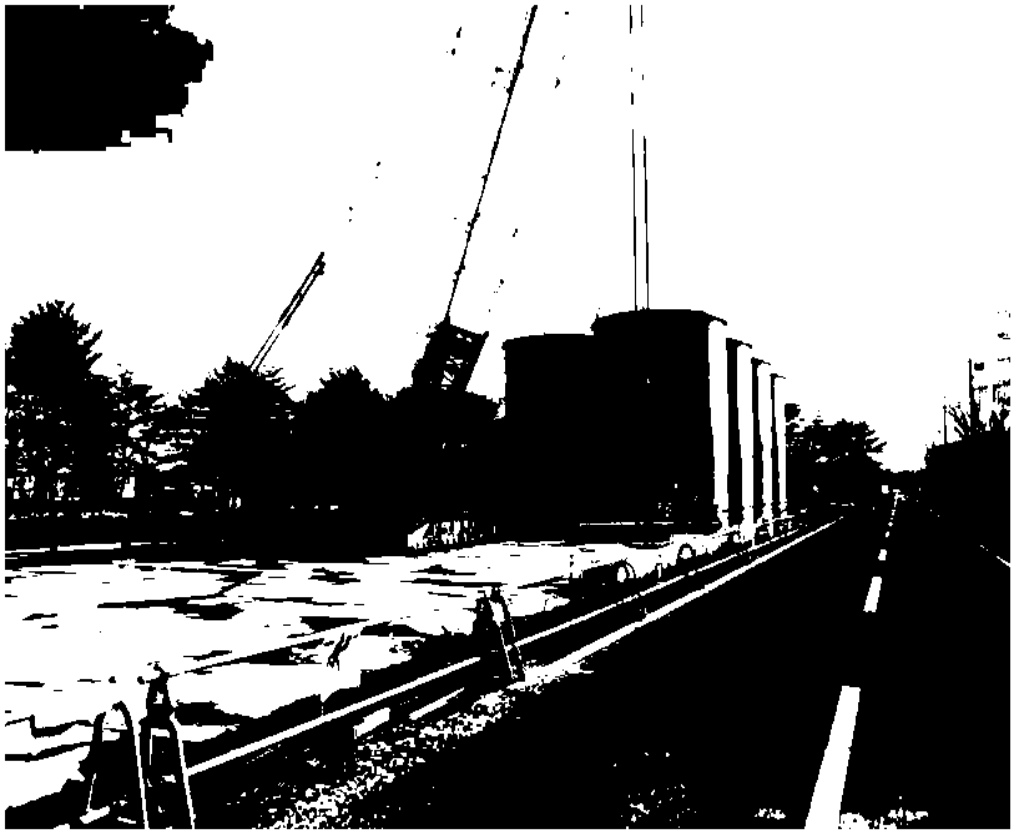
2-4. タンク建設状況(Jエリア現況写真)



2-5. タンク建設状況(Kエリア現況写真)



K1北，南（1/28）



K2エリア(1/28)

2-6. タンク建設状況(H1エリア現況写真)

H1エリア西側(1/28)

H1エリア東側(1/28)

3-1. タンク建設の方向性

RO濃縮塩水処理について、H26年度内の年度内処理が厳しい状況になっているが、今後汚染水の浄化処理計画は適宜見直しを図ることとしている。

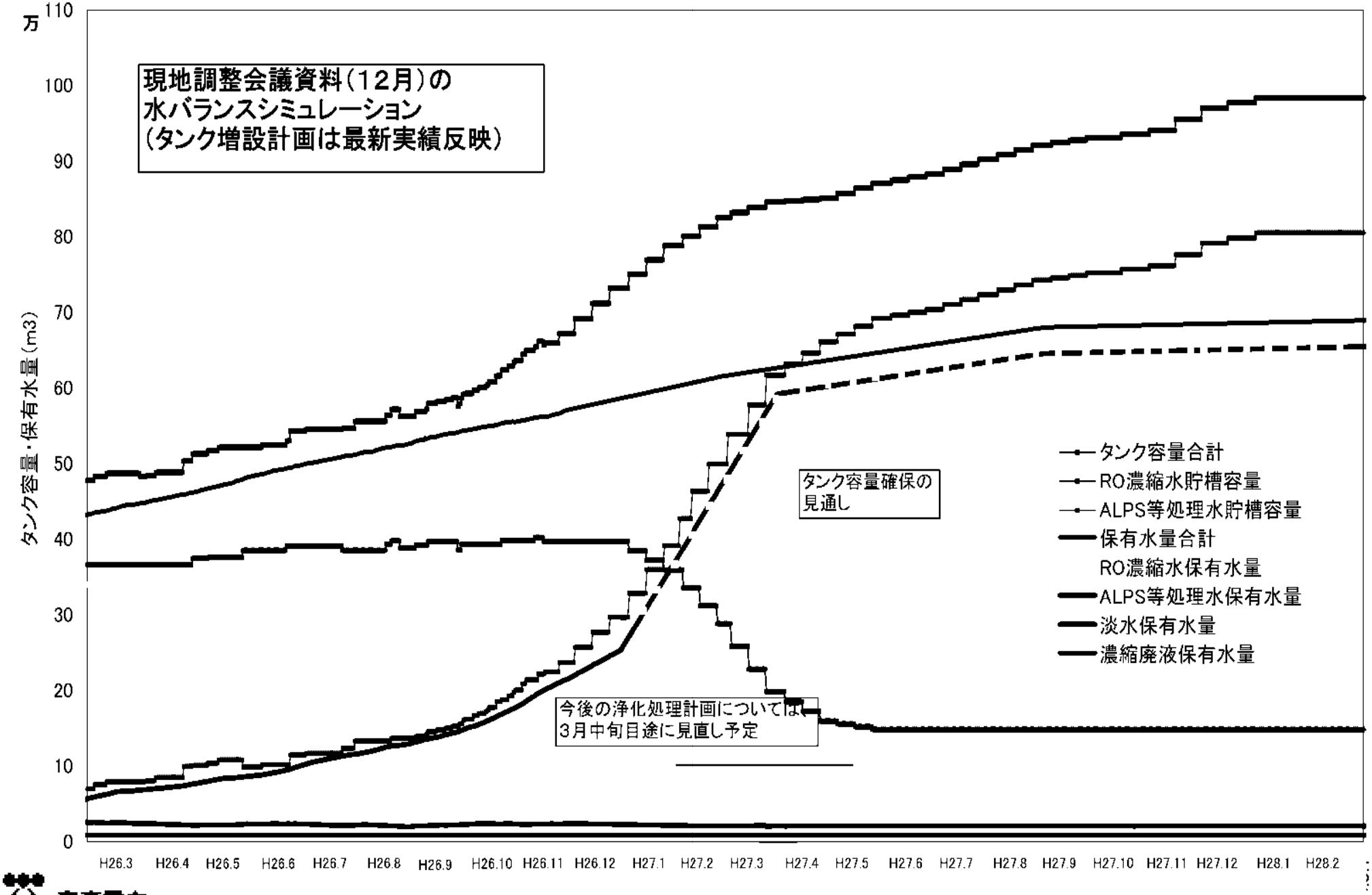
これに伴い、タンクの開発の時期は当初の想定ほど早期である必要はなくなってきているが、必要総量は当初想定と変わるものではない。

また、来年度の水の発生量の検討は今後も継続的に実施するが、新たに発生するリスクも否定できない。

来年度以降も必要量を的確に分析して、合理的な計画を立てつつタンク建設を推進していく。

それにあたっては、安全を最優先に考えて、協力企業とともに十分な安全対策をとり実施していく。

3-2. タンク計画


万
110
100
90
80
70
60
50
40
30
20
10
0
タンク容量・保有水量（m3）
現地調整会議資料（12月）の
水バランスシミュレーション
（タンク増設計画は最新実績反映）
タンク容量確保の
見通し
今後の浄化処理計画については、
3月中旬目途に見直し予定
タンク容量合計
RO濃縮水貯槽容量
ALPS等処理水貯槽容量
保有水量合計
RO濃縮水保有水量
ALPS等処理水保有水量
淡水保有水量
濃縮廃液保有水量
H26.3
H26.4
H26.5
H26.6
H26.7
H26.8
H26.9
H26.10
H26.11
H26.12
H27.1
H27.2
H27.3
H27.4
H27.5
H27.6
H27.7
H27.8
H27.9
H27.10
H27.11
H27.12
H28.1
H28.2

No.③-8

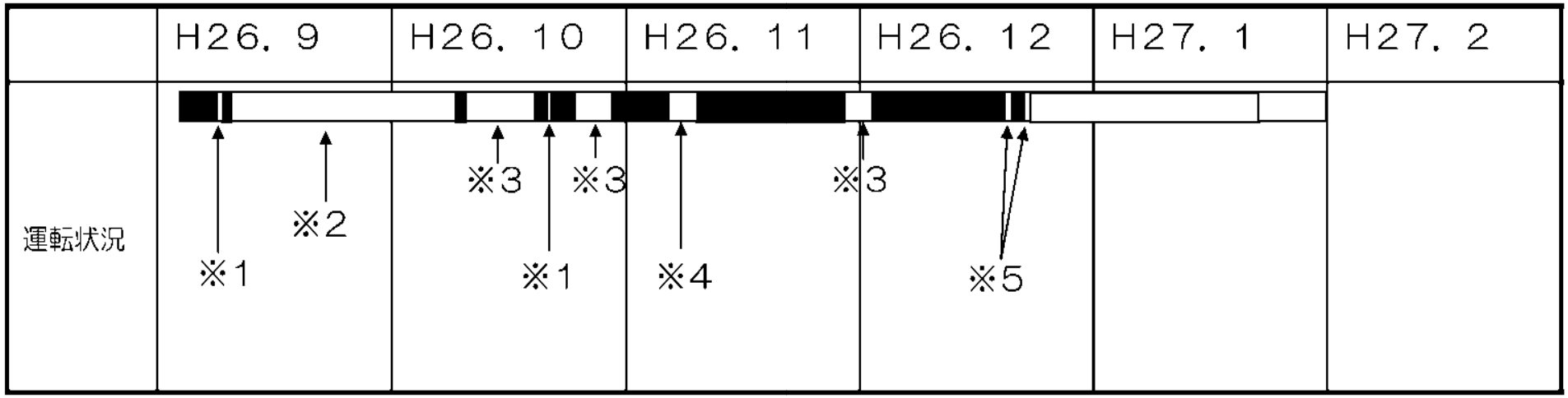
海水放射線モニタ試運転状況

東京電力 TEPCO

1．試運転状況(港湾口海水放射線モニタ)

●9月4日より試運転を開始。

（試運転状況）



（1/22現在）
・実稼動日：102日／141日
・稼働率　：72．3%

（不具合対応後の稼動状況）
・稼働日　：32日／32日
・稼動率　：100%
（フィルタ交換による短時間停止を除く）

※1：装置入口ストレーナ差圧高により停止
※2：紫外線殺菌装置破損により停止
※3：装置入口ストレーナ差圧高により停止（高波が続き防波堤作業出来ず）
※4：ゴミ、砂詰まり対策の為停止（遠心式固液分離応用装置設置(ｻｲｸﾛﾝｾﾊﾟﾚｰﾀ)）
※5：検出器ゲイン調整及び端末ソフト入替

2. 試運転での不具合状況と対応

（設備面）

不具合状況	原因	対応	備考
装置入口ストレーナ差圧高による取水ポンプ停止	海上の荒天による砂・ゴミの巻き上げ	・ストレーナのメッシュの変更実施 ・遠心式固液分離器応用装置による砂・ゴミの分離	・10/17メッシュ交換 （サイズ：0.8mm→1.4mm） ・11/5に取付完了
紫外線殺菌装置の破損による停止（約3週間）	運搬時の転倒よる微細な傷が、稼動中の整流板の振動水流によりストレス破断	・新品及び整流板を点溶接から全体溶接に変更	・10/8取替完了
天井（天板）からの漏洩（雨漏れ）	工場での締め付けの際、塗装の上から締め付けた為、塗膜が浮き上がり剥離し、台風の豪雨で隙間より雨水が侵入	・カバー上部での作業になる為、安全事前評価を行った後、天候を確認し、再コーキング処理を行う予定	・10/9応急処置完了 ・12/8恒久対策実施
エアコンの流量が直ぐ低下し熱交換しない（送風のみとなる）	エアコン用のストレーナ容量が小さく、砂・ゴミにより目詰まりを起こす	容量の増加又は遠心式固液分離器応用装置下流側からの海水を利用。	熱容量の再試算の結果現在のエアコン1台で対応可能 今後は、交互に運転する。

（測定面）

不具合状況	推定原因	対応	備考
・セシウム濃度が手分析値よりモニタ値が高い（最大で10倍） ・セシウム137と134の比率が小さい （約2：1　現状なら3：1になるはず）	・セシウムを含む異物・汚れがγ線水モニタサンプラに残留・蓄積し実際のBG値が大きくなっている可能性あり ・セシウム134はピーク領域を計算で算出しており、その補正が過大評価になっている可能性ある ・エネルギーチャンネルが低エネルギー側にシフトしている。 （線源の照射方向により、シフトする事が判明） ・コンプトン散乱線等の低エネルギー側スペクトルが加算され見かけ上計数率が大きくなっている可能性あり	・γ線水モニタサンプラを清掃し、市販の蒸留水を充填しBG値を再測定 ・手分析結果を基準とした、実液校正を実施し、換算定数を設定する。 ・セシウム137線源を検出器側面に照射する方法で、再度ゲイン調整を行う。 ・カリウム40の濃度を測定し、セシウム濃度に補正処理を行う事を検討	・11/11～25 BG測定及び実液校正を実施 ゲイン調整実施 ・12/19～20 再度ゲイン調整実施 ・12/22 カリウム40の補正処理ソフト導入

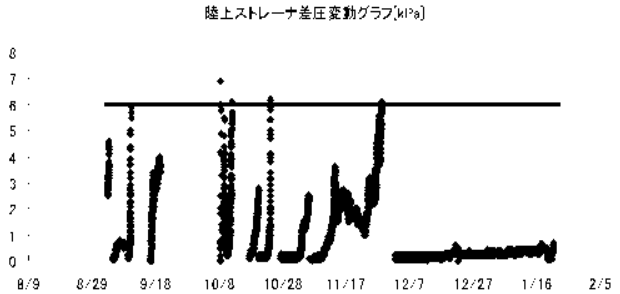
3-1. 不具合対応実績(設備面)

不具合対応状況

	H26.9	H26.10	H26.11	H26.12	H27.1	H27.2
紫外線滅菌装置破損	9/11発生 原因調査・対策検討	10/8取替				
カバー内への漏水		10/6発生 10/9応急処置		11/18安全事前評価 11/20～12/8 恒久対策実施（天板補修）		
陸上ストレーナ詰まり	9/8以降随時発生・清掃及びメッシュ変更実施		11/5遠心式固液分離器応用装置設置（サイクロンセパレータ）			
空調機ストレーナ詰まり	9/8以降随時発生・清掃実施		11/17ドレンライン改造、以降定期的な砂抜きを実施			

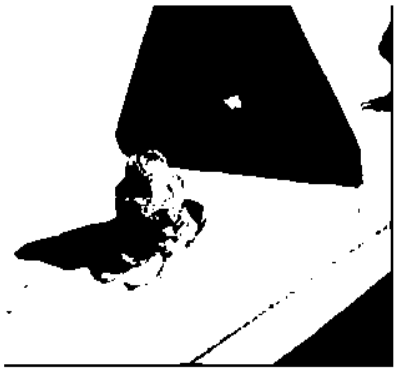
主な対策後の状況

ストレーナ詰まり対策
（サイクロンセパレータ設置）

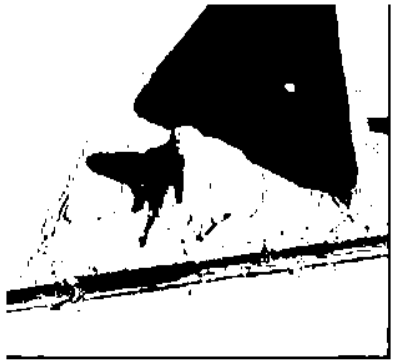


漏水対策（天板補修）

（補修前）



（補修後）



砂等の詰まりによる装置の停止は、サイクロンセパレータの追加設置により解消、またエアコンのフィルタ詰まりも解消

紫外線滅菌装置の破損は、新品への交換及び追加措置（整流板の溶接）により順調に稼動中

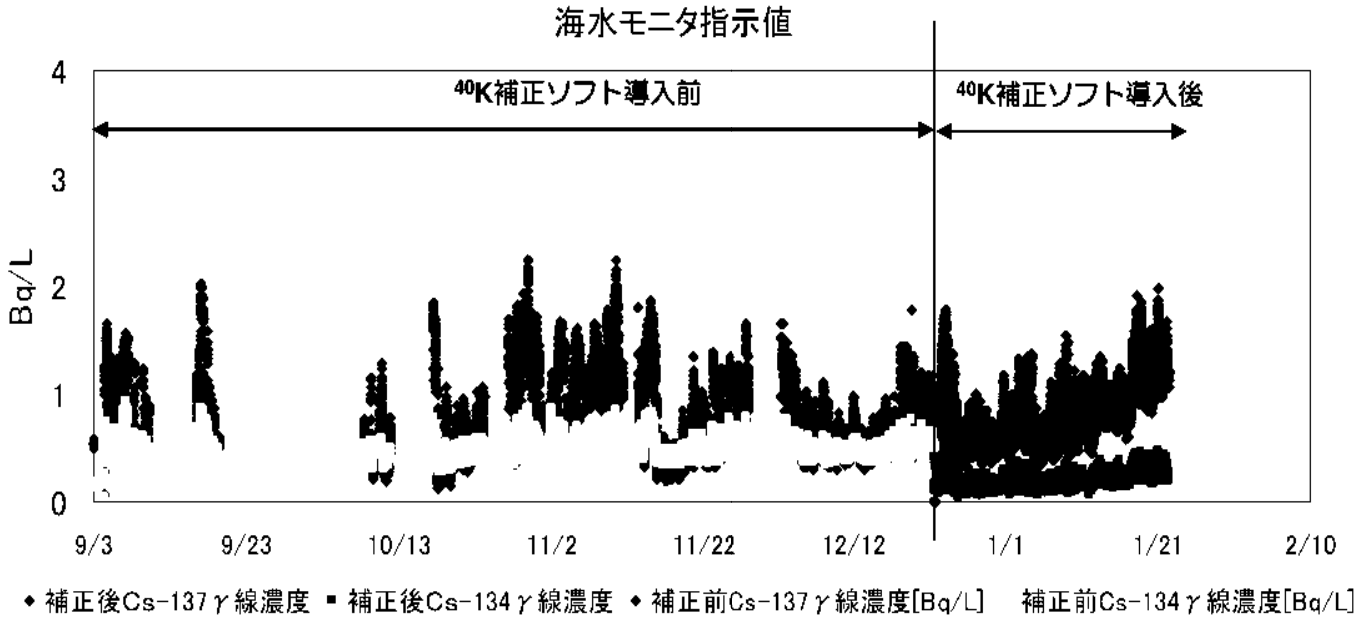
天板からの漏水は、再塗装等の実施以降、現状漏洩は確認されていない

3-2. 不具合対応実績(測定面)

不具合対応状況

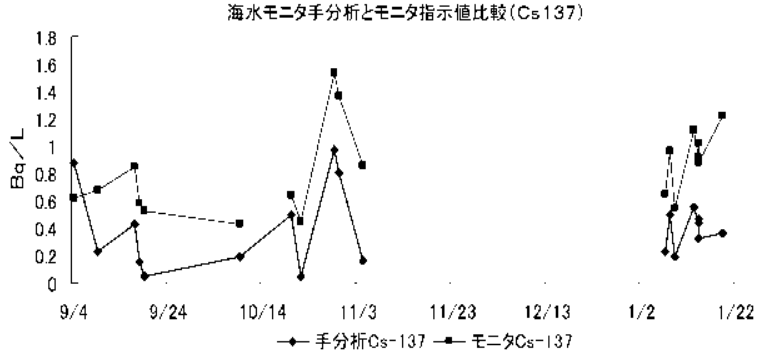
	H26.9	H26.10	H26.11	H26.12	H27.1	H27.2
Ｃｓ濃度の手分析との相違 ・チャンネルシフト ・コンプトン散乱の影響		10/8～ 原因調査・対策検討	11/11～11/25 ・BG測定 ・実液校正 ・ゲイン調整	12/19～12/22 ・再ゲイン調整 ・カリウム４０補正解析ソフト導入	12/22～データ採取・評価	

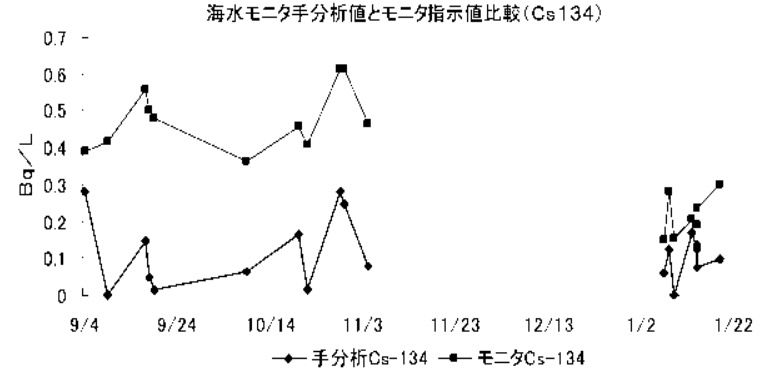
不具合対応前後のモニタ指示値

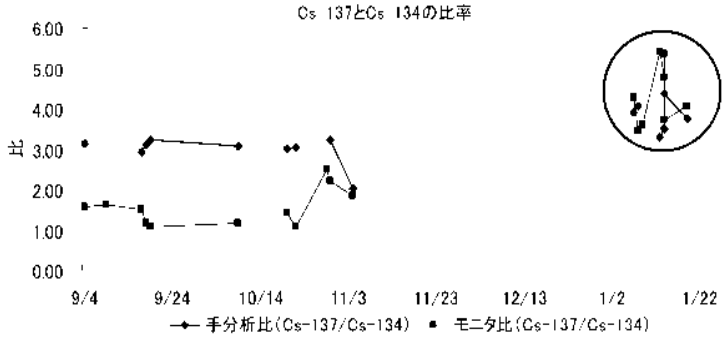


4. 不具合対応実施後のモニタ値と手分析値との比較

	手分析データ					海水放射線モニタ			
採取日時	手分析Cs-137	手分析Cs-134	K-40	全β	手分析比(Cs-137/Cs-134)	モニタCs-137	モニタCs-134	全β	モニタ比(Cs-137/Cs-134)
2014/10/9 12:30	1.914E-01	6.204E-02	1.035E+01	7.932E+00	3.09	4.280E-01	3.620E-01	8.740E+00	1.18
2014/10/20 8:45	4.925E-01	1.637E-01	1.060E+01	7.271E+00	3.01	6.400E-01	4.550E-01	8.740E+00	1.41
2014/10/22 9:20	5.096E-02	1.672E-02	-	7.554E+00	3.05	4.460E-01	4.090E-01	8.740E+00	1.09
2014/10/29 10:10	9.753E-01	2.812E-01	1.053E+01	8.263E+00	3.47	1.530E+00	6.130E-01	8.740E+00	2.50
2014/10/30 11:40	8.027E-01	2.478E-01	1.233E+01	7.507E+00	3.24	1.360E+00	6.140E-01	8.740E+00	2.21
2014/11/4 11:10	1.600E-01	7.838E-02	1.206E+01	6.516E+00	2.04	8.580E-01	4.650E-01	8.740E+00	1.85
2015/1/7 10:05	2.297E-01	5.875E-02	1.221E+01	-	3.91	6.450E-01	1.510E-01	1.100E+01	4.27
2015/1/8 11:30	4.960E-01	1.221E-01	1.060E+01	1.036E+01	4.06	9.650E-01	2.800E-01	1.920E+01	3.45
2015/1/9 11:25	1.865E-01	<5.207E-02	1.106E+01	9.840E+00	-	5.470E-01	1.520E-01	1.510E+01	3.60
2015/1/13 10:50	5.552E-01	1.680E-01	1.096E+01	8.714E+00	3.30	1.110E+00	2.050E-01	8.740E+00	5.41
2015/1/14 10:16	4.363E-01	1.242E-01	1.035E+01	8.404E+00	3.51	9.140E-01	1.920E-01	1.100E+01	4.76
2015/1/14 11:47	4.695E-01	1.338E-01	1.061E+01	7.460E+00	3.51	1.020E+00	1.900E-01	8.740E+00	5.37
2015/1/14 14:37	3.260E-01	7.474E-02	1.198E+01	7.979E+00	4.36	8.760E-01	2.360E-01	9.590E+00	3.71
2015/1/19 10:55	3.650E-01	9.744E-02	1.152E+01	6.455E+00	3.75	1.220E+00	3.000E-01	1.230E+01	4.07







ソフト導入後のモニタ値と手分析値のＣｓ濃度比（137/134）は、同等。
濃度はモニタ値が手分析値より高めで推移している。
海上の荒天により、Ｃｓ濃度は変動するが、除々に上昇傾向も見られる。
（Ｃｓのチャンバー内壁へ付着・蓄積の影響が考えられる。）

5. 今後予定

○今後の予定

チャンバー内壁への海洋生物付着状況の確認

チャンバー内壁の清掃を行い、Ｃｓのチャンバー内壁付着有無を確認。

紫外線殺菌装置の追設または清掃頻度等の運用面の検討

手分析値よりモニタ値が高めに検出されている為、引き続き測定データの収集を継続し、手分析値とモニタ値との相関を確認

○試運転工程

・前回報告：H26年９月４日～H27年２月１日

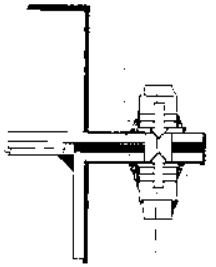
・見直し後：H26年９月４日～H27年３月３１日

○本格運用：H27年４月１日～

【参考】設備不具合状況（対策実施前）

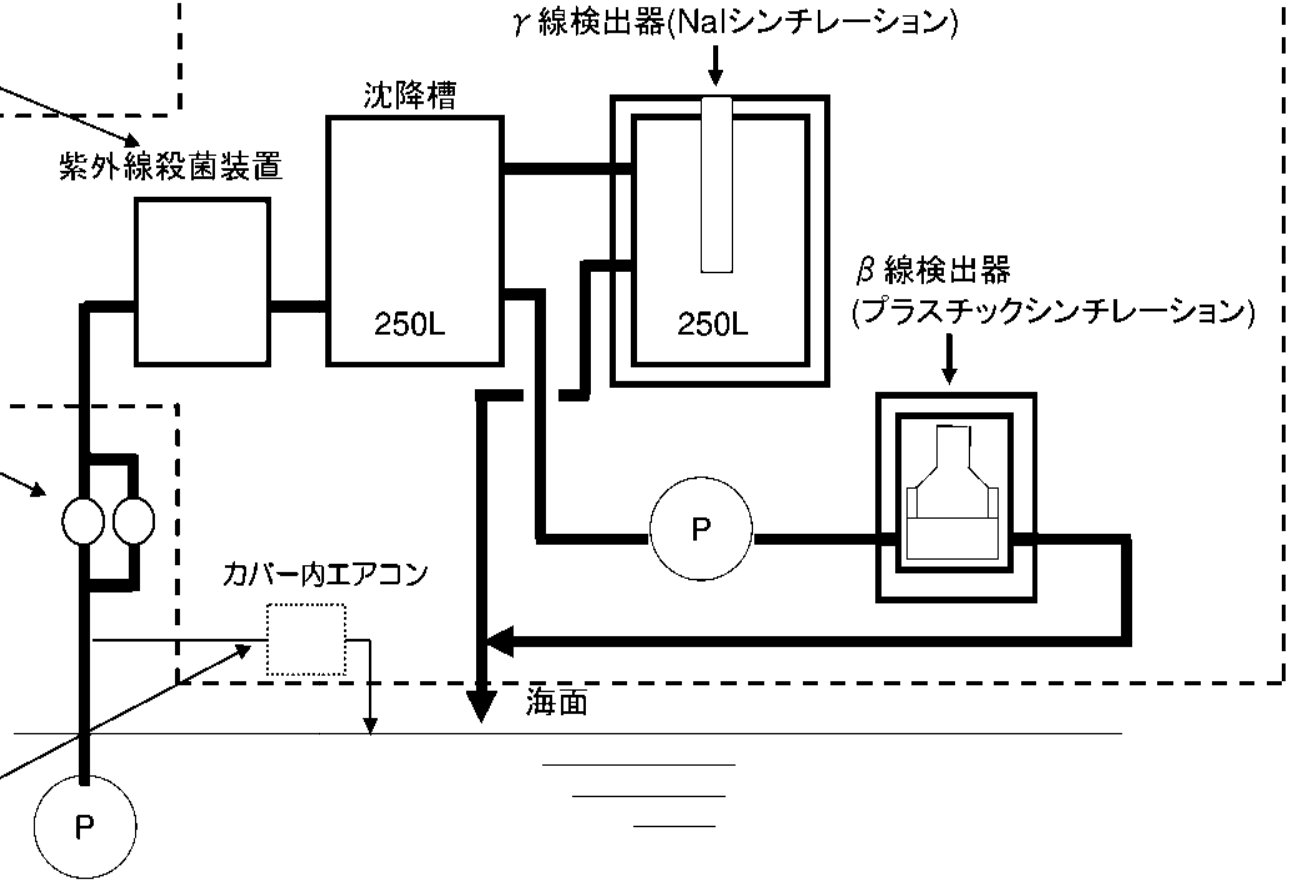
紫外線殺菌装置破損状況

天井雨漏れ状況



陸上ストレーナ詰まり状況

エアコンストレーナ詰まり状況



No.③-14

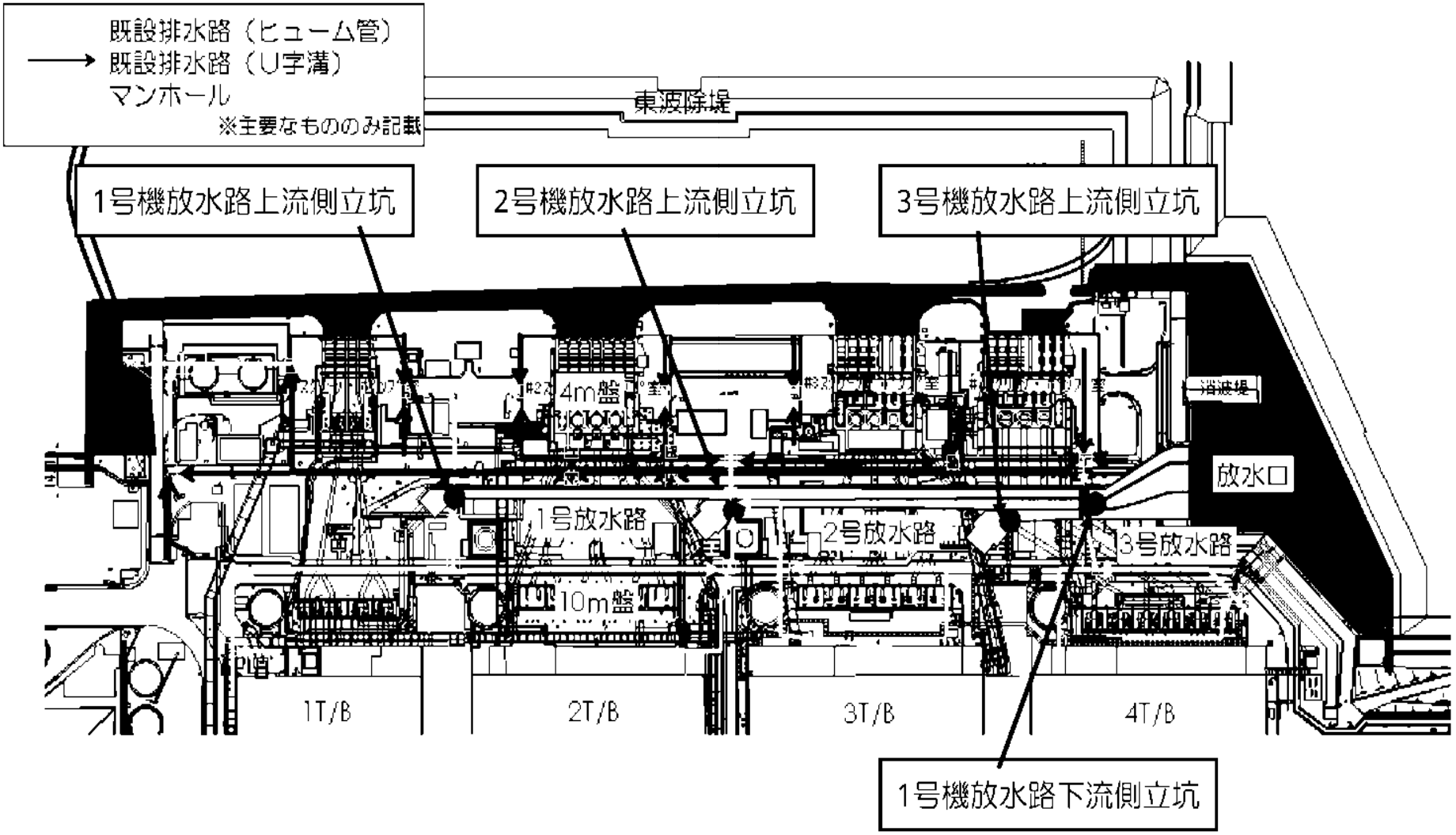
1～3号機放水路溜まり水の調査状況について

東京電力
TEPCO

1-1.1～3号機放水路溜まり水の調査状況について（概要）

1. 10m盤東側およびタービン建屋屋根に降った雨水対策を検討するための調査の一環で、雨水が流れ込む１～３号機放水路の調査を4月より開始。9月までの調査では、溜まり水や流入する雨水に主にセシウムによる汚染が見られたが、建屋滞留水や海水配管トレンチに比べて、十分に低い濃度であった。
2. 10月初旬の台風18、19号通過の際の豪雨により、一時的に何らかの流れ込みがあり、1号機放水路上流側立坑のセシウム濃度が上昇。
3. 下流側立坑の濃度も若干上昇したものの、放水路出口の放水口は土砂により閉塞されており、さらに放水口出口は海側遮水壁の内側であり埋立も終了していること、および港湾内外の海水のセシウム137濃度に上昇等はみられていないことから、外部への影響は無いものと考えられる。
4. 昨年12月に、放水路の上流側に位置する１号機逆洗弁ピットで、溜まり水の水位が２，３号機逆洗弁ピットに比べて低く、配管の下端付近であることを発見。
5. 1月にサンプリングを行ったところ、Cs-137濃度が最大44,000Bq/Lであった。また、ピット底部には約10mSv/hと高い線量率の汚染が確認された。
6. 放水路と核種組成も似ており、セシウム濃度上昇の原因として有力と考える。
7. 逆洗弁ピットの対策、及び放水路溜まり水の追加汚染対策を実施しながら、本格浄化に向けた準備を進める。

1-2. 1～3号機放水路及びサンプリング位置図（平面図）

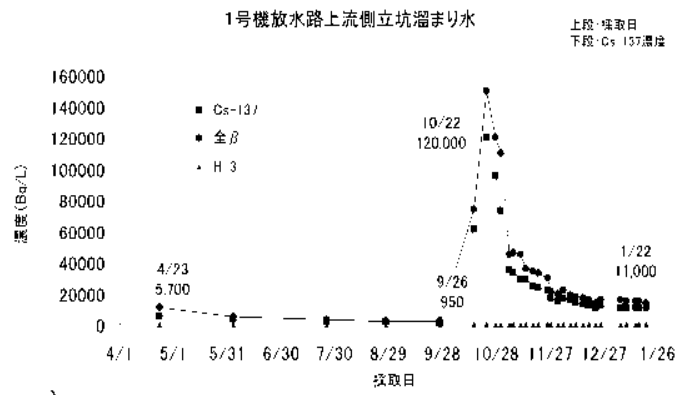


1-3. 1号機放水路調査結果

昨年10月の台風後に最高12万Bq/Lまで上昇した１号機放水路上流側立坑溜まり水のセシウム137濃度は、現在約1万Bq/Lまで低下。下流側立坑溜まり水のセシウム137濃度も、現在は1,500Bq/L程度まで低下。

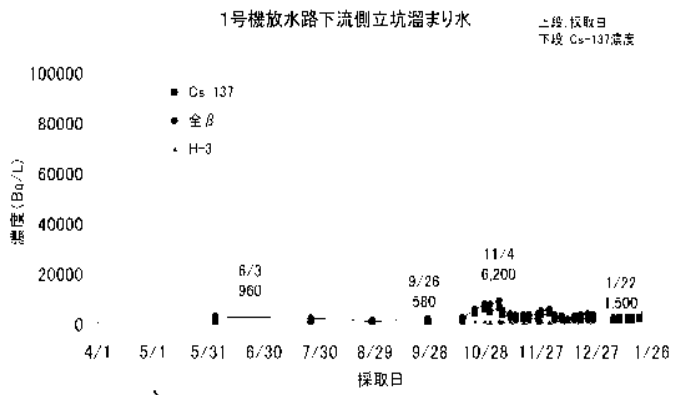
台風時の豪雨により、何らかの流入があったと考えられることから、調査のひとつとして、逆洗弁ピット溜まり水の調査を実施したところ、高濃度のセシウム137を検出。（次ページ以降参照）

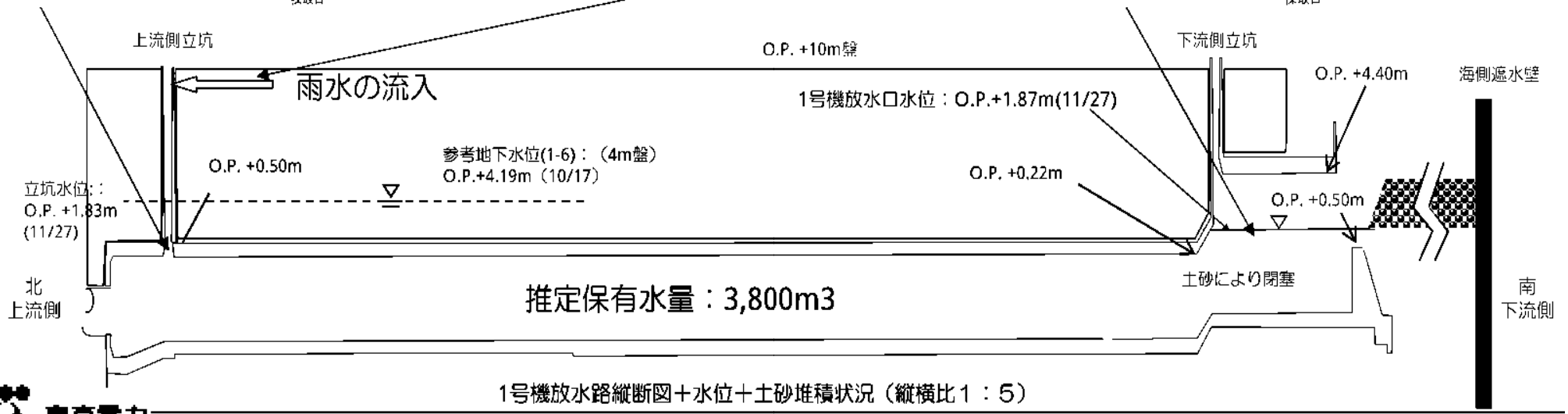
逆洗弁ピット溜まり水の濃度は、台風時に上昇した放水路の濃度より低いが、濃度上昇の原因として有力と考える。引き続き他の調査を継続するとともに、溜まり水の浄化対策を進める。



１号機上流側立坑流入水（１号T/Bルーフドレン・T/B東側地表）			
調査日：	6/12	8/26	10/6
Cs134：			420
Cs137：		採水時に流入無くサンプリングできず	1500
全β　：			1400
H3　：			9.9

（単位：Bq/L）





1号機放水路縦断図＋水位＋土砂堆積状況（縦横比１：５）

2-1（1） 1号機逆洗弁ピットのたまり水調査について

１号機放水路上流側立坑の濃度上昇に関する調査の一環として、放水路上流側立坑からの流れ込みの他、放水路周辺の調査を実施。

１２月に、放水路の上流側に位置する逆洗弁ピット*内のたまり水が、他号機のピットより水位が低く、配管の下端付近であることを確認。

＊　復水器内で発電後の蒸気を冷却するための海水配管を洗浄するため、海水の流れを逆流するための弁（逆洗弁）を設置したピット

逆洗弁ピットの配管は放水路につながっており、台風時の大量の降雨によりたまり水の水位が急上昇した際に、配管内にたまり水が侵入し、放水路に流れ込んだ可能性があると考え、溜まり水のサンプリング並びに流入経路の調査を実施。

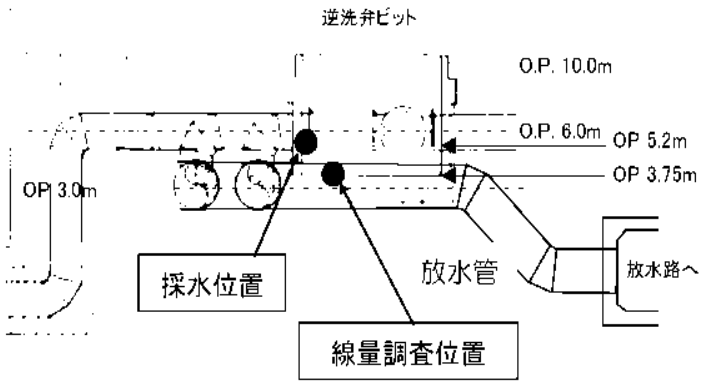
2-1(2) 調査位置図

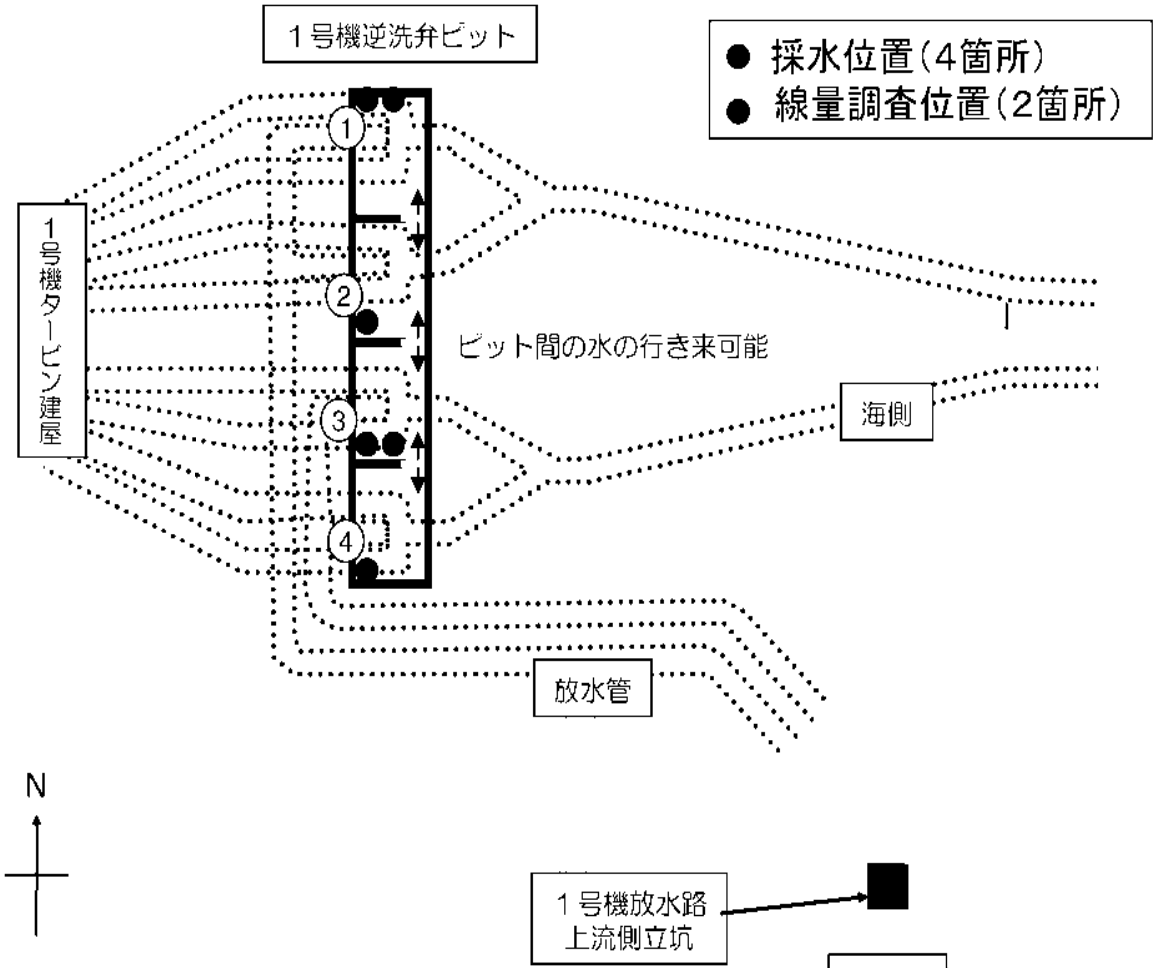
逆洗弁ピット内は、壁により４室に仕切られているが、海側部分は通路があり水が行き来できる構造。

水が行き来しにくい山側の４箇所にて採水。

２箇所で底部の線量率を測定。

分析項目
セシウム、全β、トリチウム、塩分





2-1(3) 調査結果

分析結果は下表のとおり。Cs-137濃度で42,000～44,000Bq/Lの範囲であり、どこもほぼ同じ濃度。

また、逆洗弁ピット底部の線量率測定結果は、調査点①付近が約10mSv/h、調査点③付近が約9mSv/hであった。

Cs-137濃度は高いが、全β濃度はCs濃度とほとんど変わらず、H-3の濃度も低いことから、タービン滞留水ではなく、ピット内に沈んでいる過去に飛散したガレキ等に付着した放射性物質が雨水に溶出したものと考えられる。

1号機逆洗弁ピット溜まり水調査結果

単位:Bq/L(塩素除く)

	逆洗弁ピット①	逆洗弁ピット②	逆洗弁ピット③	逆洗弁ピット④
採取日	1月15日	1月15日	1月15日	1月15日
採取時刻	11:40	11:45	11:50	11:55
塩素(単位:ppm)	230	240	240	240
Cs-134(約2年)	11,000	11,000	12,000	12,000
Cs-137(約30年)	42,000	43,000	44,000	44,000
全β	53,000	52,000	53,000	54,000
H-3(約12年)	690	580	700	600

2-1(4) 放水路への推定流入経路について

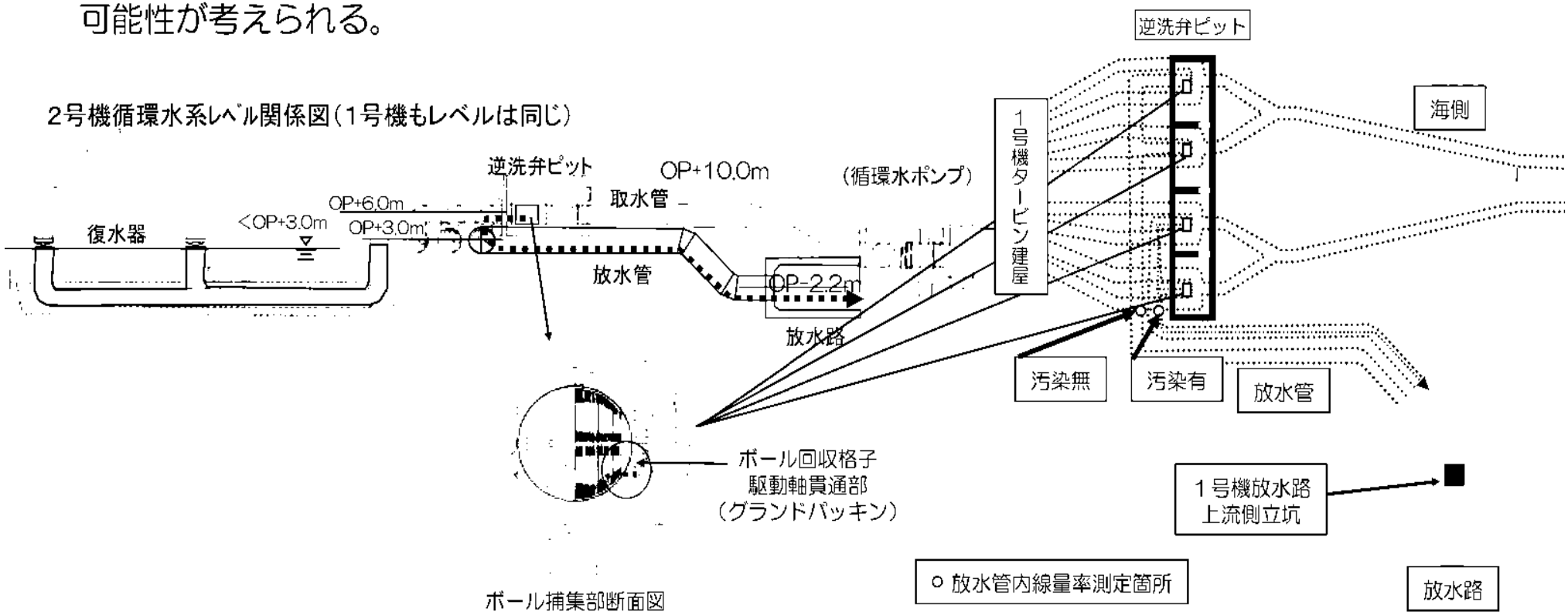
ピット内の水深は約1.5m（O.P. 5.2m）であり、循環水配管の下部が水に浸かっている状態。１２月から水位の変化はほとんど無い状況。

循環水配管の当該高さ付近には、ボール回収格子を駆動する軸の軸封部が存在。軸封部は、グランドパッキンによる止水がされているが、震災後点検等はしていない。

本軸封部のパッキンが劣化し、配管内に水が流れ込むために水位がこれ以上上昇しない可能性がある。

地上より、放水管内の線量率測定を実施したところ、２本のうち１本のみ汚染が確認された。

台風による大量の降雨時に水位が急上昇し、当該貫通部より循環水配管内に雨水が流入し、放水管を通じて放水路に到達した可能性が考えられる。



2-1(5) 1号機逆洗弁ピットのたまり水調査結果について

放水路の上流側に位置する逆洗弁ピットの溜まり水調査を実施。

逆洗弁ピット溜まり水は、Cs-137濃度で44,000Bq/Lであったが、放水路同様に、Cs-134と137の合計が全β濃度と同程度でH-3濃度が低かったことから、ガレキ等に付着した放射性物質が雨水に溶出したものと考えられる。

逆洗弁ピット溜まり水の濃度は１０月に上昇した放水路の濃度に比べて低いものの、逆洗弁ピット底部の汚染の状況から、台風による荒天で巻き上げ等による濃度上昇があったことも考えられる。

逆洗弁ピットの溜まり水の水位は、循環水配管の下部付近であり、台風により水位が急上昇した際に、当該高さにあるボール回収格子駆動軸の軸封部から溜まり水が放水管を経て放水路に流入した可能性がある。

最終的には、現在実施中の調査結果を踏まえて判断するが、１０月の濃度上昇の原因として有力と考えている。

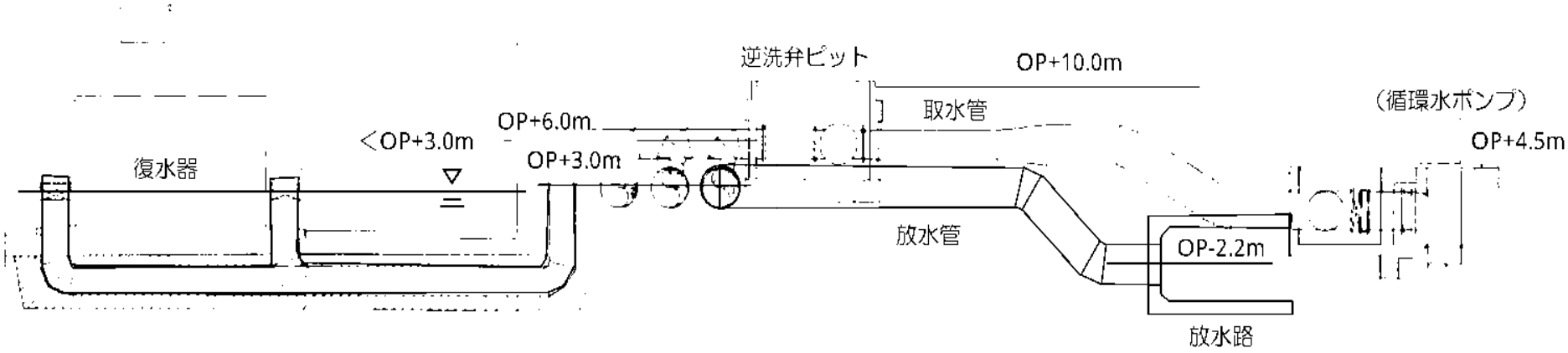
逆洗弁ピット溜まり水の水位に変化は見られておらず、周辺地下水への漏えい等は無いものと考えられる。

逆洗弁ピットへの雨水流入防止対策（屋根）を実施し、準備が整い次第ピット内の水を回収する。

【参考】放水管の状況

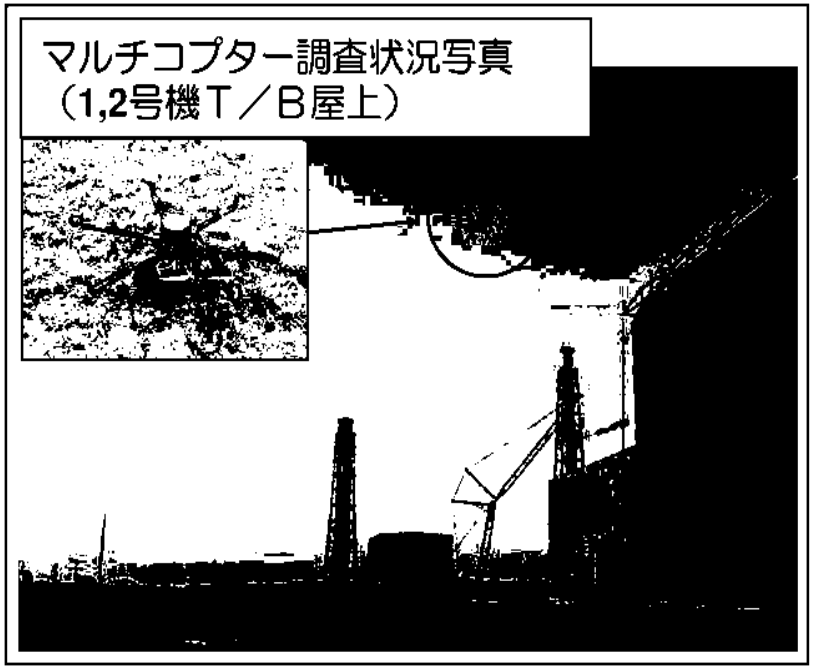
復水器から接続する配管は、逆洗弁ピット付近でO.P.+6m（中心）まで立ち上がっており、タービン建屋の水位より高く、復水器内の水位も低いことから、放水管からの流入は無いものと考えられる。

2号機循環水系ﾚﾍﾞﾙ関係図（1号機もレベルは同じ）



2-2. マルチコプターによる1～4号T／B屋根線量調査

平成26年12月9日（火）よりマルチコプターによる線量調査を実施中。
12月に1,2号機T／B建屋屋上を調査完了、現在線量解析中。
現在、3,4号機T／B建屋屋上を調査中



項　目	H26年度					
	9	10	11	12	1	2
マルチコプターによる調査	▼9/16着手 準備 （作業計画、飛行訓練、ヤード調整）			▼1/26 安全事前評価 試験飛行 1,2号T/B屋上 線量解析	3,4号T/B屋上	▼2/20完了 報告書作成

3．1号機放水路濃度上昇の外部への影響と対策について

放水路の開口部である放水口は、堆積した土砂により閉塞していること、さらに放水口出口は海側遮水壁の内側であり埋立も終了していることから、溜まり水が直接外洋に流出することは無い。

また、降雨後を中心に、放水口を閉塞している土砂を通じて溜まり水がわずかずつ流れ出ているものと考えられるが、土砂等の間を通過する際にセシウムの一部は吸着されているものと考えられる。

放水路下流側立坑の溜まり水のセシウム137濃度は、一時的に6,200Bq/Lまで上昇したものの、現在は1,500Bq/Lまで低下。

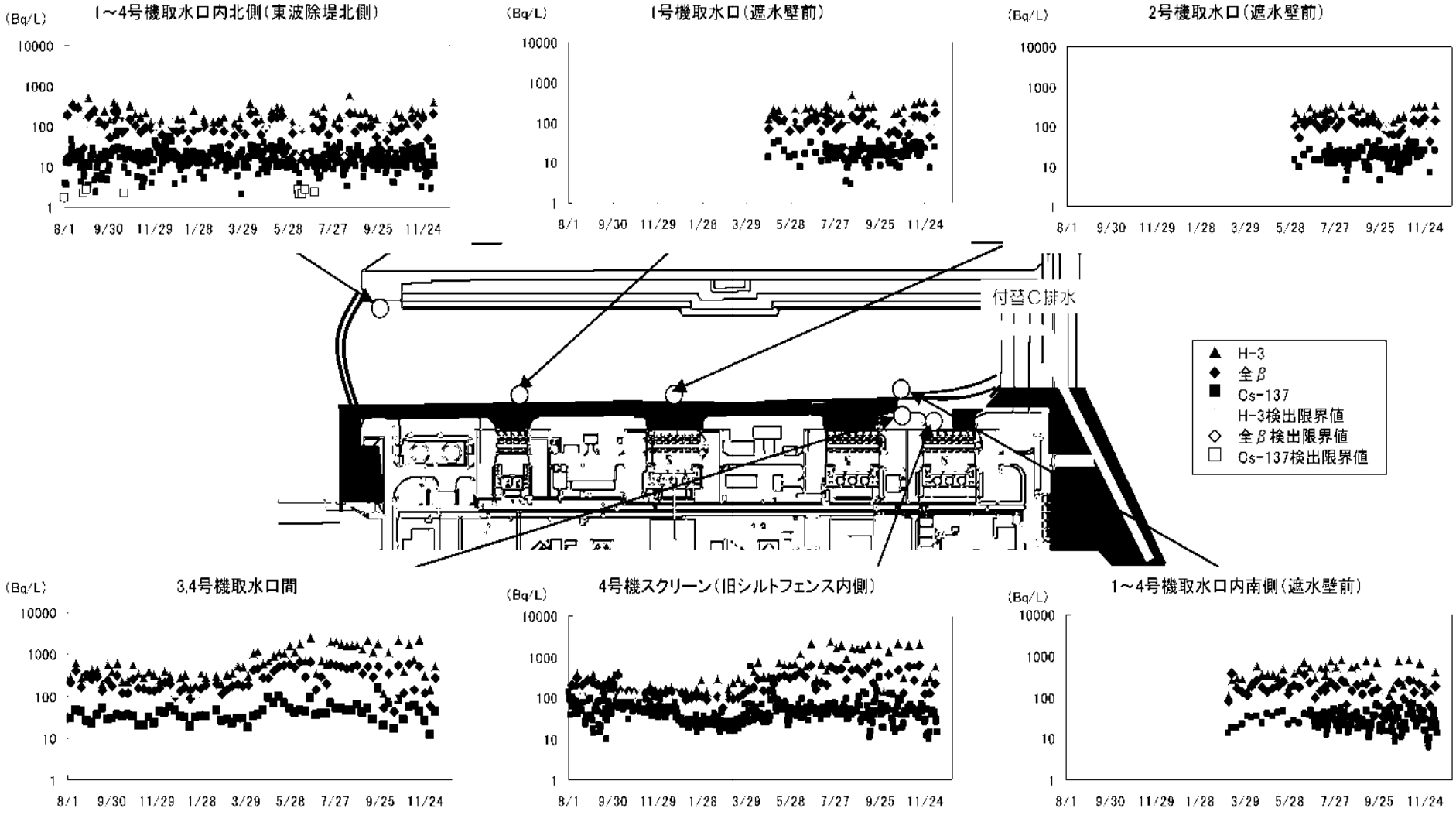
港湾内外の海水中のセシウム濃度には、特に影響は見られていないことから、外部への影響は無いものと考えられる。

今後、モバイル処理装置による浄化を行うが、それまでの間、上流側立坑にセシウム吸着材を設置して溜まり水の浄化を実施中。

また、さらなる影響低減のため、放水口部分にセシウムを吸着するゼオライトを投入する工事を実施中。

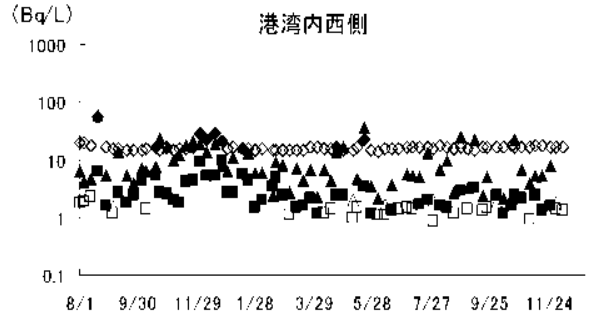
3-1(1). 1～4号機取水口付近の海水サンプリング結果

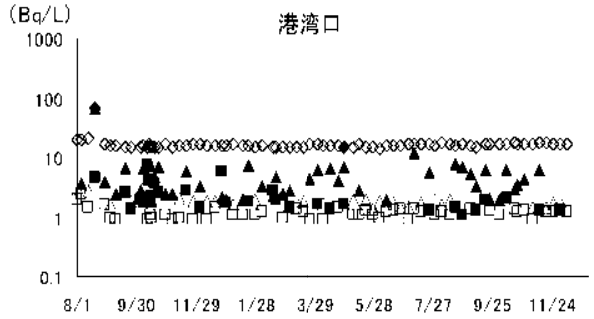
1～4号機取水口付近の海水のセシウム濃度は、最も高濃度である4号機スクリーンでも100Bq/Lを下回ってきており、概ね横ばい状態。

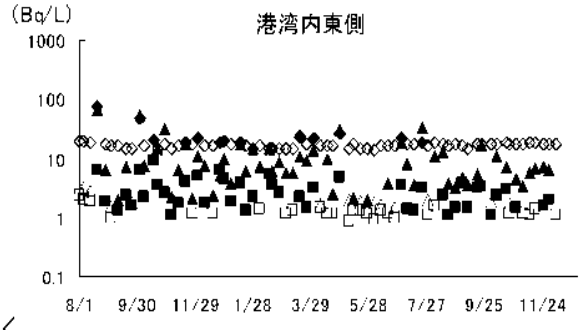


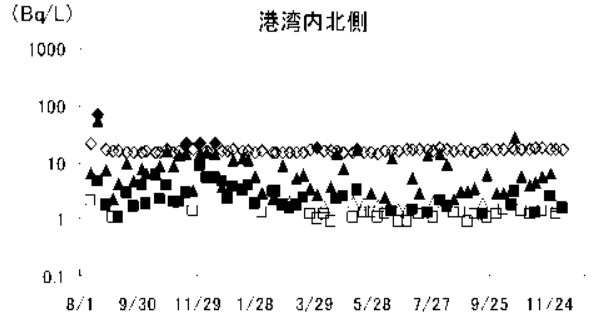
3-1(2). 港湾内の海水サンプリング結果

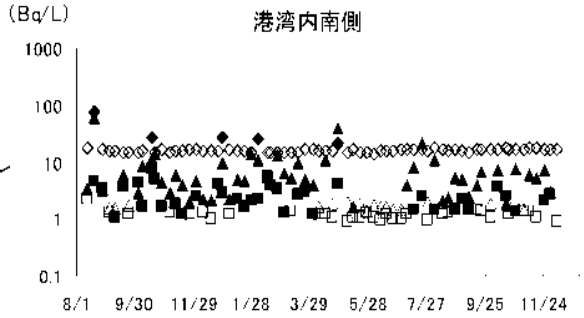
概ね横ばい傾向であるが、昨年の同時期に比べれば全体に低減傾向。

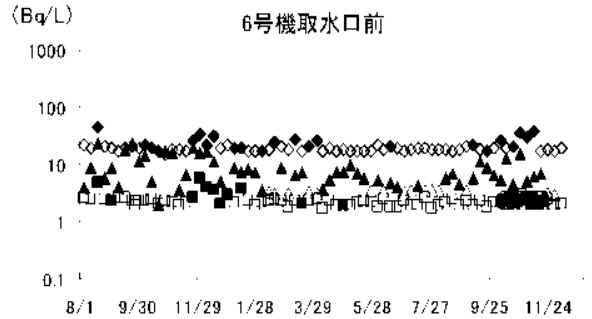


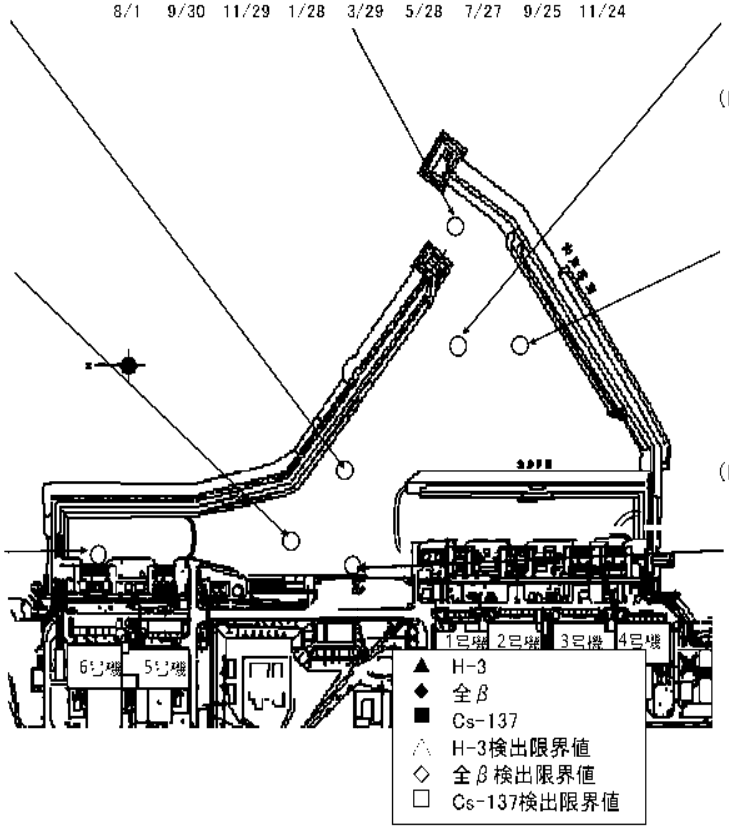


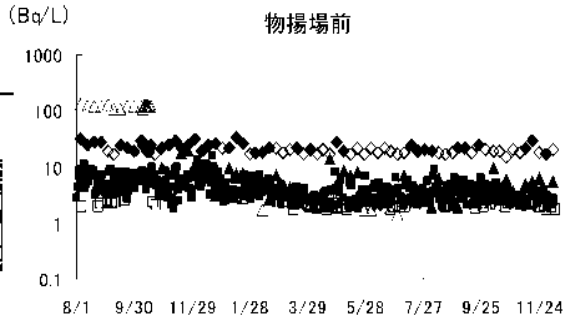






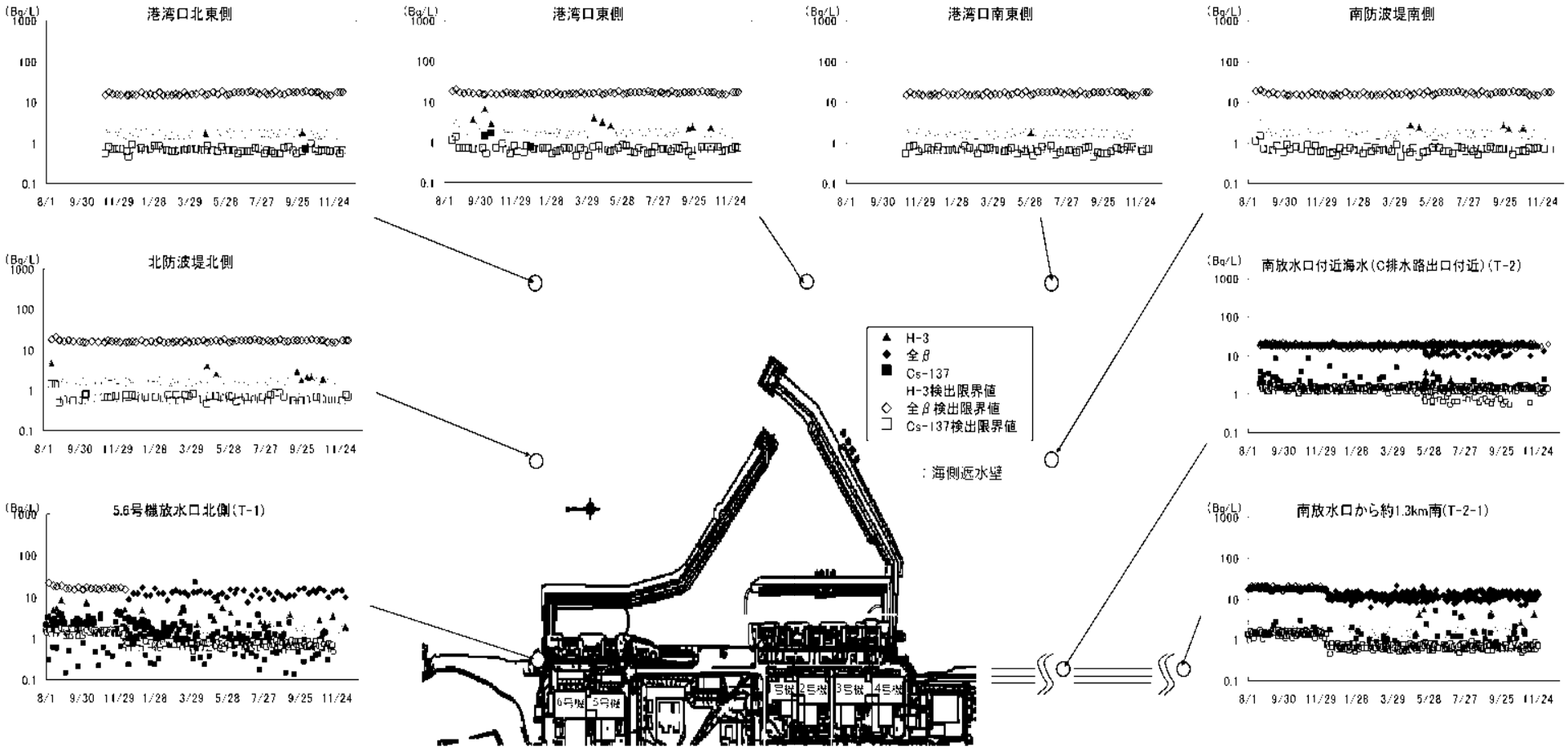






3-1(3). 港湾外(周辺)の海水サンプリング結果

港湾外の各採取点も、全体に横ばい状態で、濃度上昇などの特別な傾向は見られない。



注：昨年10月以降の南北放水口付近の全β放射能の検出は、検出下限値の変更によるものである。

3-2. 繊維状セシウム吸着材による浄化の状況について

昨年11/27～12/11にかけて、合計約10kgのモール状セシウム吸着材を設置。11/27に設置した吸着材の一部をサンプリングして分析を実施。

測定結果は下表のとおり。ほぼ経過日数に比例して吸着濃度が高くなっている。

現時点で、本吸着材による濃度低減効果ははっきりしないが、引き続きモニタリングを継続する。

表　繊維状セシウム吸着材のセシウム濃度

日付	経過日数	吸着材の核種濃度 (Bq/kg)		1号機放水路上流側立坑の溜まり水濃度(Bq/L)	
		Cs-134	Cs-137	Cs-134	Cs-137
2014/11/27	0	0	0	5,400	17,000
2014/12/11	14	1.20E+07	3.60E+07	4,300	14,000
2015/1/13	47	3.00E+07	8.90E+07	3,300	11,000

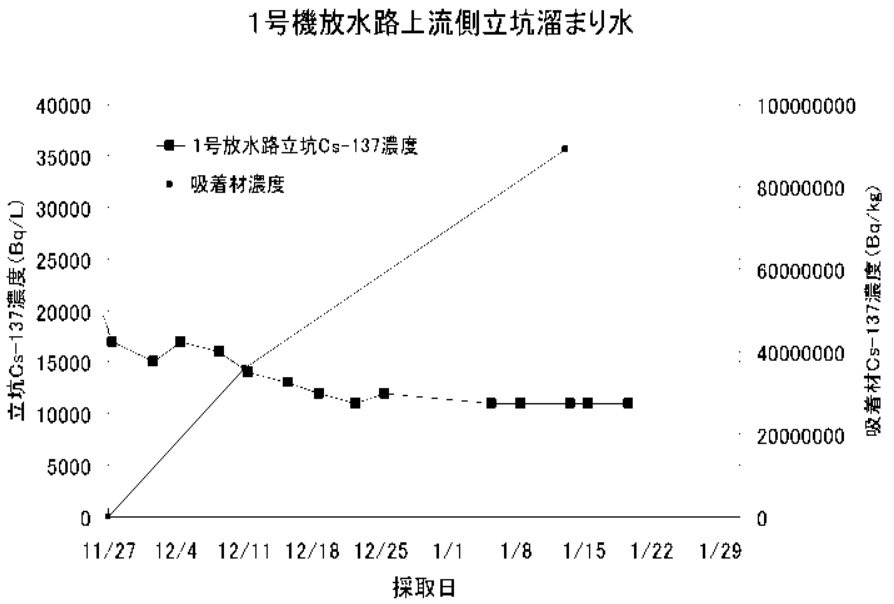


図1　繊維状セシウム吸着材の濃度と溜まり水濃度

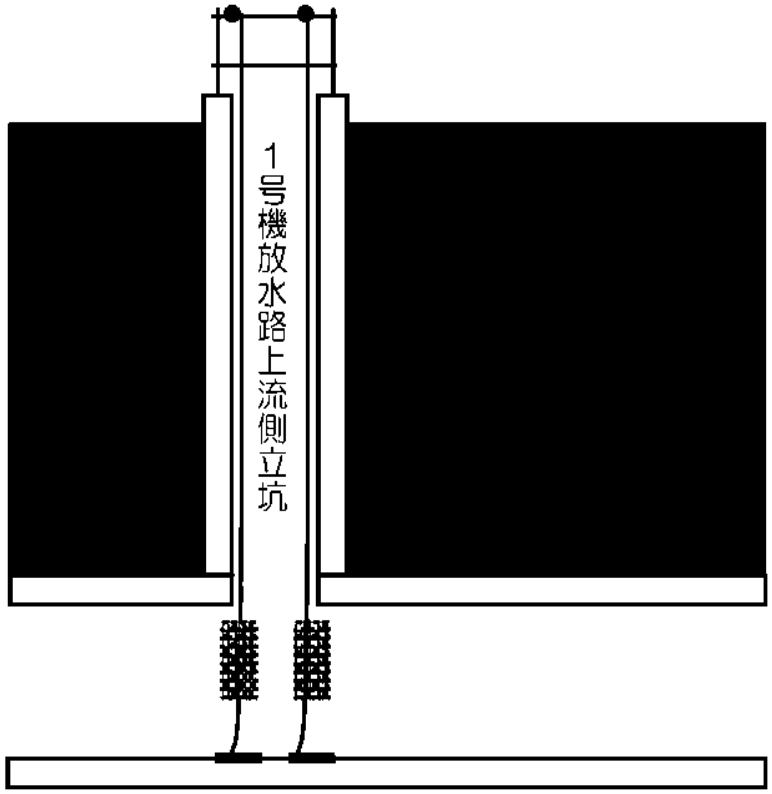
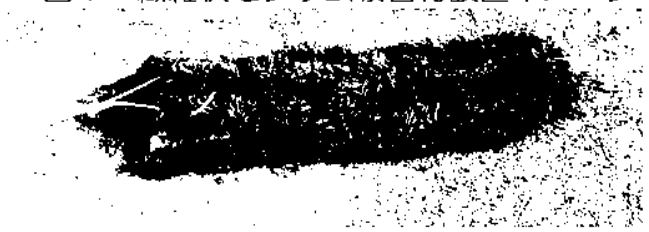


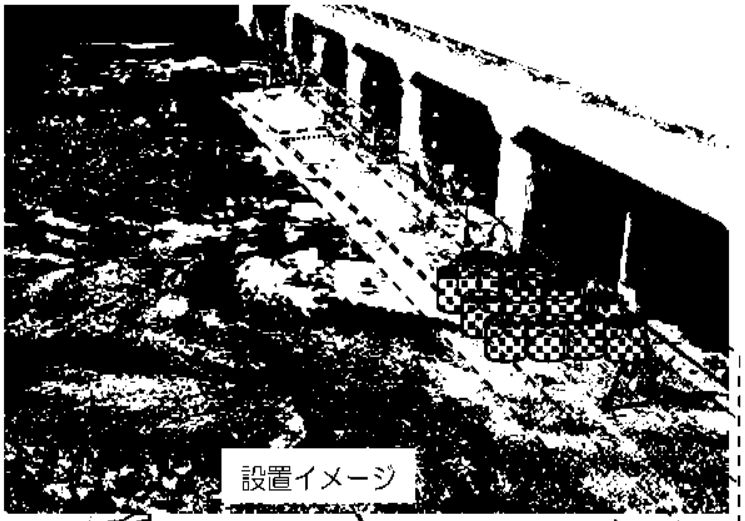
図1　繊維状セシウム吸着材設置イメージ

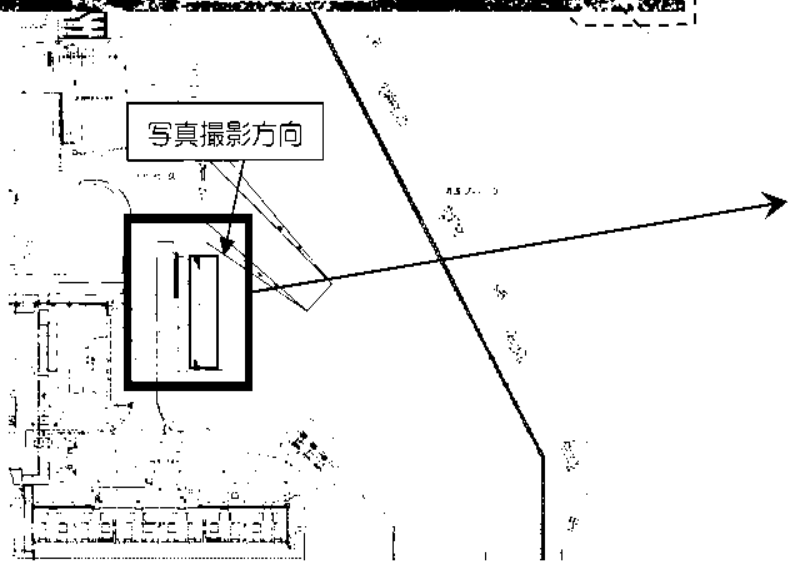


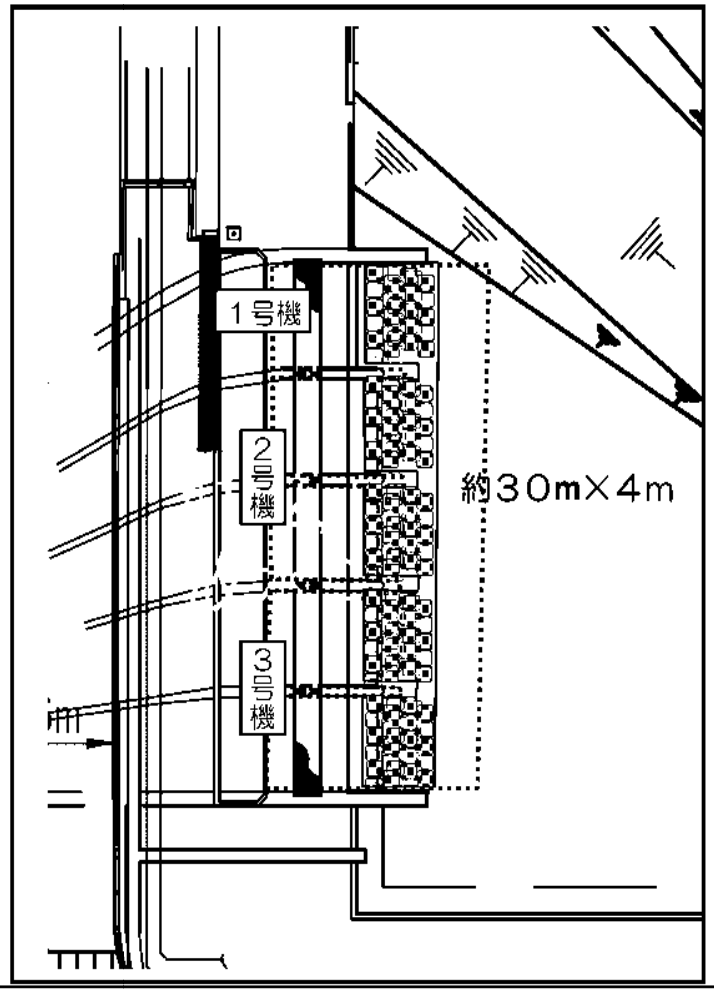
3-3(1). 放水口放射性物質吸着材設置　概要図(1／2)

Csを吸着するゼオライトを放水口に設置し、放水路溜まり水中の放射性物質流出を抑制する計画。

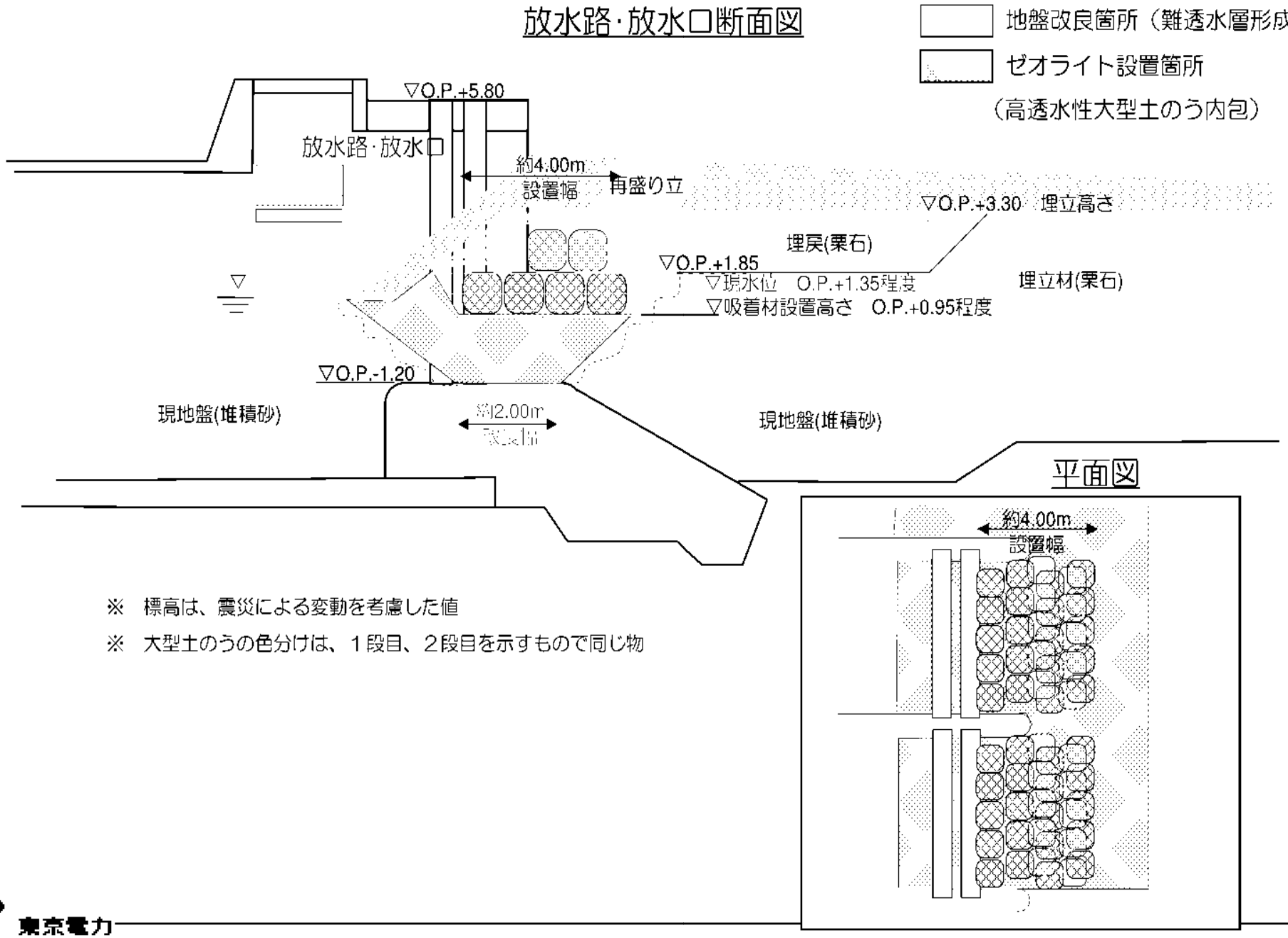
施工箇所平面図







3-3(2). 放水口放射性物質吸着材設置　概要図(2／2)



※　標高は、震災による変動を考慮した値

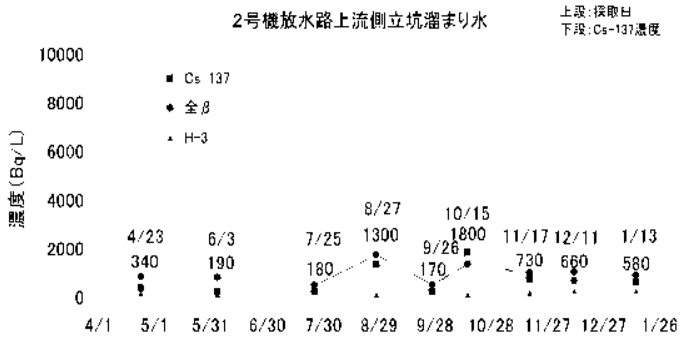
※　大型土のうの色分けは、１段目、２段目を示すもので同じ物

3-3(3). 現場状況写真

4. 2号機放水路調査結果

2号機放水路上流側立坑の溜まり水は、当初よりセシウム137濃度が340Bq/Lと低かったが、8/26の降雨後や台風後の10/15には濃度が一時的に上昇。1/13には580Bq/Lに低下。

3号機タービン建屋周辺からの流入水のセシウム濃度が高く、降雨時に一時的に濃度が上昇するものの、拡散や希釈、沈降等により濃度が低下しているものと考えられる。



2号機上流側立坑西側流入水
（2号T/Bルーフドレン・T/B東側地表）

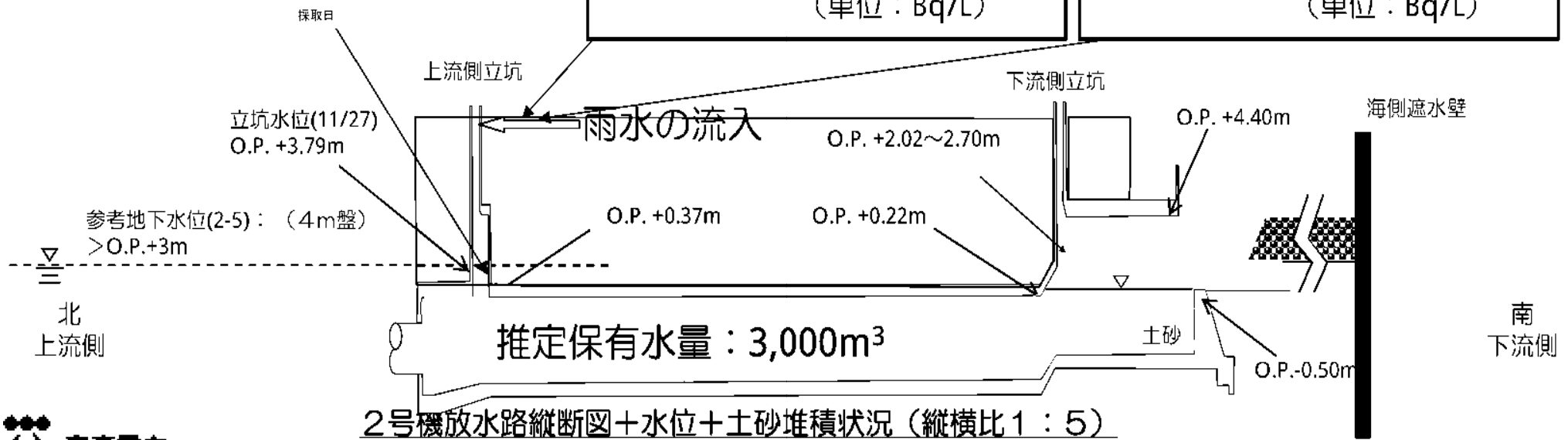
	6/12	8/26
調査日：		
Cs134：	140	サンプリングできず
Cs137：	400	
全β：	770	
H3：	13	

（単位：Bq/L）

2号機上流側立坑南側流入水
（3号T/Bルーフドレン・T/B東側地表）

	6/12	8/26
調査日：		
Cs134：	3,800	3,100
Cs137：	11,000	9,400
全β：	18,000	17,000
H3：	65	41

（単位：Bq/L）



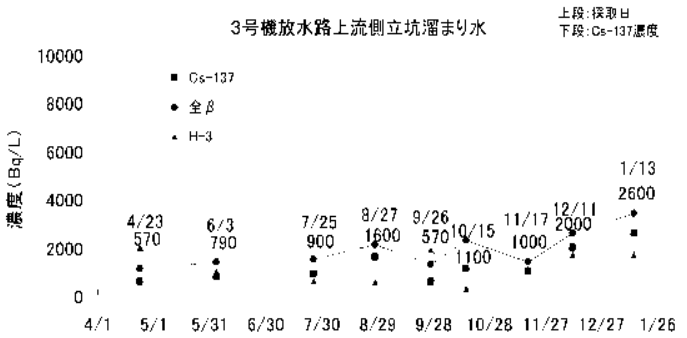
2号機放水路縦断図＋水位＋土砂堆積状況（縦横比１：５）

5. 3号機放水路調査結果

3号機放水路上流側は、2号機放水路と同様、当初よりセシウム137濃度が570Bq/Lと低かったが、 8/26の降雨後や台風後の10/15には濃度が一時的に上昇。 1,000～2,000Bq/L程度で推移。

2号機同様、降雨時の流入により一時的にセシウム濃度が上昇するものの、拡散や希釈、沈降等により濃度が低下しているものと考えられる。

12月、1月と２ヶ月続けてセシウム濃度が上昇。来月の調査結果を注意して見ていく。



3号機上流側立坑流入水
（3号S/Bﾙｰﾌﾄﾞﾚﾝ・T/B東側地表）

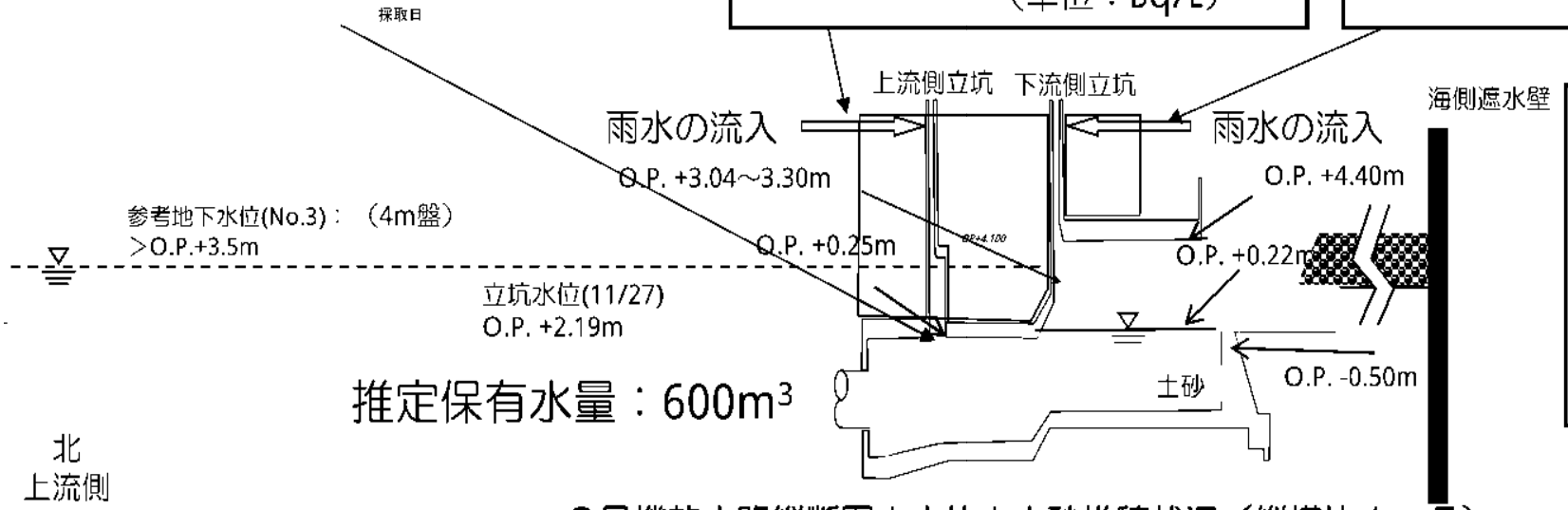
調査日：	6/12	8/26
Cs134：	1,400	サンプリングできず
Cs137：	4,100	
全β ：	4,800	
H3 ：	ND(9.4)	

（単位：Bq/L）

3号機下流側立坑流入水
（4号T/B建屋周辺雨水）

調査日：	6/12	8/26
Cs134：	1,000	サンプリングできず
Cs137：	2,800	
全β ：	3,900	
H3 ：	13	

（単位：Bq/L）



4号機ﾙｰﾌﾄﾞﾚﾝ水

調査日：	6/12
Cs134：	570
Cs137：	1,600
全β ：	2,500
H3 ：	ND(9.4)

（単位：Bq/L）

3号機放水路縦断図＋水位＋土砂堆積状況（縦横比１：５）

6. 放水路溜まり水の今後の対応について

1．モニタリングの継続

1号機放水路の溜まり水については、上流側立坑のセシウム137濃度が1万Bq/Lを下回るまで2回／週のモニタリングを継続する。

2,3号機放水路の溜まり水については、1回／月のモニタリングを継続する。

１号機逆洗弁ピット水位のモニタリングを２回／月程度行う。

2．溜まり水の浄化

モバイル処理装置による浄化について、準備を進める。

1号機放水路上流側立坑に投入したセシウム吸着材による浄化を、モバイル処理装置が稼働するまでの間、継続する。

外部への影響を更に抑制するため、１～３号機放水口部にセシウムを吸着するゼオライトを投入する工事を実施中。

3．タービン建屋周辺の調査、除染等について

10m盤全体の汚染源特定のため、タービン建屋屋根面、1～4号機周辺および海側の線量調査を実施中。

タービン建屋周辺のガレキ撤去を2月まで延長して実施中。

タービン建屋東側エリアの排水整備は除染の進展に伴い計画予定。

7. 今後の予定

項　目	1月			2月			3月			備　考
	上	中	下	上	中	下	上	中	下	
タービン建屋海側ガレキ等撤去	━━	━━	━━	━━	━━	━━				
タービン屋根面等線量率調査	━━	━━	━━	━━	━━	━━				調査結果を踏まえて対策実施
逆洗弁ピットの雨水流入抑制				━━	━━					
逆洗弁ピットの溜まり水回収						■■■	■■■	■■■	■■■	
1～3号放水口へのゼオライト設置		━━	━━	━━	━━	━━				
モバイル処理装置による放水路浄化				許認可 ■■■	■■■	■■■	■■■	■■■		
					調達、工事 ━━	━━	━━	━━		
							浄化開始 ━━	━━	━━	
モニタリング			1号機逆洗弁ピットの水位監視 ━━	━━	━━		■■■	■■■	■■■	処理終了まで継続実施
	━━	━━	━━	━━	━━	━━	━━	━━	━━	

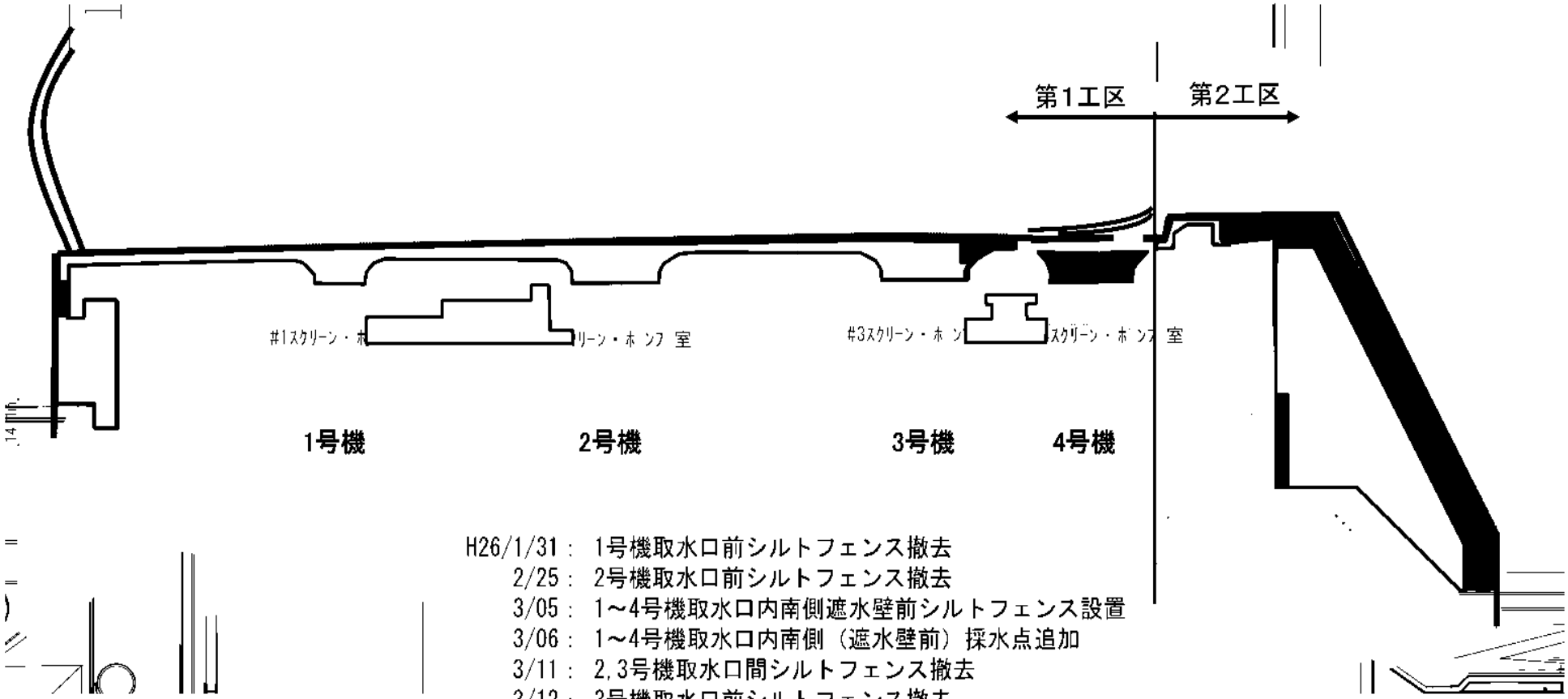
放水路の水質のモニタリング

No.③-15

港湾の海底土被覆及び魚類駆除の状況

東京電力 TEPCO

1-1. 港湾の状況(海側遮水壁設置工事の進捗)



	施工中	施工済
埋立 水中コン		
埋立 割栗石		
舗装		

(1月29日時点)

H26/1/31： 1号機取水口前シルトフェンス撤去
2/25： 2号機取水口前シルトフェンス撤去
3/05： 1～4号機取水口内南側遮水壁前シルトフェンス設置
3/06： 1～4号機取水口内南側（遮水壁前）採水点追加
3/11： 2,3号機取水口間シルトフェンス撤去
3/12： 3号機取水口前シルトフェンス撤去
3/25： 1～4号機取水口北側採取点廃止
3/27： 1号機取水口前シルトフェンス内側採取点廃止
4/19： 2号機取水口前シルトフェンス内側採取点廃止
4/28： 1号機取水口（遮水壁前）採水点追加
5/18： 3号機取水口前シルトフェンス内側採取点廃止
6/02： 2号機取水口（遮水壁前）採水点追加
6/06： 2,3号機取水口間採取点廃止
6/12： 1,2号機取水口間採取点廃止
6/23： 4号機取水口前シルトフェンス撤去

:シルトフェンス
:鋼管矢板打設完了
:継手処理完了
（1月29日時点）

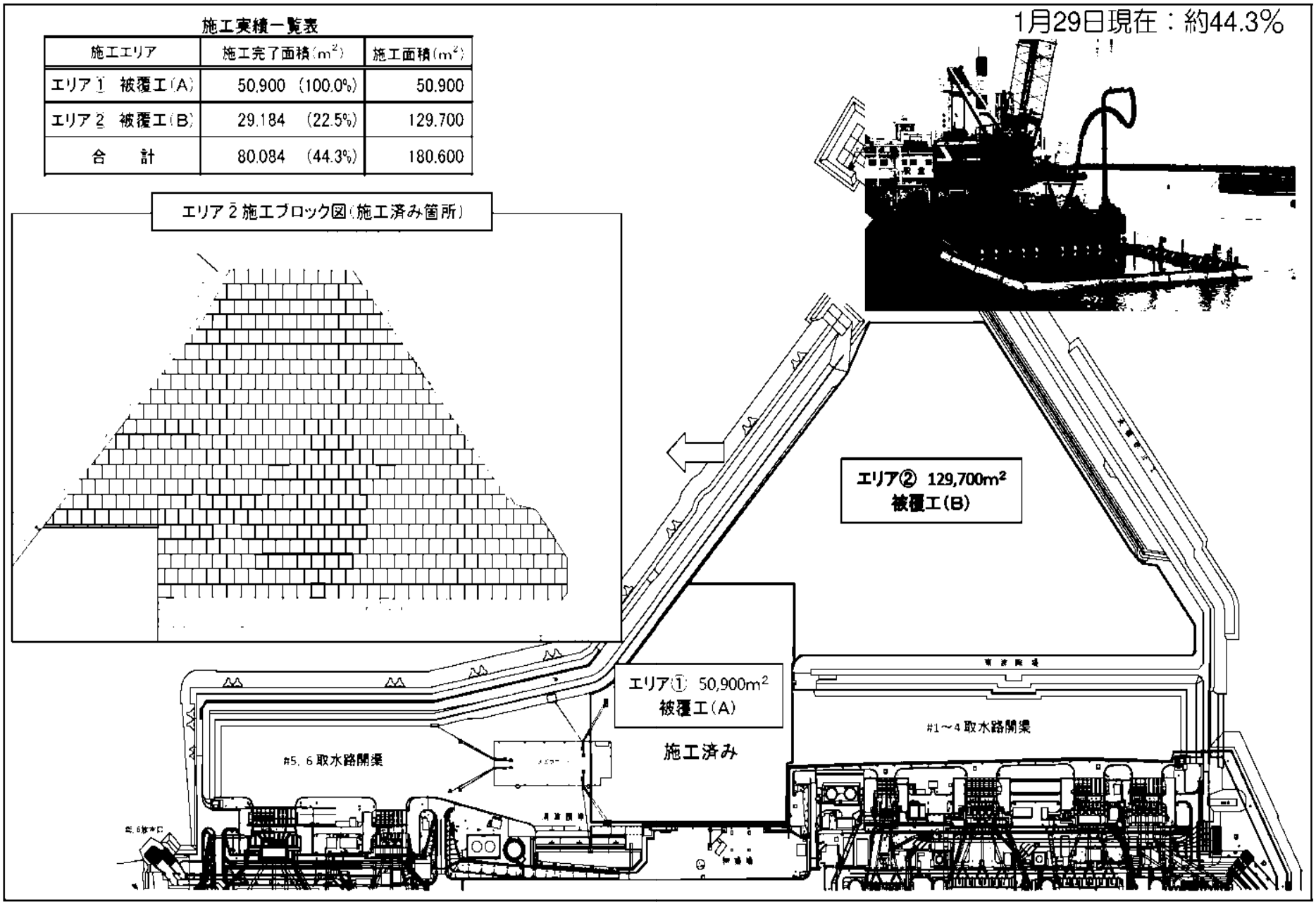
1-2. 港湾の状況(港湾内海底土被覆工事の進捗)

施工実績一覧表

施工エリア	施工完了面積(m²)	施工面積(m²)
エリア① 被覆工(A)	50,900 (100.0%)	50,900
エリア② 被覆工(B)	29,184 (22.5%)	129,700
合 計	80,084 (44.3%)	180,600

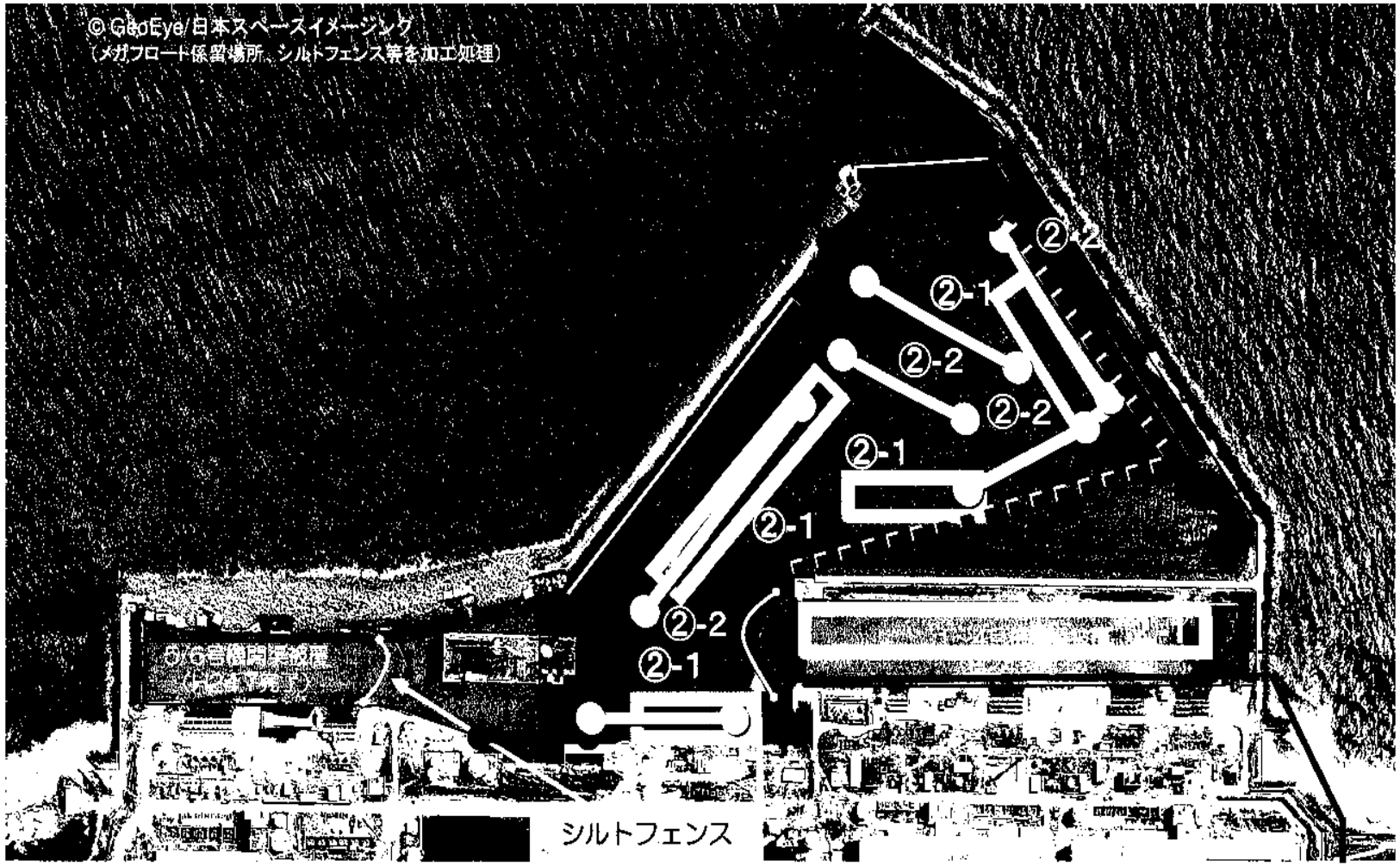
1月29日現在：約44.3%

エリア②施工ブロック図(施工済み箇所)



2-1. 魚介類対策実施状況(1／2)

現在実施している対策



①:魚類移動防止　①－1:港湾口底刺し網設置、　①－2:港湾口ブロックフェンス設置、
①－3 :堤防内側仕切り網設置, ①－4:物揚場シルトフェンス/底刺し網設置など

②:魚類捕獲　②-1:カゴ漁　　, ②-2:港湾内底刺し網

2-2. 魚介類対策実施状況(2／2)

1．実施中（実施済み）

（1）環境の改善

○海側遮水壁設置による港湾内への放射性物質流入量の低減　←遮水壁施工中

○港湾内海底土の被覆

←１～４号機取水路開渠部、５、６号機取水路開渠部における海底土被覆（H24年５月～）

←港湾内中央部における海底土被覆

（海底土の放射性物質濃度調査：H26年２、３月、海底土被覆：H26年７月～ ）

（2）魚類捕獲・移動防止

○港湾内かご漁（H24年10月～）、港湾口への底刺網設置（H25年２月～）、港湾内底刺網漁（H25年３月～）

○防波堤内側仕切り網設置（H25年３月～）

○港湾口におけるブロックフェンス設置（H25年７月～）

○物揚場前におけるシルトフェンス、底刺網設置（H25年２月～）

○１～４号取水路開渠部の海側遮水壁未施工部における底刺網設置（H26年２月～６月）、
シルトフェンス設置（H26年３月～）

2．計画中（検討中）

（1）魚類捕獲・移動防止

○港湾口底刺網の漁網の改善（スズキ網の採用）

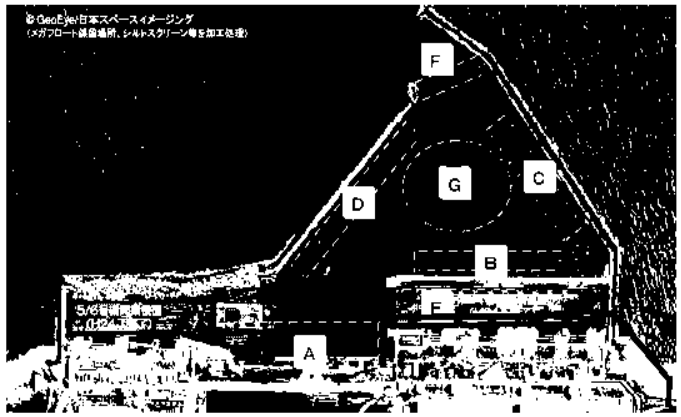
←糸が太く、網丈約８．５mの網（１反）についてテスト。網の取り回し（巻揚げ、手入れ等）が困難。（H26年４月）

←糸が太く、網丈約４mの網（１反）についてテスト。網の取り回しは対応可能。（H26年５月）

←同網の４反（幅約１８０m（港湾口の最短距離約１２０m））連結等をテスト（H26年６月～７月）。
同網にかかった海藻、魚類等が少ない場合には網の取り回しは可能。

←同網に海藻等が大量にかかった場合には網の回収が困難なため、同網を２反ずつに分けてテスト
（①H26.7.21～25、②8.8～14、③.9.21～27、④10.27～30、⑤.11.18～21、⑥12.20～22、⑦1/13～18 ）、2回目、 7回目のテストでは海藻類が多く網に付着。網の回収は出来たが、網の手入れが困難な状況。魚の捕獲数は少ない傾向なので、一定の魚ブロック効果がある。今後数回のテストを予定。

3-1. 港湾魚類捕獲状況(1／4)



魚類捕獲場所

A:物揚場付近、B:東波除堤付近
C:南防波堤付近、D:北防波堤付近
E:1～4号取水路開渠部付近
F:港湾口付近、G:港湾中央付近

1. かご漁

捕獲日	捕獲場所	捕獲魚類数(匹)	Cs濃度最高の試料(魚類捕獲場所)	Cs濃度(Bq/kg(生))		
				Cs-134	Cs-137	Cs合計
H25年度上期	A,B,C,D	306	ムラソイ(D)	72,000	140,000	212,000
H25年10月	A,B,C,D	9	ムラソイ(D)	34,000	76,000	110,000
H25年11月	A,B,C,D	8	クロソイ(A)	25,000	64,000	89,000
H25年12月	A,B,C,D	28	ｴｿﾞｲｿｱｲﾅﾒ(D)	2,600	6,400	9,000
H26年1月	A,B,C,D	44	ムラソイ(B)	20,000	49,000	69,000
H26年2月	A,B,C,D	23	ムラソイ(D)	27,000	67,000	94,000
H26年3月	A,B,C,D	17	ｴｿﾞｲｿｱｲﾅﾒ(D)	3,500	9,400	12,900
H26年4月	A,B,C,D	19	ムラソイ(C)	53,000	140,000	193,000
H26年5月	A,B,C,D	2	マアナゴ(D)	310	840	1,150
H26年6月	A,B,C,D	2	重量不足のため分析対象なし			
H26年7月	A,B,C,D	3	ムラソイ(A)	22,000	63,000	85,000
H26年8月	A,B,C,D	2	マアナゴ(B)	320	950	1,270
H26年9月	A,B,C,D	0				
H26年10月	A,B,C,D	1	重量不足のため分析対象なし			
H26.11.13	A,B,C,D	0				
H26.12.11	A,B,C,D	4	ｴｿﾞｲｿｱｲﾅﾒ(D)	200	690	890
H26.12.12	A,B,C,D	0				
H27.1.8	A,B,C,D	0				

3-2. 港湾魚類捕獲状況(2／4)

2. 港湾内底刺し網漁

捕獲日	捕獲場所	捕獲魚類数（匹）	Cs濃度最高の試料（魚類捕獲場所）	Cs濃度（Ｂｑ／ｋｇ（生））		
				Cs-134	Cs-137	Ｃｓ合計
H25年度上期	A, B, C, D, G	386	タケノコメバル（B）	93,000	180,000	273,000
H25年10月	A, B, C, D, G	33	カサゴ（B）	31,000	70,000	101,000
H25年11月	A, B, C, D, G	22	アイナメ（B）	4,300	9,900	14,200
H25年12月	A, B, C, D, G	22	シロメバル（A）	33,000	78,000	111,000
H26年1月	A, B, C, D, G	16	シロメバル（D）	39,000	94,000	133,000
H26年2月	A, B, C, D, G	21	タケノコメバル（G）	16,000	41,000	57,000
H26年3月	A, B, C, D, G	18	シロメバル（A）	24,000	62,000	86,000
H26年4月	A, B, C, D, G	9	ホシガレイ（C）	250	720	970
H26年5月	A, B, C, D, G	7	ムラソイ（C）	4,900	13,000	17,900
H26年6月	A, B, C, D, G	25	シロメバル（B）	15,000	41,000	56,000
H26年7月	B, C, D, G	11	タケノコメバル（B）	4,100	12,000	16,100
H26年8月	B, C, D, G	6	アイナメ（D）	310	940	1,250
H26年9月	B, C, D, G	12	シロメバル（D）	790	2,400	3,190
H26年10月	A, B, C, D, G	6	試料損傷のため測定対象なし			
H26.11.6	C, G	5	アイナメ（G）	35	100	135
H26.11.12	A, B, D	2	シロザケ（D）	ND(5.7)	6.7	6.7
H26.11.18	C, G	2	ヒラメ（C）	28	140	168
H26.11.28	B, D	7	試料損傷のため測定対象なし			
H26.12.2	C, G	2	ヒラメ（C）	13	60	73
H26.12.9	A, B, D	0				
H26.12.16	C, G	1	ｴｿﾞｲｿｱｲﾅﾒ（G）	300	1,000	1,300
H26.12.23	A, B, D	1	アイナメ（A）	330	1,100	1,430
H27.1.6	C, G	0				
H27.1.14	A, B, D	0				
H27.1.20	C, G	0				

3-3. 港湾魚類捕獲状況(3／4)

3. 港湾口底刺し網(1/2)

捕獲日	捕獲場所	捕獲魚類数(匹)	Cs濃度最高の試料	Cs濃度（Bq/kg（生））		
				Cs-134	Cs-137	Cs合計
H25年度上期	F	1020	シロメバル	110,000	210,000	320,000
H25年10月	F	101	タケノコメバル	26,000	58,000	84,000
H25年11月	F	119	ムラソイ	40,000	91,000	131,000
H25年12月	F	112	タケノコメバル	74,000	170,000	244,000
H26年1月	F	52	タケノコメバル	51,000	120,000	171,000
H26年2月	F	53	マコガレイ	42,000	100,000	142,000
H26年3月	F	40	マコガレイ	1,500	3,900	5,400
H26年4月	F	47	マコガレイ	11,000	29,000	40,000
H26年5月	F	101	ムラソイ	18,000	49,000	67,000
H26年6月	F	72	シロメバル	18,000	49,000	67,000
H26年7月	F	58	マコガレイ	9,900	28,000	37,900
H26年8月	F	39	ムラソイ	8,500	24,000	32,500
H26年9月	F	66	ヒラメ	44	150	194
H26年10月	F	52	マコガレイ	100	340	440
H26.11.4	F	16	試料損傷のため測定対象なし			
H26.11.5	F	7	試料損傷のため測定対象なし			
H26.11.10	F	25	試料損傷のため測定対象なし			
H26.11.14	F	8	試料損傷のため測定対象なし			
H26.11.15	F	8	アイナメ	640	2,000	2,640
H26.11.16	F	7	クロダイ	ND(6.3)※	13	13
H26.11.18	F	3	クロダイ	69	250	319
H26.11.21	F	2	アイナメ	250	870	1,120
H26.11.22	F	2	マコガレイ	44	150	194
H26.11.25	F	4	試料損傷のため測定対象なし			
H26.11.29	F	6	試料損傷のため測定対象なし			

3-4. 港湾魚類捕獲状況(4／4)

3. 港湾口底刺し網(2/2)

捕獲日	捕獲場所	捕獲魚類数(匹)	Cs濃度最高の試料	Cs濃度（Bq/kg（生））		
				Cs-134	Cs-137	Cs合計
H26.12.2	F	1	試料損傷のため測定対象なし			
H26.12.5	F	3	試料損傷のため測定対象なし			
H26.12.6	F	0				
H26.12.8	F	1	試料損傷のため測定対象なし			
H26.12.9	F	3	マコガレイ	780	2,600	3,380
H26.12.12	F	3	ヒラメ	81	230	311
H26.12.13	F	1	試料損傷のため測定対象なし			
H26.12.15	F	5	クロソイ	50	150	200
H26.12.18	F	8	タケノコメバル	53,000	170,000	223,000
H26.12.20	F	8	タケノコメバル	9,900	33,000	42,900
H26.12.22	F	0				
H26.12.23	F	1	ケムシカジカ	46	180	226
H26.12.24	F	4	ケムシカジカ	ND(7.2)※	23	23
H26.12.25	F	2	シロメバル	6,300	20,000	26,300
H26.12.26	F	6	アイナメ	70	220	290
H26.12.28	F	2	マコガレイ	240	800	1,040
H27.1.6	F	3				
H27.1.7	F	0				
H27.1.8	F	0				
H27.1.9	F	2				
H27.1.11	F	3				
H27.1.12	F	0				
H27.1.13	F	0				
H27.1.14	F	0				
H27.1.18	F	0				
H27.1.19	F	0				
H27.1.20	F	3				
H27.1.21	F	0				

測定・精査中

＜訂正版＞

添 付 資 料

当社原子力発電所（福島第一，福島第二，柏崎刈羽）で発生した重大な人身災害の原因と対策および安全性向上対策について

平成２７年２月２日

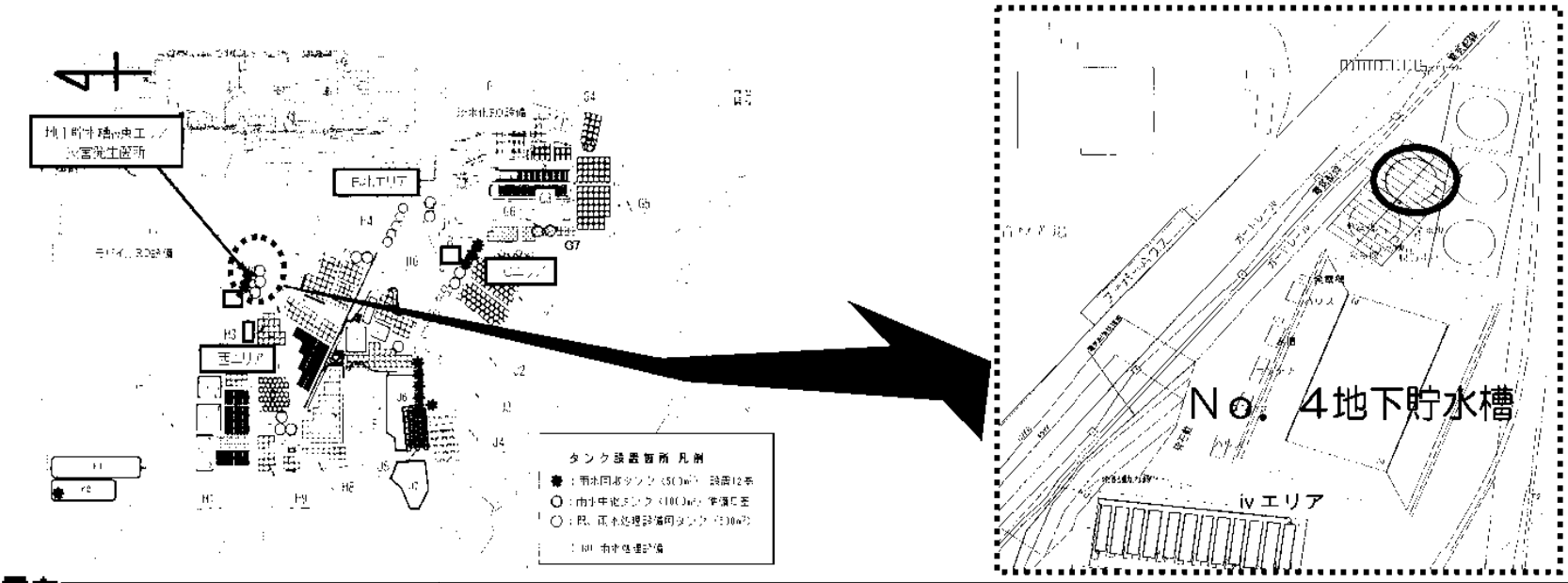
東京電力
TEPCO

目次

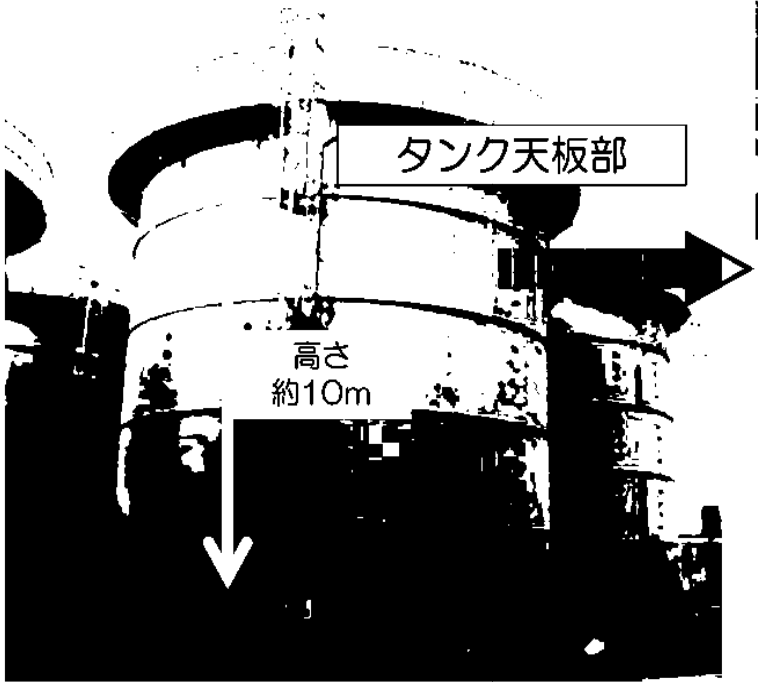
１．人身災害の概要（福島第一、福島第二、柏崎刈羽）
２．今回の事故を受け実施した安全性向上対策
３．原因と対策（福島第一、福島第二、柏崎刈羽）
４．過去に福島第一で実施した対策の振り返り

１－１．福島第一における人身災害の概要

■発生日時：平成27年１月19日　午前９時６分頃
■発生場所：雨水受けタンクＮｏ．２（Ｎｏ．４地下貯水槽エリア東側）
■作業体制：３名（当社社員１名及び協力企業作業員２名）
■装　　備：タイベック、全面マスク、ヘルメット、安全短靴、手袋(綿手・ゴム手２重）、安全帯
■発生状況：構内雨水受けタンク設置工事において、当該タンク水張り試験後にタンク内面を検査するための準備作業を行っていた協力企業社員が、当該タンク天板（約10m）から誤って転落した。
発電所構内救急医療室に搬送後、同日午前10時31分、病院へ搬送し治療を行っていたが、翌20日午前１時22分、医師により死亡が確認された。



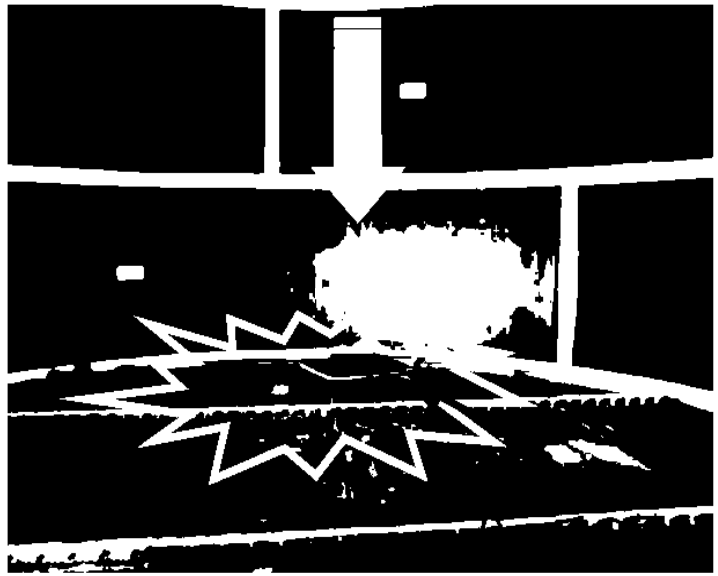
１－１．福島第一における人身災害の概要



雨水受けタンクＮｏ．２

タンク天板部

タンク内部

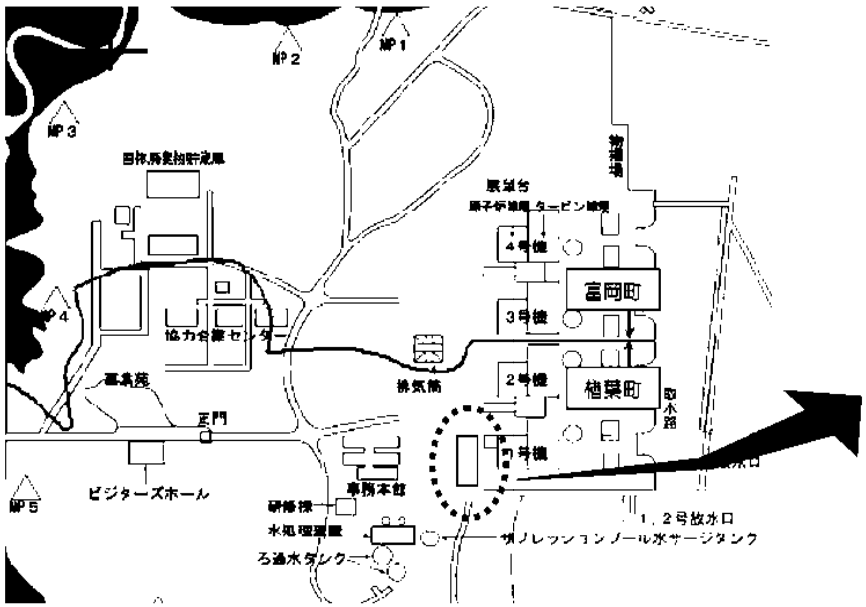


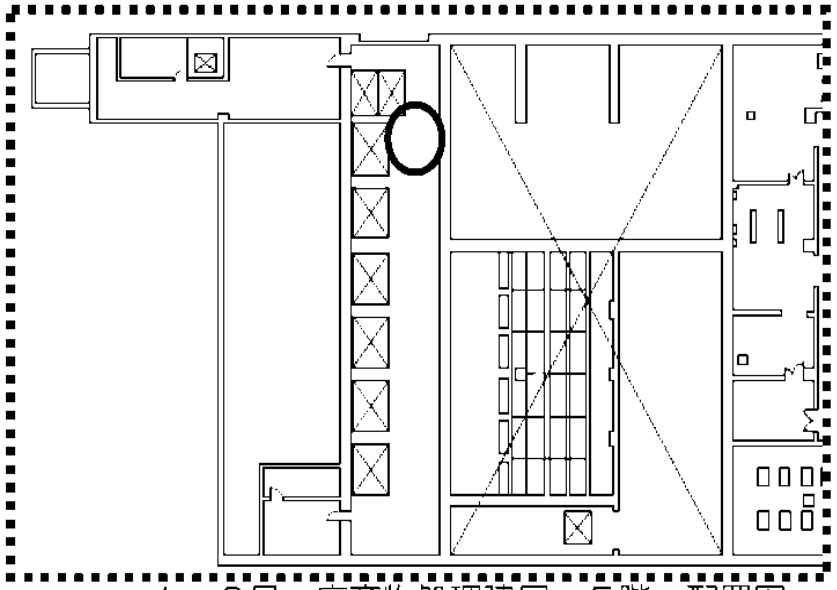
タンク内部底面

１－２．福島第二における人身災害の概要

■発生日時：平成27年１月20日　午前９時30分頃
■発生場所：１・２号機廃棄物処理建屋　５階（管理区域）
■作業体制：６名（協力企業作業員６名（ただし被災時は一人作業））
■装　　備：Ｃ区域用作業服、タイベック、ヘルメット、作業靴、手袋（軍手、ゴム手袋）
■発生状況：放射性廃液を濃縮減容する設備の点検作業を行っていた協力企業作業員が、同点検で使用する機器横倒用架台と受台＊を固定していたボルト・ナットを緩めたところ受台が回転し頭部を挟まれた。
救急車およびドクターヘリを要請し同日午前10時48分、病院へ搬送したが、同日午前11時57分、医師により死亡が確認された。

＊濃縮減容設備の点検の際に設備を当該の架台と受台を用いて向きを横にする

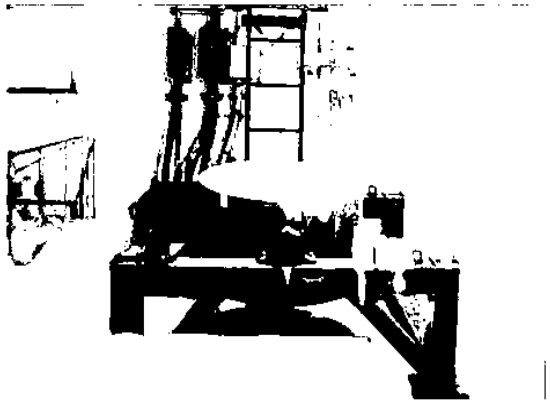




１・２号　廃棄物処理建屋　５階　配置図

１－２．福島第二における人身災害の概要

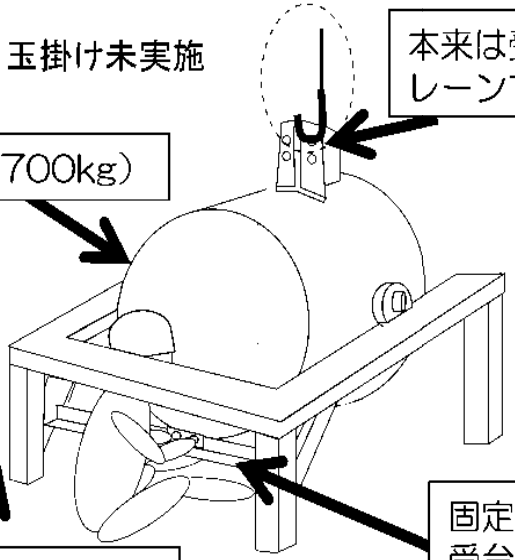
災害発生時の状況（推定）



玉掛け未実施

本来は受台を天井クレーンで玉掛けする

受台（約700kg）

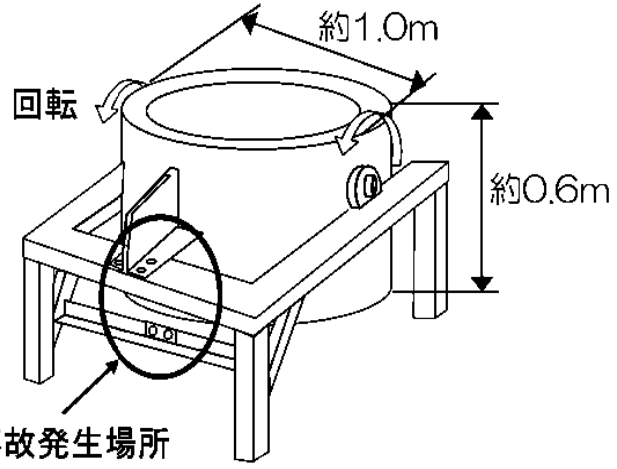


濃縮器点検
横倒用架台

固定ボルト
受台を横向状態で
架台に固定するもの

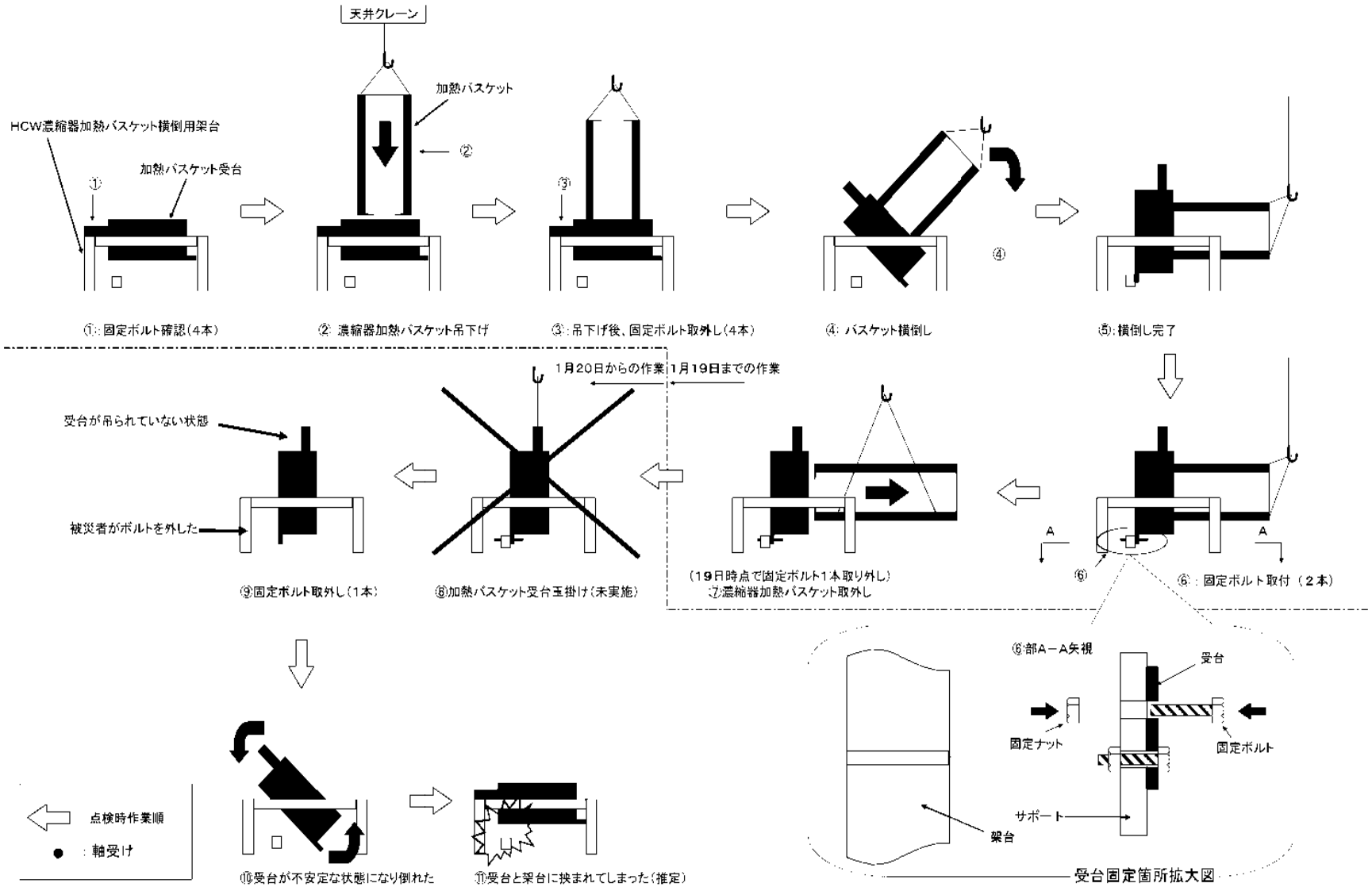
災害発生前の状態

受台が回転し、架台との間に頭を挟まれた



災害発生後の状態

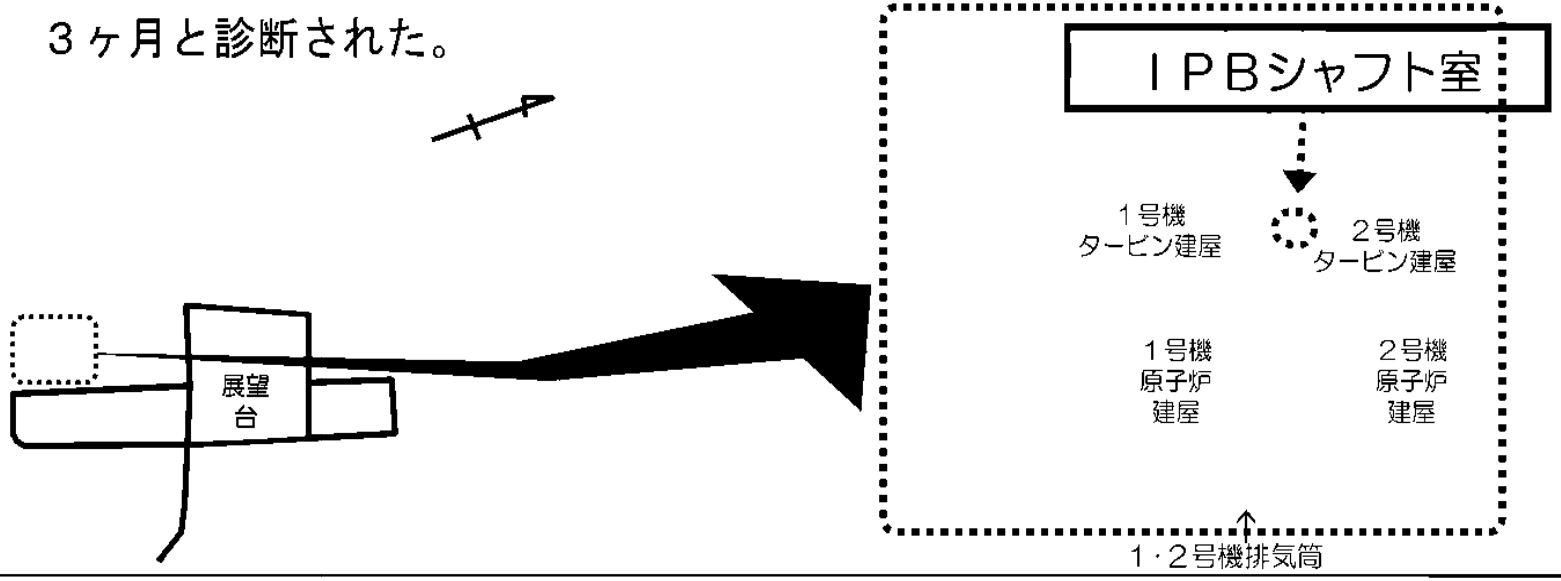
１－２．福島第二における人身災害の概要（参考）



濃縮器加熱バスケット横倒用架台使用手順（災害発生時手順）

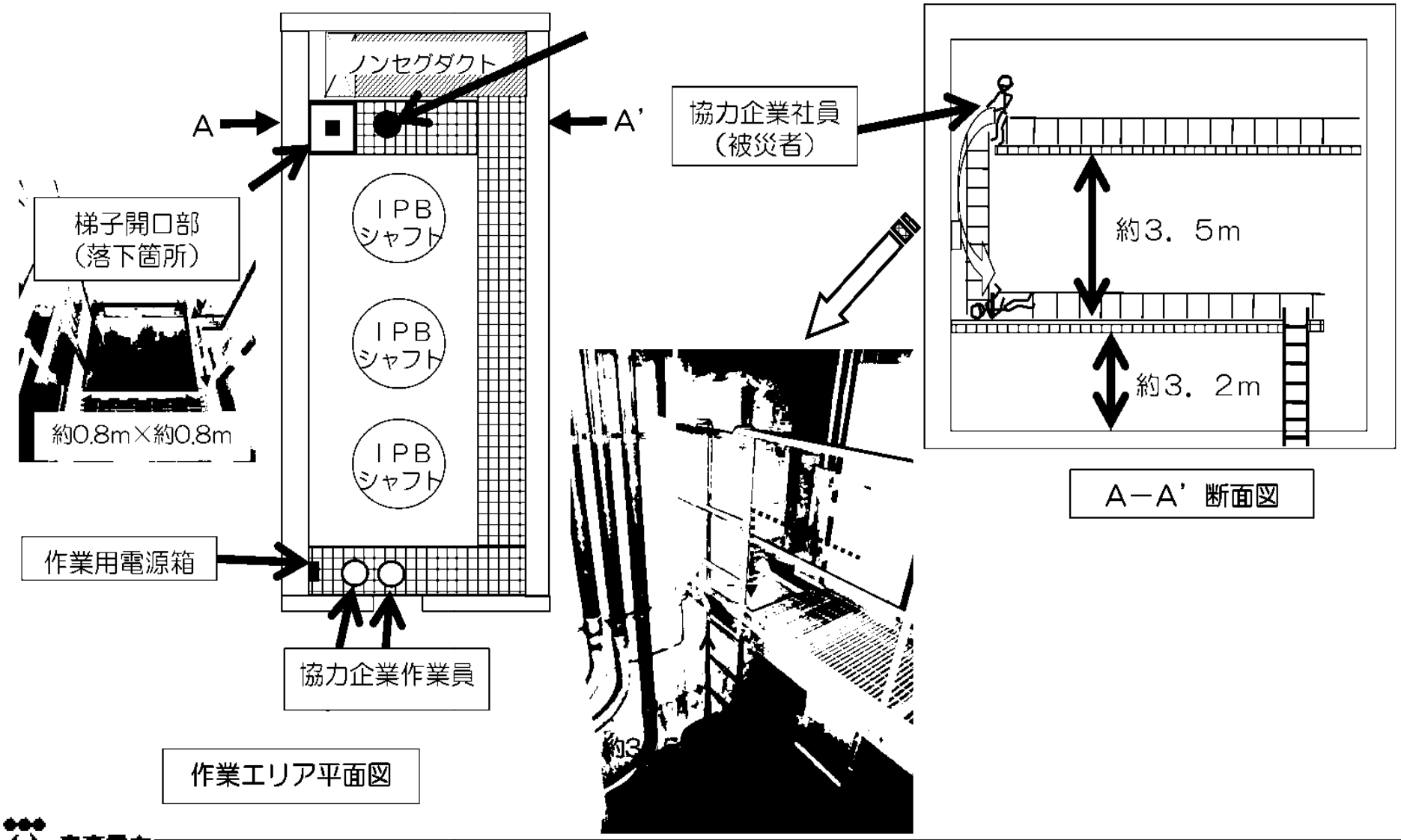
１－３．柏崎刈羽における人身災害の概要

■発生日時：平成27年１月19日　午後２時40分頃
■発生場所：２号機ＩＰＢシャフト室（非管理区域）
■作業体制：３名（協力企業作業員３名（ただし被災時は一人作業））
■装　　備：ヘルメット、ヘッドライト、ハンディライト、作業靴、手袋
■発生状況：作業用電源箱の点検作業を行っていた協力企業作業員が、当該作業とは別の現場の写真撮影中に、グレーチング開口部から約3.5m落下した。
当該室照明が別作業の安全処置により通電されていなかった（点灯しなかった）ため、入口扉を開放し、外光を取り入れたうえで、ヘッドライトまたはハンディライトを使用して当該作業を行っていたが、写真撮影にあたっては光が反射してしまうことからヘッドライトを消灯し実施していた。
救急車を要請し同日午後３時55分、病院へ搬送し治療行為を受け、入院、全治３ヶ月と診断された。



１－３．柏崎刈羽における人身災害の概要

災害発生時の状況



２．今回の事故を受け実施した安全性向上対策

重大な人身災害が連続した状況を踏まえ、各原子力発電所の全作業を中断し、以下の安全性向上対策を当社と協力企業にて実施した。

１）安全点検

今回の災害を踏まえ、各原子力発電所の全作業について、「意識、手順、設備」の３つの観点から、現場および手順書の確認、是正を実施。

２）意識向上・事例検討会の実施

今回の３事例を「各自が各々で考える」事例検討会を実施。

３）当社及び元請各社経営層による現場確認

当社及び元請各社の経営層自らが現場を巡視し、ヒアリング・オブザベーションを通じ、リスクを指摘して改善を図った。

４）原因の洗い出し

今回の３事例の原因調査を行い、対策を実施するとともに各発電所で水平展開を実施する。

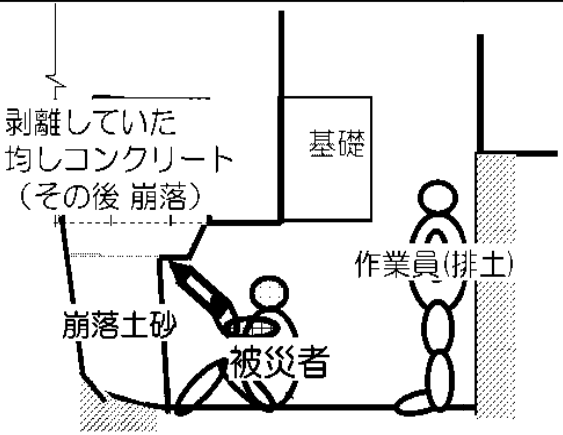
５）過去に福島第一で発生した人身災害の振り返り（福島第一のみ）

過去に福島第一で発生した重大な人身災害において、その都度、安全総点検を実施していたにもかかわらず、今回の災害を防止することができなかったため、マネジメントの改善点等を含め、分析を実施した。

2．今回の事故を受け実施した安全性向上対策

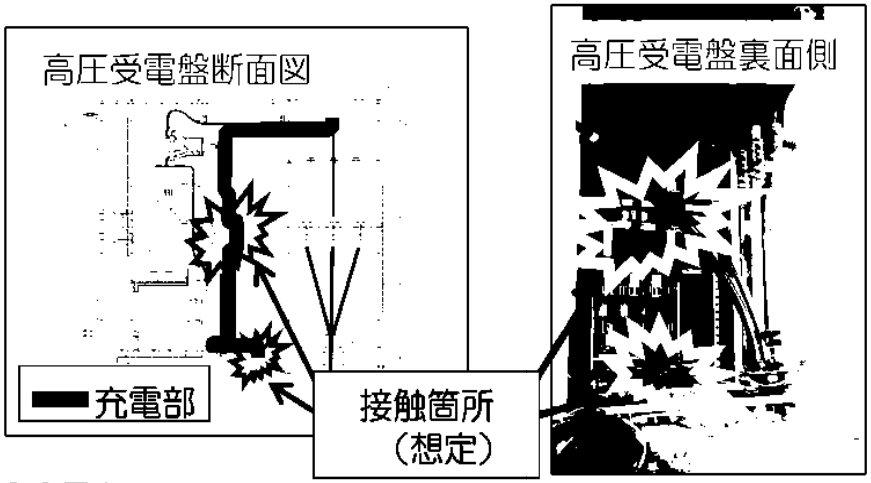
■現場の不安全状態の是正に取り組んできたが、人身災害が繰り返し発生。

H26.3.28　崩落した土砂の下敷きになり死亡

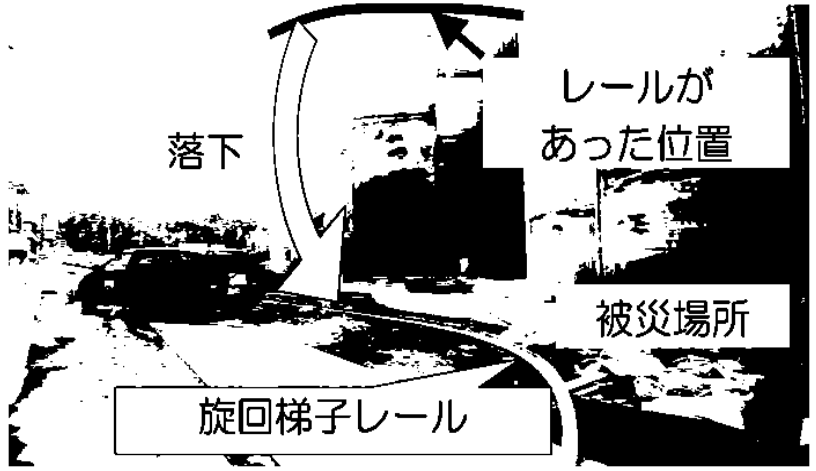


H26.9.20　単管パイプが落下し負傷

H26.9.30　新事務棟電源（6.9kV）の感電負傷



H26.11.7　旋回梯子レールが落下し負傷



２．今回の事故を受け実施した安全性向上対策

１）安全点検結果

■以下の３つの観点から点検を実施し、安全確認を行った。

①意識
- 基本動作：基本動作の徹底、必要性の確認
- 安全装備：高所作業等における保護具の確認
- 意識徹底：ルールの背景の理解、ＴＢＭ－ＫＹ*の必要性

②手順
- 手順書の有無：手順が必要な作業における手順書の有無の確認
- 手順書のポイント理解：手順における留意点の理解
- 治具の扱い：手順書の有無確認、留意点含め治具の扱いの理解

③設備
- 不安全箇所の確認：重量物、開口部、アンバランス（吊り上げ）、高所、手すり、治具、暗所（照明）等のポイントで不安全箇所を抽出・是正

＊ツールボックスミーティングー危険予知の略
作業開始前に、小グループでその日の作業や段取りからそこに潜む危険を予知し、安全に作業できる方法を決めること。

2．今回の事故を受け実施した安全性向上対策

■安全点検結果

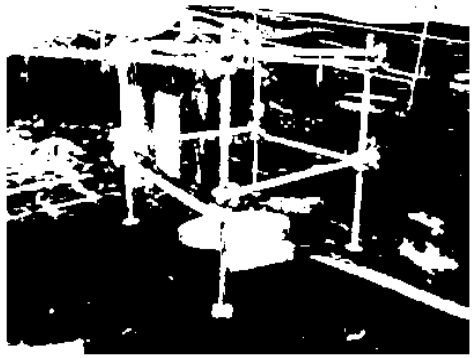
福島第一：作業件数392件に対して実施済

福島第二：作業件数39*件に対して実施済（1月28日より作業再開）

柏崎刈羽：作業件数91件に対して実施済（1月26日より作業再開）

安全点検是正処置例

是正前



是正後(開口部にバリケードを設置)

是正前

是正後(安全帯使用の標識を設置)

*件数に誤りがありましたので、訂正しております。（平成27年２月２日訂正）

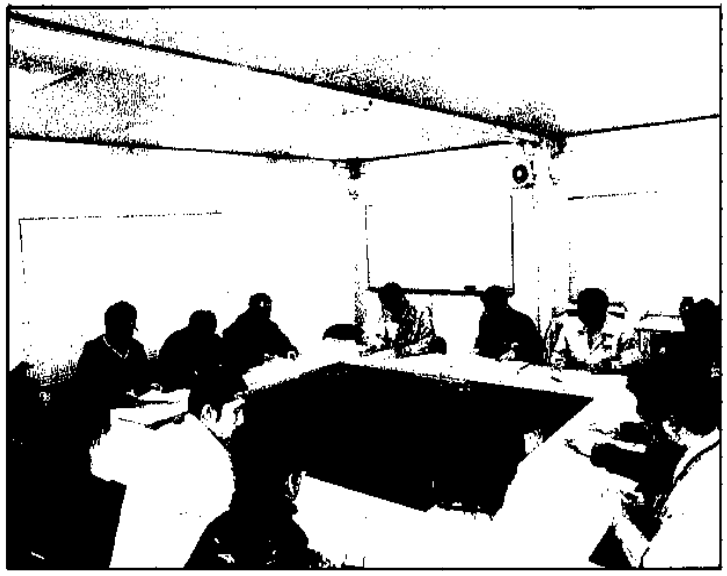
２．今回の事故を受け実施した安全性向上対策

２）意識向上・事例検討会の実施結果

■１月21日から当社社員及び協力企業作業員の全員を対象とし、今回発生した３件の人身災害事故について事例検討会を継続実施中。

（福島第一の実績例）

延べ人数 社員約1,500人、協力企業約15,000人（２月２日現在）



２．今回の事故を受け実施した安全性向上対策

３）当社及び元請各社経営層による現場確認結果

■当社および元請企業経営層による現場訪問を行い、問題点を抽出し、現場改善を図った。

現場訪問実施数：10社（１月19日～１月25日）
：31社（１月28日～１月31日）
改善箇所抽出数：323件（１月31日現在）

［平成27年1月29日撮影］

［平成27年1月31日撮影］

当社経営層による現場視察

［平成27年1月29日撮影］

協力企業との意見交換会

３－１．福島第一で発生した人身災害の原因と対策（直接原因）

	原　因	対　策
①	タンク天板部にあるハッチの形状は、蓋が落下する可能性がある構造であった	● 今後設置するタンクは、ハッチの蓋が落下しない構造にする
②	重さ約43kgの天板開口部のハッチの蓋を一人で開けようとした 当社管理員は元請会社社員の単独作業を止めなかった	● 検査についても、段取り、体制を含む手順書を作成し運用する ● ハッチの蓋に2人で開ける原則と「開口部注意」の標識を貼り付ける
③	タンク天板で作業（高所作業）を行うにあたり、装備していた安全帯を使用しなかった	● 高所作業は2人以上で実施し、作業開始前に安全帯の使用状況を相互に指差呼称で確認する ● 全作業員は、フルハーネスタイプの安全帯を常時使用する

３－１．福島第一で発生した人身災害の原因と対策（背後要因）

	要　因	対　策
①	検査が遅れると考え、ハッチの蓋を開けることを急いだことから、危険予知が行われず安全帯の使用も失念した（推定）	● 当社および元請の幹部の発信、現場確認を通じて、「安全第一」の意識を徹底を図る ● 大切な人の写真を携行するなどして、自分自身の安全に対し、意識を高める
②	被災者が災害防止責任者であり、能力も高い人物であったことから、単独行動の予定外作業を止めることができなかった	● どのような相手に対しても、不安全行為を指摘し抑止できる能力と習慣を身につける
③	段取りを含む検査の実施方法を明確にしていなかった	● 検査の段取り、検査体制を含む手順書を作成し運用する
④	検査内容が目視点検等であったため、作業とは認識していなかった	● 当社及び元請社員は、検査開始前に検査準備状況を確認する。準備が整っていない場合は一旦立ち止まり、不足している準備の内容を確認し、安全を確保した上で準備を行う

３－１．福島第一で発生した人身災害の原因と対策（背後要因）

	要　因	対　策
⑤	元請会社では災害防止責任者が専任でなければならないという認識が曖昧で作業に従事した	● 当社及び元請会社は、災害防止責任者など監視者、監督者の役割を再認識し、直接作業に加わらないように徹底する
⑥	「5/6号機Fエリアタンクハッチ蓋落下」では、人身災害は発生しておらず、タンクの健全性への影響にのみ注意が向い、同様なハッチの蓋の落下を防ぐ対策の水平展開が十分に行われなかった	● 運転経験情報の活用、水平展開の弱さ、安全管理の仕組み・組織・体制の弱さ、当社の関与・力量不足を改善する

３－２．福島第二で発生した人身災害の原因と対策（直接要因）

	原　因	対　策
①	受台の下に入らないと、固定ボルトの取外・取付ができない構造だった	架台の改造を行い、受台の固定ボルトを長尺ボルトに変更することにより，受台の下に入らなくても固定ボルトの取外・取付ができる構造にする（図１参照）
②	固定ボルトを取り外すと、架台と受台に挟まれる危険箇所があったが、注意喚起の表示がなかった	架台と受台の危険箇所に人が不用意に入らないように、注意喚起の表示を取り付ける（図１参照）
③	架台と受台の使用方法が施工要領書に記載されていなかった	架台の使用方法を詳細に記載した資料を作成し、施工要領書に反映する
④	作業員全員に架台の使用方法についてTBM－KYで周知できていなかった	作業員全員にTBM－KYの際に、架台及び受台の使用方法を詳細に記載した資料を使って説明する

３－２．福島第二で発生した人身災害の原因と対策

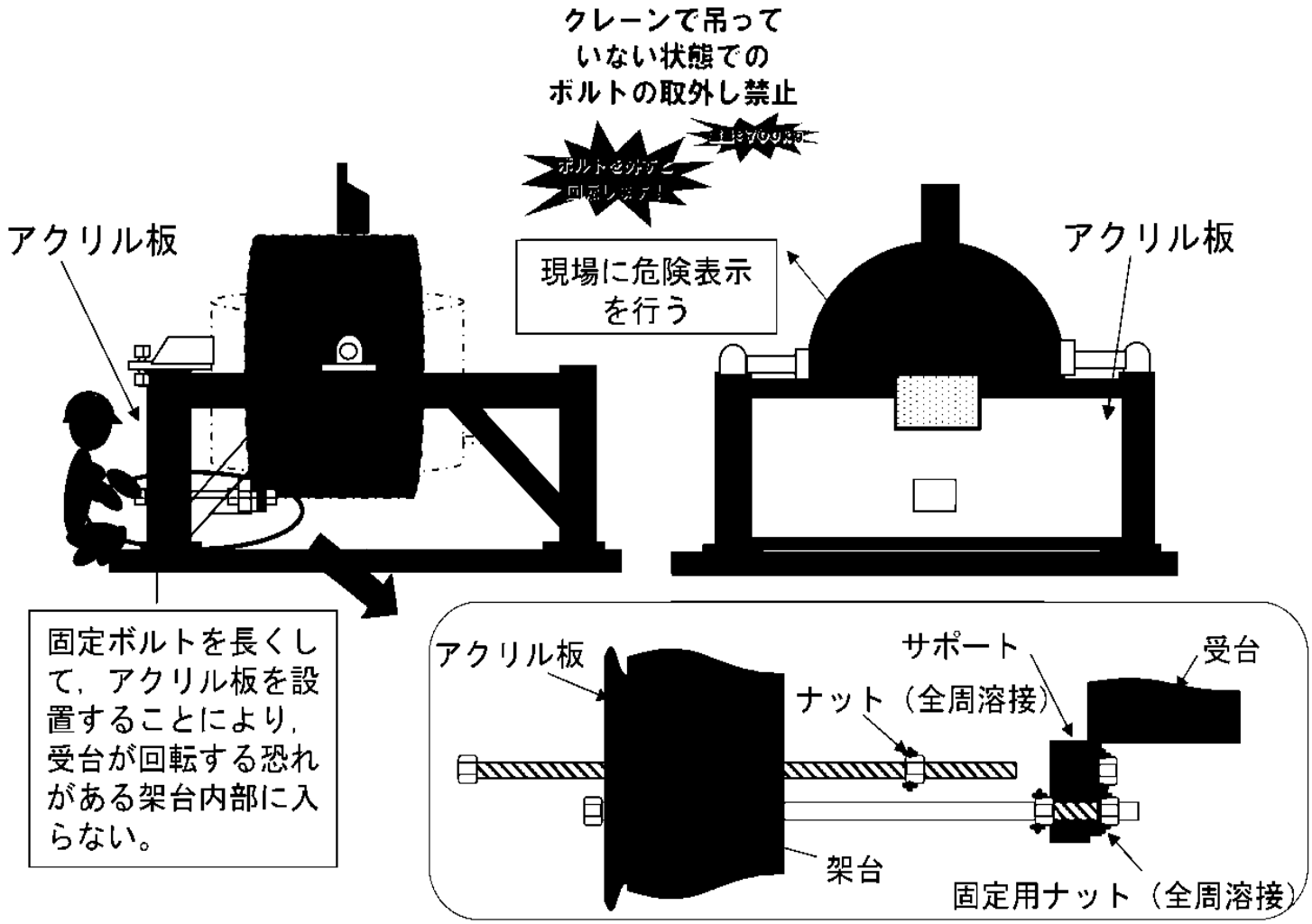


図１　固定ボルト改善及び表示板

３－２．福島第二で発生した人身災害の原因と対策（背後要因）

	要　因	対　策
①	重量物となる治具を新規に設計する場合でも、プラント設備でないという理由から設計管理の対象外となっていた	○組織要因対策1【設計管理】 ● 落下・回転・はさまれ災害等に繋がる点検用治具を新規設計する場合は、設計管理対象とする ● 過去に製作した落下・回転・はさまれ災害等に繋がる点検用治具についても、安全事前評価又は事前検討会で危険箇所が有るか確認を行う
②	事前検討会の前に、点検対象機器及び治具の現場確認をせず事前検討会を実施したため、架台の使用時の危険を抽出できなかった。また、事前検討会参加者の危険予知能力を高める教育ができていなかった	○組織要因対策2【作業管理（リスク評価）】 ● 当社監理員および作業員全員に現場のリスクを抽出するための教育を受講させ、危険予知能力を高める ● 当社監理員が協力企業と一緒に現場確認することを含めた事前検討会を実施し、TBM－KY立会い実施ポイントを決める

３－２．福島第二で発生した人身災害の原因と対策（背後要因）

	要　因	対　策
③	TBM－KYが形骸化していることにより、重要なリスクを自ら考えず協力企業の作業員全員で確認する活動が不足した	○組織要因対策3【作業管理】 ● 当社監理員は治具を含め、重量物取扱作業等、危険作業についてはTBM－KYに参加し、監理員が指導した実施状況をグループマネージャーに報告する ● TBM－KYの参加者に、必ず違った注意点や危険箇所を1つ以上発言させるような教育を当社が行う ● 請負会社の災害防止担当者はTBM－KYの実施方法について指導する ● TBM－KYは作業員全員で実施するよう再徹底させる

３－３．柏崎刈羽で発生した人身災害の原因と対策（直接原因）

	原　因	対　策
①	開口部に常設の落下防止対策（チェーン）がなかった	● 当該開口部に常設の落下防止措置を設置する ● 全てのエリアに対して開口部付近に落下防止の安全設備が設置されていない場所をもれなく抽出し、速やかに対策を実施する ● 現場の危険要因を抽出し、改善する
②	開口部に対する養生（区画，蓋等）がなされていなかった	
③	安全管理がなされていない場所（暗所，高所）で作業を行った	
④	単独行動の予定外作業を行った	● 元請企業工事担当者、品質管理担当者等が行う写真撮影等の間接作業も作業の位置づけとする旨、ルールの明確化を図る
⑤	安全帯を携行・使用していなかった	● 不特定のエリアをまたいで活動する当社工事監理員および協力企業の関係者は、作業環境や状況が変化することに備え、現場では常に安全帯を携行する

３－３．柏崎刈羽で発生した人身災害の原因と対策（背後要因）

	要　因	対　策
①	事前の作業計画と現場確認による安全な作業環境の提供、安全対策が不十分	● 作業開始前に安全点検を実施し、危険箇所（開口部，照度等）を抽出し排除する ● 標準化された作業については、安全性を高めるための手順書の見直しを定期的に実施する ● 日常の作業確認、連絡等を通じた、作業エリアの状況の把握、理解の重要性を再教育する
②	TBM－KYでのリスク抽出（近傍の開口部）が不十分だった	● TBM－KYの実施時期、範囲を明確化すると共に、災害情報を積極的に活用しTBM－KYを充実する ● KYスキル向上のため教育の見直しを行う
③	ルールを守らせ、監視する取り組み（安全教育）が不十分	● ルールの必要性、意義を理解させるとともに、マネジメントオブザベーションにより、ルールの遵守状況の監視を強化する

4．過去に福島第一で実施した対策の振り返り（１）

問題点１　人身災害の撲滅に対する取り組みの不足

①現場の危険箇所を抽出して排除していく継続的安全活動が不足していた。

②スケジュール遵守のプレッシャーに押され、事故後の再発防止活動が拙速になり、点検や対策の範囲が狭くなった。

対策

a. 原子力・立地本部長を責任者とし、人身安全改善活動を強力に展開する。【問題点①②】

b. 原子力・立地本部長、CDO、所長は、現場第一線の所員や協力企業との対話を通じ、「安全第一」の意識付けを徹底する。【問題点①②】

c. 原子力・立地本部長、CDO、所長は、自ら現場を巡視し、リスクの発見と除去を行う。
また、発電所幹部と元請企業所長の合同巡視を定期的に実施する。【問題点①】

d. 当社監理員が定期的に現場出向し、改善箇所を見つけリスクの除去を図る。【問題点①】

e. 作業停止中に行う短期間の点検と対策に加え、作業再開後も継続的に原因分析の深堀り、対策の改善を図る。【問題点②】

４．過去に福島第一で実施した対策の振り返り（２）

問題点２　過去のトラブル・災害の教訓の活用、水平展開の弱さ

①災害の原因分析・対策の責任者が明確に定まっておらず、報告書の作成が遅延した。

②昨年８月の５／６号機Ｆエリアタンクハッチの蓋の落下時の対策を水平展開していれば、今回の事故を防止できた可能性があった。また、昨年９月の単管パイプの落下事故の対策が、１１月の旋回梯子レール落下事故や今回の事故の防止につながっていない。

③根本原因分析の深堀が足りず、効果的な対策として水平展開ができていない。

④不適合情報、運転経験情報の活用、労働災害情報の学習が不十分。

対策

a. 事故分析・対策および水平展開の責任者、検討体制、対策の水平展開の期限を定め、定期的に所長が確認する。【問題点①】

b. 水平展開の責任者は、対策を具体的に文書で記述し、組織内への展開を図り、現場において実効性を確認する。【問題点②】

c. 原因分析おいては、他の種類の作業に対しても有益な教訓が得られるまで根本原因を深堀りする。【問題点③】

d. 不適合情報、運転経験情報、労働災害情報などの情報をグループ単位で毎日活用し、所員の危険予知能力を向上するとともに、発電所全体への水平展開を図る。【問題点④】

4．過去に福島第一で実施した対策の振り返り（３）

問題点３　災害防止に関する力量不足

①机上業務に時間を要し、当社監理員が現場に出向する回数が少なく、十分な教育・訓練、工事管理ができていない。また、現場でのリスク検知能力、不安全行為を指摘し抑制する能力が不足している。

②作業手順書には、細部までの具体的な作業手順が記されておらず、当社監理員は作業内容の把握が十分にできていない。

対策

a. 危険予知能力向上のための教育・訓練【問題点①】

- 現場環境を模擬した体験型の教育・訓練施設を設置し活用する。
- 社外の専門家の指導を受け、不安全箇所・不安全行動の抽出改善を行う。
- 模範的な危険予知の例を収集し、当社監理員および作業班長に教育する。
- 職位、所属にかかわらず、不安全行為を見たら指摘できる習慣、能力を身につける。

b. 作業手順の把握【問題点②】

- 元請工事管理員とコミュニケーションを取って具体的な作業をイメージできるようにする。
- 初めての作業や工事内容の変更があった場合は、当社監理員は現場において、当該作業手順を確認する。

以　上

<参考資料>
平成27年2月5日
東京電力株式会社

IAEAによる運転安全評価レビューの準備会合開催について

本店におけるオープニング風景

オープニング風景①

（向かって左：Liper氏　右：Tarren氏）

オープニング風景②

画像提供：東京電力株式会社
撮影日：平成27年2月2日

柏崎刈羽原子力発電所におけるミーティング風景

ミーティング風景①

ミーティング風景②

画像提供：東京電力株式会社
撮影日：平成27年2月3日

柏崎刈羽原子力発電所における現場の視察風景

現場の視察風景①

１～４号機側高台における
ガスタービン発電機車などに関する説明の様子

現場の視察風景②

本レビューに向けた現場確認の様子

画像提供：東京電力株式会社
撮影日：平成２７年２月４日

柏崎刈羽原子力発電所におけるクロージング風景

クロージング風景①

クロージング風景②

画像提供：東京電力株式会社
撮影日：平成27年2月5日

Norton, Charles

From: Tateiwa, Kenji <tateiwa.kenji@tepco.co.jp>
Sent: Thursday, February 05, 2015 9:24 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 6, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 6, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (1/30/2015)
(only in Japanese)
1-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_03-j.pdf

1-2. Wind Velocity Simulation Inside Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_04-j.pdf

1-3. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_07-j.pdf
(page 6/116) ALPS Status
(page 10/116) Various Water Treatment Systems
(page 19/116) Filling Up Seawater Piping Trenches
(page 38/116) Subdrain System
(page 41/116) Frozen Soil Wall
(page 85/116) Radioactivity in Units 1-3 Discharge Canal

2. Causes of Significant Occupational Safety Issues at 1F/2F/KK and Countermeasures (2/3/2015)
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu15_j/images/150202j0301.pdf

3. Nuclear Safety Reform Plan 2014 Q3 Progress Report (2/3/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247946_6844.html

4. IAEA OSART Preparatory Meeting at Kashiwazaki Kariwa (2/2~5/2015)
(only in Japanese)
http://www.tepco.co.jp/kk-np/data/publication/pdf/2014/270205.pdf

5. Removal of Highly Contaminated Water Inside Seawater Piping Trenches (1/28/2015)
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=iwz87j2v&catid=69631

6. TEPCO Official English YouTube
https://www.youtube.com/user/OfficialTEPCOen

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: +1-202-412-2860

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 29, 2015 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 30, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 30, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 6** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (1/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_05-j.pdf
(English translation as of 12/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141225_01-e.pdf

1-3. Retrieval of Thermocouple Installed in Unit 2 RPV Bottom via SLC Line
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_08-j.pdf

1-6. Work Condition Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_10-j.pdf

1-8. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_11-j.pdf

1-9. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_12-j.pdf

1-10. Status Update of Study on Alternate Core Debris Retrieval Methods (METI)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_14-j.pdf

1-11. Strategic Plan and Risk Mitigation (Nuclear Damage Compensation and Decommissioning Facilitation Corporation)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_15-j.pdf

2. Updated Schedule on Completion of Contaminated Water Treatment (1/23/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150123_02-e.pdf

3. Occupational Safety Corrective Actions (1/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150126_01-e.pdf

4. National Academy of Sciences Fukushima Lessons Learned Committee Phase 2 #3 (1/29/2015)
http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=7732
Attached is a compact version of TEPCO's presentation.
Let me know if you would like to receive the original sized file.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji (mobile)
To: Tateiwa, Kenji
Sent: Thursday, January 22, 2015 10:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 23, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 23, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 30** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. Briefing Materials for Fishermen's Association of Iwaki City (1/16/2015)
(only in Japanese)
1-1. Addition of Sr-Removal Capability to KURION and SARRY Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150119_03-j.pdf
1-2. Illustration of Contaminated Water Removal Process from Underground Piping Trenches
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_10-j.pdf

1-3. Treated Water Discharge Criteria for Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_07-j.pdf

2. Contract Worker Dies After Falling Into Rainwater Receiving Tank at Fukushima Daiichi (1/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150119_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 15, 2015 8:41 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST

Nuclear Sector Colleagues,

Happy New Year!
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 16, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (12/25/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf
(English translation as of 11/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141127_01-e.pdf

1-3. Shortening the Length of Circulating Water Cooling System Loop
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_08-j.pdf

1-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

1-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_11-j.pdf

1-8. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (12/26/2014)
(only in Japanese)
2-1. Status of Filling Up Underground Seawater Piping Trenches
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_01.pdf

2-2. Measures to Achieve Incremental Effective Dose Limit at Site Boundary
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_03.pdf

2-3. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_05.pdf

2-4. Leakage of ALPS-Treated Water from J6 Tank Farm
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_06.pdf

3. IAEA to Review Fukushima Daiichi Decommissioning and Kashiwazaki Kariwa Operational Safety (1/7/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247076_6844.html

4. Figures and Video Clips Describing Various Water Management Measures
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

5. Overview of Fukushima Daiichi Accident and Lessons Learned (33 MB)
http://www.tepco.co.jp/en/decommision/accident/images/outline01.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Monday, December 22, 2014 7:59 PM
Subject: [TEPCO Weekly Fukushima Update Call] TUE, Dec. 23 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
TUE, Dec. 23, 2014 at 3 pm Eastern Standard Time
(**No call next two weeks**. Next call will be on **Fri, Jan. 16, 2015** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (12/19/2014)
(only in Japanese)
1-1. Removal of Cs and Sr from Seawater, etc.
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_03-j.pdf

1-2. Unit 1 Reactor Building Refueling Floor Inspection Results
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_05-j.pdf

1-3. Applicability of Plastic Scintillation Fiber (PSF) to Detect Minor Leakage from Tanks
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_07-j.pdf

1-4. Leakage of ALPS-Treated Water
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_08-j.pdf

1-5. Response to Various Issues

http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l141219_09-j.pdf

2. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool (12/22/2014)
http://www.tepco.co.jp/en/decommision/index-e.html

2-1. Video Clip Summarizing Path to Success (6 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w220b15k&catid=61795

2-2. Video Message from Mr. Hirose, TEPCO's President (5 minutes)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=w785h9cj&catid=61783

2-3. Explanation Slides (only in Japanese)
http://www.tepco.co.jp/nu/fukushima-np/handouts/2014/images/handouts_141222_04-j.pdf

Happy holidays to you all!

All the best,
Kenji

特定原子力施設監視・評価検討会
（第31回）
資料2

海水配管トレンチ
汚染水対策工事の進捗について

平成２７年２月９日

東京電力株式会社

東京電力
TEPCO

目　次

１．　海水配管トレンチ汚染水対策工事の進捗状況

２．　２号機海水配管トレンチ
- ２．１　２号機海水配管トレンチ　揚水試験について
- ２．２　２号機海水配管トレンチ　前回の報告事項
- ２．３　２号機海水配管トレンチ　立坑充填の施工方針・検討内容

３．　３号機海水配管トレンチ
- ３．１　３号機海水配管トレンチ　充填状況
- ３．２　３号機海水配管トレンチ　今後の予定

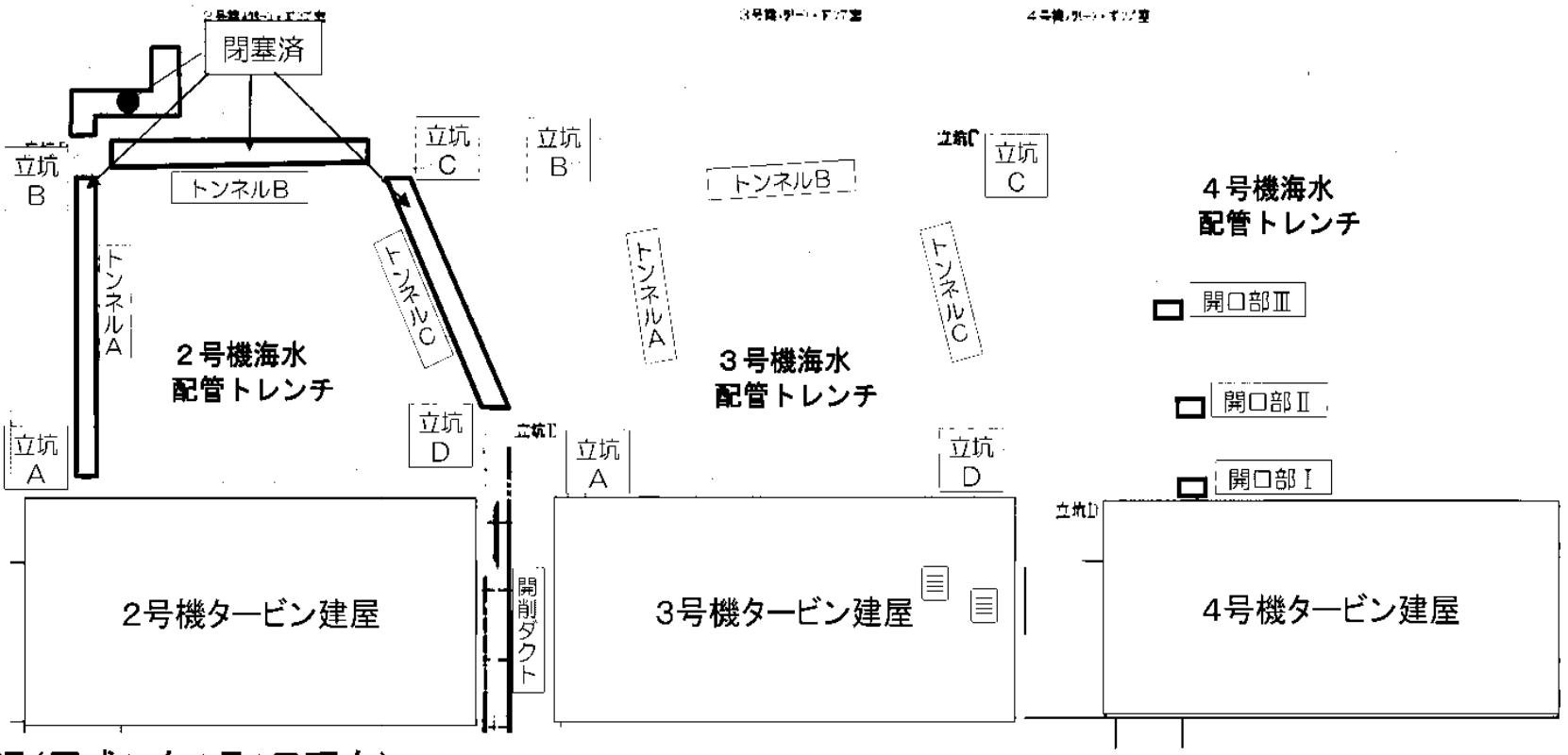
４．　４号機海水配管トレンチ
- ４．１　４号機海水配管トレンチ　調査実施状況
- ４．２　４号機海水配管トレンチ　施工方針

５．　トレンチ充填・閉塞の今後の予定

無断複製・転載禁止　東京電力株式会社

1. 海水配管トレンチ汚染水対策工事の進捗状況

■位置図



■進捗状況(平成27年2月6日現在)

号機	2号機	3号機	4号機
状況	・12/18 トンネル部閉塞充填完了 ・立坑充填作業準備中	・トンネル部充填実施中	・T／B接続部及び開口部Ⅰ調査中 ・充填作業準備中
残滞留水量	約1,990m³	約5,680m³	約900m³
充填量	約2,510m³	約220m³	0m³

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2．1(1) 2号機海水配管トレンチ 揚水試験について 実施内容

（1）目的

トンネル部充填完了後，トンネルA～Cの連通性を確認。

（2）試験日時，概要

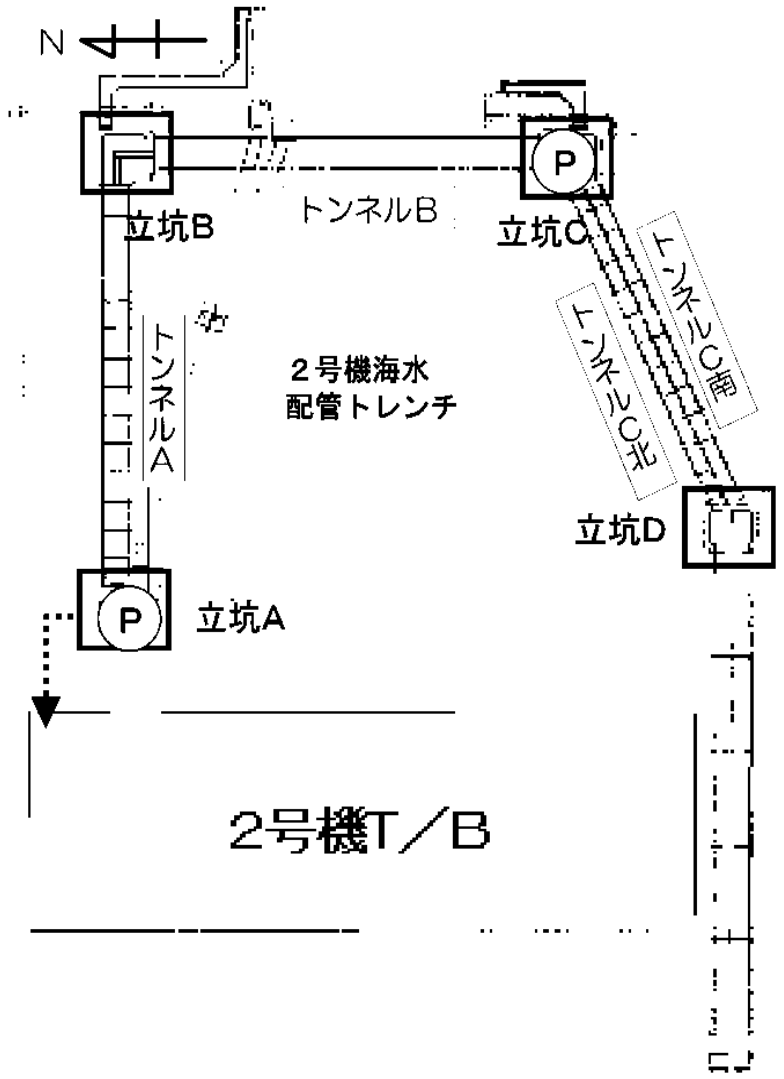
	日時	揚水箇所	揚水量
1回目	12/24 10:02～11:22 12/24 11:31～12:31	立坑C北 立坑A	約60m^3 約30m^3
2回目	1/20 10:00～11:00	立坑A	約30m^3

（3）評価方法

各立坑の水面の面積と水位変化から算出した変化量及び，水の流れの方向を基に，各トンネルの連通度合いを推定。

＜参考＞ 各立坑の水面の面積（試験変動水位付近）

	水面の面積	備考
立坑A	約20m^2	
立坑B	約0.2m^2	・モルタルで詰められているため面積小
立坑C北 南	約20m^2 約50m^2	 ・分岐トレンチの面積含む
立坑D北 南	約10m^2 約200m^2	・北側開削ダクトは変動水位範囲より下のため含まず ・南側開削ダクト約77m含む



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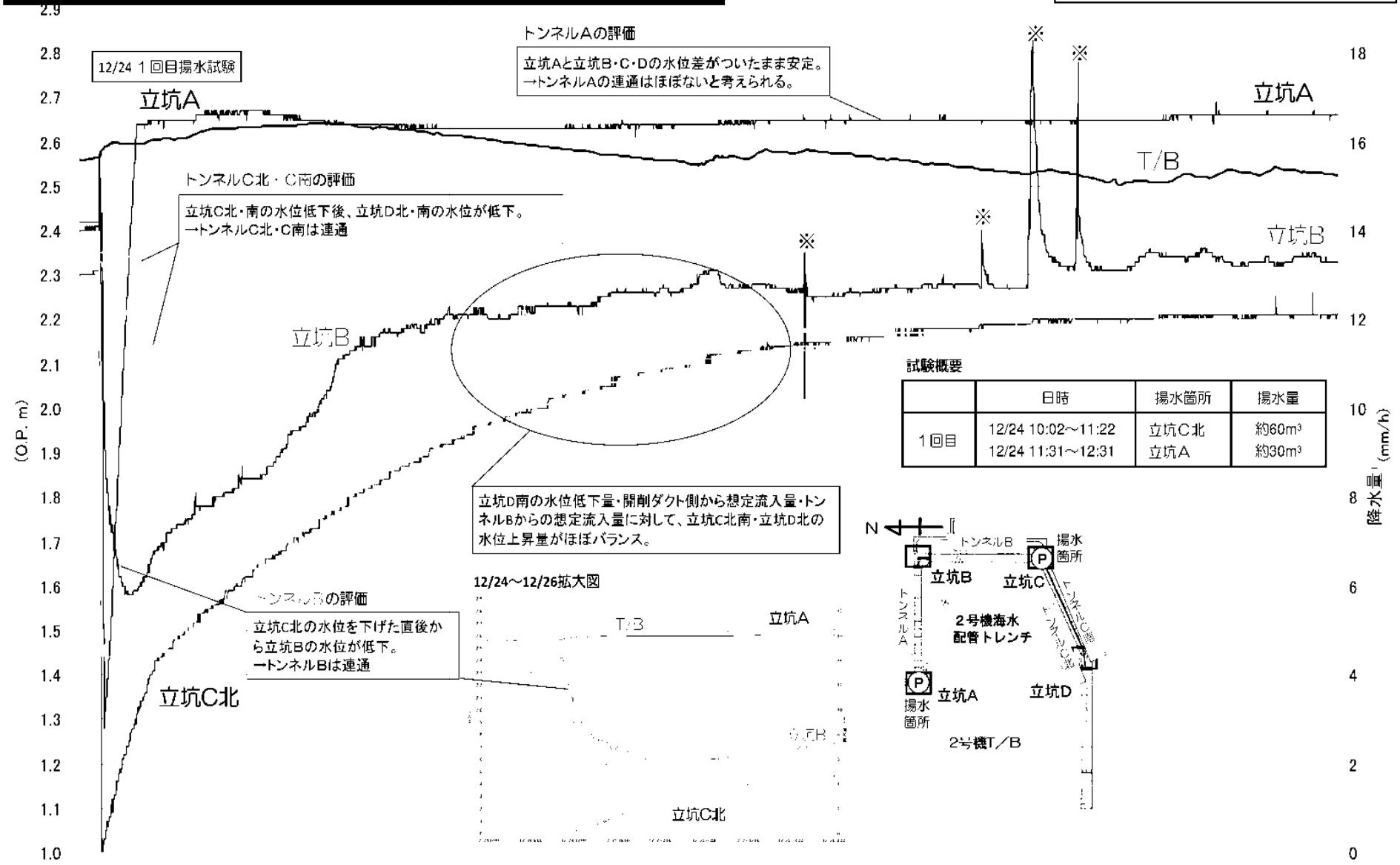
2．1(2) 2号海水配管トレンチ 揚水試験について 試験後(1回目:12/24)の水位変化

2015.1.13 各立坑測量結果に基づきデータを補正



※削孔に伴う注水及びコア回収のため，一時的に水位が変化

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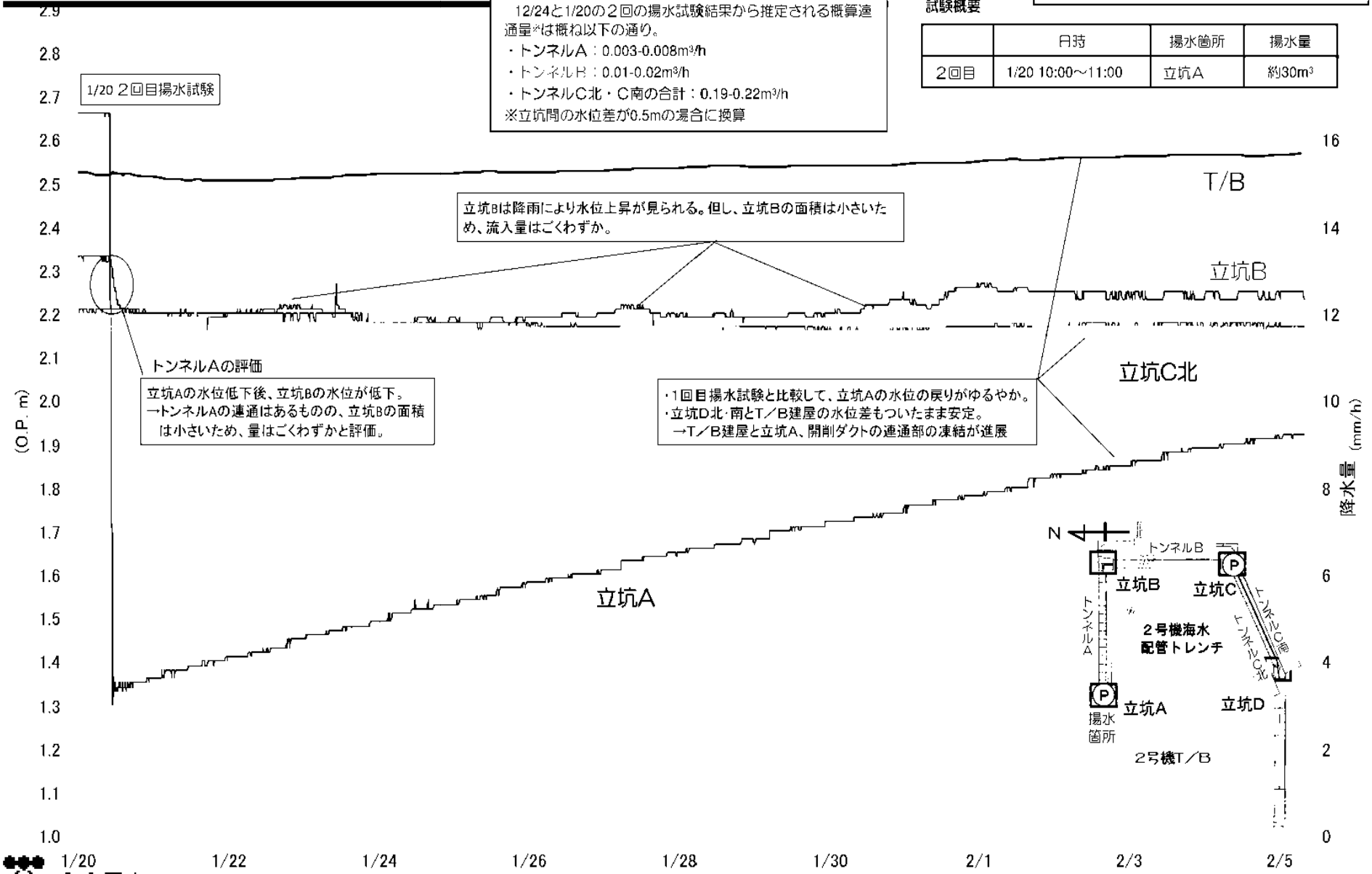
2．1(3) 2号海水配管トレンチ 揚水試験について 試験後(2回目:1/20)の水位変化

2015.1.13 各立坑測量結果に基づきデータを補正

12/24と1/20の2回の揚水試験結果から推定される概算透通量※は概ね以下の通り。
・トンネルA：0.003-0.008m³/h
・トンネルB：0.01-0.02m³/h
・トンネルC北・C南の合計：0.19-0.22m³/h
※立坑間の水位差が0.5mの場合に換算

試験概要

	日時	揚水箇所	揚水量
2回目	1/20 10:00～11:00	立坑A	約30m³



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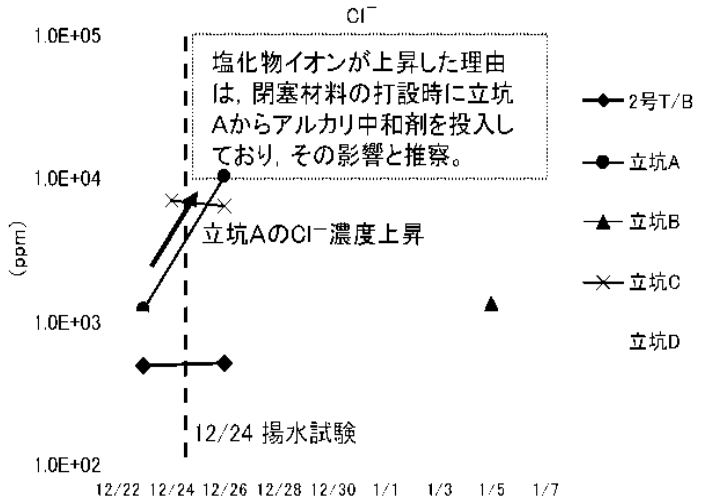
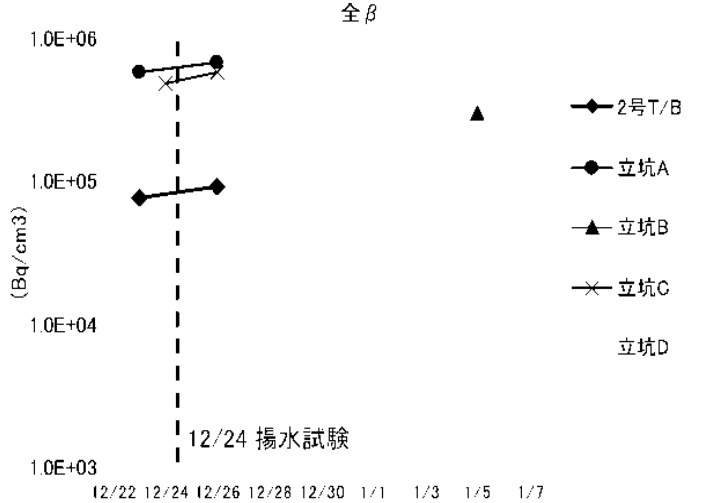
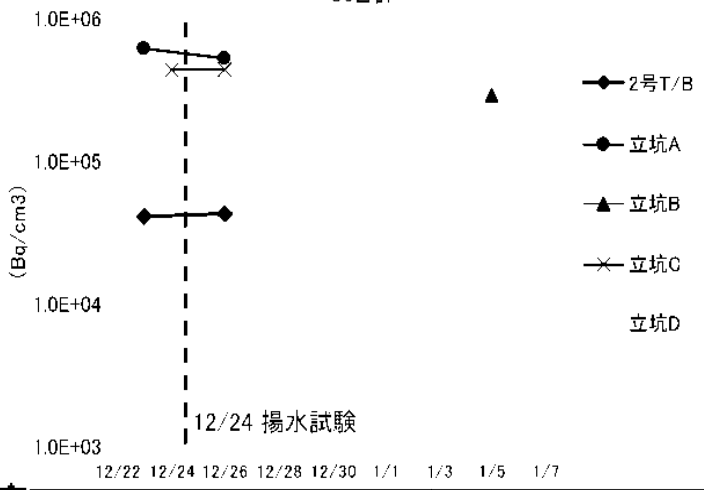
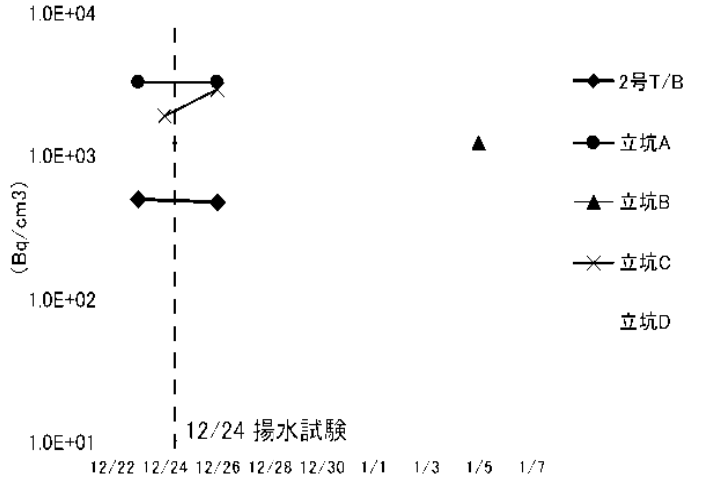
2．1（4）　2号機海水配管トレンチ　揚水試験について
試験（1回目）後の水質分析結果

揚水試験前後の水質を比較した結果，立坑A，C，Dはほぼ変化はなく，また，立坑Bも他の立坑の水質と同じレベル。
前述の揚水試験結果においても，トンネルの連通に起因する水位変化以外の，顕著な立坑水位の変化は見られない。
よって，トレンチへの地下水の流出入はほとんどないと推定。









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2．2　2号機海水配管トレンチ　前回の報告事項

- ２号機海水配管トレンチのトンネル部充填を行い，約２，５００m^{3}の滞留水を除去，および地下水等の流入による再滞留を防止。

- また，内部を充填し，汚染水を除去したことに伴い，外的要因（津波等）により高濃度汚染水が流出するリスクを低減。

- 今後，立坑の充填を実施し，さらなるリスクの低減を目指す。

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2．3(1) 2号機海水配管トレンチ　立坑充填の施工方針・検討内容

■ 立坑充填の施工方針

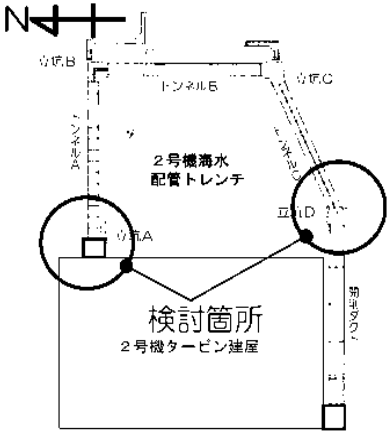
立坑の充填は，タービン建屋側の立坑A及びDから実施する。

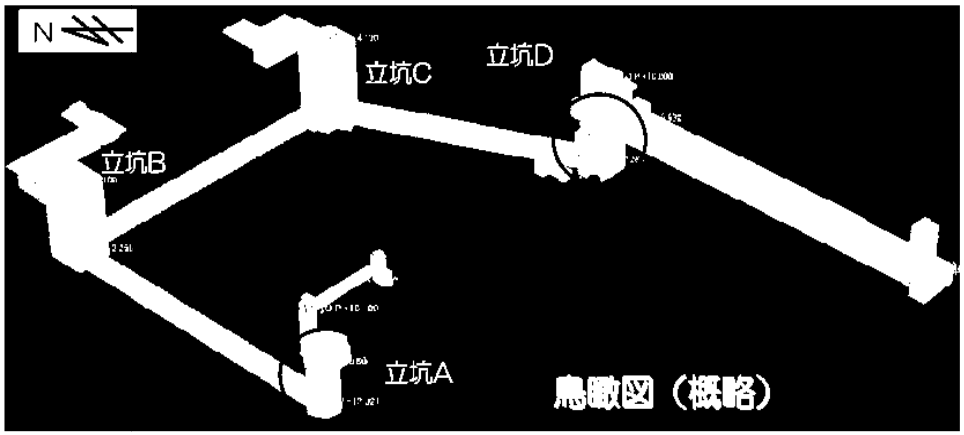
立坑内部は高線量環境下で人が中に入ることができないことから，トンネル充填と同様，充填孔から材料を流動させて充填する。

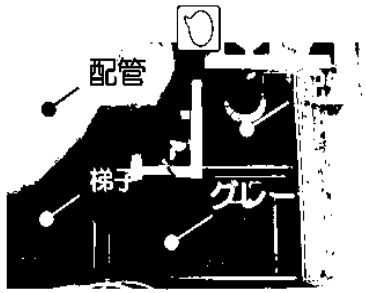
■ 立坑充填で重要な要求品質

- 立坑内の水平方向５m程度流動すること（流動性）
- 支障物周りに密実に充填でき，鉛直方向に連続する水みちを残さないこと（充填性）
- 水中で材料が分離しないこと（水中不分離性）
- 材料自体が難透水性であること（水密性）

⇒　上記の性能が発揮され，水みちが遮られること（遮水性）を期待。







２号立坑Ａの内部状況（震災前）

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2．3(2)　2号機海水配管トレンチ　立坑充填の施工方針・検討内容
立坑充填の材料の絞り込み

■ 立坑充填で用いる材料の選定に当たっては，各材料の特性を活かし，複数を組み合わせる。
そのうち，大量打設・施工性に優れたセメント系材料を基本とする。

	セメント系	薬液・樹脂系
概　要	骨材の有無により，セメントペースト，モルタル，コンクリートに分類。目的に応じて，混和剤・混和材等を加えることにより各種性能を向上させることが可能。	ひび割れや隙間の充填，構造物の補修・補強材等に使用。 少量での使用が一般的。
充填性	高い（発熱による体積変化が避けられないが，混和剤（材）により収縮低減が可能）	高い（圧入が一般的）
流動性	高い（配合にて調整可）	高い（圧入が一般的で，流動させて使用するケースも実績はあるが稀）
水中不分離性	水中で分離しづらい（配合にて調整可）	水中で分離しづらい
施工性	練り混ぜから打ち込み終了までの作業時間： 1.5～2時間以内 （ミキサー車１台あたり） 大量使用が可能	練り混ぜから打ち込み終了までの作業時間： 1～2時間程度以内 大量使用が困難：実績２～３m^3程度
施工実績	立坑や横坑のプラグ材として実績多数。	水中の橋脚の補強や補修で型枠内に流し込む方法で実績多数。
備　考	トンネル閉塞材料として使用。 配合により異なるが，材料自体にわずかな透水性あり。	使用する量によっては受注生産が必要。 材料自体の遮水性は高い。

青字：長所，赤字：短所

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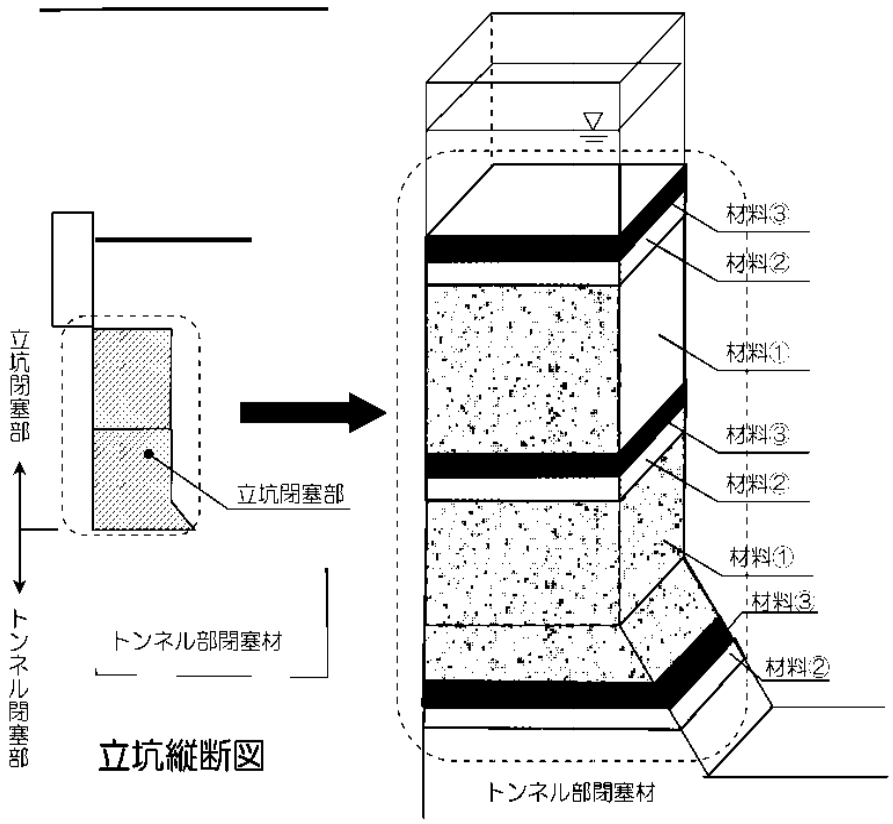
2．3(3) 2号機海水配管トレンチ　立坑充填の施工方針・検討内容
特性を踏まえた材料の組合せ

■セメント系材料（一次充填材）は硬化に伴う収縮により，ひび割れ・隙間が生じる可能性があることから，収縮低減策を施すとともに，ひび割れ等の微小な隙間への充填性に優れた材料（二次充填材），および，隙間表面を覆うことで遮水効果を発揮する材料（キャッピング材），の3種類の材料を層状に組合せて水みちを遮ることを基本とする。



立坑縦断図

各材料施工のイメージ

【材料①】立坑内部全体を充填する（一次充填材）
・立坑内部への充填性が高く，収縮を抑えた材料を用いることにより，水みちの発生を抑制しつつ，立坑内部を充填する。
⇒ セメント系材料にて充填する。

【材料②】隙間を充填する（二次充填材）
・一次充填材施工後に発生の可能性がある隙間・ひび割れに，流動性・隙間充填性が高い材料を流し込み，遮水効果を高める。

【材料③】閉塞部表面を遮水する（キャッピング材）
・充填面を一次充填材より遮水性の高い材料で覆い，遮水効果を高める。

3種類の材料を組合せることで，遮水効果を高める

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2．3(4) 2号機海水配管トレンチ　立坑充填の施工方針・検討内容
一次充填材の選定

■ セメント系材料に対し，ひび割れ抑制策を施したものを一次充填材とする。
⇒　膨張材や収縮低減剤等を添加した流動性の高い水中不分離性コンクリートを選定。

【ひび割れ抑制策】

抑制策	抑制策実現のための具体的な内容
単位セメント量の低減	骨材の使用
セメントによる温度上昇の抑制	打設回数の分割による水和熱量のコントロール
混和剤・混和材の使用	膨張材，収縮低減剤，防水材の添加

【使用する混和剤・混和材と期待する効果】

項　目	期待する効果
膨 張 材	硬化初期段階から膨張しプレストレス効果を期待。
収縮低減剤	自己収縮の低減を期待。
防 水 材	材料内部の微小な空隙の充填，及び組織の緻密化による材料自体の遮水性向上を期待。

【一次充填材の適用に向けた主な確認項目】

性　能	確認内容	確認結果
充填性	支障物周りの充填性確認試験	支障物を考慮した模型による充填状況を確認
	収縮・膨張試験	膨張材の効果で，長期間，膨張側に推移していることを確認
流動性	スランプフロー試験	材料の拡がりを確認し，必要とする流動性を有することを確認
水中不分離性	水中での材料不分離性を確認	材料を水中に落下させ，濁度・pHから材料分離していないことを確認
遮水性	遮水性の確認試験（材料自体）	供試体で材料そのものの遮水性を確認
	打込温度・水和熱の影響によるひび割れ発生リスクの確認	温度応力解析で，打込温度・分割回数，打設間隔等によるひび割れ発生リスクへの影響を評価
施工性	養生期間，打設量等の確認	必要な養生期間，材料供給等の制約の有無を確認

ケーブル間充填 確認状況

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2．3(5) 2号機海水配管トレンチ 立坑充填の施工方針・検討内容
二次充填材の選定

■ 一次充填材に発生の可能性があるひび割れ・隙間に対し，材料投入位置が限定されているという現場条件を踏まえ，材料投入位置から流動し，隙間等に流れ込む材料（二次充填材）について検討。

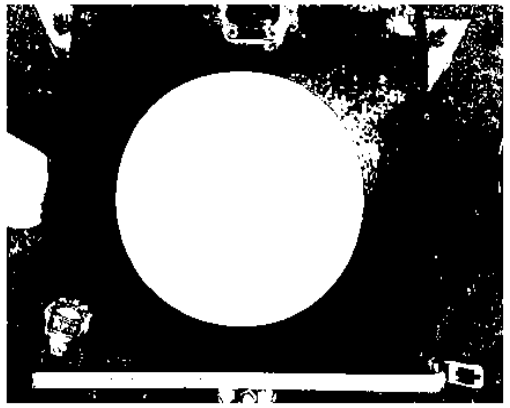
■ 隙間への充填性を向上させるため，トンネル閉塞材料のフライアッシュを，より真比重の大きな材料に置き換え，材料の自重を大きくすることで対応。

⇒ フライアッシュと同程度の粒径で，加重材として使用実績の豊富な硫酸バリウム微粉末を選定。

材　料	フライアッシュ※	硫酸バリウム微粉末
概　要	■トンネル部充填において，主に流動性向上の目的で使用。	■バリウムイオンと硫酸イオンからなるイオン結晶性の化合物。 ■水に対して難溶，水和・膨潤せず化学的に不活性。
真比重	2.3程度	4.20～4.35程度
備　考	セメントの真比重は，3.2程度 ※ トンネル閉塞材の構成材料の１つ	トンネル閉塞材の構成材料のうち，フライアッシュ全てを硫酸バリウム微粉末に置き換えた

【二次充填材の適用に向けた主な確認項目】

性能	確認内容	確認結果
充填性	隙間への充填性確認試験	0.15mm以上の隙間への充填性を確認。また，0.15mm未満のひび割れには入り込まないものの，表面を覆うことを確認。
流動性	5m流動試験，到達先での密度試験	フロー試験および5m流動先において同密度で硫酸バリウムが到達することを確認
水中不分離性	水中での材料不分離性を確認	材料を水中に落下させ，濁度・pHから材料分離していないことを確認
遮水性	隙間充填後の遮水性確認試験	割裂させた供試体のひび割れ（0.4mm程度）中に充填後，遮水性の向上を確認
施工性	養生期間，打設量等の確認	必要な養生期間，材料供給等の制約の有無を確認



フロー試験 実施状況

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2．3(6) 2号機海水配管トレンチ　立坑充填の施工方針・検討内容
キャッピング材の選定

■セメント系材料より遮水性が高い樹脂系材料のうち，立坑の端部までの流動性を有するエポキシ系（エポキシ樹脂グラウト）を選定。

材　料	エポキシ系	発泡ウレタン系	シリコン系
概　　要	水中接着タイプのエポキシ樹脂 （骨材入，無の両タイプ）	超速硬注入用ポリウレタン樹脂 水と結合して発泡し，硬化	水平ジョイントのシール材
流動性 （立坑サイズ）	ある（調合による）	低い（発泡し広がる）	低い
練り混ぜ実現性 （1～2m^3程度）	ハンドミキサによる混合可能	ハンドミキサによる混合可能	m^3単位の施工は困難（使用量を満たせない）
施工性 （施工時間・圧送）	施工は1時間程度 （調合により延長可能）	発泡時間・可使時間が短い ひび割れ箇所注入が基本	施工は2時間程度以内 押出しガンによる施工が基本
耐放射線性	1MGy	1.5MGy	0.07MGy

青字：長所，赤字：短所

【二次充填材の適用に向けた主な確認項目】

性能	確認内容	確認結果
充填性	隙間への 充填性確認試験	到達先のケーブル間にも材料が行き渡ることを確認
流動性	5m流動試験	5m流動することを確認。
遮水性	隙間充填後の遮水性確認試験	割裂させた供試体の表面を覆い，遮水性の向上を確認
施工性	ポンプ圧送性能，施工量等の確認	圧送試験により、要求圧送距離を満足することを確認。

5m流動試験実施状況

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2．3(7) 2号機海水配管トレンチ　立坑充填の施工方針・検討内容
立坑充填における施工サイクル

■ 3種類の材料（一次充填材，二次充填材，キャッピング材）を組み合わせ，2回のサイクルで充填することが望ましい。

- 一次充填材のみの温度応力解析（1～3サイクル）結果では，サイクル数に拠らず打設表面にひび割れが発生する可能性が高い結果が得られたが，貫通するひび割れは発生しない結果となった。
- また，温度応力解析の結果，サイクル数が3サイクルを超えると，一次充填材の厚さが小さくなることに加え，コンクリートの積み重ねにより，コンクリート内部に温度差が生じ，縦方向のひび割れが貫通する可能性が高まると考えられる。

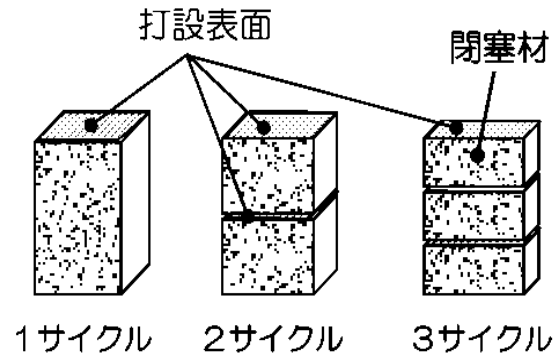
▼

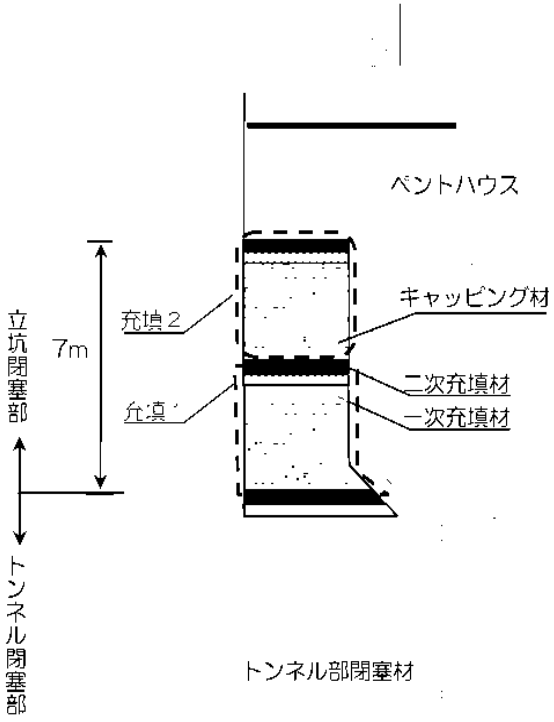
1サイクル若しくは2サイクルとする

▼

- 一次・二次充填材・キャッピング材を2層組み合わせることで，1サイクルより高い遮水効果を期待。
- 2サイクル実施することで，施工時の改善点を次サイクルへ反映することが可能。

→　上記理由により，計2回のサイクルで充填する。





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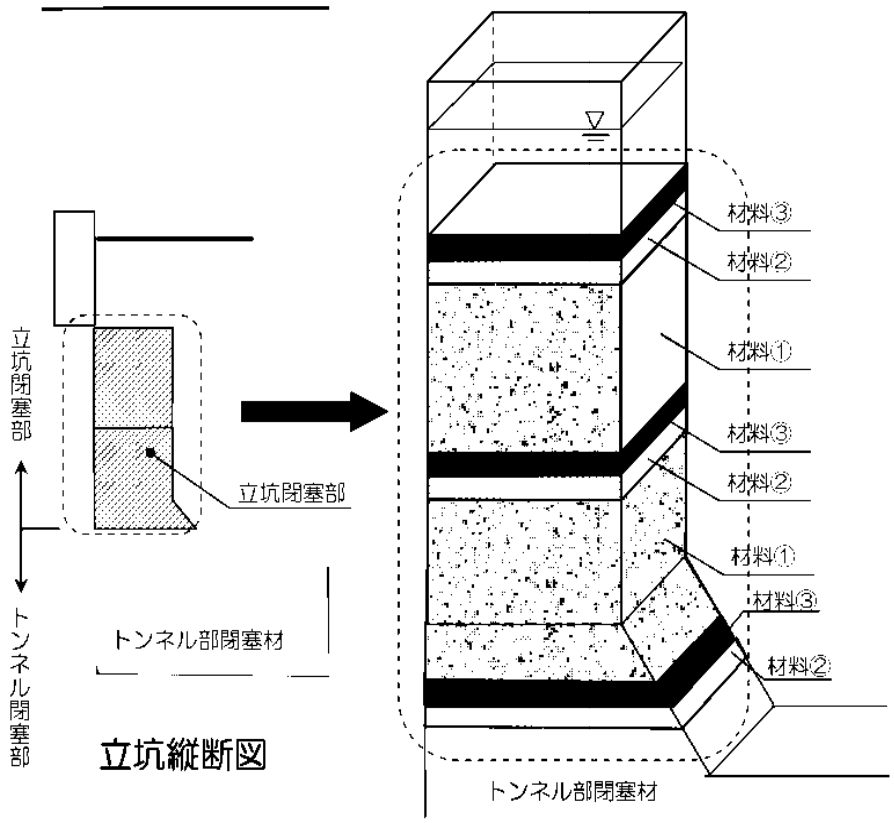
2．3(8) 2号機海水配管トレンチ　立坑充填の施工方針・検討内容
立坑充填の施工手順

- まず，トンネル閉塞材料の最終打設面に生じている可能性がある，わずかな隙間の充填，および表面を遮水性の高い材料で覆うことを目的として，二次充填材，キャッピング材の充填を実施する。
- 次に，一次充填材・二次充填材・キャッピング材の順に，必要な養生期間を空けながら充填を実施。以後，これを２サイクル分繰り返す。



立坑縦断図

各材料施工のイメージ

【トンネル・立抗接続部（トンネル天端付近）の充填】

・トンネル部最終打設面の僅かな隙間等に対し，その連通を遮るための材料（二次充填材・キャッピング材）を充填する。

【立坑部の充填】（２サイクル分繰り返す）

・一次充填材の充填（中２日間程度養生）
・二次充填材の充填（中２日間以上養生）
・キャッピング材の充填（中１日間以上養生）

※ ２回目以降の充填では，必要に応じて１回目の施工条件（打設厚や施工時の水位等）を変えて打設する。

材料①：一次充填材（水中不分離性コンクリート）
材料②：二次充填材（加重材／硫酸バリウム）
材料③：キャッピング材（エポキシ樹脂グラウト）

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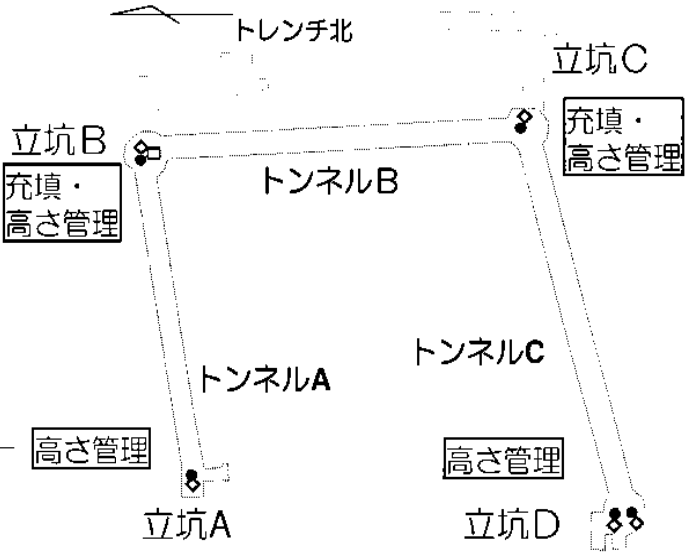
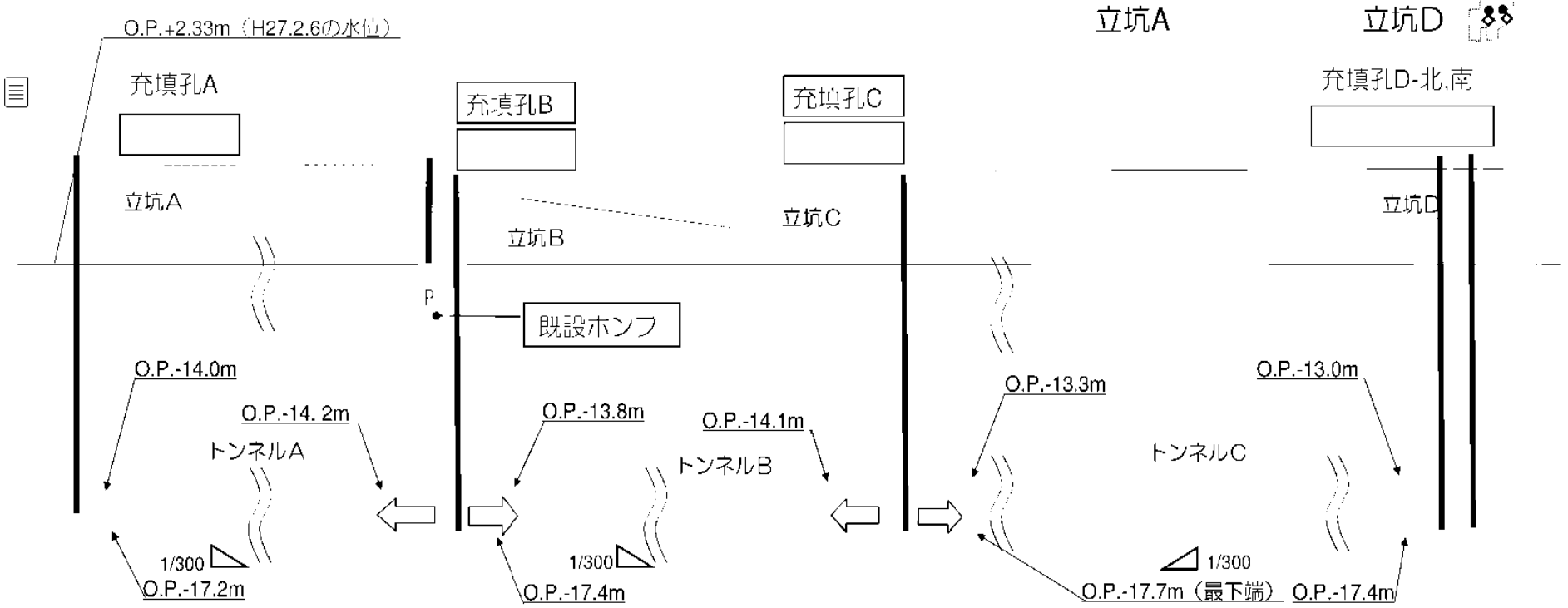
3．1　3号機：充填状況

- ３号機海水配管トレンチのトンネル部充填を２月５日より開始。
- ２月９日現在，約220m³打設完了しており，同量の滞留水を除去。
- 打設高さについては現在調査・評価中。

■天井部打設の際には，２号機トンネル充填時における知見を反映し，投入側及び到達側の水位が同程度となるように管理する。

※図中の各充填孔･観測孔･ポンプにおいて枠で囲まれているものは，現状使用中のもの。





【３号機海水配管トレンチ概略断面展開図）】

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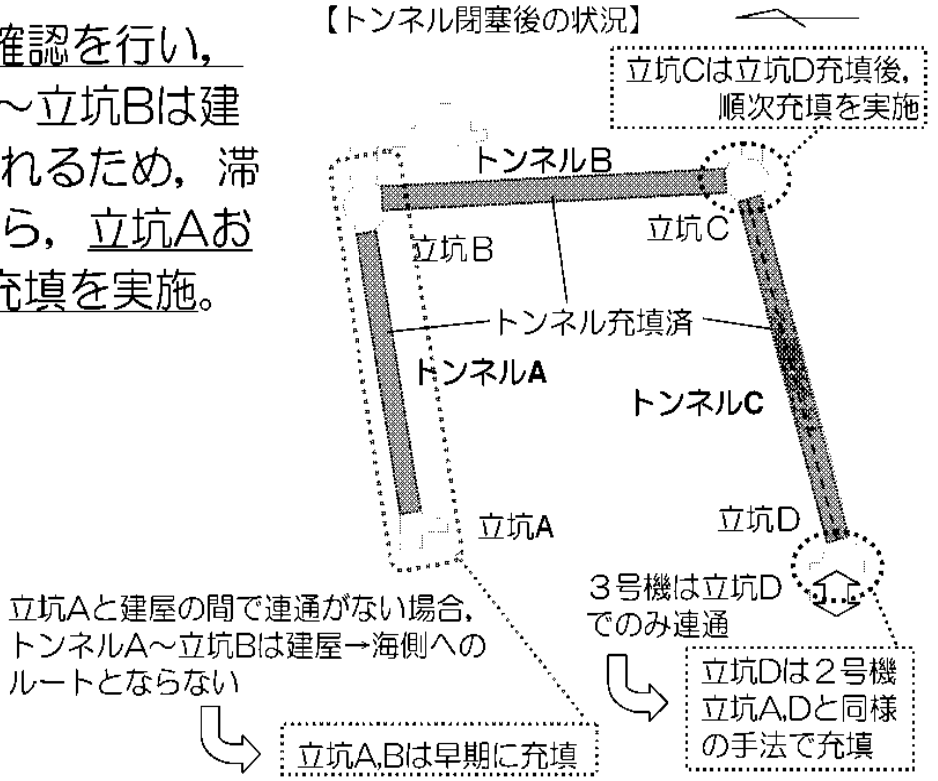
3．2　3号機:今後の予定

- トンネル充填完了次第，順次立坑の充填を行う。
- 立坑の充填に際しては，建屋と連通している立坑Dを，２号機立坑A,Dと同様の手法にて充填。
- 立坑Aについては，建屋との連通状況の確認を行い，連通がないことが確認出来た場合，立坑A～立坑Bは建屋から海側へのルートとならないと考えられるため，滞留水の早期除去によるリスク低減の観点から，立坑Aおよび立坑Bは，立坑Dの充填と並行して，充填を実施。
- 立坑Cについては，立坑D充填完了後，順次充填を行う。



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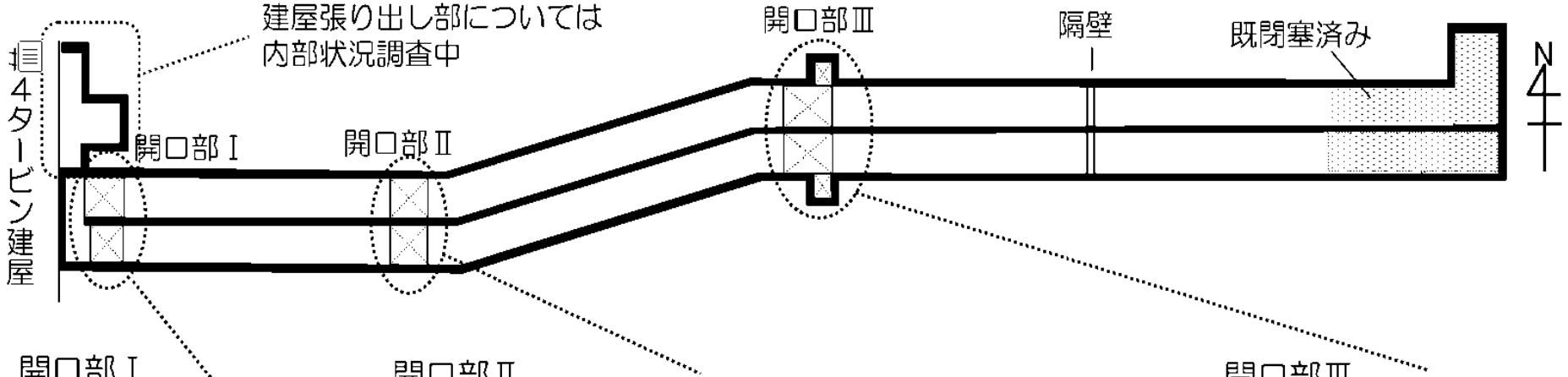
4．1　4号機：調査実施状況

- 開口部Ⅰ，Ⅲはガレキが存在しているが，移送ポンプ，打設管の設置に向け調査中
- 開口部Ⅱは現場調査結果に基づき，支障となるガレキが少なく，打設管等については設置中
- 建屋張り出し部については，引き続き調査実施中
- 調査・施工準備完了次第，内部充填・間詰め充填を実施予定

―平面図―

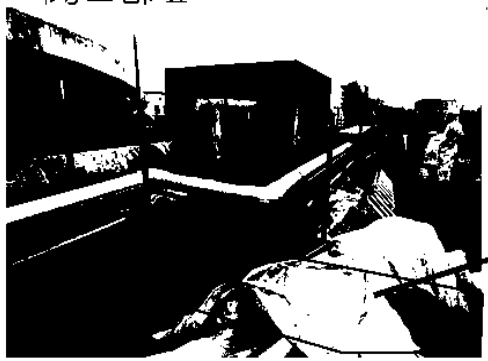


開口部Ⅰ

ガレキあり

開口部内部の状況

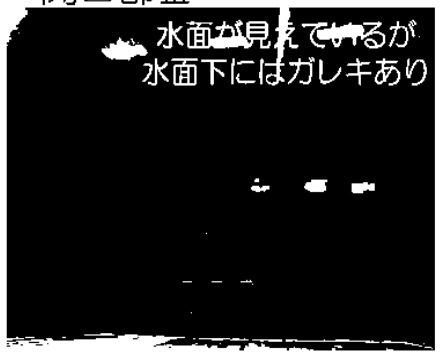
開口部Ⅱ



開口部Ⅱ　地上部状況（調査前）

MH内部の状況

開口部Ⅲ



開口部内部の状況

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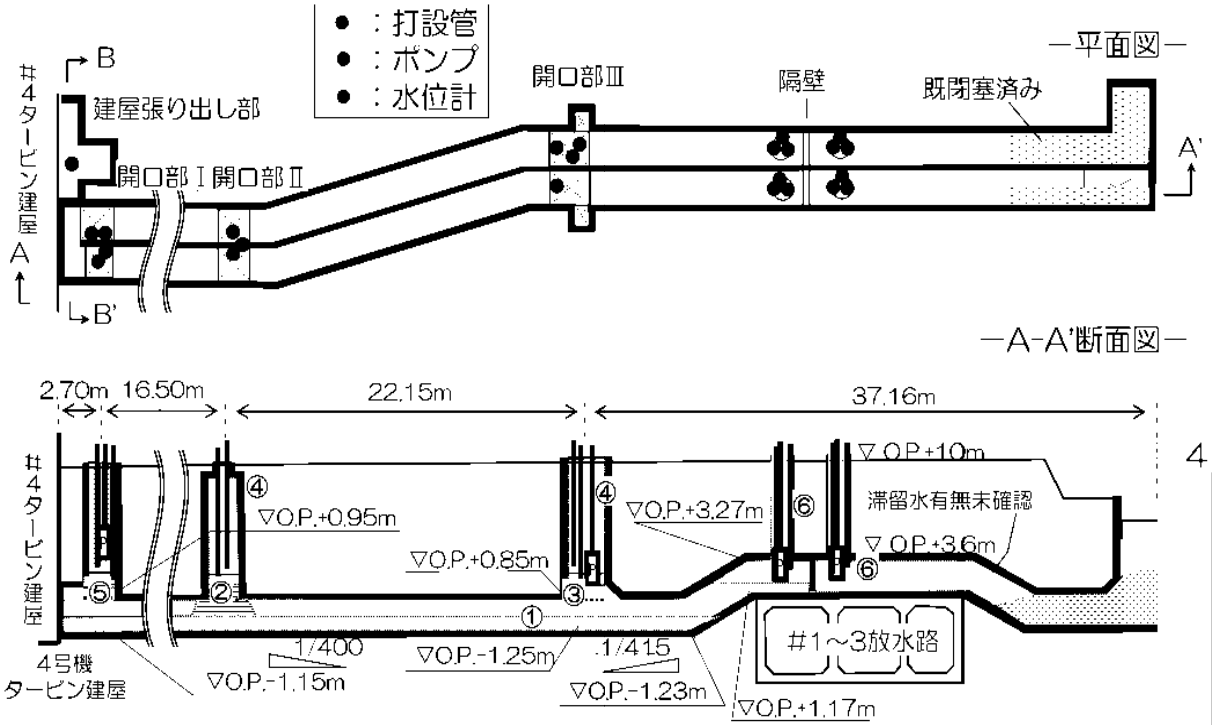
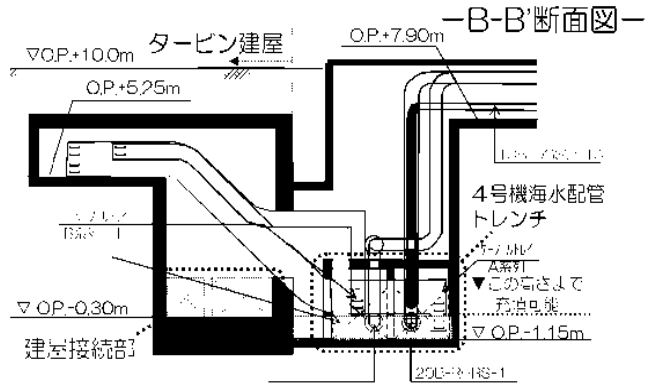
4．2　4号機：施工方針

- トンネル部の充填に際しては，建屋との接続部の底盤高さがO.P.-0.3mであるため，当該高さまでは閉塞材料で充填し，その後，間詰め充填を行う。
- 間詰め充填は，建屋張り出し部，開口部Ⅰ，開口部Ⅱを候補として検討。
- 現状，建屋張り出し部は現在調査中であり，間詰め完了までに時間を要すると考えられる。
- また，開口部Ⅰはガレキが大量に存在しており，現状，撤去は困難。
- よって，滞留水の早期除去によるリスク低減の観点から，間詰めは開口部Ⅱにて行い，開口部Ⅱ～Ⅲ間を先行して充填する。その後，建屋張り出し部で間詰めを行い，開口部Ⅰ～Ⅱ間を充填する。
- トンネル部充填と併せて隔壁周辺の充填などにより，建屋から海側への水の移動の阻害を図る。





（4号機海水配管トレンチをタービン建屋から望む）

4号機施工手順（番号は左図と対応）

① トンネル部についてO.P.-0.3mまで充填
② 開口部Ⅱにて間詰め充填
③ 開口部Ⅱ～Ⅲ間を天井部まで充填
④ 開口部Ⅱおよび Ⅲを充填
⑤ 建屋張り出し部にて間詰め充填を行い，開口部Ⅰ～Ⅱ間および開口部Ⅰ充填
⑥ 放水路上部を充填

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5. トレンチ充填・閉塞の今後の予定

- ２号機立坑A,Dの充填については，２月下旬より開始予定。充填完了後，揚水試験を行い，引き続き立坑B,Cおよび開削ダクト部の充填を行う。

- ３号機トンネル部については２月５日より充填を開始しており，充填完了次第，引き続き立坑の充填を実施。

- ４号機は施工準備が整い次第，内部充填・間詰め充填を開始予定。

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特定原子力施設 監視・評価検討会
（第31回）
資料3

陸側遮水壁閉合後の水位管理について

平成27年2月9日

東京電力株式会社
鹿島建設株式会社

東京電力 TEPCO　鹿島

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

目次

1．建屋滞留水の水位管理について
2．陸側遮水壁の遮水性発現後の水位管理
陸側遮水壁造成順序と地下水位変化の想定
1～4号機建屋内外の水位管理方針

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

目次

1．建屋滞留水の水位管理について

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

１．１　現状の建屋滞留水の水位管理

１～４号機建屋内に滞留している高濃度放射性汚染水については，プロセス主建屋・高温焼却炉建屋に移送し，さらに，汚染水処理設備により放射性核種のセシウム及び塩分を除去して淡水を生成し，原子炉への注水に再使用している（循環注水冷却）。

ただし，１～４号機の建屋内には地下水が流入しているため，高濃度放射性汚染水が系外に放出しないよう適切に建屋内水位を管理する必要がある。

現状の1～4号機の建屋滞留水の水位管理の運転上の制限は，以下のとおり。

■２・３号炉の立坑およびタービン建屋の滞留水水位はOP3,500mm以下であること。
■建屋滞留水の水位が各建屋近傍のサブドレン水の水位を超えないこと。

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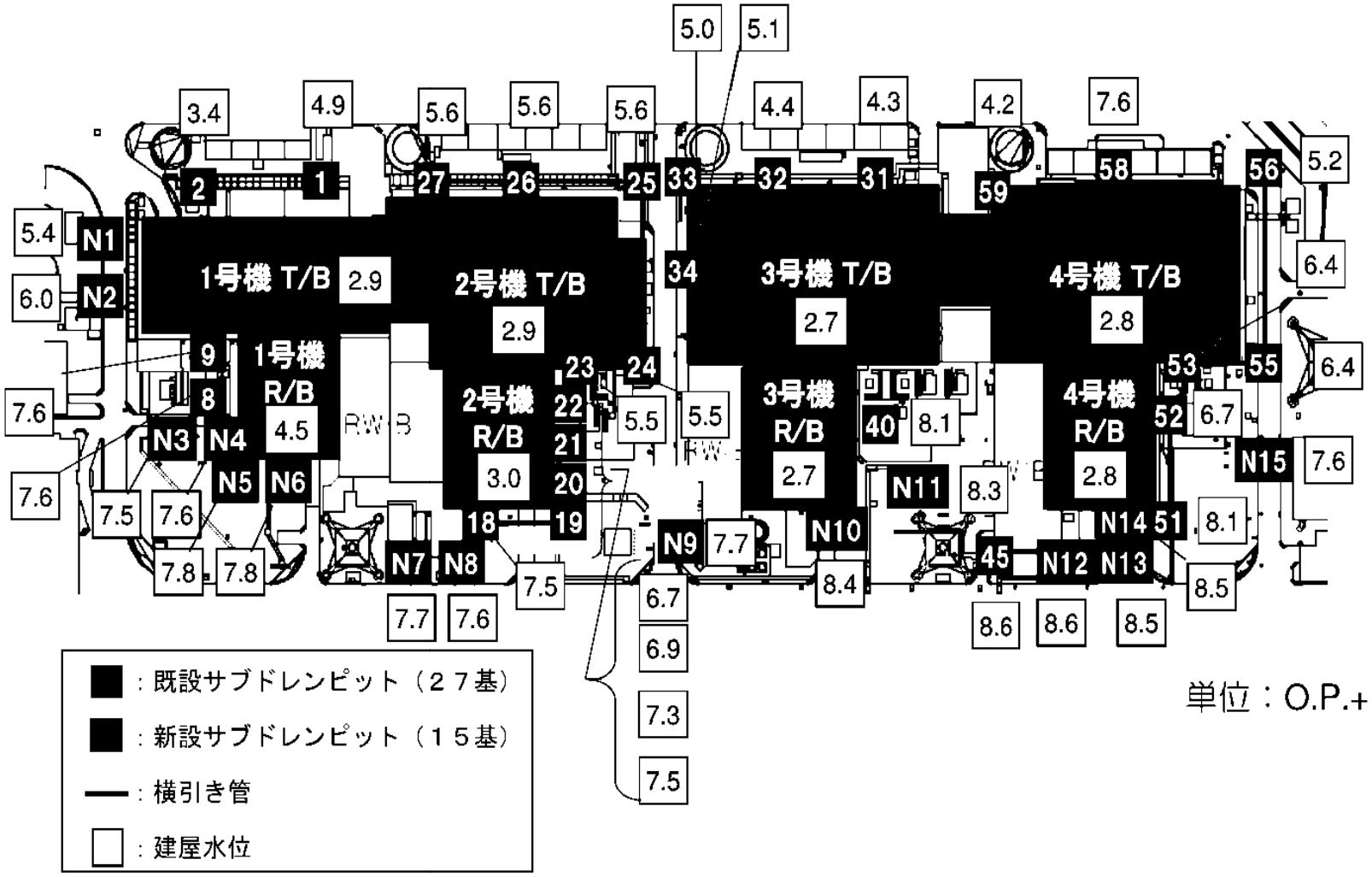
1．2　現状の建屋水位とサブドレン水位（平成26年11月10日）



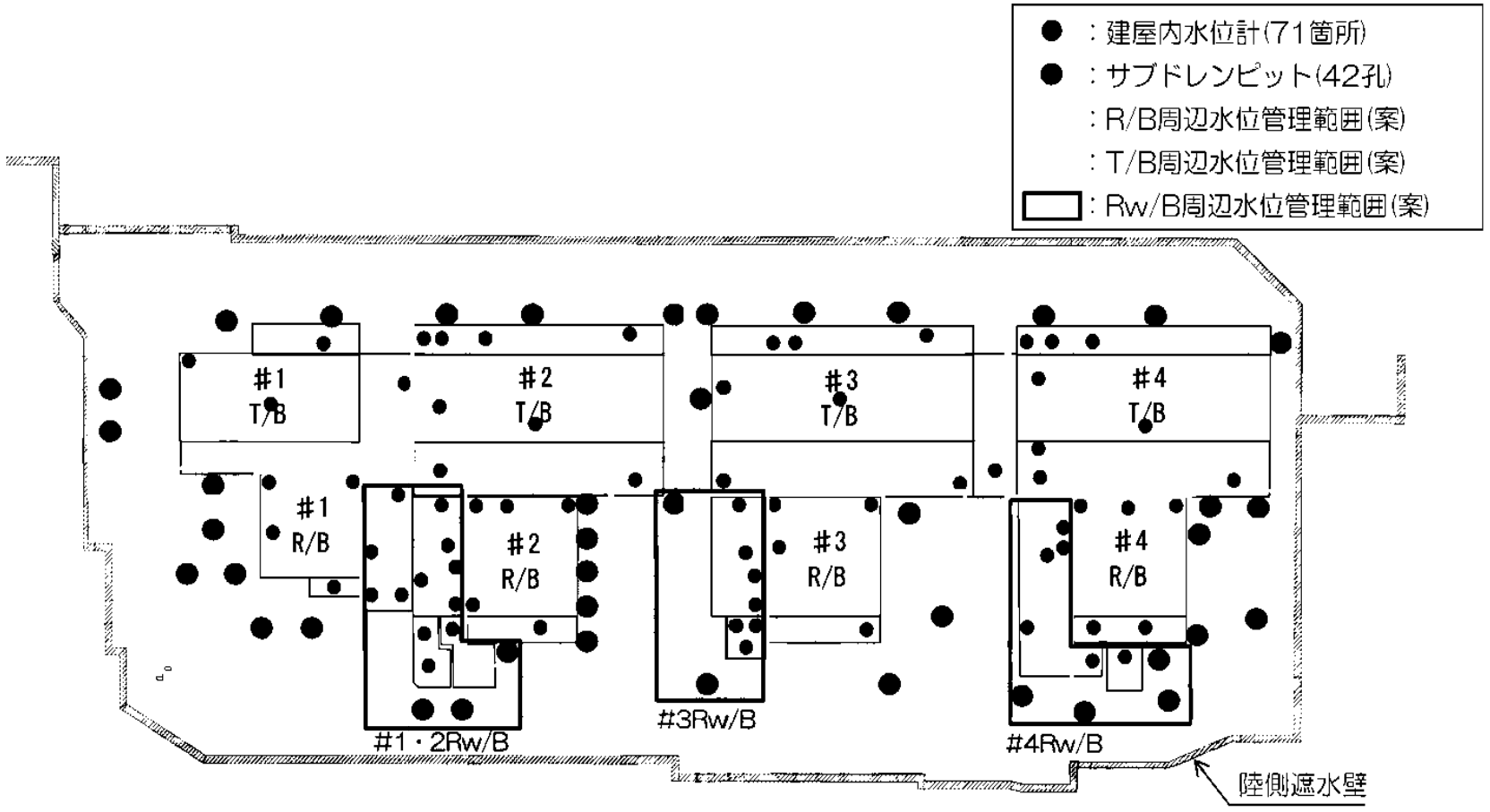
無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

2．建屋内滞留水水位計設置後の水位管理（実施計画変更申請中）

建屋内滞留水水位計を設置した後の水位管理は以下のように行う。

建屋水位と地下水位のデータ管理は，１～４号機の各建屋毎に行う。

各建屋に設置した水位計の水位が近傍のサブドレン水位を上回らないように管理する。



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2．陸側遮水壁の遮水性発現後の水位管理

陸側遮水壁造成順序と地下水位変化の想定

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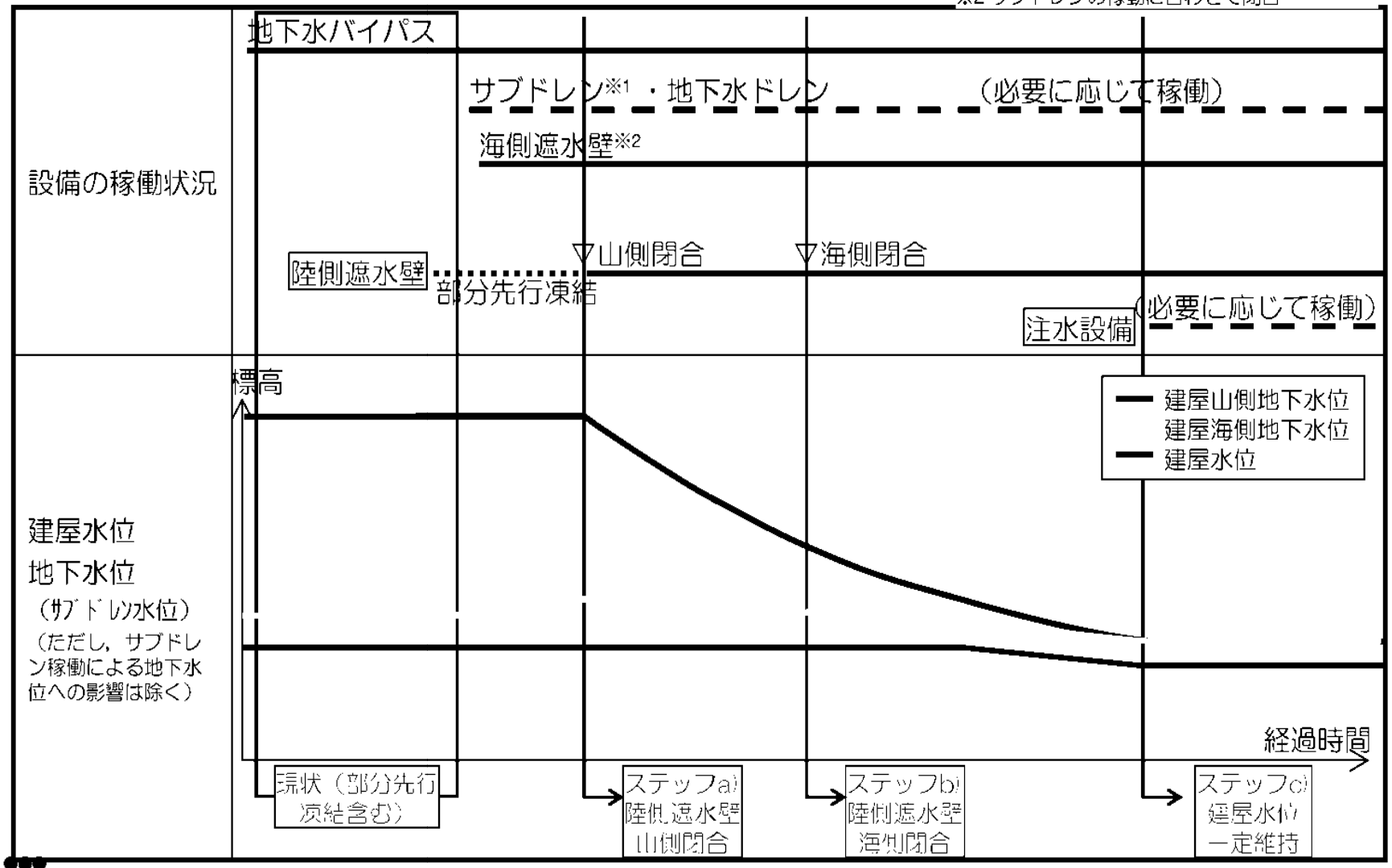
1．陸側遮水壁閉合等に伴う地下水位変化の想定（イメージ）

陸側遮水壁造成等に伴い地下水位は以下に示すイメージで変化すると想定される。
以降，各ステップにおける地下水位変化の概要を示す。

※1 サブドレンの稼動は関係者と調整の上，実施
※2 サブドレンの稼動に合わせて閉合



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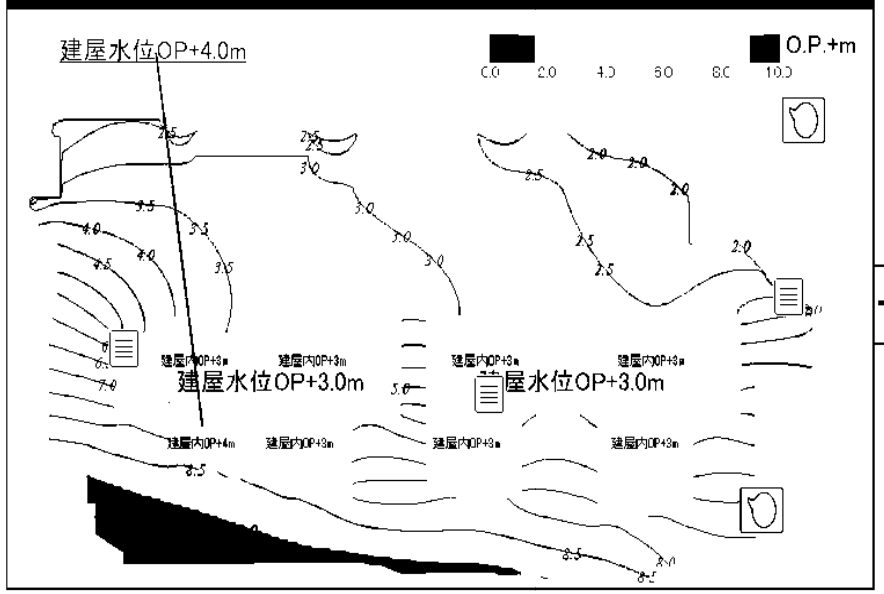
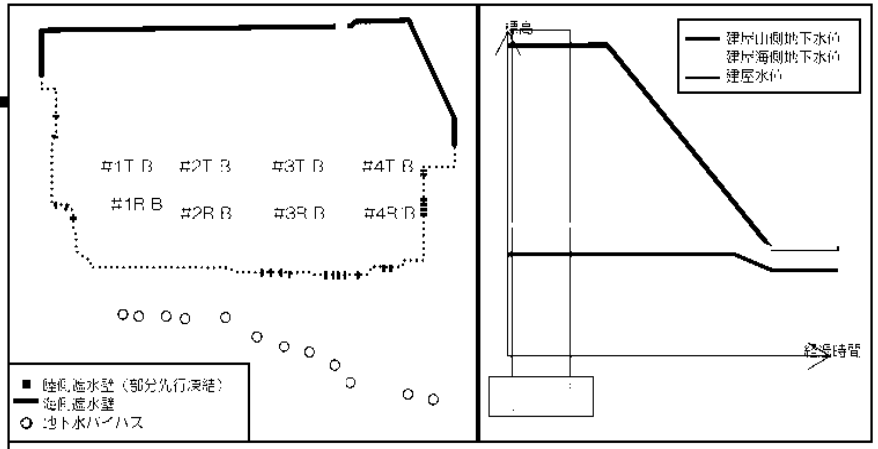
2．1　現状（部分先行凍結を含む）





稼働中

地下水バイパス

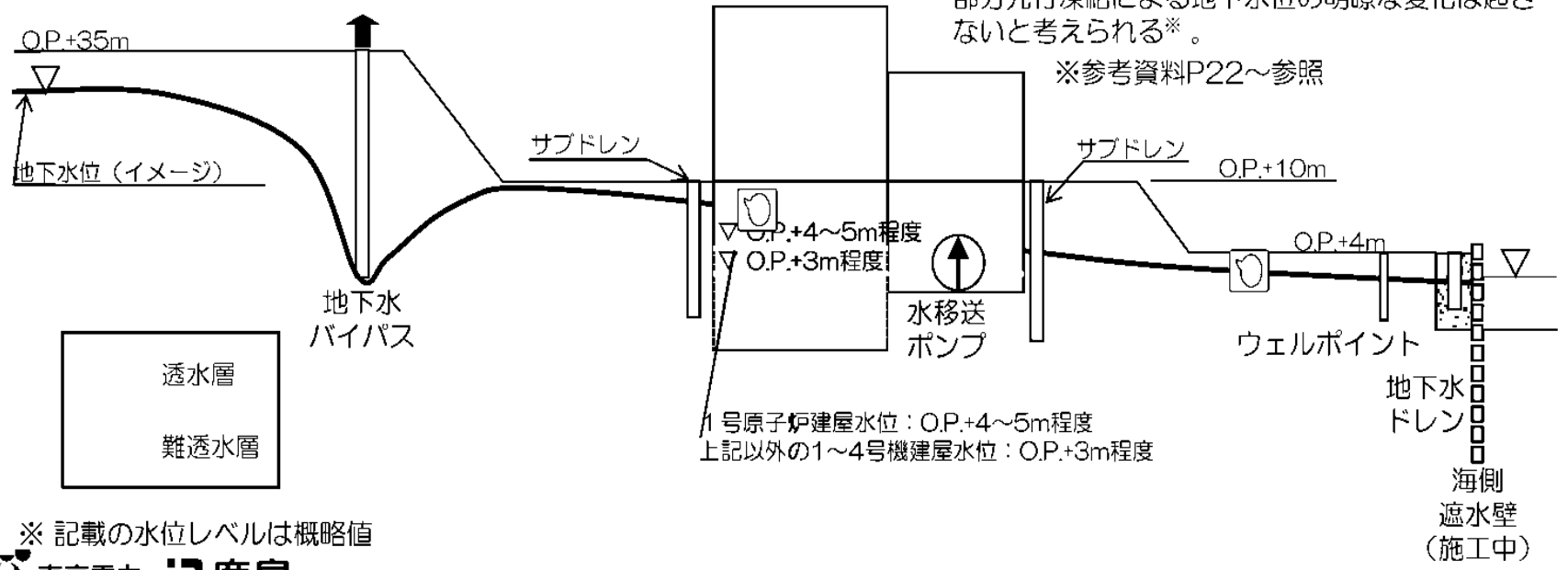
施工中

海側遮水壁未閉合（施工中）

部分先行凍結（今後実施）※

部分先行凍結による地下水位の明瞭な変化は起きないと考えられる※。

※参考資料P22～参照



※ 記載の水位レベルは概略値

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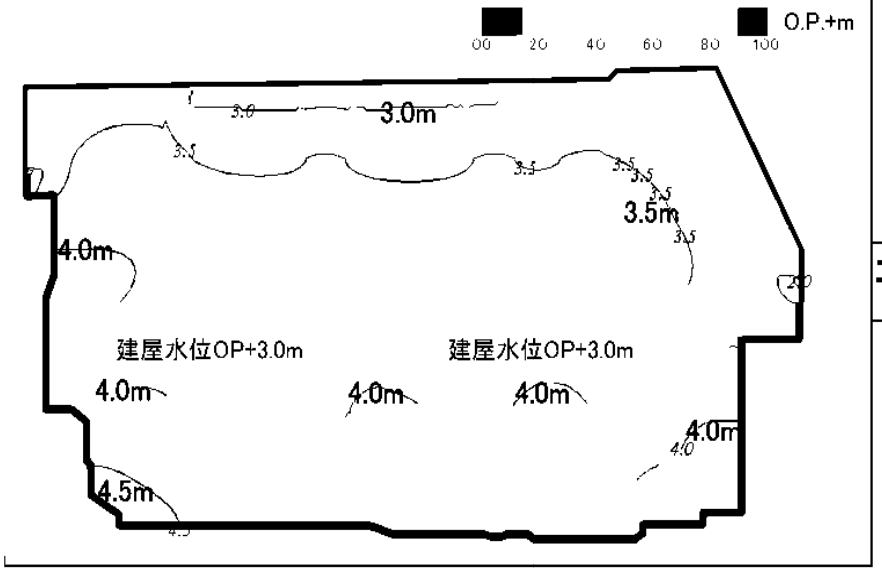
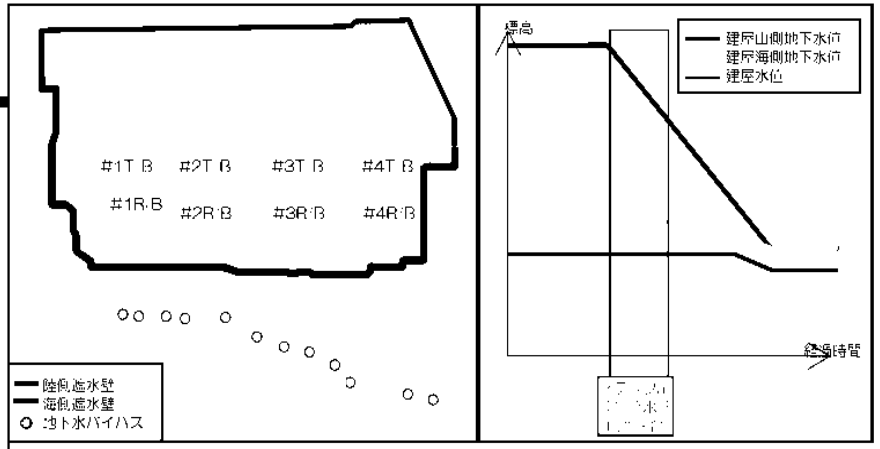
2．2　ステップa）陸側遮水壁山側閉合



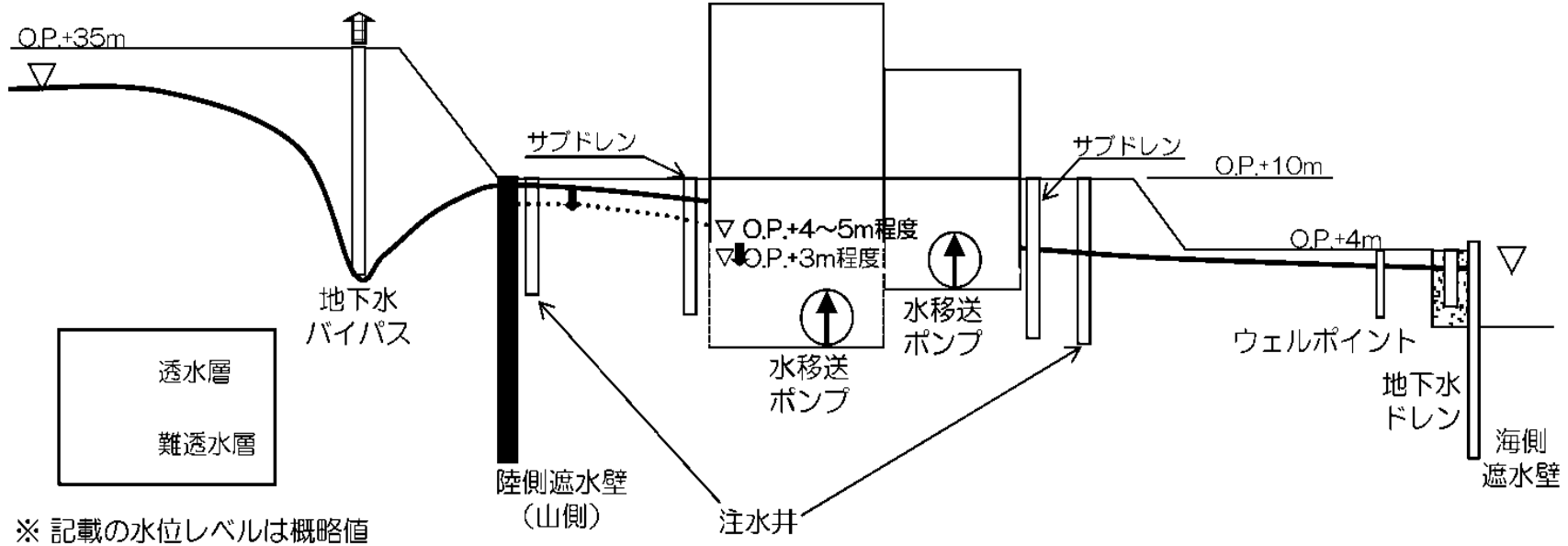


凍結による遮水性の発現に伴って，主に建屋山側の地下水位が低下していく。

建屋海側の地下水位は，海側遮水壁閉合の影響により一旦上昇した後，陸側遮水壁山側閉合により若干低下する。

サブドレン・地下水ドレンは必要に応じ稼動

1～4号機の全ての建屋水位をほぼ均一にする。



※ 記載の水位レベルは概略値

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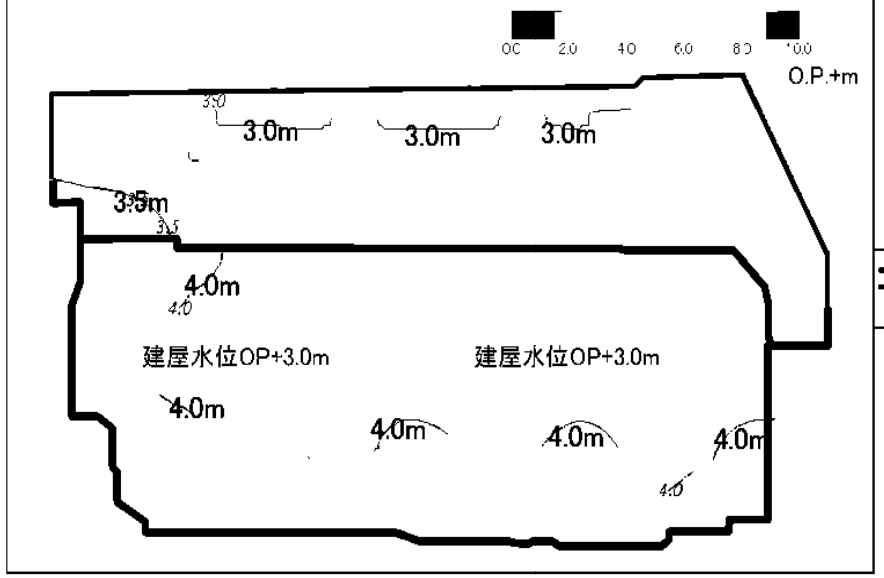
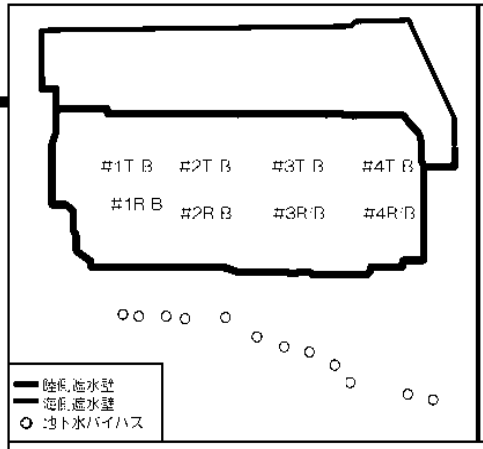
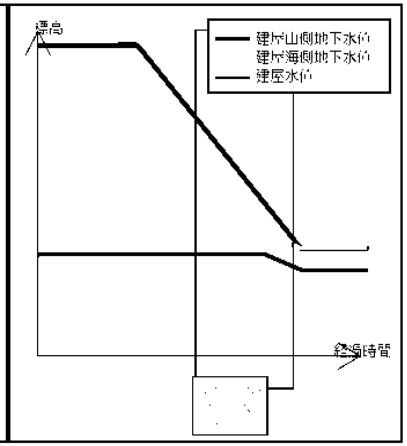
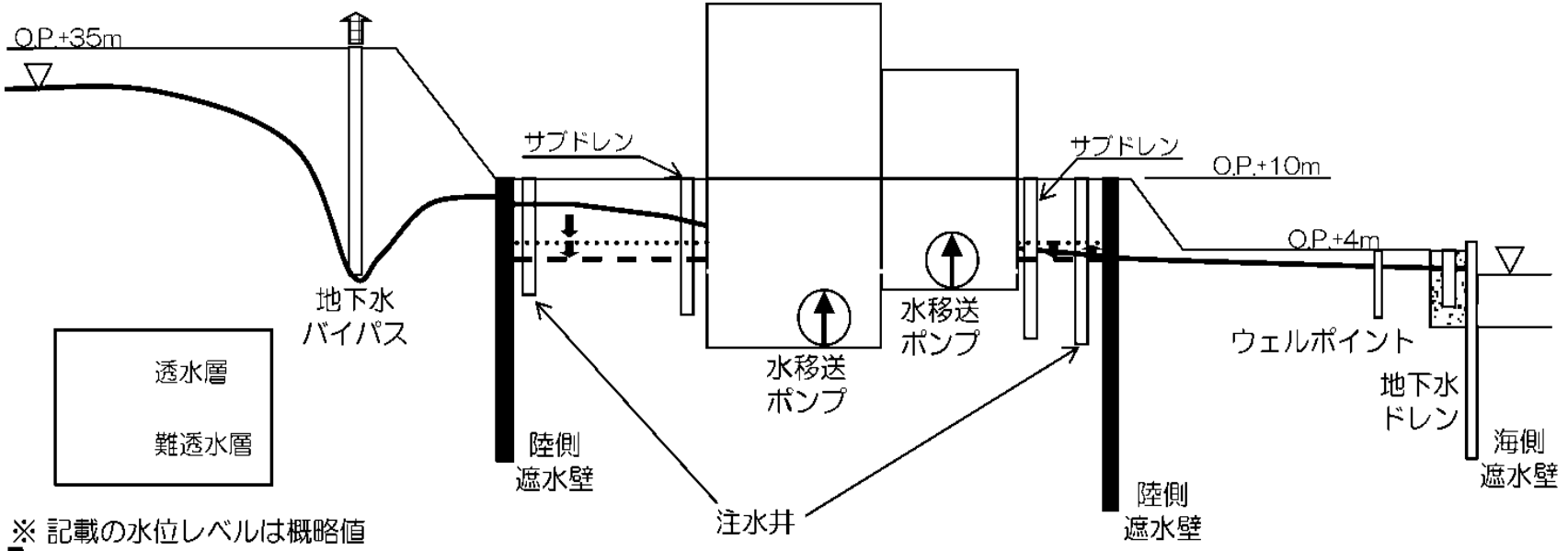
2．3　ステップb）陸側遮水壁海側閉合







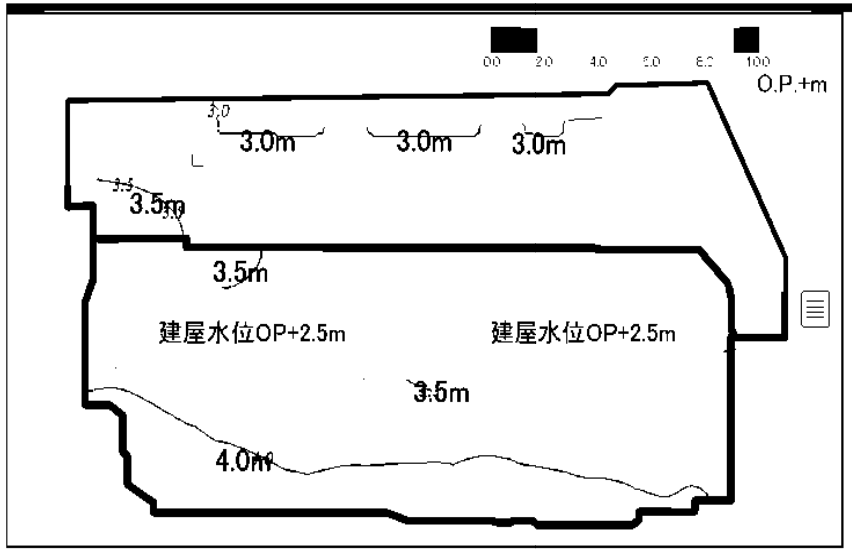
陸側遮水壁海側の凍結による遮水性の発現に伴って，遮水壁内の地下水位は均一化しながら低下する。
建屋周辺の地下水位の低下に合わせて，建屋水位を必要に応じ低下させることで建屋水位と地下水位の水位差を確保する。
サブドレン・地下水ドレンは必要に応じ稼動

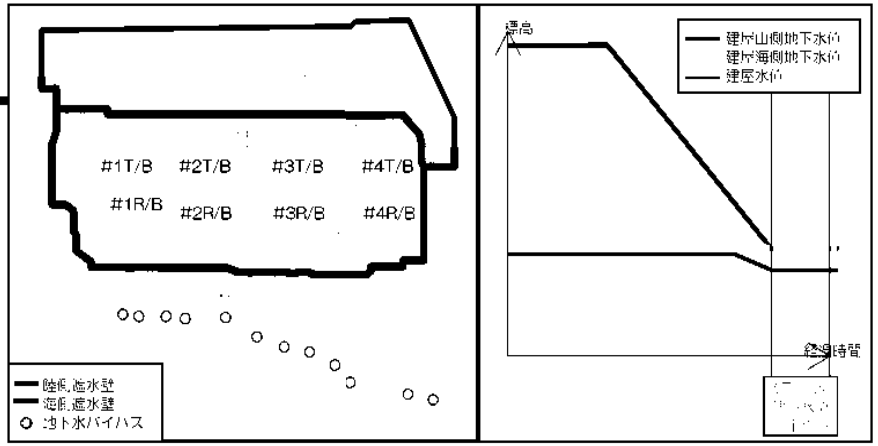


※ 記載の水位レベルは概略値

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

2．4　ステップc）建屋水位一定維持

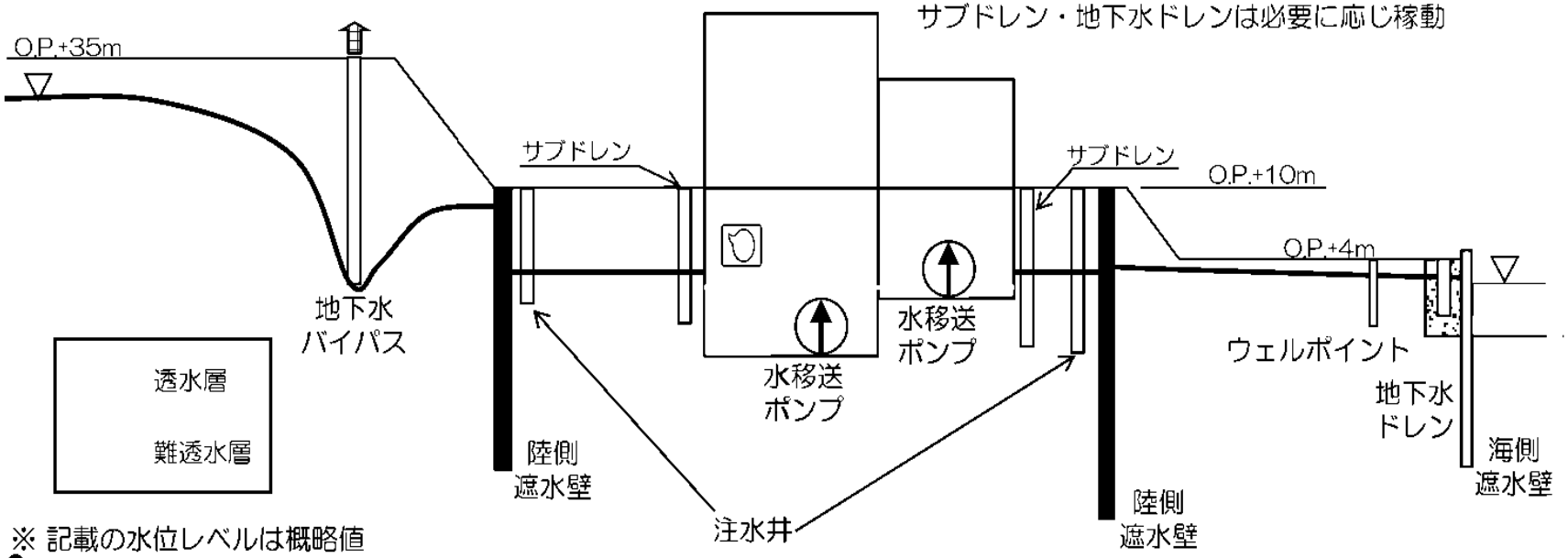




降雨等による地下水涵養と建屋への地下水流入とのバランスにより地下水位の低下は緩慢となり，建屋周辺の地下水位はある一定の水位に落ち着く。

必要に応じ注水井からの注水を実施することで建屋水位と地下水位の水位差を確保する。

サブドレン・地下水ドレンは必要に応じ稼動



※ 記載の水位レベルは概略値

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

2．陸側遮水壁の遮水性発現後の水位管理

1～4号機建屋内外の水位管理方針

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

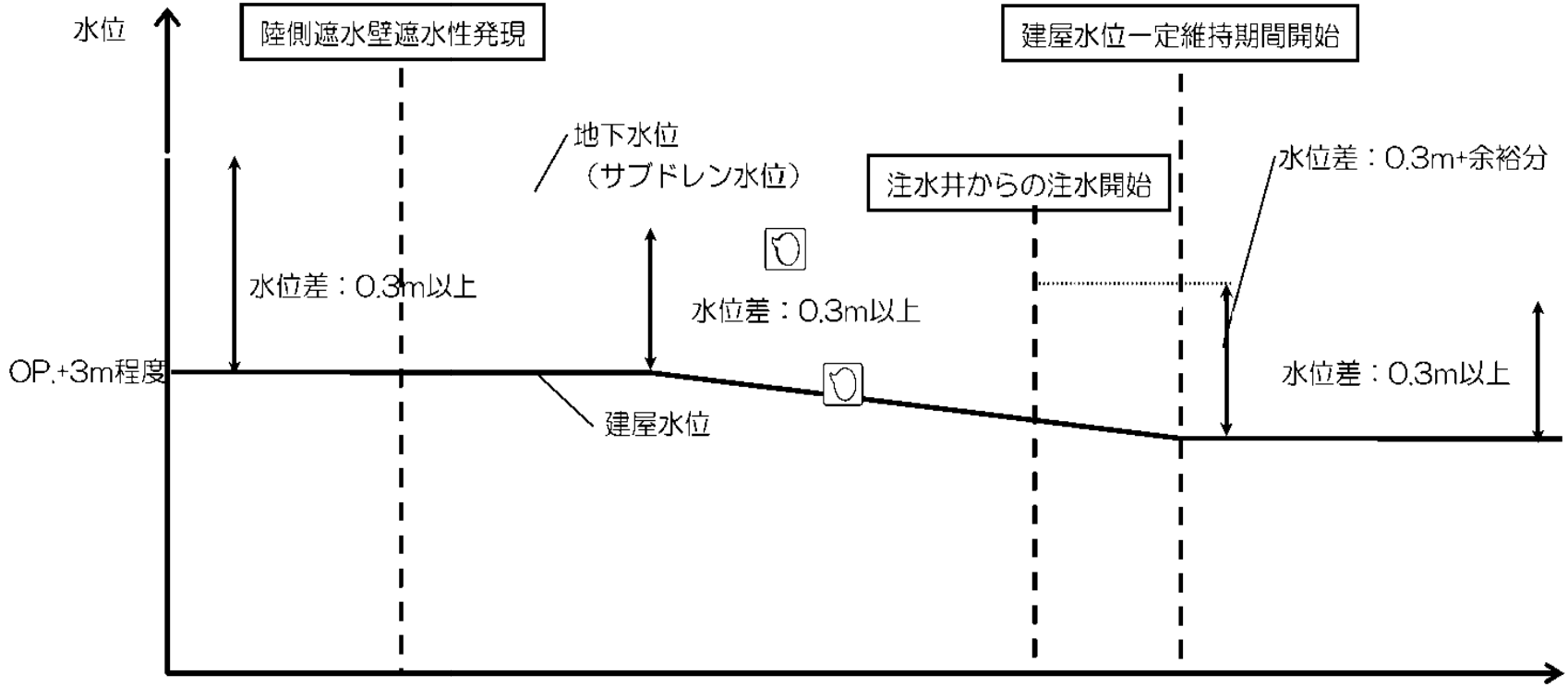
1．陸側遮水壁の遮水性発現後の1～4号機建屋内外の水位管理方針

建屋水位が地下水位を上回ることがないよう管理する。

地下水位の低下に合わせて必要に応じ建屋水位を低下させ，建屋水位と地下水位の水位差を確保する。

建屋水位一定維持期間において，降雨等による地下水涵養と建屋への地下水流入とのバランスにより建屋周辺の地下水位はある一定の水位に落ち着くが，必要に応じ注水井からの注水を行うことにより，建屋水位と地下水位の水位差を確保する。

サブドレンは，降雨時などに建屋への地下水流入量低減のために必要に応じ稼働する。



地下水位低下に伴う建屋内外の水位管理（イメージ）

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

2．1　陸側遮水壁山側閉合〔ステップa）〕後の地下水位低下　解析条件

解析の目的

陸側遮水壁山側３辺の遮水性発現後を想定しシミュレーション解析をすることで，地下水位低下量および地下水位低下時期について解析・評価する。

解析モデルおよび手法

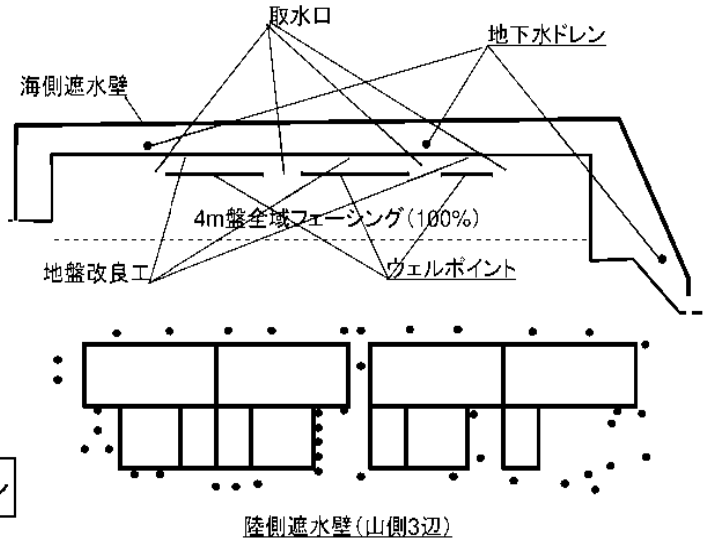
解析モデル化領域：海側遮水壁と陸側遮水壁山側３辺で囲まれた領域

解析手法：準３次元解析（GWAP）による非定常解析

建屋水位と地下水位の水位差が小さい（制御上厳しい）条件について解析を行った。

各設備		解析条件
海側（鋼管）遮水壁		閉合
4m盤	地盤改良	完了
	揚水工（ｳｪﾙﾎﾟｲﾝﾄ）	稼動（稼働水位：GL-1.0m（O.P.+3.0m）
	地下水ドレン	
	フェーシング	100%
4～10m盤間	フェーシング	0%
10m盤（陸側遮水壁内）	フェーシング	0%
	サブドレン	稼動（稼動水位：建屋水位+1m）
	陸側遮水壁	山側3辺閉合（海側未閉合）
	注水井からの注水	無

降雨量	約4mm/日　一定（建屋以外の領域に降雨）	年平均降雨量1,545mmより設定
降雨浸透率	55%	汚染水処理対策委員会報告より



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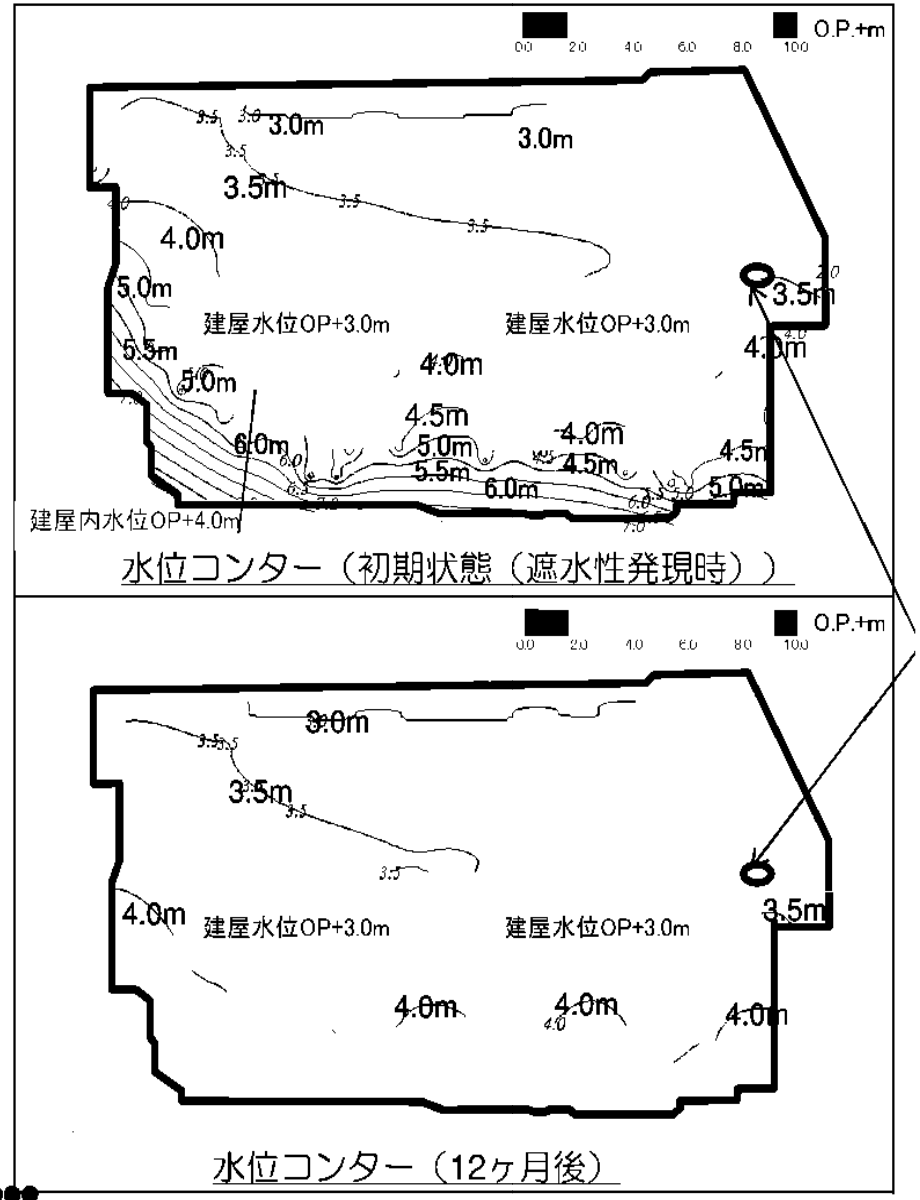
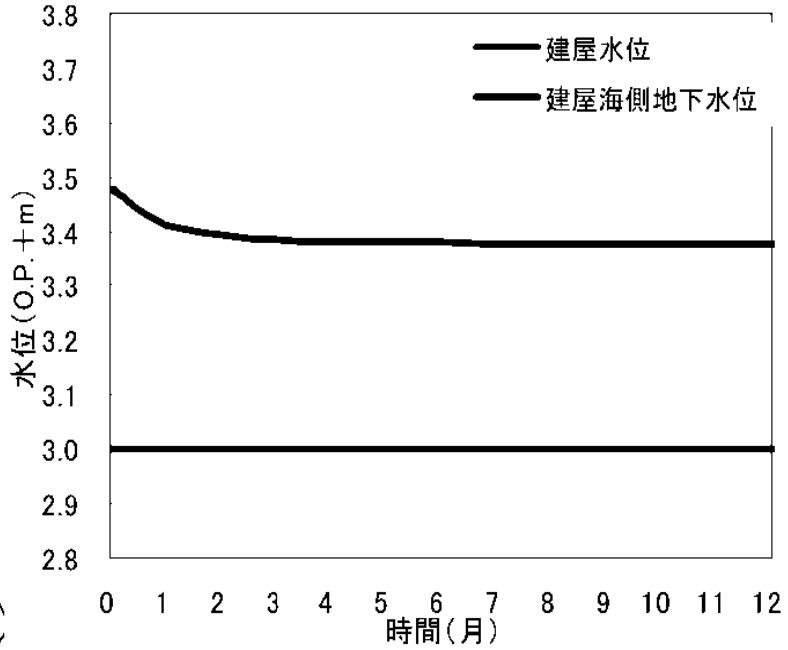
2．2　陸側遮水壁山側閉合〔ステップa）〕後の地下水位低下　解析結果





建屋水位に対する地下水位の経時変化
（解析上，水位差が小さいサブドレンNo.56の水位変化について抽出した。）

陸側遮水壁山側３辺閉合後の建屋海側の地下水位の低下量は0.1～0.3m程度である。

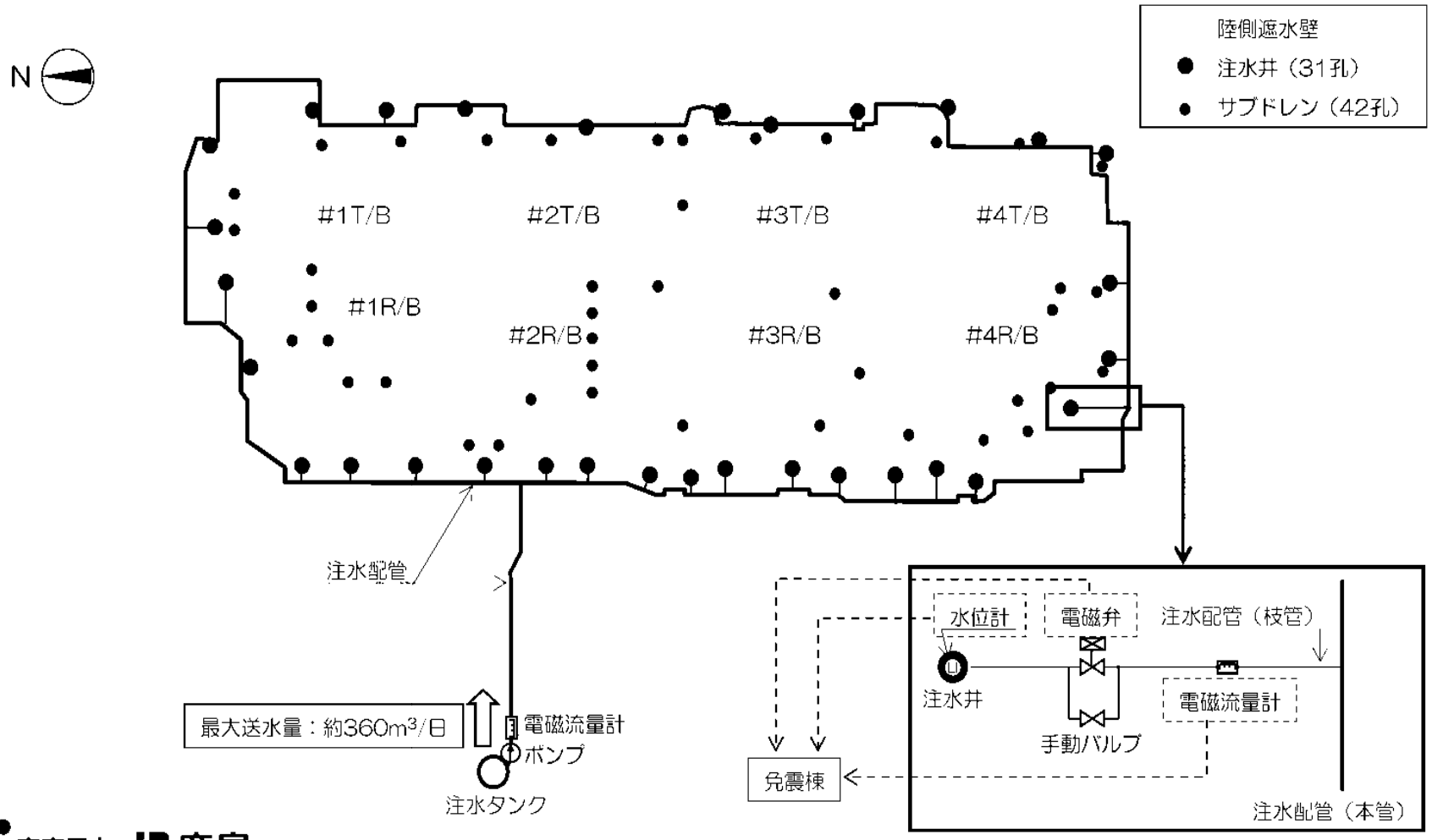
無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

3.1　注水井および関連設備の配置

注水井配置

注水井１孔毎の計測データ（水位・注水量・電磁弁稼働状況）を取り込み，免震棟にて遠隔監視・操作が可能

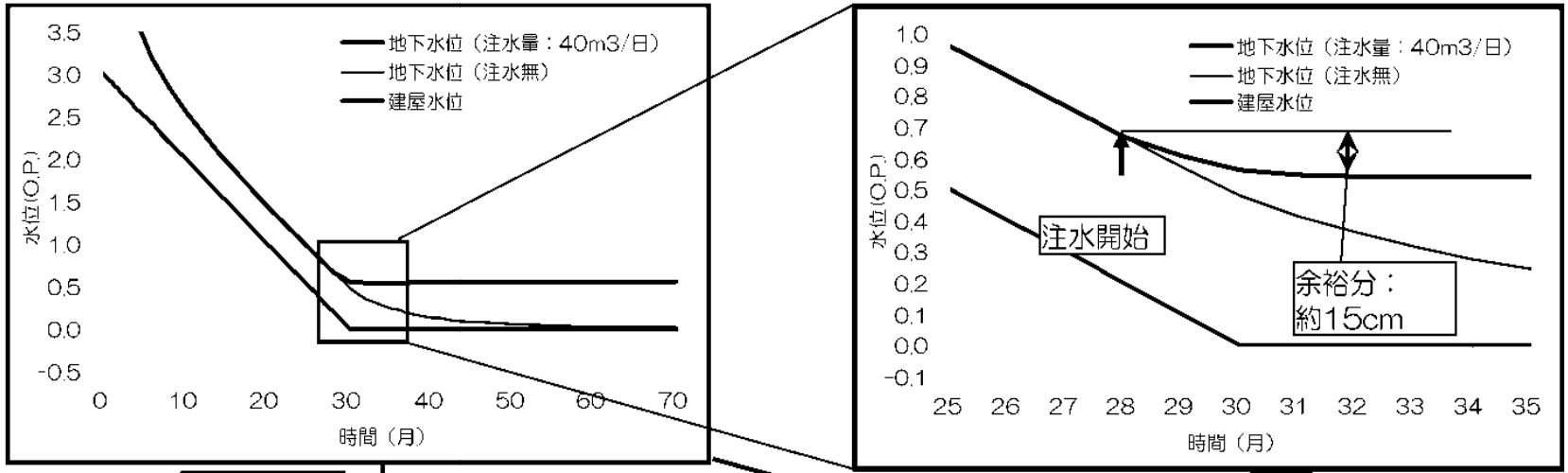
電磁弁が故障した場合には手動バルブの開閉により注水井への注水が可能



無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

3．2　注水井からの注水効果に関する解析結果（降雨浸透率：0mm/日）

ケース	建屋水位	建屋周辺地下水位（初期）	注水井（孔）	注水総量（m^3/日）	1孔当り注水量（L/分/孔）	降雨浸透(mm/日)
1	O.P. +3 m →0m	サブドレン稼動	31	0	0	0
2				40	0.9	



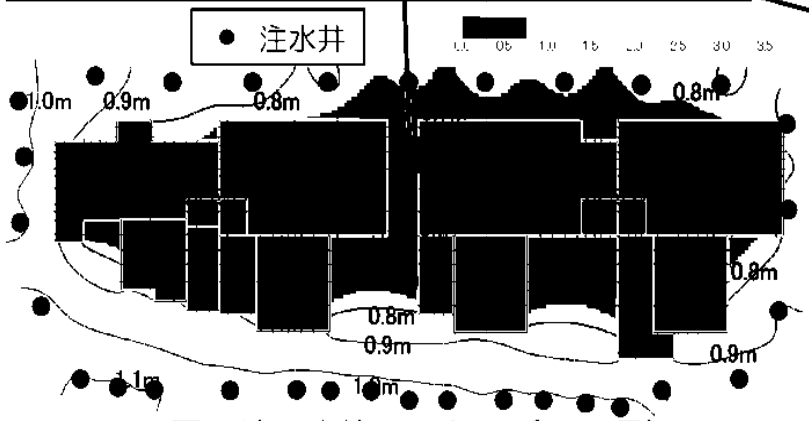


図　地下水位コンター（30ヶ月）

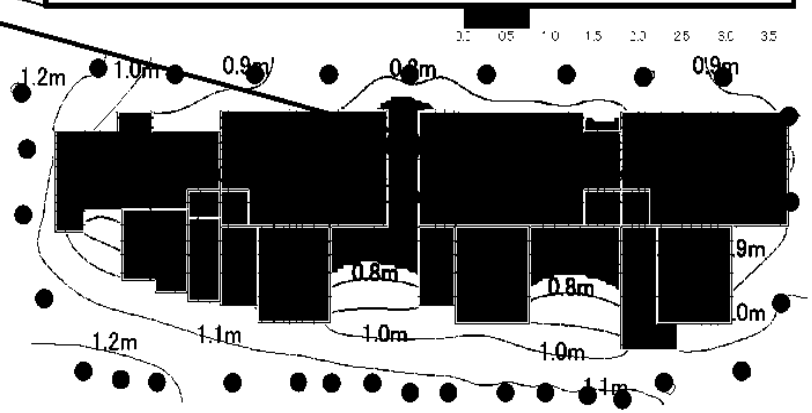


図　地下水位コンター（60ヶ月）

水位差50cmを目標として，15cm程度の余裕を持って注水井からの注水を行うことで水位差を確保できる。

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3．3　注水井からの注水による地下水位の維持について

5・6号機建屋周辺で実施した「注水試験結果（フィージビリティ・スタディ）」より，下記の結論が得られている。

注水井１本当りの注水量：10L/分以上確保することが可能

注水井からの注水により，解析結果と同程度の地下水位上昇を確認

これらを基に解析を実施して，現計画の注水井配置による地下水位維持を確認した。

陸側遮水壁山側凍結開始前に，各注水井において上記の注水量が確保出来ることを注水試験により確認する。なお，十分な注水を行うことが出来ない場合には注水井の再設置等必要な対応を行う。

陸側遮水壁閉合後，現地において注水効果を確認し，不足する場合には注水井の増設等必要な対応を行う。

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

特定原子力施設 監視・評価検討会
（第31回）
参考3

陸側遮水壁閉合後の水位管理について　参考資料

平成27年2月9日

東京電力株式会社

東京電力 in 鹿島

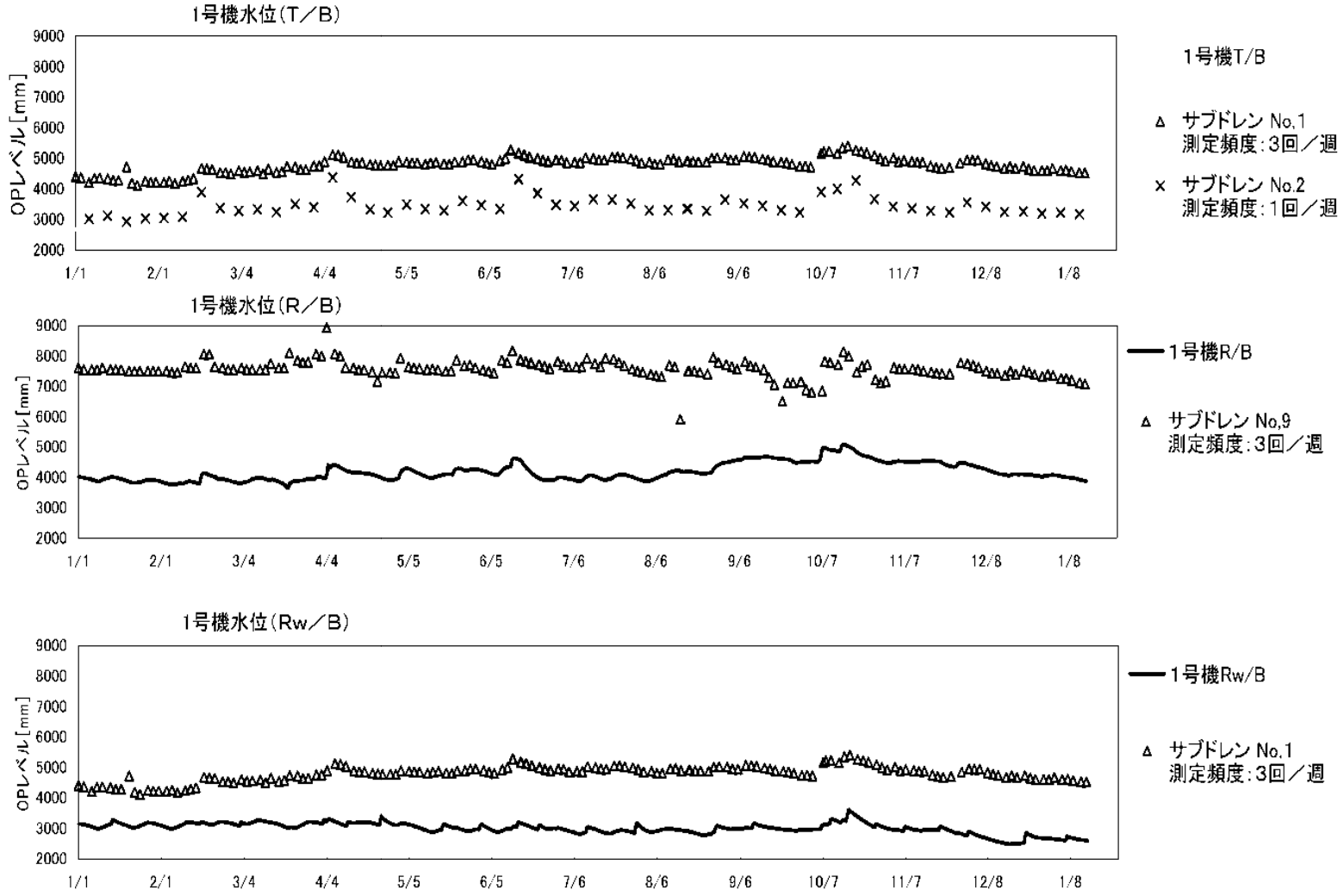
TEPCO

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

建屋水位・サブドレン水位管理の現状

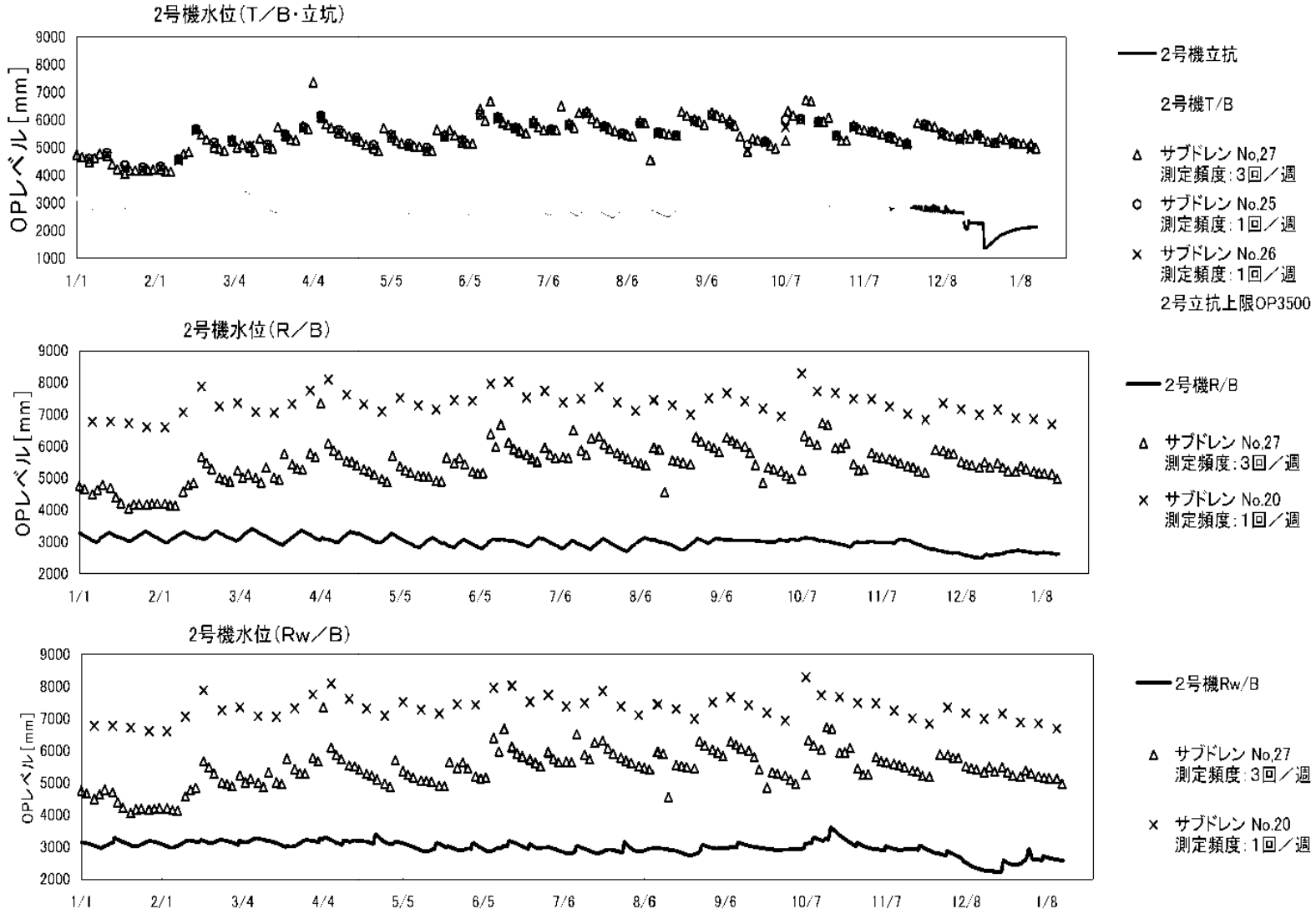
無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

建屋水位監視状況（１号機）



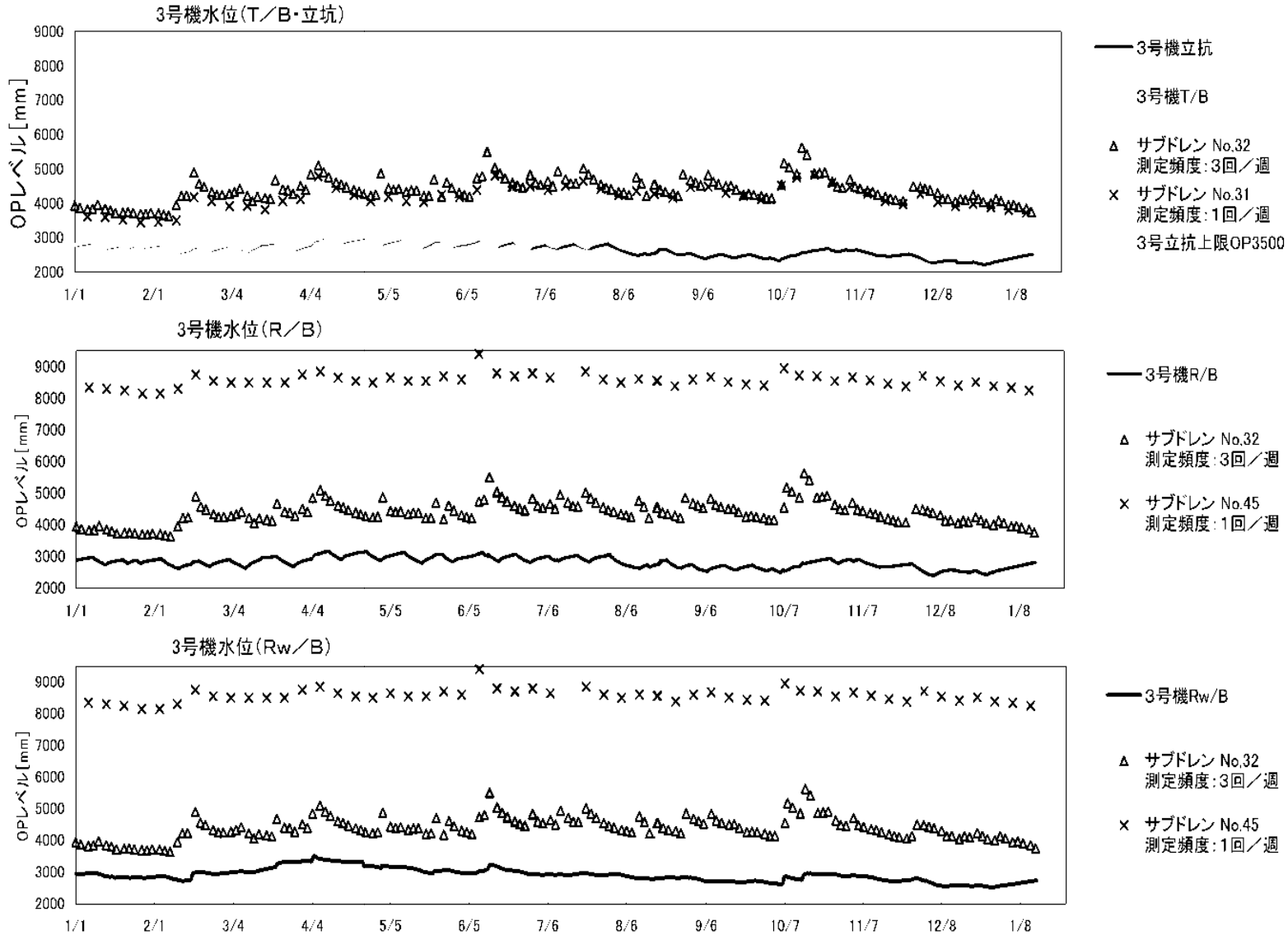
無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

建屋水位監視状況（２号機）



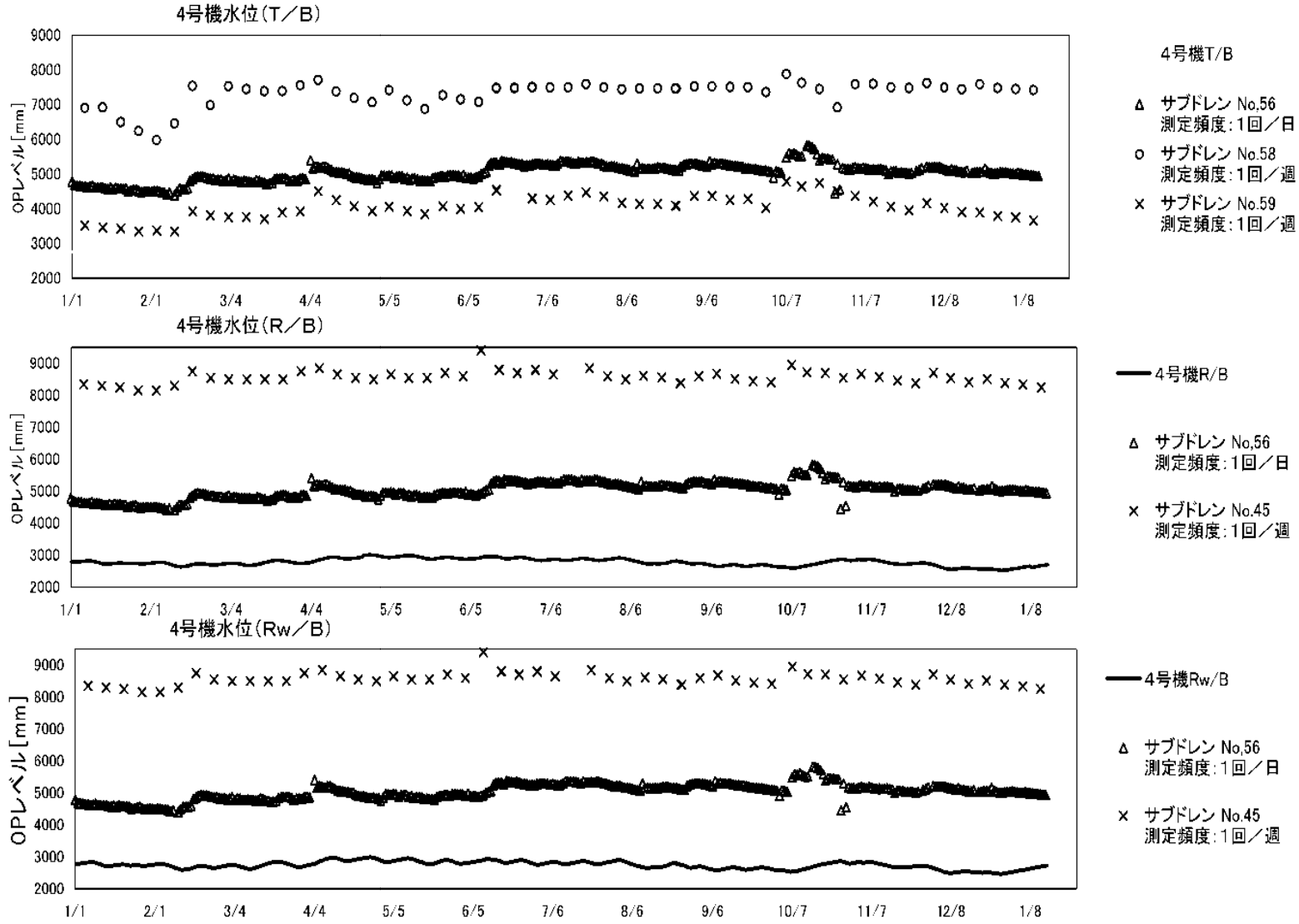
無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

建屋水位監視状況（３号機）



無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

建屋水位監視状況（４号機）



無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

建屋滞留水ポンプ・水位計の追加設置と設置後の水位管理
（別途　実施計画申請中）

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

建屋水位・地下水位の監視と制御

建屋水位データおよび地下水位データ(サブドレン水位)を免震棟に伝送し，一括管理を行う．各々の水位データを基に，以下の警報を出力させ，水位を管理する．

偏差大　：建屋水位の指示値の中で偏差が大きい水位計を検出し警報を出力
水位差小：地下水位と建屋水位の水位差にて警報を出力

「偏差大」は，水位計の異常や建屋水位の挙動等の異常の検出，「水位差小」は，地下水位－建屋水位間の水位差の管理を目的に設定．
次頁以降に，データ収集方法，管理方法（「偏差大」および「水位差小」のイメージ）を示す．

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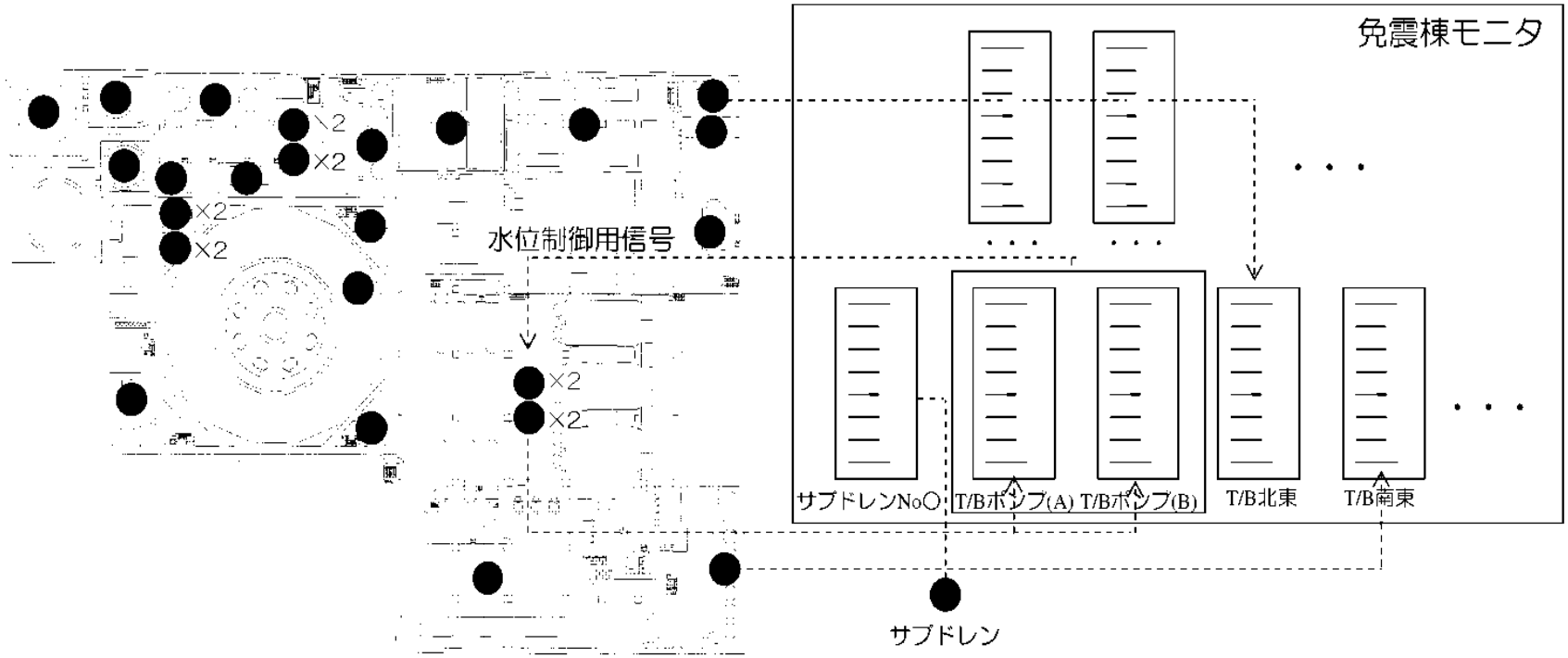
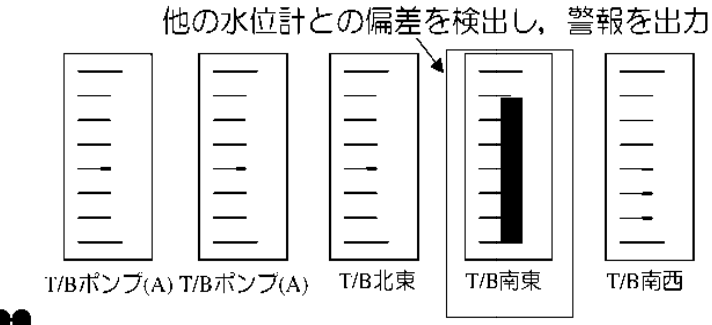
水位データの収集方法と管理方法のイメージ（1／2）

特定原子力施設　監視・評価検討会
（第23回）資料　加筆

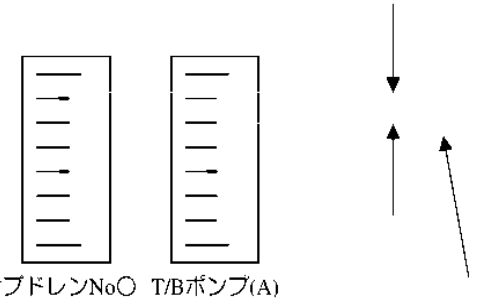
建屋の各箇所における水位を免震棟に収集



偏差大



水位差小



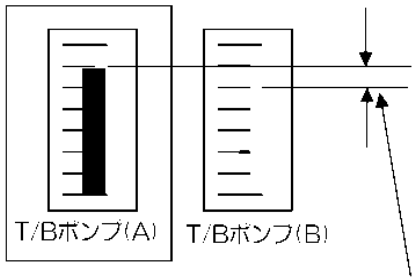
地下水位との水位差が予め定めた設定値以下になった場合に警報を出力

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

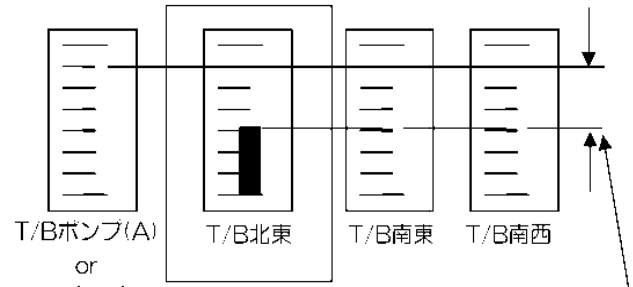
水位データの収集方法と管理方法のイメージ（2／2）

特定原子力施設　監視・評価検討会
（第23回）資料　加筆

偏差大



ポンプ制御用水位計同士の偏差を検出し，警報を出力

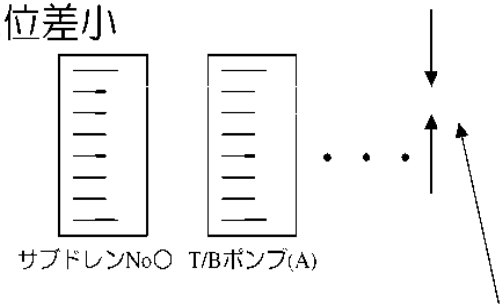


ポンプ制御用水位計と他の水位計との偏差を検出し，警報を出力

偏差大
警報

＜対応＞
①現場で実水位を計測し，以下を確認する．
・水位計の単体故障
・局所的な残水
②計器校正および水中ポンプ投入による残水処理等を実施する．

水位差小



地下水位との水位差が予め定めた設定値以下になった場合に警報を出力

水位差小
警報

①他の水位計を確認し，偏差によるものでは無いことを確認
（偏差による場合は上記手順）
②水位設定を免震棟にて変更し，建屋水位を低下させる．

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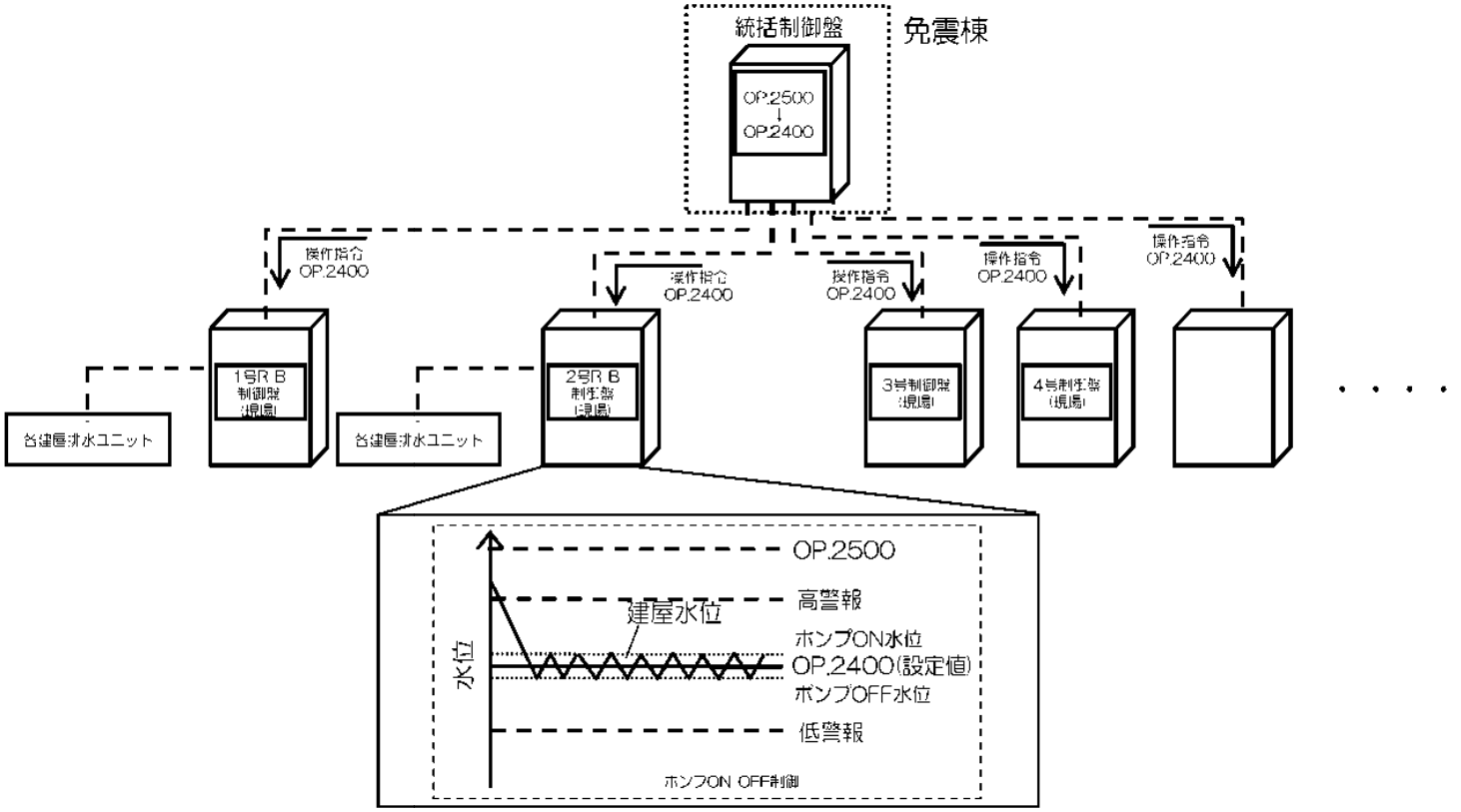
建屋水位制御方法について

建屋水位については常時監視し，各建屋の滞留水水位を総括制御盤からの指令で水位制御を行う．

各建屋の排水ユニットは，確実に制御可能なポンプのON-OFF制御により水位一定制御を行う．



制御システム構成イメージ

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

建屋滞留水の移送先の受入裕度について

なお，直近２年の実績で最小値である5,800m^{3}の受入可能量は，1～4号機建屋の水位で約25cm分の移送量に相当する．（※1～4号機の建屋滞留水保有エリア（約23,000m^2）の滞留水を全て一様に移送する場合を想定）

		受入可能量	プロセス主建屋	高温焼却炉建屋	週報※
		容量（m^3）	水位(O.P.)	水位(O.P.)	
2013年度	最大値	約12,200	2,545	1,789	110報
	最小値	約5,800	4,318	3090	96報
	平均値（参考）	約7,600	4,025	2,239	－
2014年度	最大値	約11,900	2,571	1,905	146報
	最小値	約6,600	4,368	2,297	154報
	平均値（参考）	約8,200	3,976	1,854	－

※：福島第一原子力発電所における高濃度の放射性物質を含むたまり水の貯蔵及び処理の状況について

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

従来設備と新規設備の比較（１／２）

特定原子力施設　監視・評価検討会
（第２３回）資料　再掲

	従来設備（現状）	新規設備（案）
建屋水位 計測頻度	3回／日（Webカメラによる目視確認）	常時水位計測データを取り込み，免震棟（遠隔）にて一括管理
ポンプ等の 設置箇所	各号機タービン建屋 （合計11台（4箇所））	各号機の各建屋（原子炉建屋，タービン建屋，廃棄物処理建屋）に原則として1箇所設置（合計22台（11箇所））．
建屋水位の 計測ポイント	各建屋１箇所 （合計12箇所）	ポンプ設置エリアに水位制御用水位計（11箇所），想定外の局所的な水の滞留により屋外への流出リスクが否定できない箇所（60箇所）に監視用水位計を設置．（合計71箇所）
水位計計測精度	放射線影響等によるドリフト（～数百mm）が発生しており，定期的に調整を実施（高線量作業）	要求精度を検討中． 耐放射線性，メンテナンス性を向上し，システム全体として信頼性向上を図る．精度については建屋水位と地下水位の水位差に見込む．

なお，設置箇所，機器の詳細仕様等は，現場調査の結果等を踏まえて適宜見直す．

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

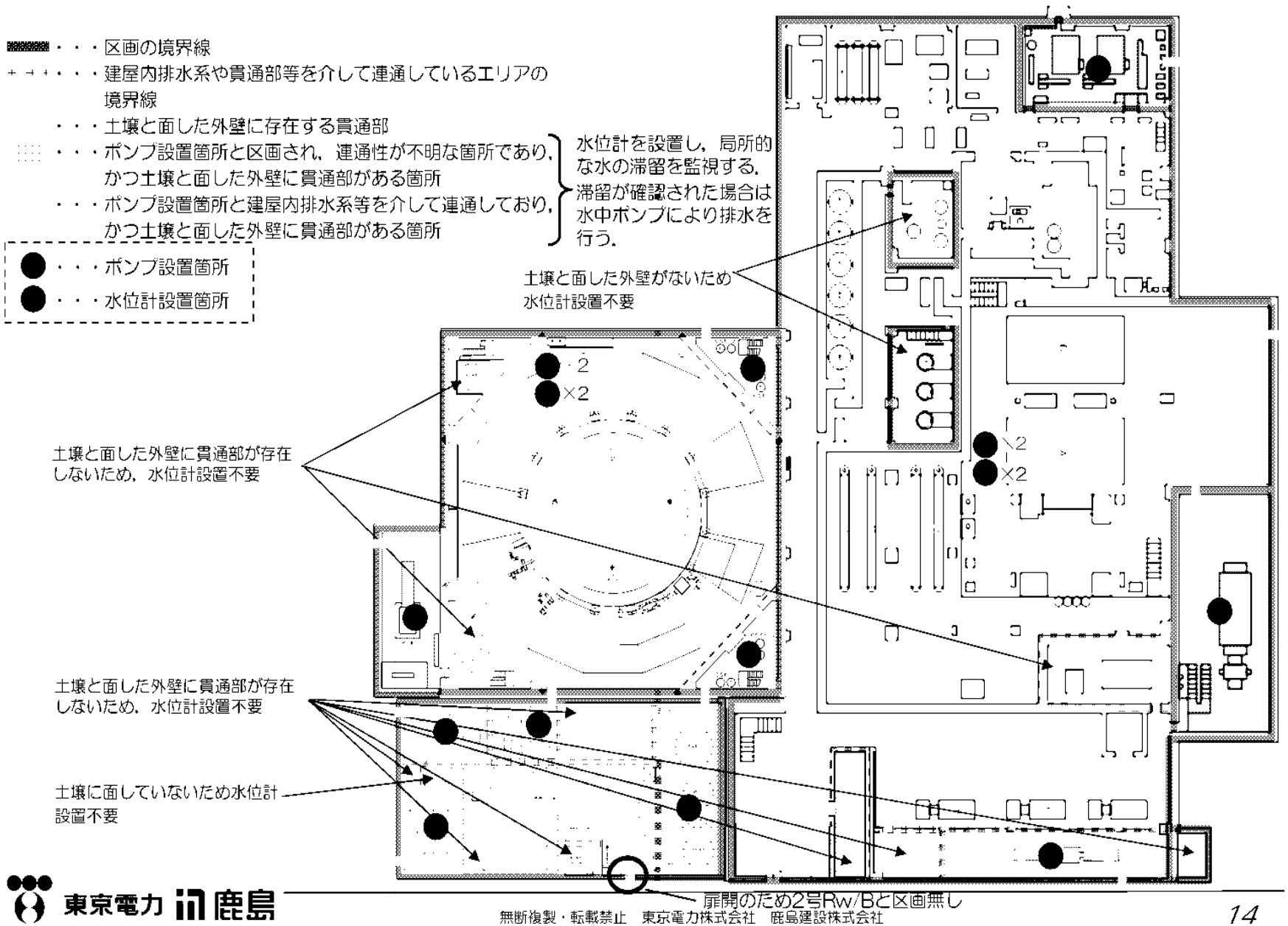
従来設備と新規設備の比較（2／2）

項目	従来設備（現状）	新規設備（案）
設備の構成	各号機タービン建屋から排水する設備構成	各建屋を同一水位にするため，各号機の各建屋（原子炉建屋，タービン建屋，廃棄物処理建屋）から排水する設備構成とする．（多重化を考慮）
容量 （ポンプの容量）	最大約1,920m^3/日 （80m^3/h）	現状以上の排水容量とする． 降雨時の建屋水位変動実績等を踏まえ，過去最大降雨（浪江における24時間最大降雨）に対する建屋水位応答を評価した結果，80m^3/h排水時の水位上昇は約198mmと算定した．この値は，水位差（建屋－周辺地下水）300mmを考慮しても余裕があると考えている．
水位制御方法	現場での手動操作によるON-OFF制御	自動で設定水位への制御を行い，各建屋の水位を一定にする．また，地下水位低下に伴う設定水位の変更やポンプの運転等を免震棟で遠隔操作できるようにし，制御性を向上させる．
水位制御の範囲	各号機タービン建屋からの排水のみ（建屋間は水位差による移動）	原則として，各号機の各建屋に排水設備を設け，各建屋を同一水位に制御する．
水位制御の能力 ・時間応答性		上記排水容量による建屋水位低下量は約50mm/日．これに対し，地下水位低下量は約5～10mm/日程度となっており，余裕を有している．

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

建屋の区画とポンプ・水位計設置箇所（１号機）

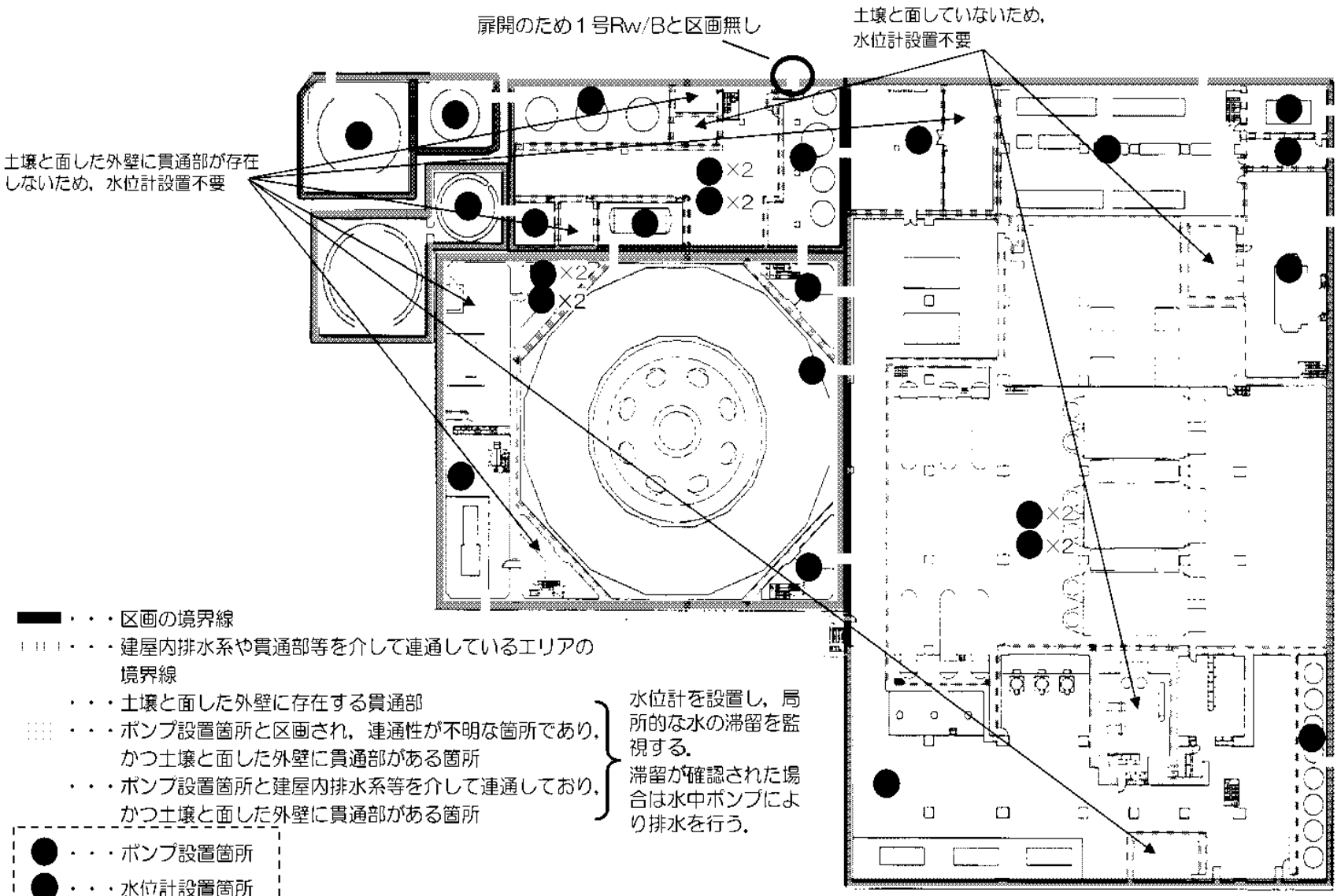
特定原子力施設　監視・評価検討会
（第23回）資料　加筆



無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

建屋の区画とポンプ・水位計設置箇所（２号機）

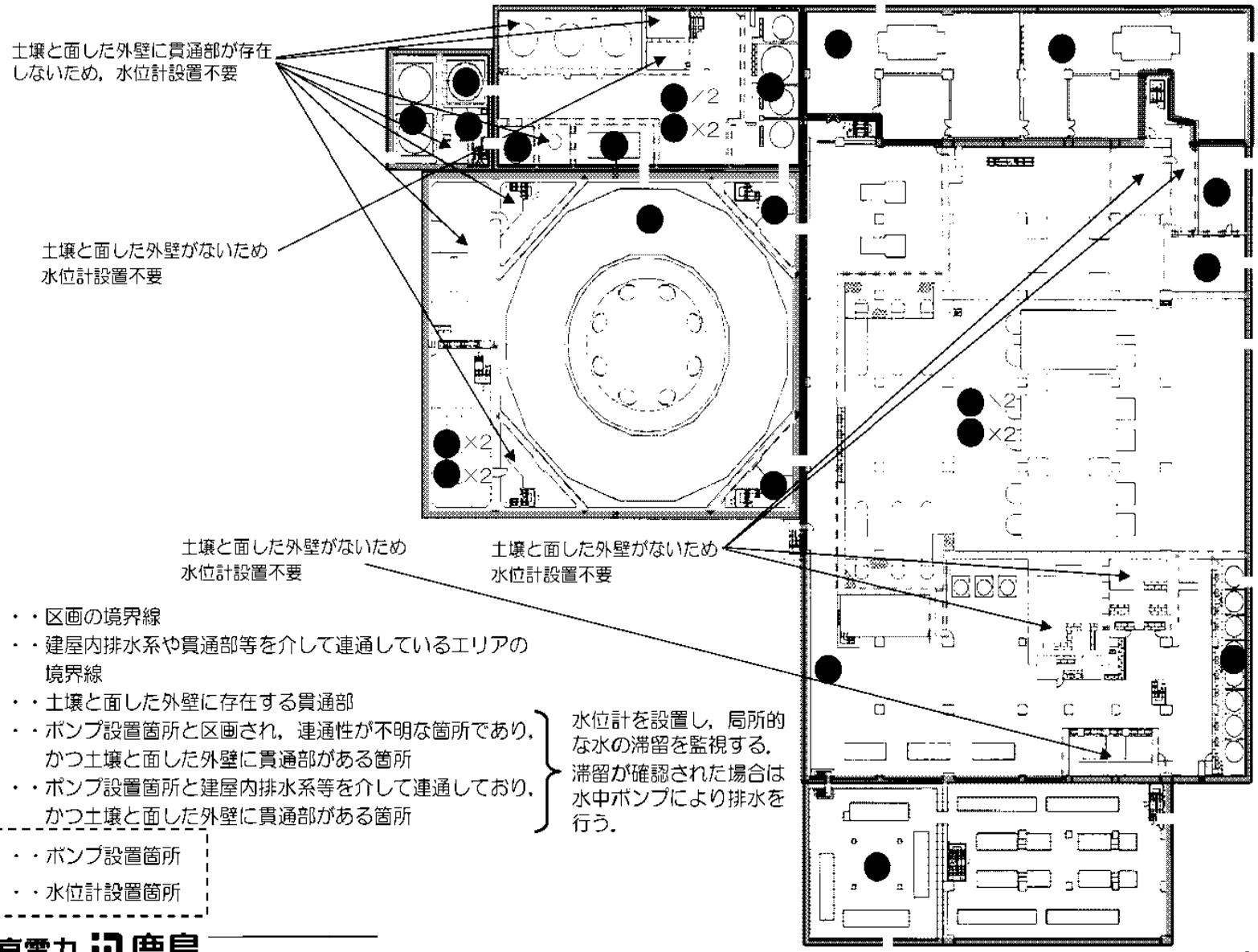
特定原子力施設　監視・評価検討会
（第23回）資料　加筆



無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

建屋の区画とポンプ・水位計設置箇所（３号機）

特定原子力施設　監視・評価検討会
（第23回）資料　加筆



■・・・区画の境界線

・・・建屋内排水系や貫通部等を介して連通しているエリアの境界線

・・・土壌と面した外壁に存在する貫通部

・・・ポンプ設置箇所と区画され，連通性が不明な箇所であり，かつ土壌と面した外壁に貫通部がある箇所

・・・ポンプ設置箇所と建屋内排水系等を介して連通しており，かつ土壌と面した外壁に貫通部がある箇所

} 水位計を設置し，局所的な水の滞留を監視する．滞留が確認された場合は水中ポンプにより排水を行う．

●・・・ポンプ設置箇所

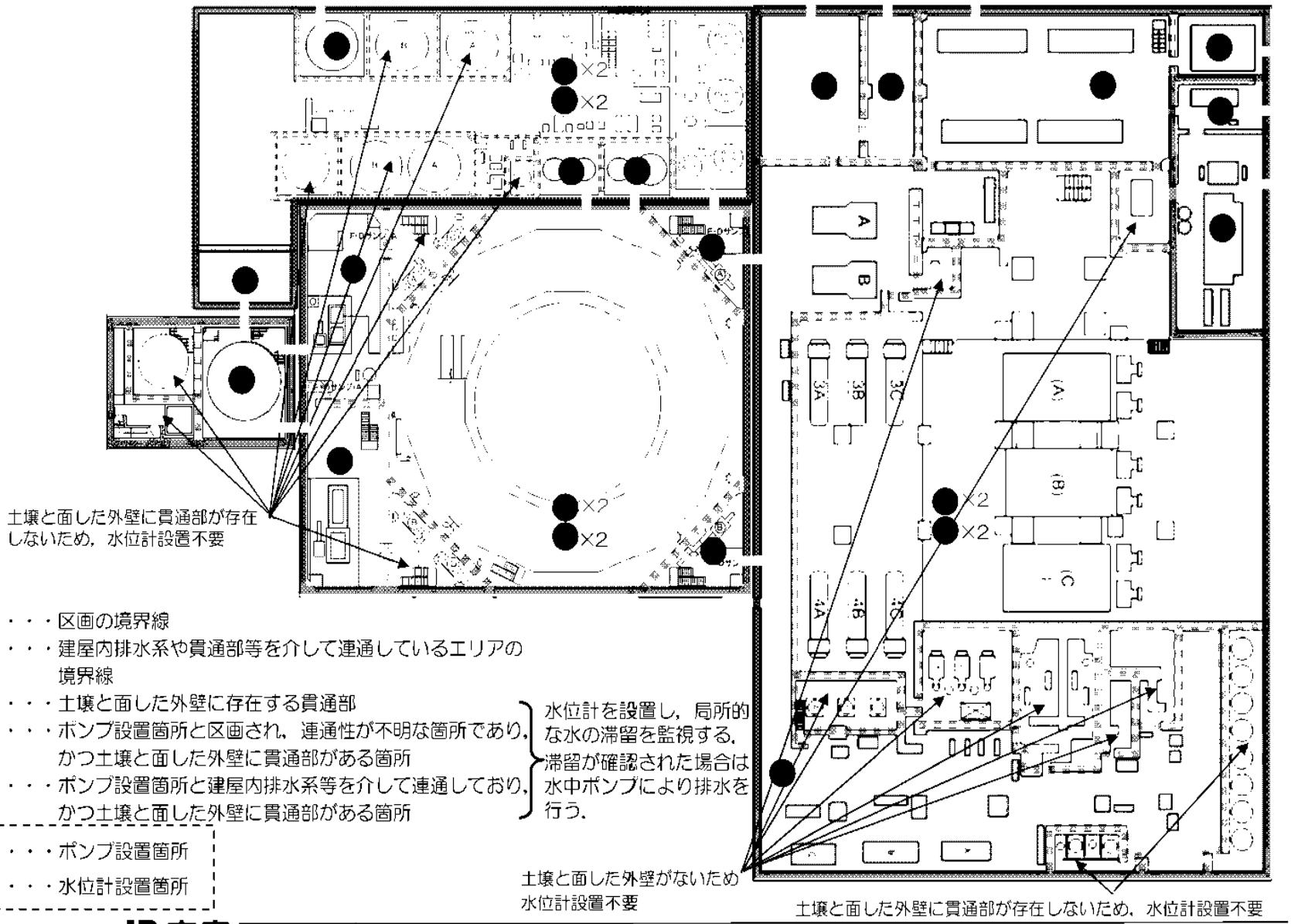
●・・・水位計設置箇所

東京電力 TEPCO　鹿島

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

建屋の区画とポンプ・水位計設置箇所（４号機）

特定原子力施設　監視・評価検討会
（第23回）資料　加筆



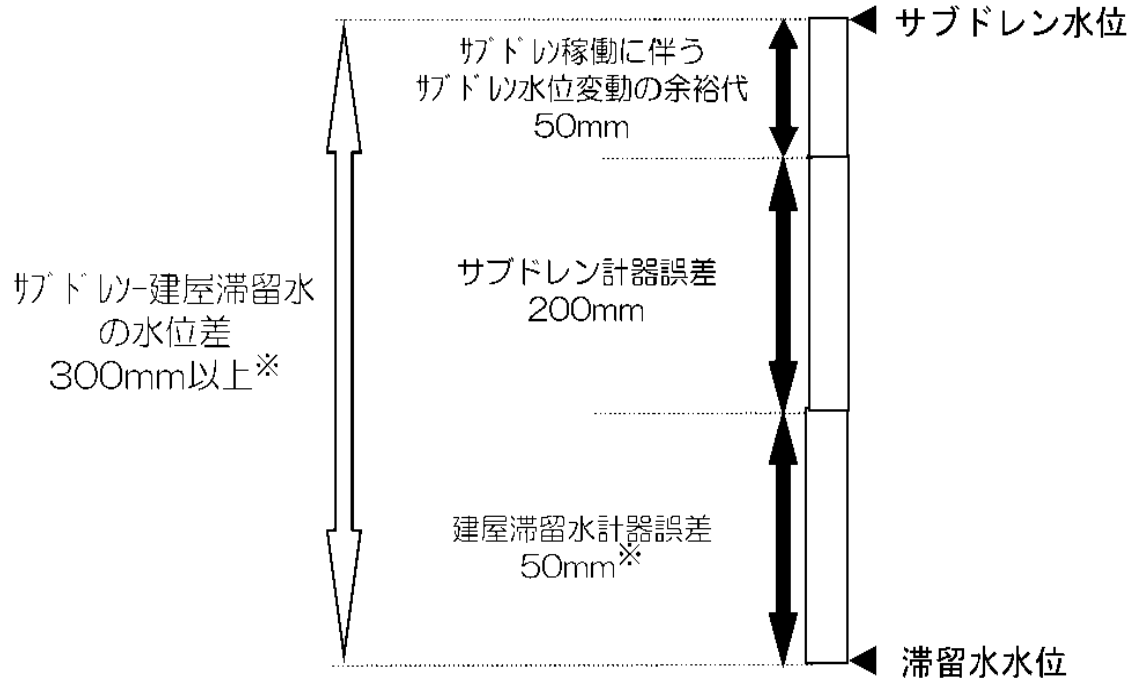
東京電力 TEPCO　鹿島

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

サブドレン一建屋滞留水の水位差管理について

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

サブドレンー建屋滞留水間の水位差の設定



※：現在申請中の「2.6 滞留水を貯留している（滞留している場合を含む）建屋」における建屋滞留水水位計等に関する変更申請の認可後に，認可内容に合わせて記載を適正化する．

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

サブドレン一建屋滞留水間の水位差の設定根拠について

サブドレン稼働に伴う水位変動

海側サブドレンの水位低下量は極めて小さくなるよう山側サブドレンは段階的に水位低下させるが，サブドレン一建屋滞留水の水位差確保においては，保守的な解析※から得られた最大日低下量30mmに裕度を持たせた50mmをサブドレン稼働に伴う海側サブドレンの水位変動の余裕代として見込む.

※海側遮水壁が無い状態で山側サブドレンを稼働し３m程度を一度に汲み上げた場合

サブドレン水位計の測定誤差

サブドレン水位計は，水圧式水位計を採用しており，水位管理における計器の測定誤差は200mmを見込む.

建屋滞留水水位計の測定誤差

建屋滞留水水位計は，水圧式水位計を採用しており，水位管理における計器の測定誤差は50mmを見込む.

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

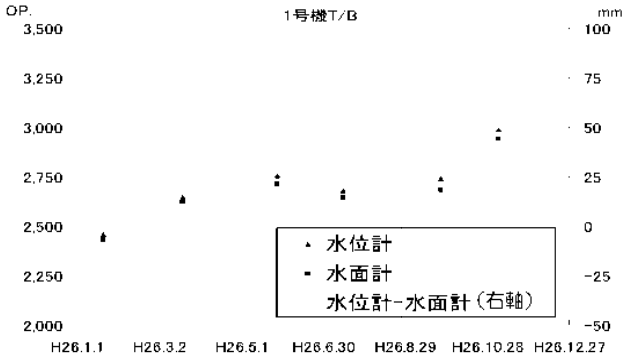
既存の建屋水位計の精度確認状況

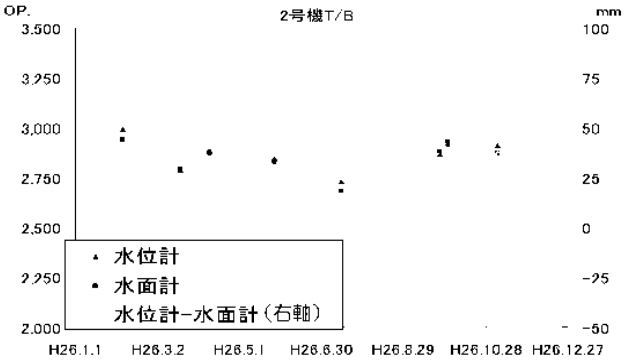
建屋滞留水水位計の測定誤差について

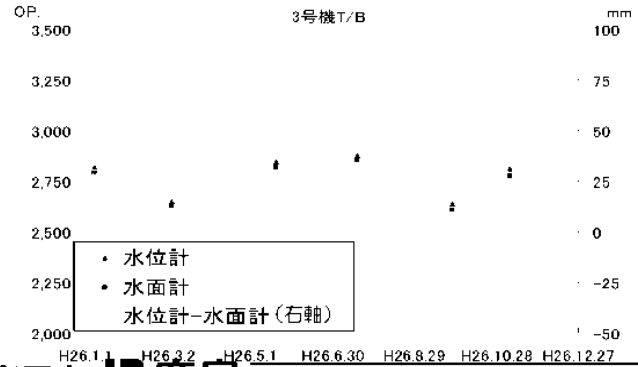
水圧式水位計を用いて計測しており，当該水位計については，定期的（約２ヶ月）に水面計による実測値との比較を実施し，必要に応じて以下のとおり補正している.

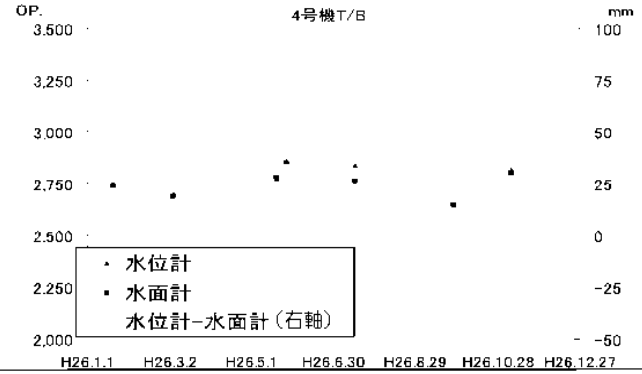
・水位計の値が水面計より低い場合は，50mm単位で補正を行うことを標準とする.
・水位計の値が水面計より高い場合は，水位計の測定誤差が0～＋100mmの範囲に収まるように，100mm単位で補正を行うことを標準とする.

測定誤差（水位計と水面計の値の差）は，基本的に補正単位の50mm以内となるよう管理している.









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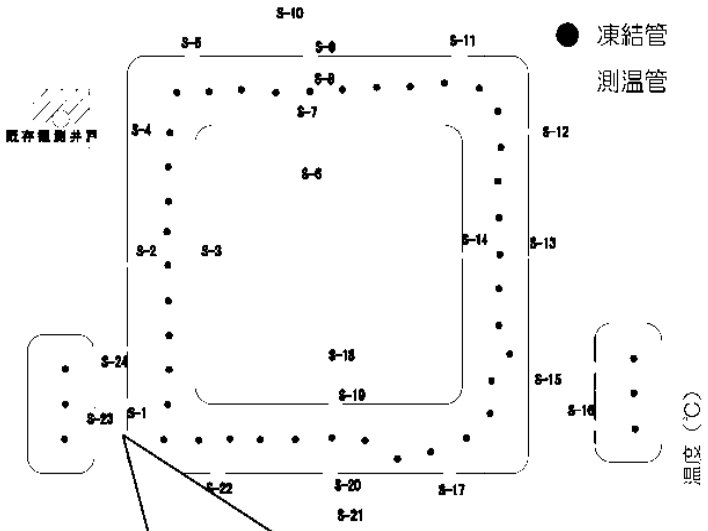
部分先行凍結について

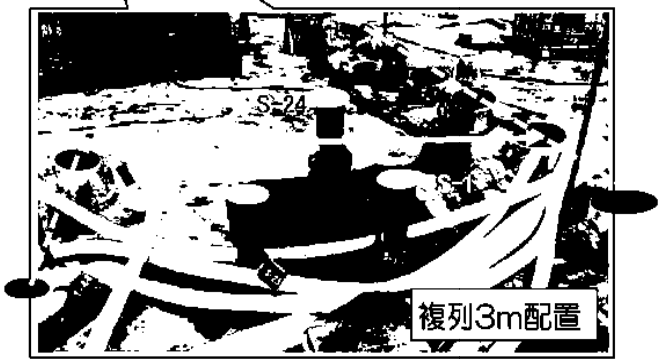
無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

原地盤での複列施工の凍結実証試験（フィージビリティ・スタディ）

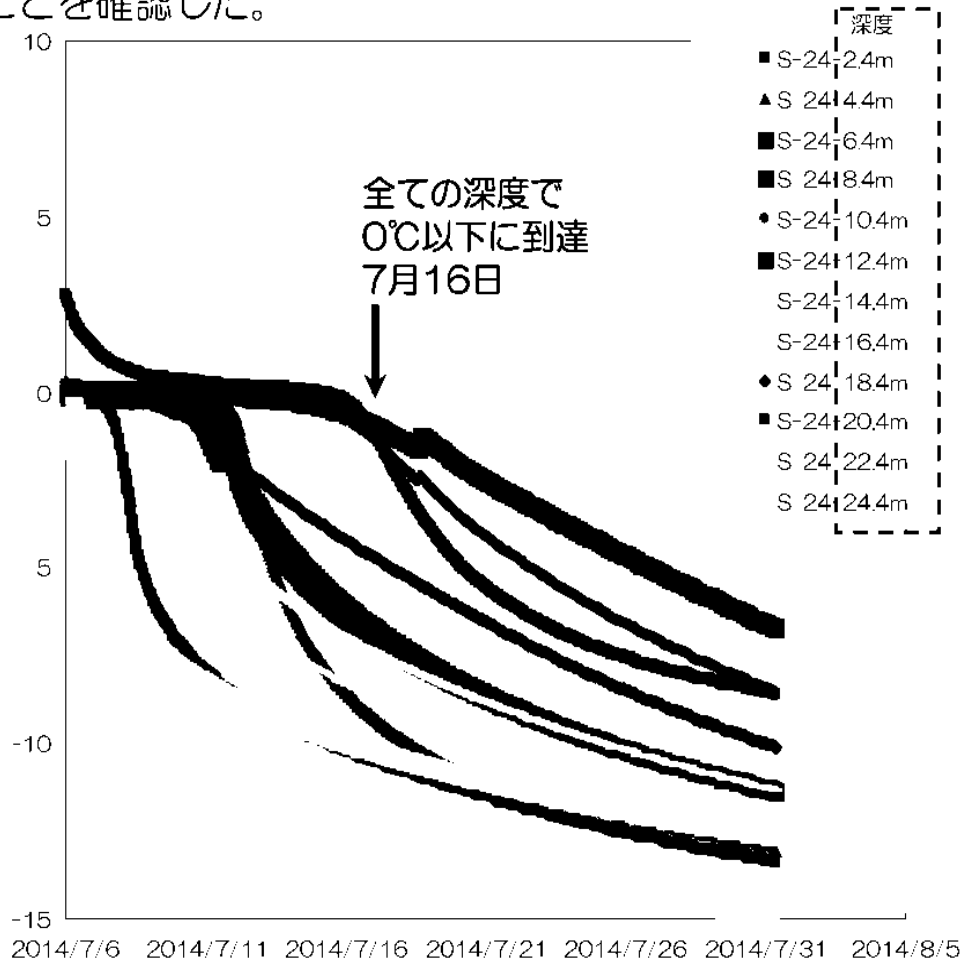
原地盤での凍結実証試験において，「貫通施工できない埋設構造物に対し複列施工する」ことを想定し，凍結管間隔３m幅に対して片側３本ずつの複列施工の凍結実証試験を実施した。

凍結管間の中央部（S-24）の測温結果より，3月14日に凍結開始し，7月16日に全ての深度で0℃に到達したことを確認した（凍結期間： 約120日）。また，一般部（凍結管間隔：1m）は，凍結開始後10～15日で0℃に到達したことを確認した。





凍結管（頂部）　測温管（頂部）



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複列施工箇所の凍結に要する期間に関する検討　解析条件

実証試験結果をもとに物性値を定め，複列施工箇所の凍結に要する期間に関する解析を行った。

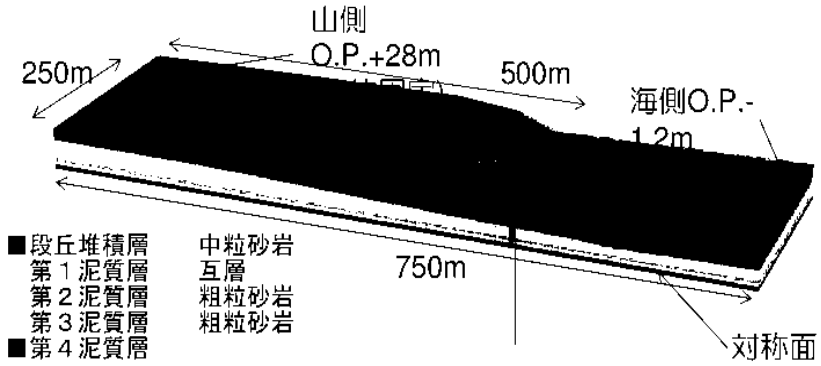
解析モデルおよび条件

水理物性

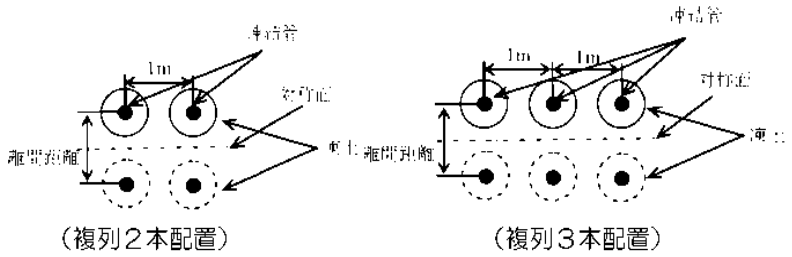
地層	透水係数(cm/s)	比貯留係数(cm^{-1})
段丘堆積層・砂岩	3.0×10^{-3}	2.9×10^{-6}
泥岩	1.1×10^{-6}	4.5×10^{-7}
互層	(水平)1.0×10^{-3} (鉛直)1.1×10^{-6}	5.8×10^{-7}

熱物性

地層	透水係数(cm/s)	比貯留係数(cm^{-1})
段丘堆積層・砂岩	3.0×10^{-3}	2.9×10^{-6}
泥岩	1.1×10^{-6}	4.5×10^{-7}
互層	(水平)1.0×10^{-3} (鉛直)1.1×10^{-6}	5.8×10^{-7}

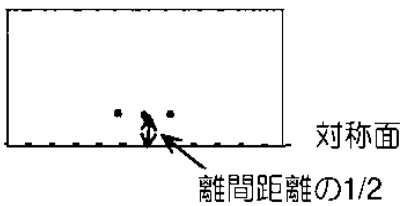


解析メッシュ図(1/2対称モデル)



（複列２本配置）　（複列３本配置）

凍結管拡大図（平面図）



解析メッシュ拡大図（平面図）

水理境界条件　広域三次元地下水解析結果に基づき、凍土造成前は中粒砂岩層0.1m/day、互層0.03m/day、山側凍土壁位置でO.P.8.5mの水位となるように設定　(主要な水理境界条件は上図に表示)

温度設定条件　雰囲気温度15℃、初期地中温度15℃
ブライン温度-30℃

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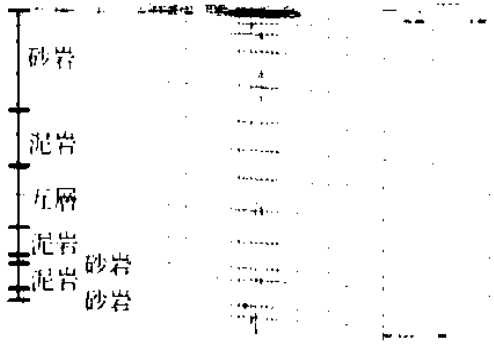
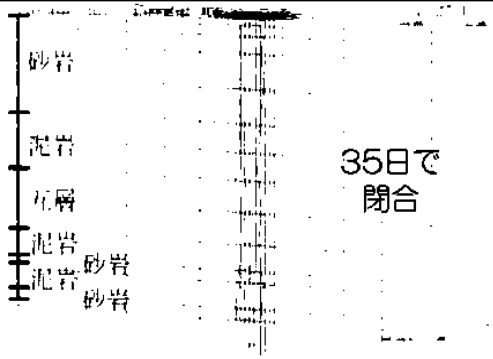
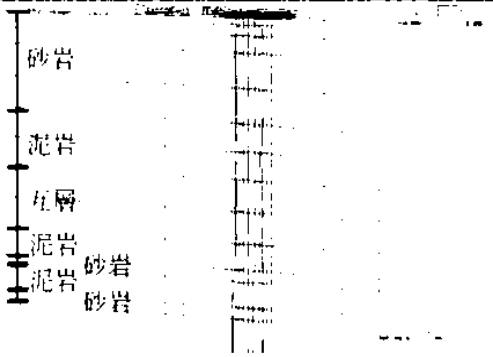
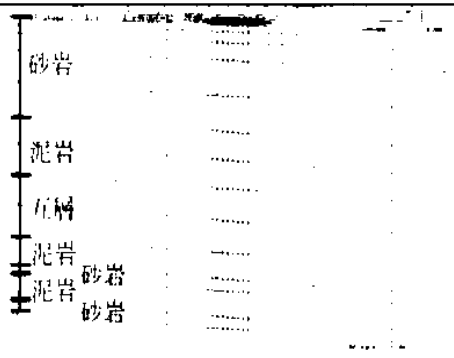
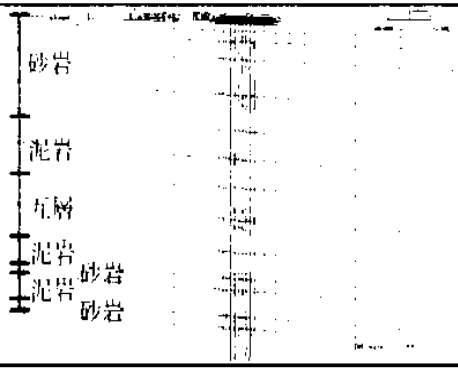
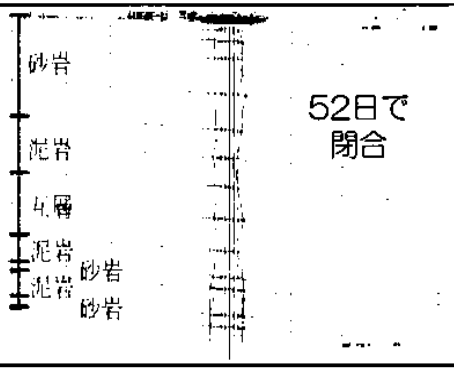
複列施工箇所の凍結に要する期間に関する検討　解析結果

現地の施工での複列施工箇所を分類すると，①凍結管間隔1.5m以下・片側２本配置，②凍結管間隔1.5～2m程度・片側３本配置の２種類に大別できる。

それぞれの，凍結に要する期間は，①：35日程度，②：50日程度である

<table>
<tr><td rowspan="2">凍結管間隔
1.5m</td><td colspan="3">片側２本配置</td></tr>
<tr><td>20日後</td><td>40日後</td><td>60日後</td></tr>
<tr><td></td><td> 
</td><td> 
</td><td> 
</td></tr>
<tr><td rowspan="2">凍結管間隔
2.0m</td><td colspan="3">片側３本配置</td></tr>
<tr><td>20日後</td><td>40日後</td><td>60日後</td></tr>
<tr><td></td><td> 
</td><td> 
</td><td> 
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</table>

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

部分先行凍結の目的

以下の目的のため，陸側遮水壁山側の一部を先行凍結する.

陸側遮水壁山側において凍結管間隔が広い箇所については，複列施工などを実施しているが，一般部（凍結管間隔：約1m）と比較して，凍結に時間を要することを原地盤での実証試験において確認している。複列施工箇所は，一般部の凍結期間に加え，20～40日程度の期間が必要となると考えている。

そのため，一般部と同時に凍結開始した場合，凍結に時間を要する部位が残り，地下水流が集中し，さらに凍結しにくくなるという事象が想定される。

この様な地下水流が集中する部位に対しては，部分的に地盤改良工法等の止水対策を施すことにより閉合させることが出来ると考えている。

しかしながら，より確実かつ早期に陸側遮水壁を閉合させるために，凍結に時間を要すると予想される部位の凍結を先行的に開始する。

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

部分先行凍結の地下水位への影響

目的

部分先行凍結前後での地下水位への影響評価

解析条件

部分先行凍結により遮水される長さは全体の6%程度

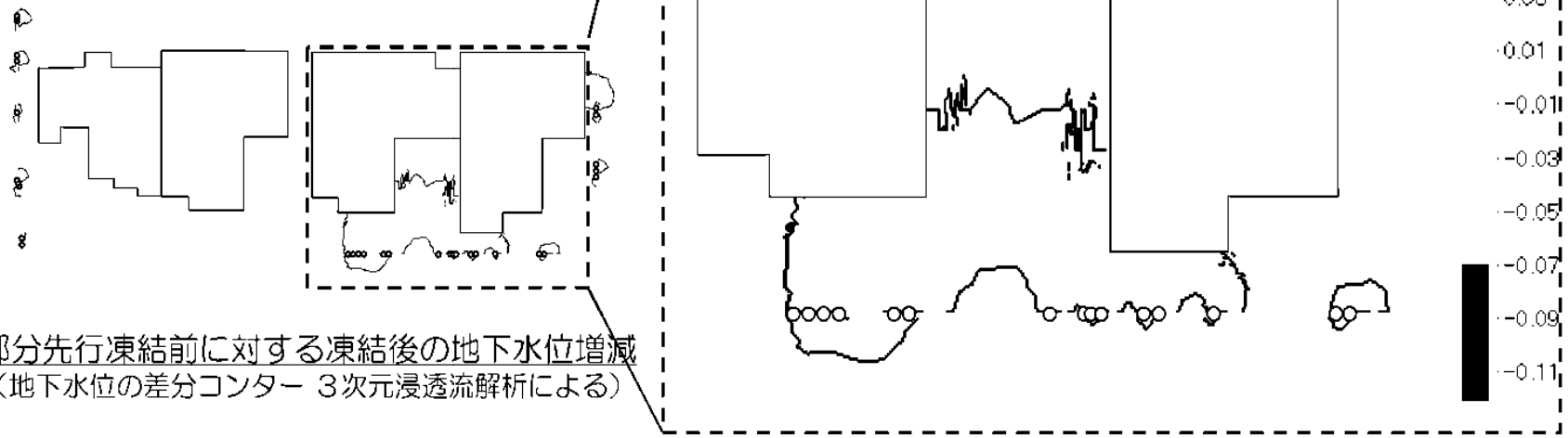
解析結果

部分先行凍結前に対し凍結完了後，建屋山側の地下水位が数cm程度低下する。

解析条件

陸側遮水壁山側総延長	986m	100%
先行凍結による遮水長さ※	60m	6%

※：凍結範囲は半径1mと仮定



部分先行凍結前に対する凍結後の地下水位増減
（地下水位の差分コンター ３次元浸透流解析による）

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

陸側遮水壁による建屋への地下水流入量抑制効果

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

地下水分布基礎方程式について

・地下水流動の基礎方程式（ダルシーの法則）

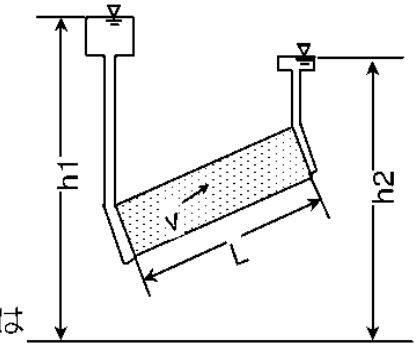
$$v = k\,i = k\frac{\Delta h}{L}$$

v：流速，i：動水勾配，k：透水係数，
Δh：水位差，L：距離

・連続の式（質量保存の法則）

Q=VA＝k i A

Q：流量，A：面積



地下水の流れ

上記を元に，定常軸対象浸透流（不圧帯水層：（例）サブドレン）の基礎方程式は下記に導かれる．

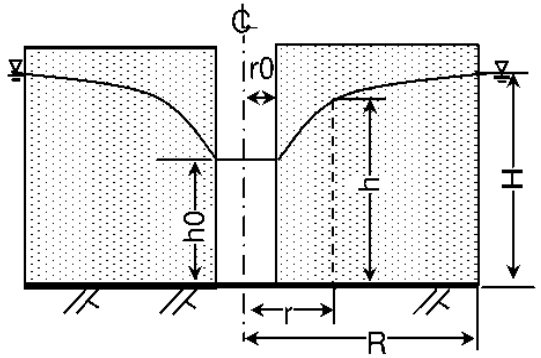
$$Q = 2\pi k\, r\, h\frac{dh}{dr}$$

r:井戸中心からの距離

→上記式を基礎方程式として，降雨の影響を加え
二次元及び三次元の地下水位を解析コードを用いて計算する．
例）r=r0，h=h0で微分方程式を解くと

$$h^2 - h_0^2 = \frac{Q}{\pi k}\ln\frac{r}{r_0}$$

※井戸からr位置の水位低下量は対数関数となる



不圧帯水層の軸対象定常浸透流

また，定常断面二次元浸透流（不圧帯水層：（例）陸側遮水壁の基礎方程式は

$$Q = h\,k\frac{dh}{dL}$$

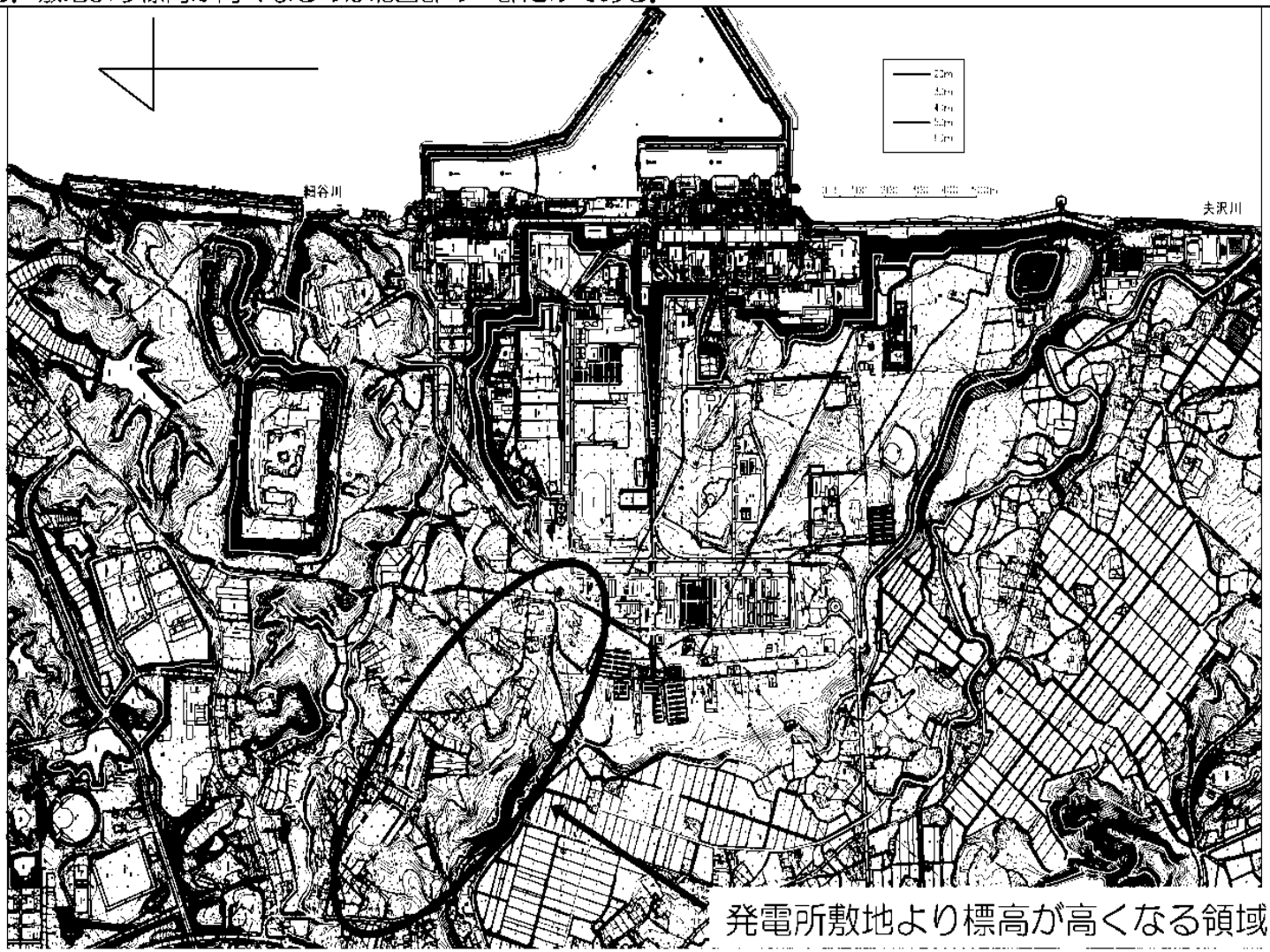
となり，水位低下式は

$h^2 - h_0^2 = Qk/L$　となる・

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

福島第一原子力発電所周辺の地形

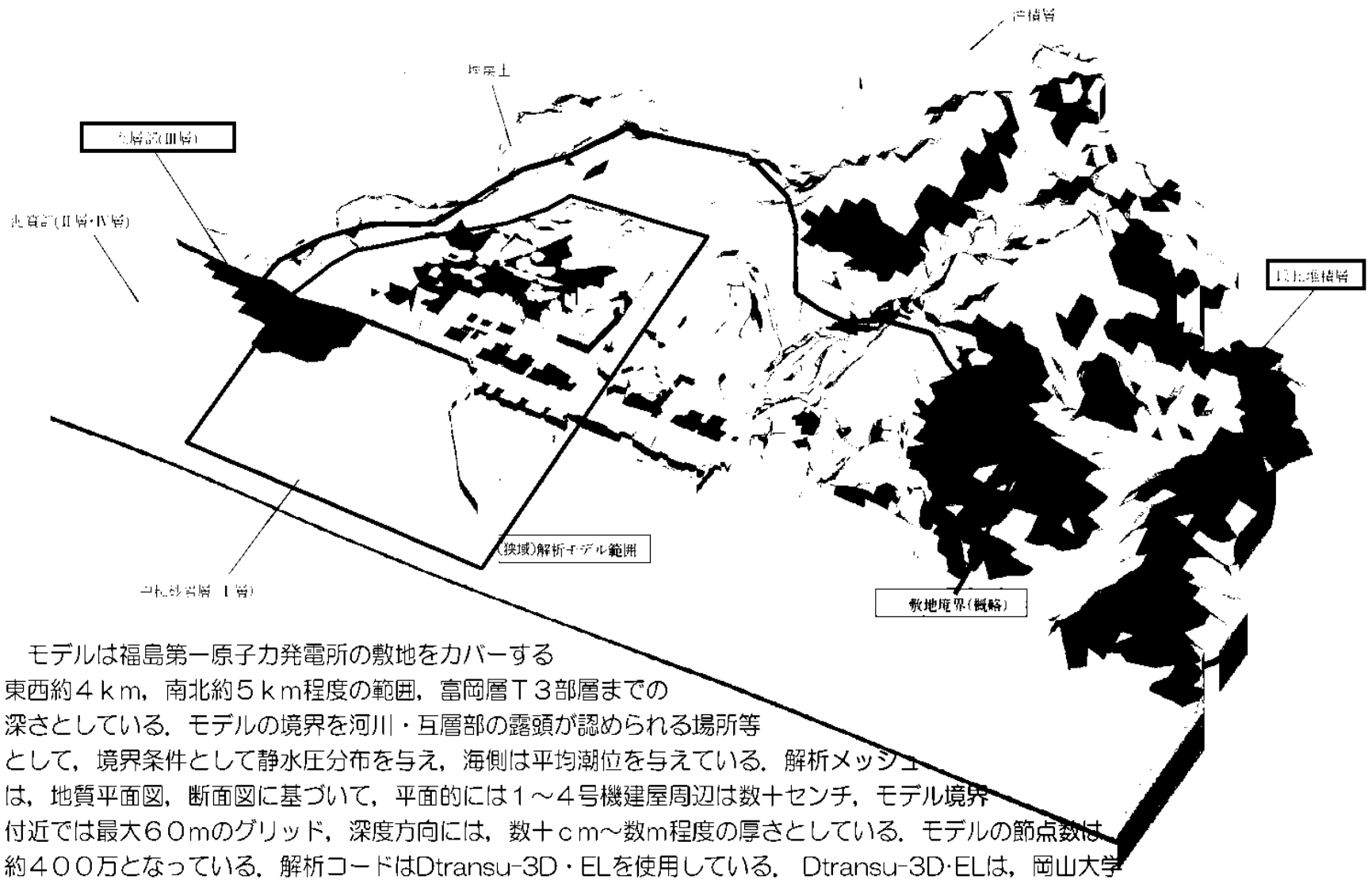
発電所の敷地は，周囲を川に挟まれた海抜３５m程度の台地であり，海側を掘削し，海抜約１０mの地盤に，発電所建屋を設置している．敷地より標高が高くなるのは北西部の一部だけである．



無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

3次元解析モデルについて（鳥瞰図）１／３

特定原子力施設　監視・評価検討会
（第22回）資料1　加筆

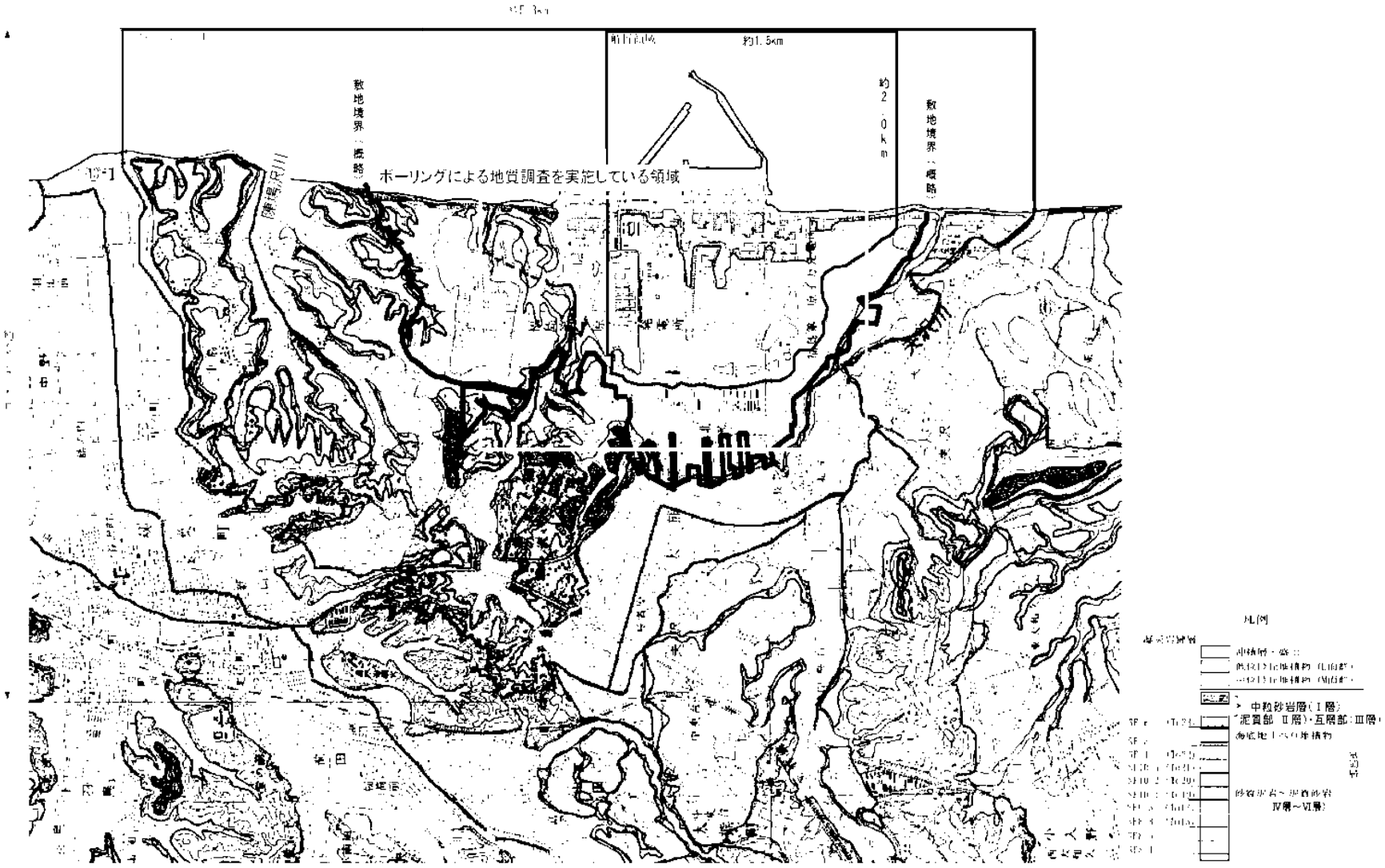


モデルは福島第一原子力発電所の敷地をカバーする東西約４ｋｍ，南北約５ｋｍ程度の範囲，富岡層Ｔ３部層までの深さとしている．モデルの境界を河川・互層部の露頭が認められる場所等として，境界条件として静水圧分布を与え，海側は平均潮位を与えている．解析メッシュは，地質平面図，断面図に基づいて，平面的には１～４号機建屋周辺は数十センチ，モデル境界付近では最大６０ｍのグリッド，深度方向には，数十ｃｍ～数ｍ程度の厚さとしている．モデルの節点数は約４００万となっている．解析コードはDtransu-3D・ELを使用している． Dtransu-3D·ELは，岡山大学西垣 誠教授，三菱マテリアル（株），（株）ダイヤコンサルタント，三者共同で開発したプログラムです．本プログラムのソースコードは公開されており，多数の使用実績が報告されている．

出典：第9回汚染水処理対策委員会

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

3次元解析モデルについて（地表面の地質分布と解析モデル化領域）2／3

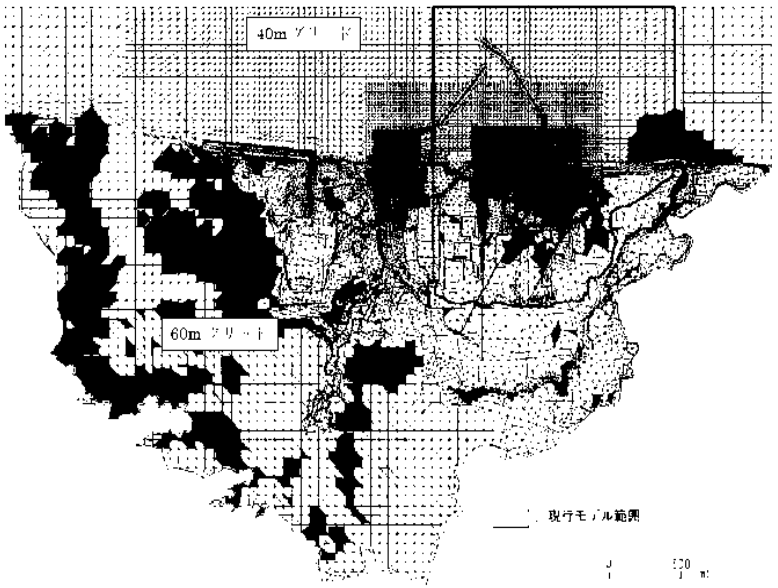


出典：第9回汚染水処理対策委員会

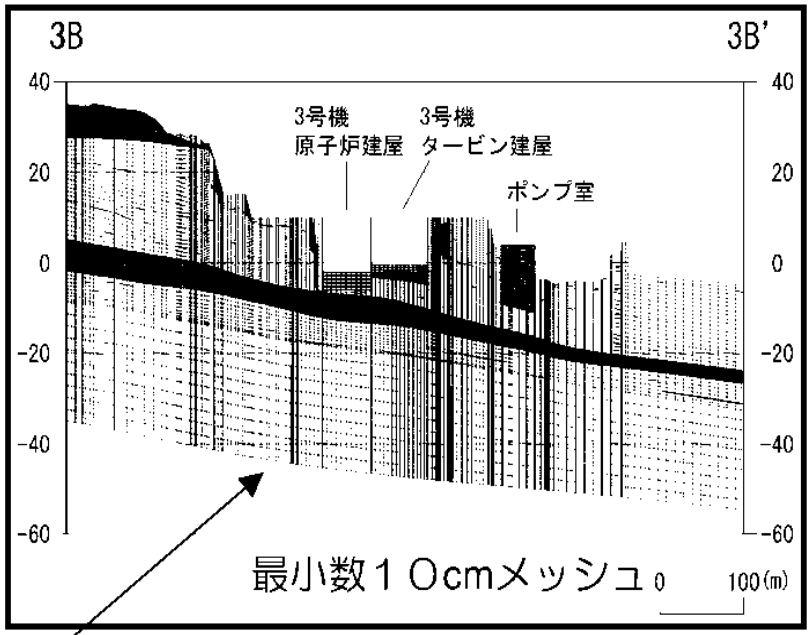
無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

3次元解析モデルについて（解析メッシュ図）3／3

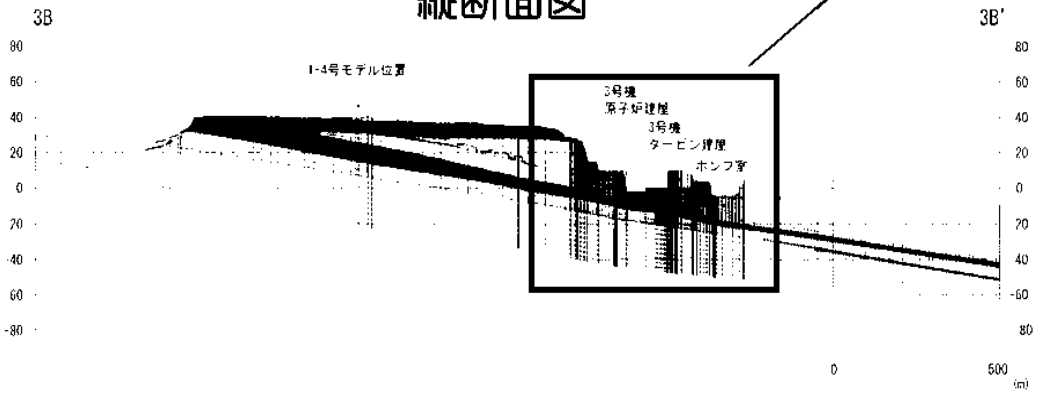
平面図

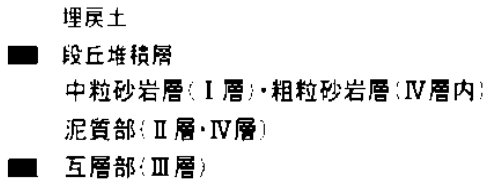


縦断面図（建屋付近拡大）



縦断面図





出典：第9回汚染水処理対策委員会

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

3次元解析条件　物性値

地層区分		震災前		震災後		有効間隙率	備考
		透水係数(cm/sec)		透水係数(cm/sec)			
地層名	記号	水平	鉛直	水平	鉛直	(実流速換算時)	
盛土	bk	2.8E-03	2.8E-03	2.8E-03	2.8E-03	0.46	震災前室内試験結果
段丘堆積物	tm	3.0E-03	3.0E-03	3.0E-03	3.0E-03	0.41	中粒砂岩層同様
沖積層	al	1.0E-03	1.0E-03	1.0E-03	1.0E-03	0.41	文献値
中粒砂岩	ss1	3.0E-03	3.0E-03	3.0E-03	3.0E-03	0.41	震災前現位置試験結果
中粒砂岩(南側、上部)	ss3	1.0E-04	1.0E-04	1.0E-04	1.0E-04	0.41	
泥岩	m0	1.1E-06	1.1E-06	1.1E-06	1.1E-06	0.54	
中粒砂岩(南側、下部)	ss2	1.0E-04	1.0E-04	1.0E-04	1.0E-04	0.41	
泥岩	m1	1.1E-06	1.1E-06	1.1E-06	1.1E-06	0.54	
互層	alt	1.0E-03	1.1E-06	1.0E-03	1.1E-06	0.41	
泥岩	m2	1.1E-06	1.1E-06	1.1E-06	1.1E-06	0.54	
細粒砂岩	fs	2.3E-03	2.3E-03	2.3E-03	2.3E-03	0.41	
泥岩	m3	1.1E-06	1.1E-06	1.1E-06	1.1E-06	0.54	
粗粒砂岩	cs	2.0E-03	2.0E-03	2.0E-03	2.0E-03	0.41	
泥岩	m4	1.1E-06	1.1E-06	1.1E-06	1.1E-06	0.54	
建屋基礎およびMMR	-	1.0E-06	1.0E-06	1.0E-06	1.0E-06	0.30	コンクリート相当
建屋側壁	-	1.0E-06	1.0E-06	5.0E-06	5.0E-06	0.30	感度解析から設定※1
既設矢板	-	1.0E-06	1.0E-06	1.0E-04	1.0E-04	0.30	感度解析から設定、施工幅0.8m※2
ホンフ室およびピット	-	1.0E-06	1.0E-06	1.0E-06	1.0E-06	0.30	コンクリート相当
4m盤グラウチング	-	−	−	3.0E-05	3.0E-05	0.30	中粒砂岩層の1/100相当、施工幅2m
砕石		−	−	1.0E-01	1.0E-01	0.41	埋立部
鋼管矢板	-	−	−	1.0E-06	1.0E-06	0.30	海側バウンダリ、施工幅2m
凍土壁		−	−	0.0E+00	0.0E+00	−	施工幅2m

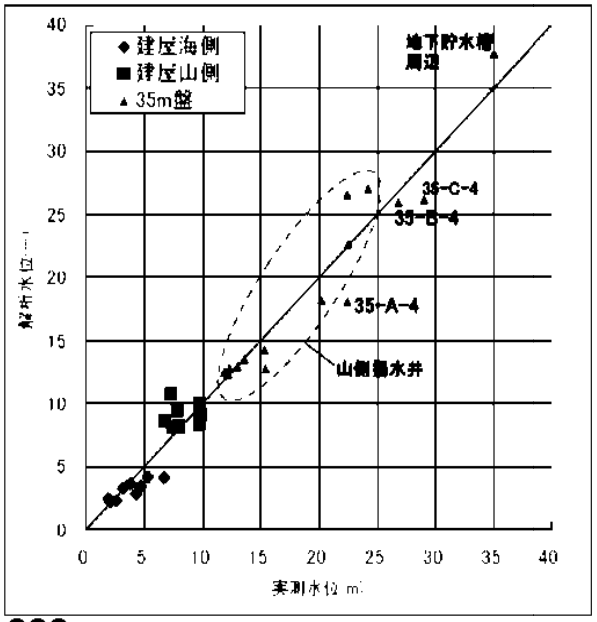
※1 建屋への流入量が400m³/日を再現できる透水係数
※2 地下水位(C-3, C-4, C-5)が再現できる透水係数

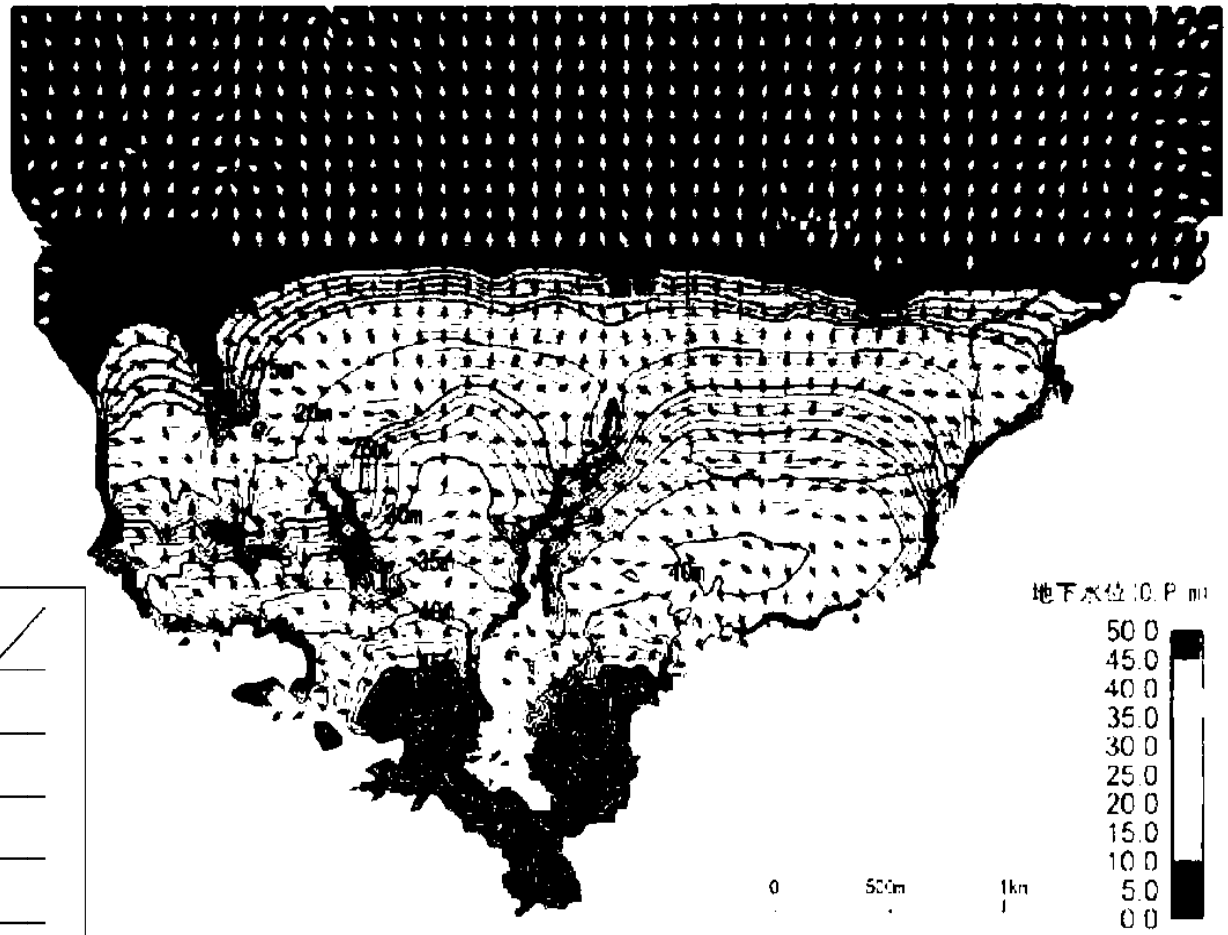
沖積層の透水係数については実測データがないため，日本の地盤を対象とした地下水データベース（梅田浩司，柳澤孝一，米田茂夫(1995)：日本の地盤を対象とした透水係数データベースの作成，地下水学会誌，第37 巻，第1号，1995）の第四紀更新世（平均値：1.2E-03 cm/sec）と第四紀完新世（平均値：5.6E-04cm/sec）の透水係数の平均値(8.1E-4cm/sec)から1E-3(cm/sec)と設定した．

出典：第9回汚染水処理対策委員会

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

3次元解析モデルの妥当性；対策前　再現解析結果（中粒砂岩層）



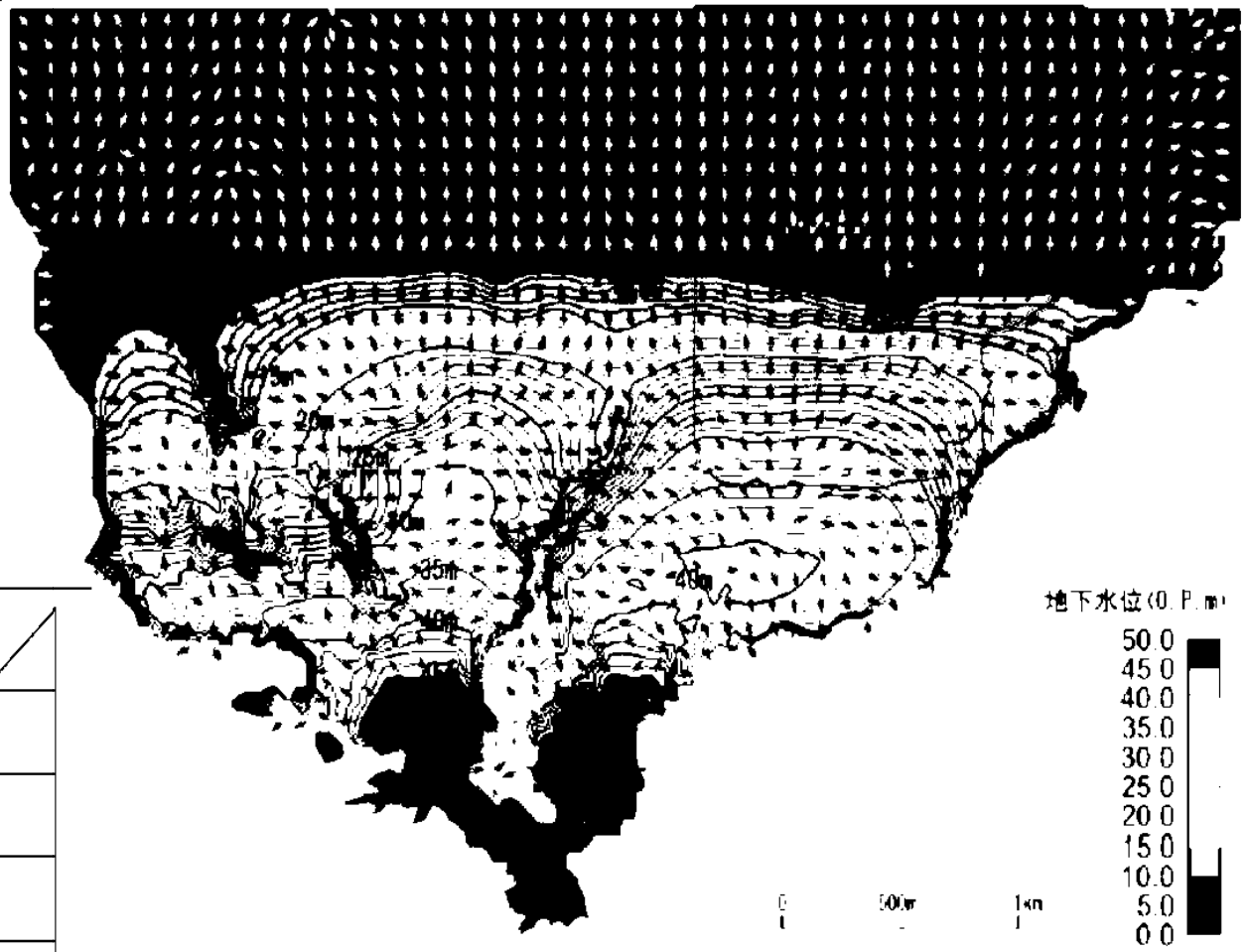


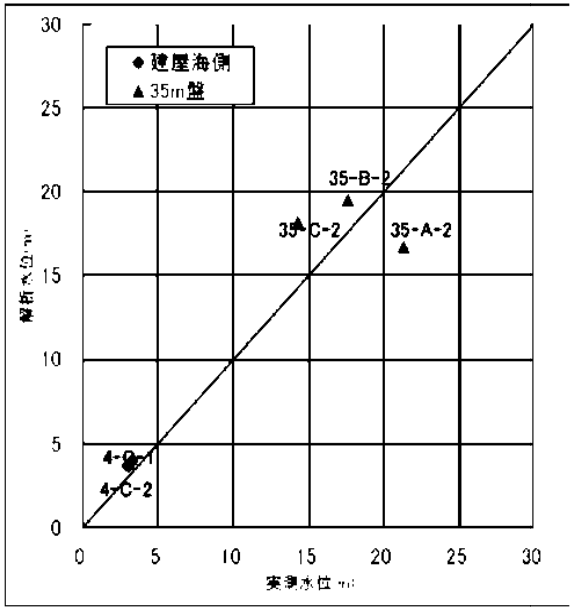
汚染水対策を実施する前に計測している不圧地下水（中粒砂岩層（Ⅰ層））の地下水位を概ね再現できている.

出典：第9回汚染水処理対策委員会

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

3次元解析モデルの妥当性；対策前　再現解析結果（被圧（互層（Ⅲ層））



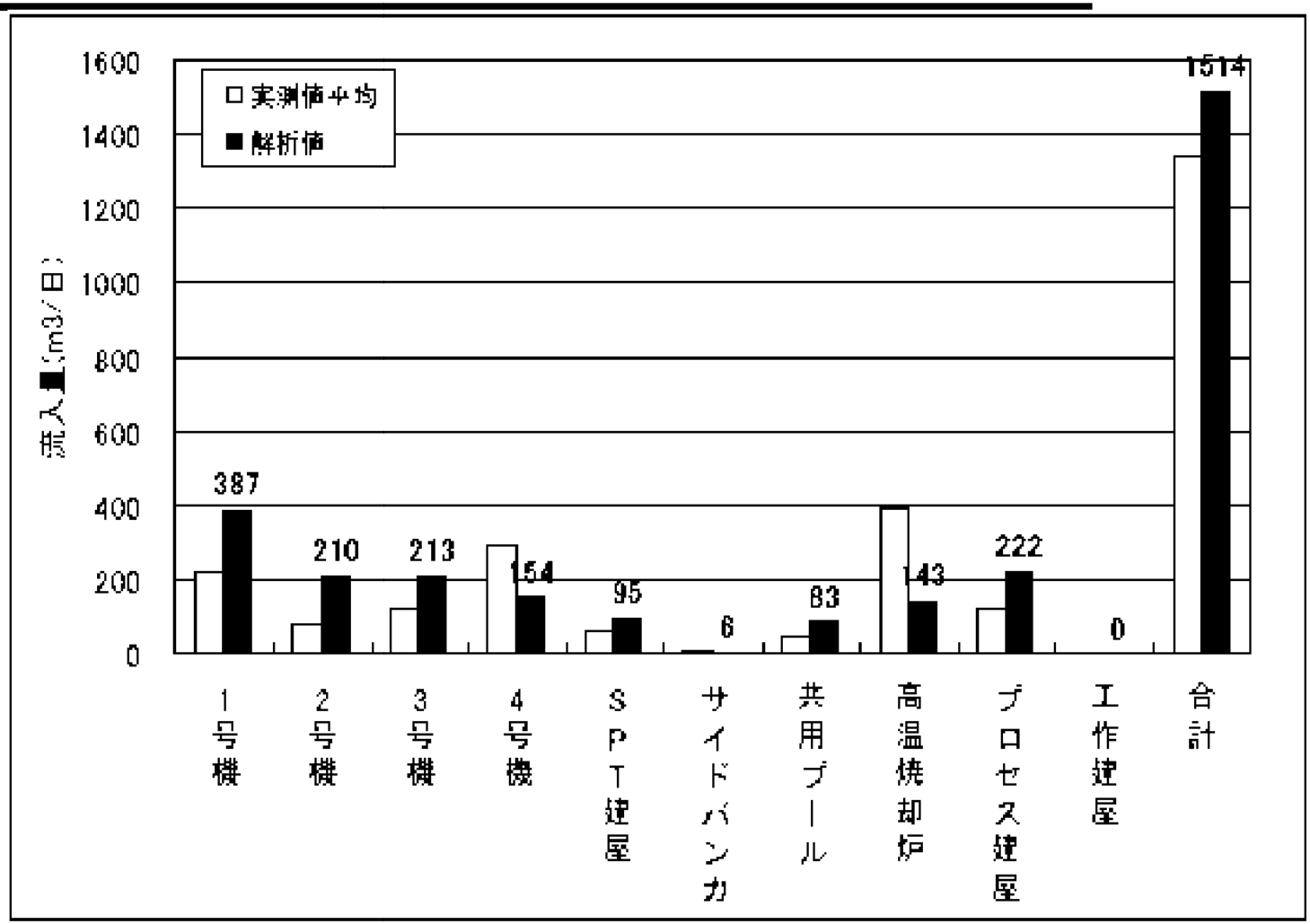


汚染水対策を実施する前に計測している被圧地下水（互層（Ⅲ層））の地下水位を概ね再現できている.

出典：第9回汚染水処理対策委員会

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

3次元解析モデルの妥当性；震災前サブドレン流入量の比較



震災前のサブドレン流入量は，解析モデルの方が全体的に多めに計算される結果となっているが概ね震災前相当である．

出典：第9回汚染水処理対策委員会

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陸側遮水壁による建屋への地下水流入量抑制効果－各対策の効果（定常解析）－

ケース	対策工					建屋流入量（トン/日）			地下水汲上げ量（トン/日）		
	4m盤対策（ｶﾞﾗｽ固化壁，ｳｪﾙﾎﾟｲﾝﾄ）	地下水ﾊﾞｲﾊﾟｽ	海側遮水壁（地下水ドレン）	山/海側ｻﾌﾞﾄﾞﾚﾝ	陸側遮水壁（４辺）	合計	1～4号機建屋	プロセス主建屋，高温焼却炉建屋	ｳｪﾙﾎﾟｲﾝﾄ+地下水ﾄﾞﾚﾝ	地下水ﾊﾞｲﾊﾟｽ	山/海側ｻﾌﾞﾄﾞﾚﾝ
Ⅰ ※1	●	－	－	－	－	410	320	90	50	－	－
Ⅱ ※2	●	●	－	－	－	390	300	90	50	460	－
Ⅲ	●	●	●	●	－	160	120	40	120	410	700
Ⅳ	●	●	●	－	●	130	30	100	40	530	－

※1 汚染水処理対策委員会報告書（H25.12）の「ケース1」に該当
※2 〃 の「ケース2」に該当

建屋への地下水流入量抑制効果の比較

サブドレン稼働により，１～４号機の建屋流入量全体は120m^3/日まで減少する.

陸側遮水壁の４辺閉合により，１～４号機の建屋流入量全体は30m^3/日まで減少する.

無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

陸側遮水壁による建屋への地下水流入量抑制効果－解析条件（定常解析）－

各ケースの解析条件

ケース	解析条件					対策工				
	降雨浸透率	境界条件	透水係数	建屋水位	サブドレン稼働水位	4m盤対策（ｶﾞﾗｽ固化壁，ｳｪﾙﾎﾟｲﾝﾄ）	地下水ﾊﾞｲﾊﾟｽ	海側遮水壁（地下水ドレン）	山/海側ｻﾌﾞﾄﾞﾚﾝ	陸側遮水壁（４辺）
Ⅰ ※1	A	a	α	①	－	●	－	－	－	－
Ⅱ ※2	A	a	α	①	－	●	●	－	－	－
Ⅲ	A	a	α	①	建屋水位+1m	●	●	●	●	－
Ⅳ	A	a	α	①	－	●	●	●	－	●

※1 汚染水処理対策委員会報告書（H25.12）の「ケース１」に該当
※2 〃 の「ケース２」に該当

○降雨浸透

A：850mm/年（降雨浸透率：55%）
B：降雨浸透率　30%
C：降雨浸透率　70%
D:11mm/日

※陸側遮水壁（凍土）内ﾌｪｰｼﾝｸﾞ率：80%

○境界条件

a：陸・海：静水圧
b：陸：不透水、海：静水圧
c：陸・海：不透水

○中粒砂岩の透水性

α：2分割 3号機建屋南側の泥岩の挟層を伴う中粒砂岩の透水性を低下させる
β：均一 中粒砂岩の透水性を均一(3.0E-03/sec)

○建屋内の水位条件

建屋水位	1号機	2～4号機	プロセス	HTI（高温焼却炉）
①	OP4m	OP3m	OP4m	OP3m
②	OP3m	OP2m	OP4m	OP3m
③	ドライアップ			

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準３次元解析(GWAP)と解析条件について

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準3次元解析（GWAP）と解析条件について

■ 解析手法

準3次元浸透流解析プログラム（GWAP）による非定常浸透流解析

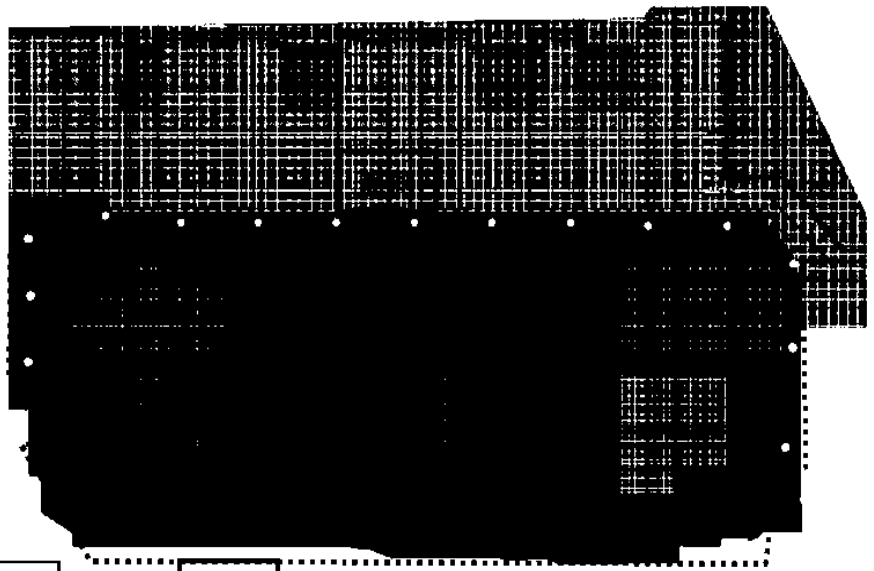
■ 解析条件

- モデル化領域：海側遮水壁と陸側遮水壁山側に囲まれた領域（右図参照）〔陸側遮水壁内外への水移動はないと仮定〕
- 建屋モデル化部分：1～4号のタービン建屋
  - ・原子炉建屋
  - ・廃棄物処理建屋
- 降雨浸透：2.3mm/日（基本ケース）
- 深部岩盤からの湧上り：なし（0 m^3/日）
  （地下水位低下に対して安全側）
- 地下水位（初期）：サブドレン稼動時
  - ・非稼動時
- 建屋水位：一定
  経時的に低下
  （パラメータとして設定）
- 注水量： 0m^3/日
  110m^3/日（パラメータとして設定）

●物性値

	透水係数(cm/s)	設定間隙率
建屋外地盤	3.0×10^{-3} ※1	0.16※3
建屋外壁	1.0×10^{-5} ※2	－

※1： 3次元浸透流解析結果（汚染水処理対策委員会にて報告）における“中粒砂岩”の透水係数より設定.
※2：3次元浸透流解析結果（汚染水処理対策委員会モデル）における建屋流入量に基づき感度解析を行って同定した.
※3：3次元浸透流解析結果（汚染水処理対策委員会モデル）における地下水位低下速度に基づき，感度解析を行って同定した.



：注水井（海側）：15孔
●：注水井（山側）：16孔

図　解析モデル

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陸側遮水壁の遮水性発現による水位低下について

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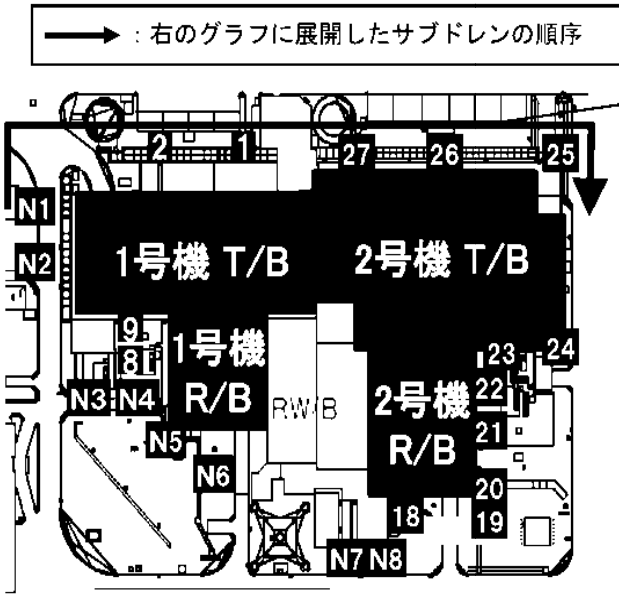
海側遮水壁閉合および陸側遮水壁山側閉合による建屋海側の地下水位変動について（定常解析結果）

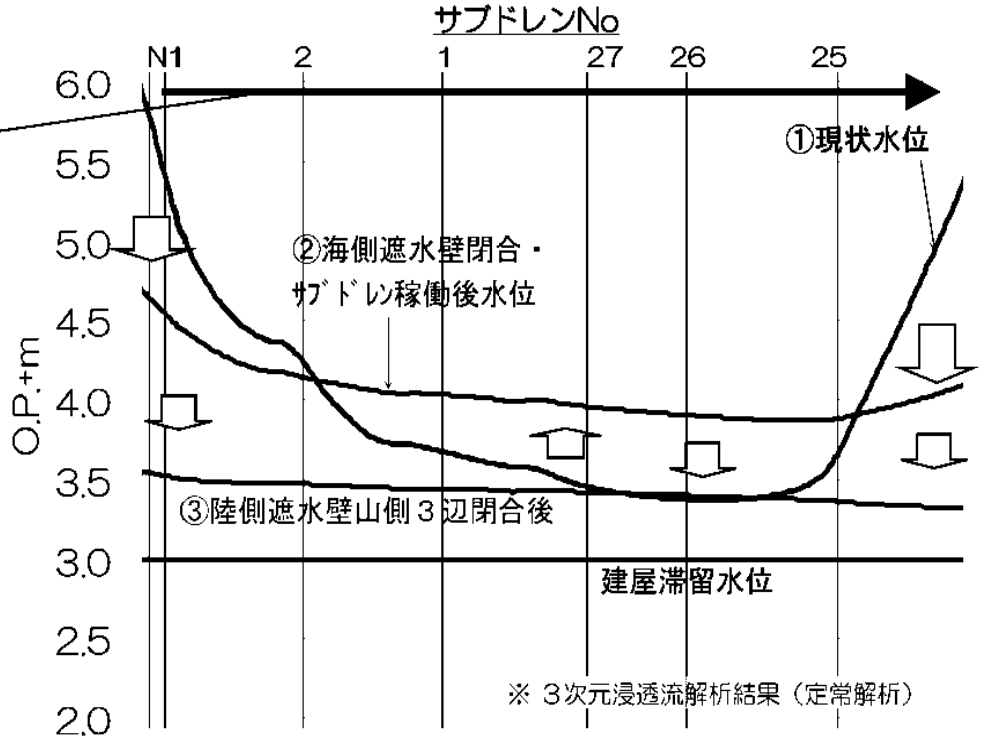
建屋海側の地下水位変動に関する解析検討結果

建屋海側の地下水位は，海側遮水壁閉合により50cm程度上昇する．
その後，陸側遮水壁山側3辺閉合により同程度地下水位が低下し，建屋海側の地下水位はほぼ現状水位と同程度となる．

揚水井	揚水井の設定水位	建屋滞留水の水位	備考
サブドレンピット	建屋滞留水の水位 ＋1.0m	OP+3.0m	地下水バイパス汲上げ 海側遮水壁閉塞
地下水ドレンポンド	地表面(GL) －1.0m	－	



サブドレン配置図



各設備稼働に伴う地下水位の変化（1/2号建屋海側）

※サブドレン稼働後水位は，建屋際約50cm位置での水位を示す．

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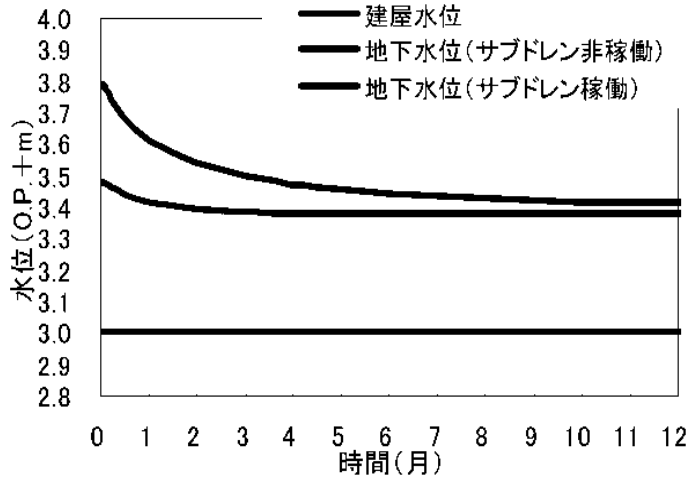
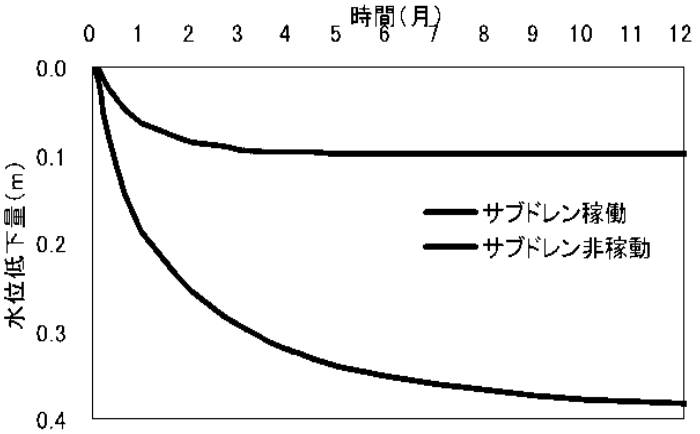
陸側遮水壁山側の遮水性発現に伴う建屋海側の地下水位低下量と低下速度

各設備		解析条件
海側（鋼管）遮水壁		閉合
4m盤	地盤改良	完了
	揚水工（ｳｪﾙﾎﾟｲﾝﾄ）	稼動（稼働水位：GL-1.0m（O.P.+3.0m）
	地下水ドレン	
	フェーシング	100%
4～10m盤	フェーシング	0%
10m盤（陸側遮水壁内）	フェーシング	0%
	サブドレン	稼動（稼動水位：建屋水位+1m）**非稼動**
	陸側遮水壁	山側3辺閉合（海側未閉合）
	注水井からの注水	無

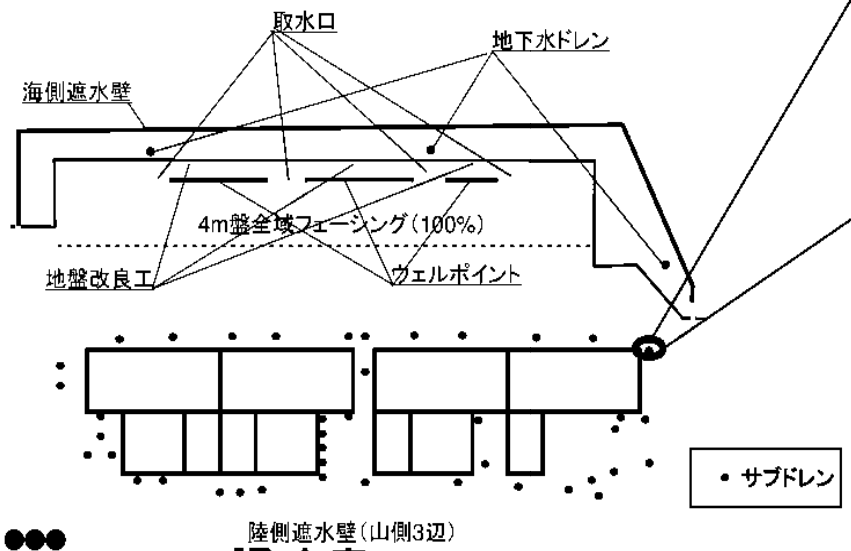
降雨量	約4mm/日　一定（建屋以外の領域に降雨）	年平均降雨量1,545mm
降雨浸透率	55%	汚染水処理対策委員会報告より



陸側遮水壁の遮水性発現後の地下水位の経時変化



陸側遮水壁の遮水性発現後の地下水位低下量



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極端に降雨が少ない場合の地下水位低下　解析条件

解析の目的

極端に降雨が少ない場合の地下水位低下予測

上記に対する対応としての注水井からの注水の効果について

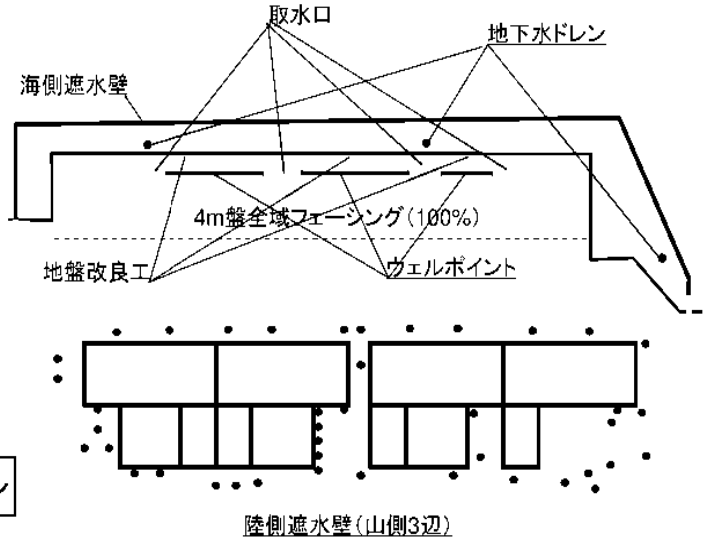
解析モデルおよび手法

解析モデル化領域：海側遮水壁と陸側遮水壁山側３辺で囲まれた領域

解析手法：準３次元解析（GWAP）による非定常解析

各設備		解析条件
海側（鋼管）遮水壁		閉合
4m盤	地盤改良	完了
	揚水工（ｳｪﾙﾎﾟｲﾝﾄ）	稼動（稼働水位：GL-1.0m（O.P.+3.0m）
	地下水ドレン	
	フェーシング	100%
4～10m盤	フェーシング	0%
10m盤（陸側遮水壁内）	フェーシング	0%
	サブドレン	稼動（稼動水位：建屋水位+1m）
	陸側遮水壁	山側3辺閉合（海側未閉合）
	注水井からの注水	0m³/日 110m³/日

降雨量	0mm/日



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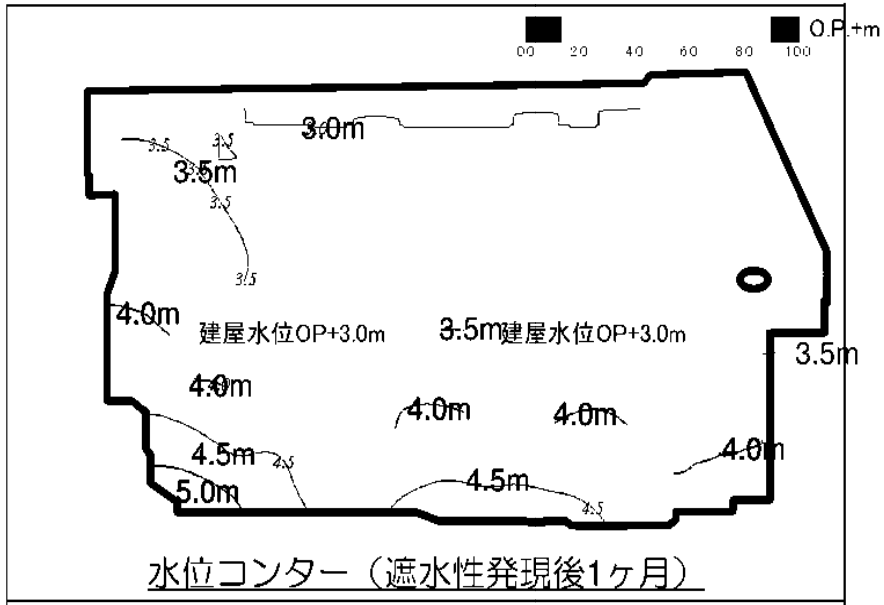
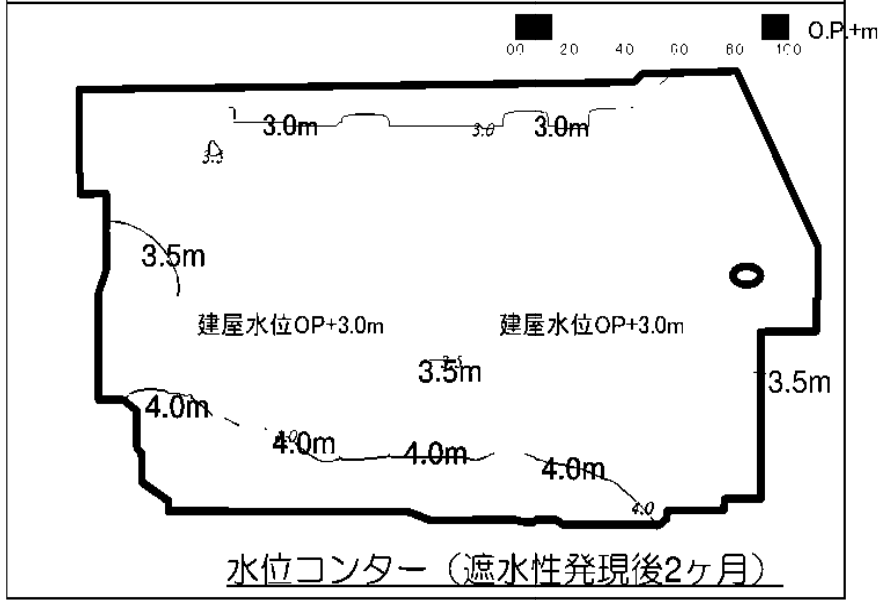
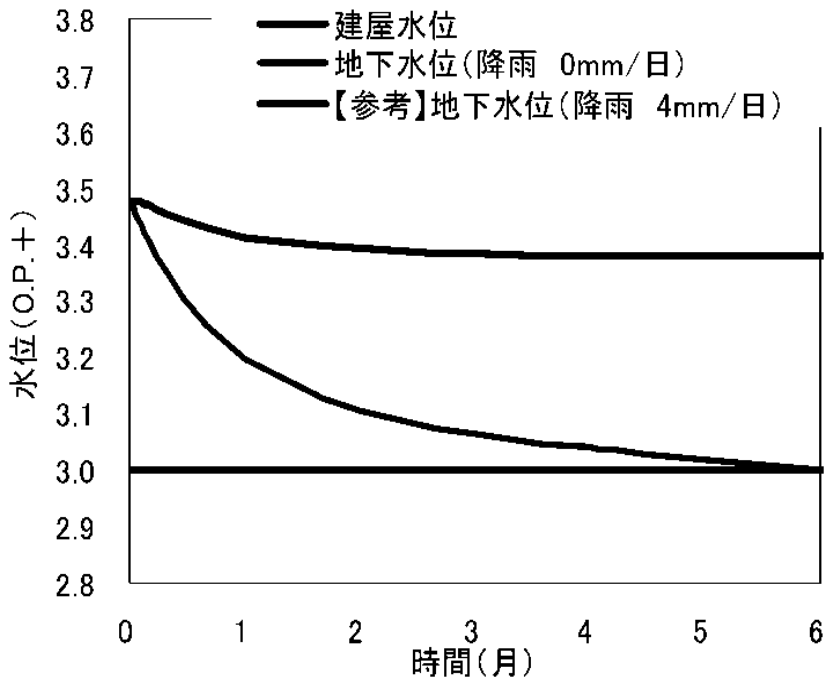
極端に降雨が少ない場合の地下水位低下　解析結果



水位コンター（遮水性発現後1ヶ月）



水位コンター（遮水性発現後2ヶ月）



建屋海側地下水位の経時変化

降雨が全くない場合，10mm/日（0.3m/月程度）の速度で建屋海側の水位が低下する.

建屋滞留水の移送能力は約50mm/日（1.5m/月程度）あり，十分余裕を持っている.

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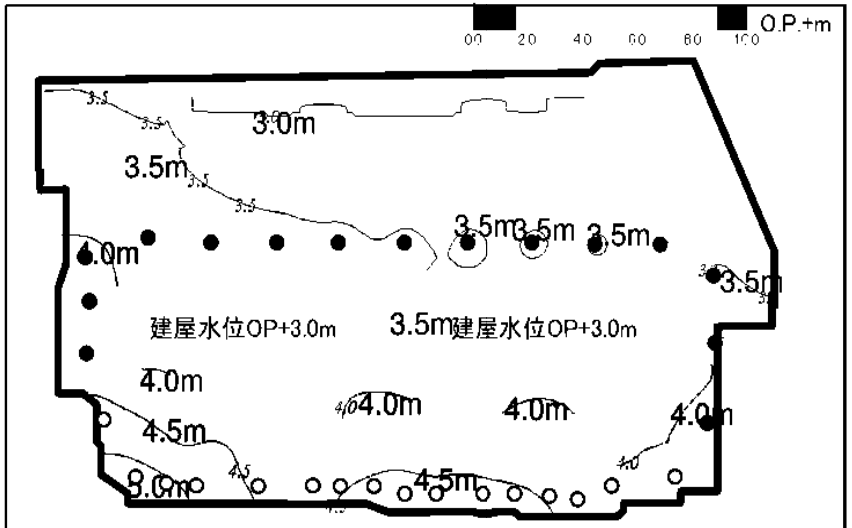
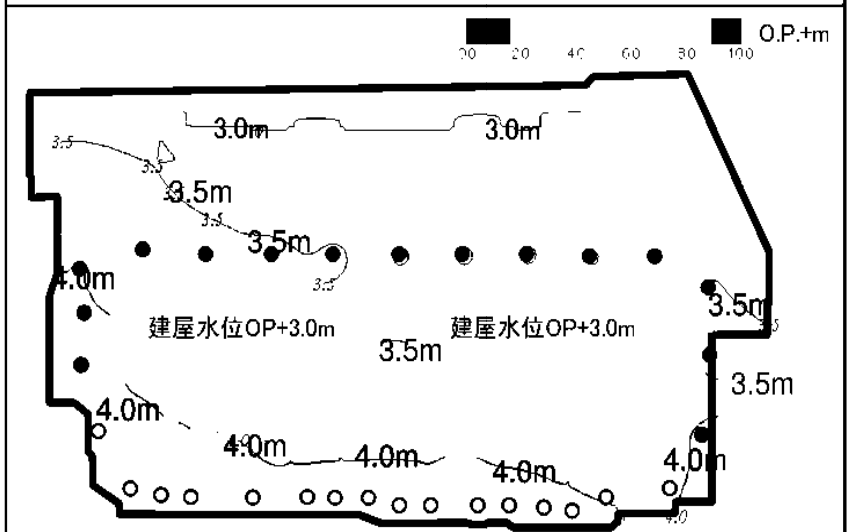
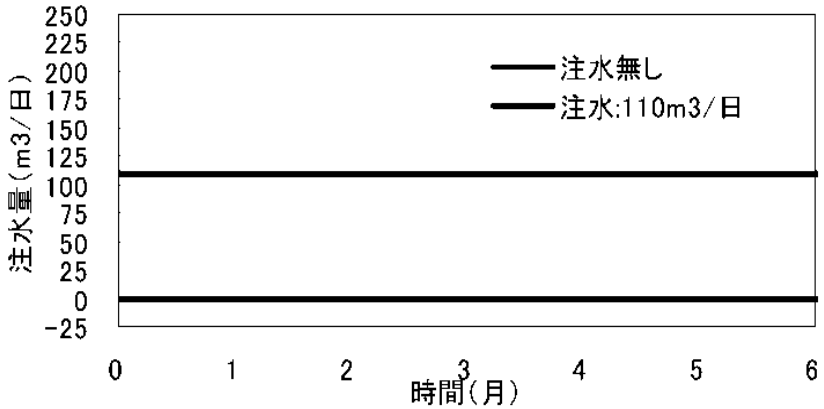
極端に降雨が少ない場合の地下水位低下に対する対応　注水井からの注水



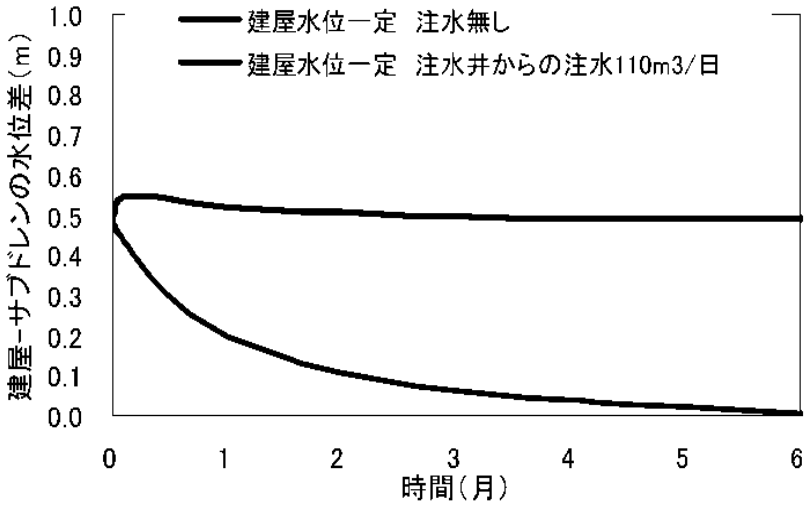
水位コンター（遮水性発現後1ヶ月）



水位コンター（遮水性発現後2ヶ月）



注水井からの注水条件



建屋ー地下水位　水位差の経時変化

● 注水井（注水中）
○ 〃　（停止）

必要に応じた注水井からの注水により，建屋と地下水位の水位差を確保できる.

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原地盤における注水試験結果と注水設備

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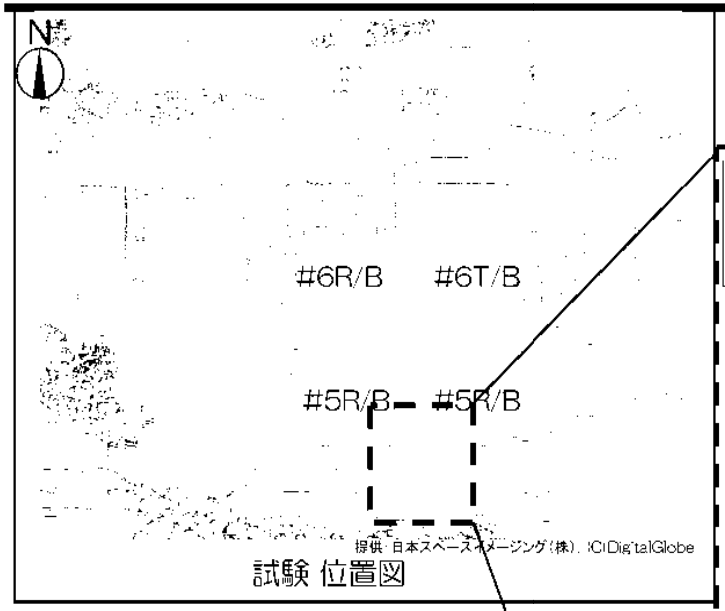
原地盤における注水試験（フィージビリティ・スタディ）の概要

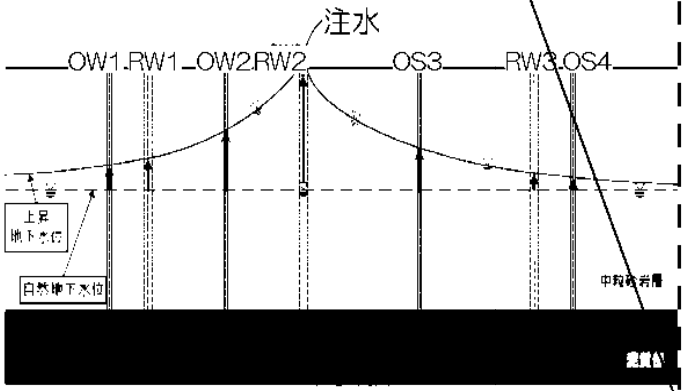
5号機建屋南側にて中粒砂岩層※を対象として注水試験等を実施.
※ 1～4号機建屋周辺の注水対象土層と同種の土質条件



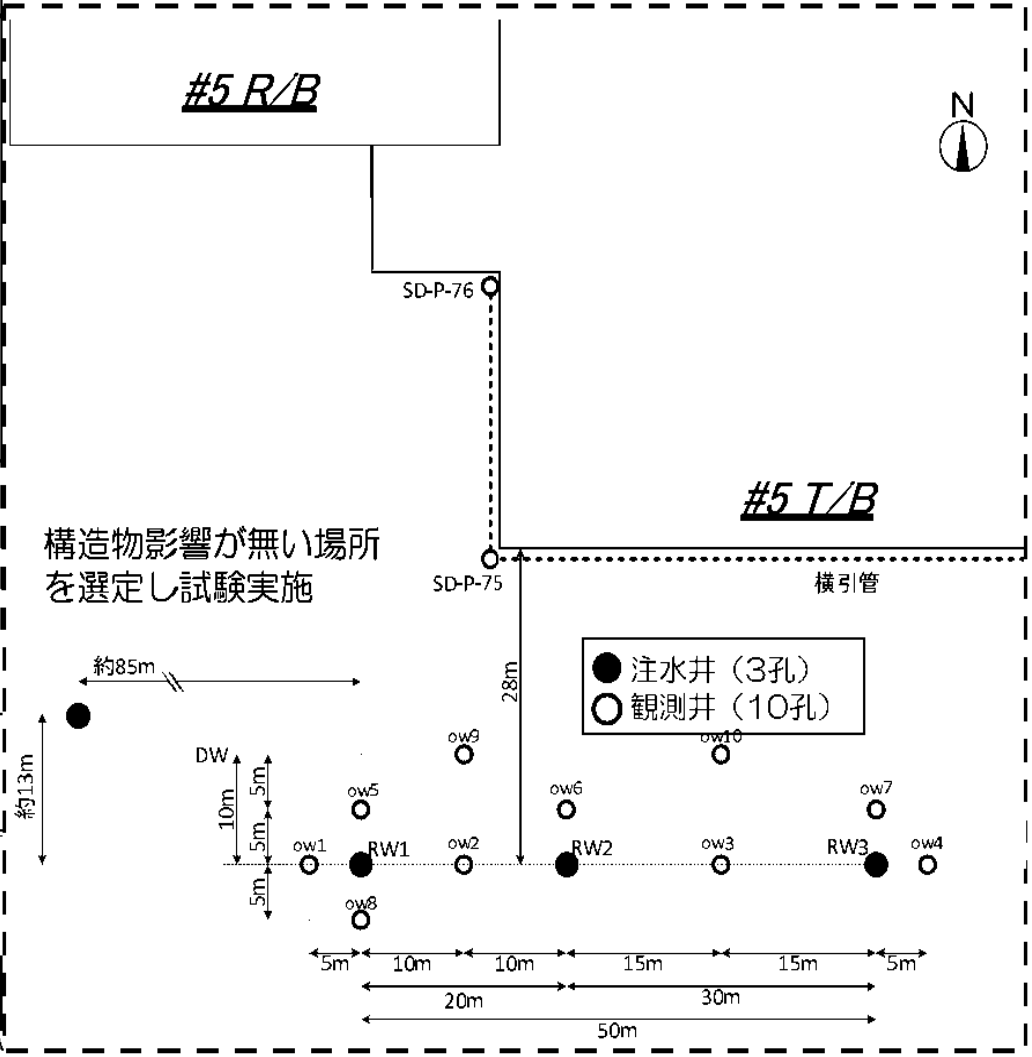
試験 位置図

目的

注水井の注水性能の把握
注水による周辺地盤の地下水位への影響
→注水井配置を設計する地下水解析の検証



構造物影響が無い場所
を選定し試験実施



注水井・観測井配置図

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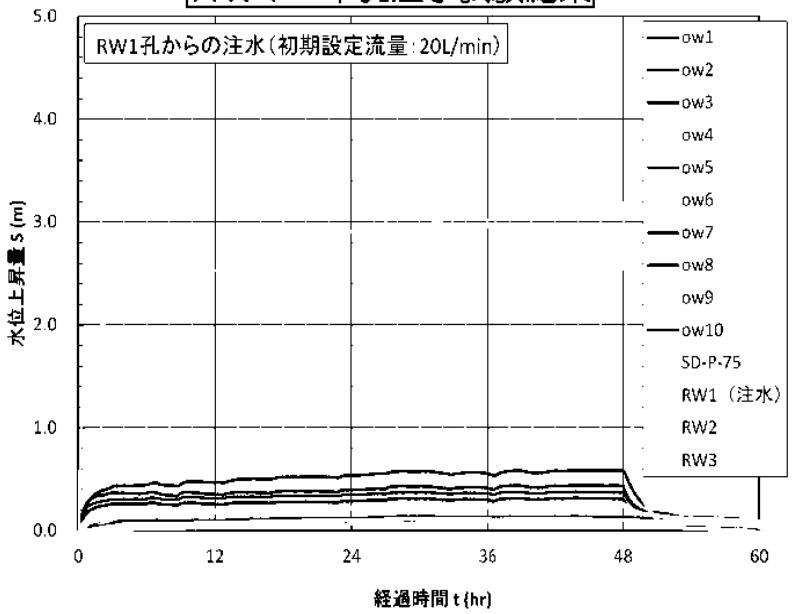
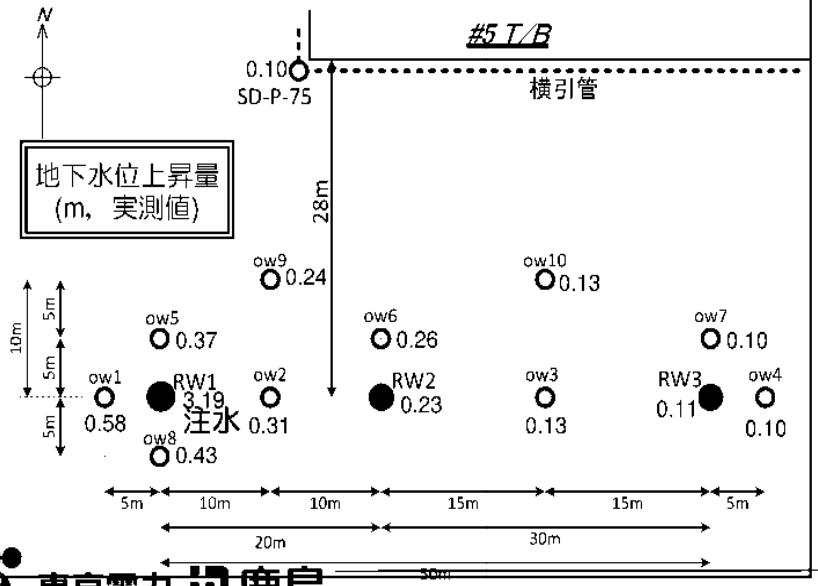
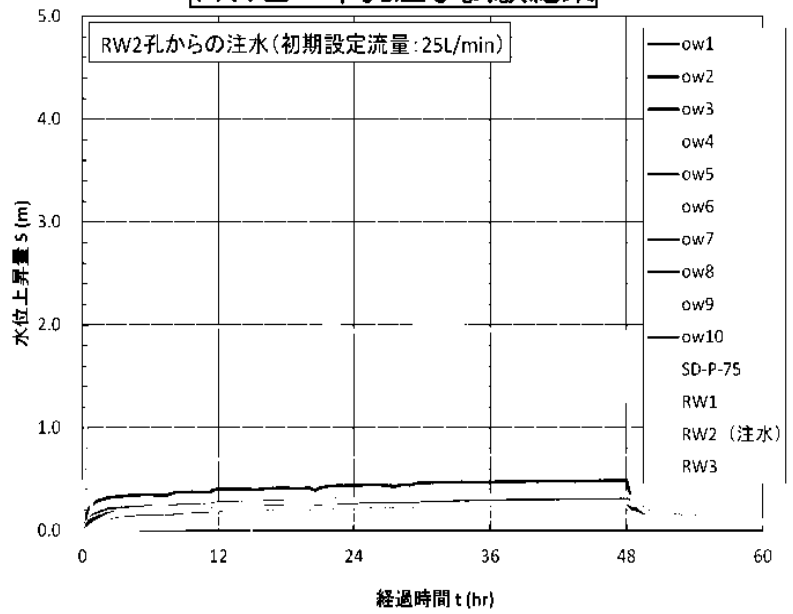
原地盤における注水試験結果（単孔注水RW1・RW2）

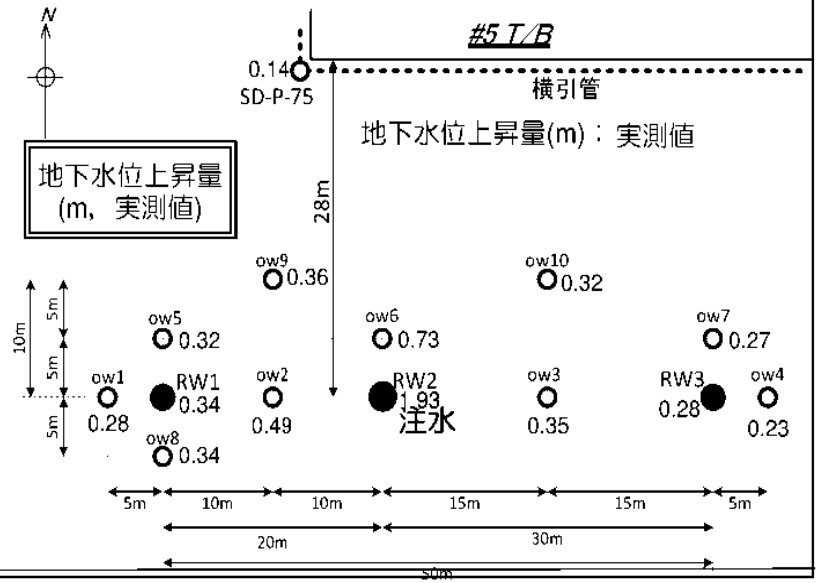
RW1　単孔注水試験結果





RW2　単孔注水試験結果





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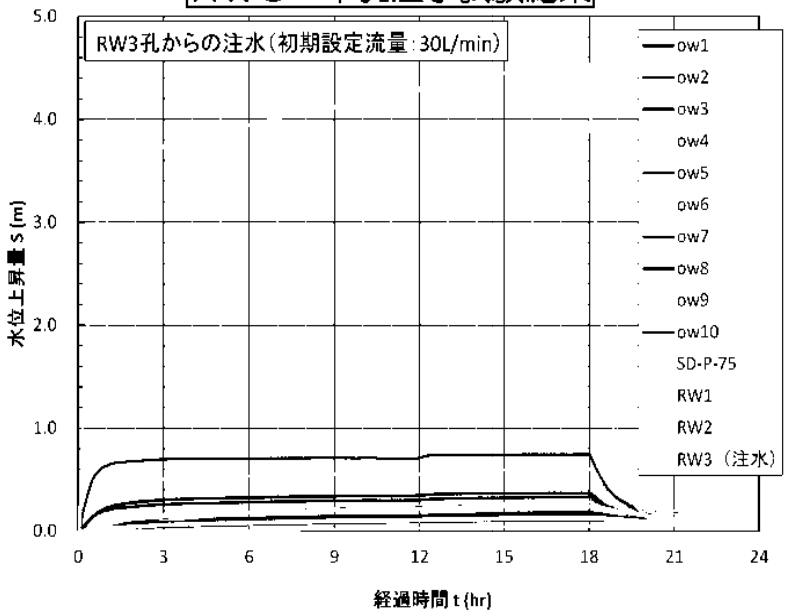
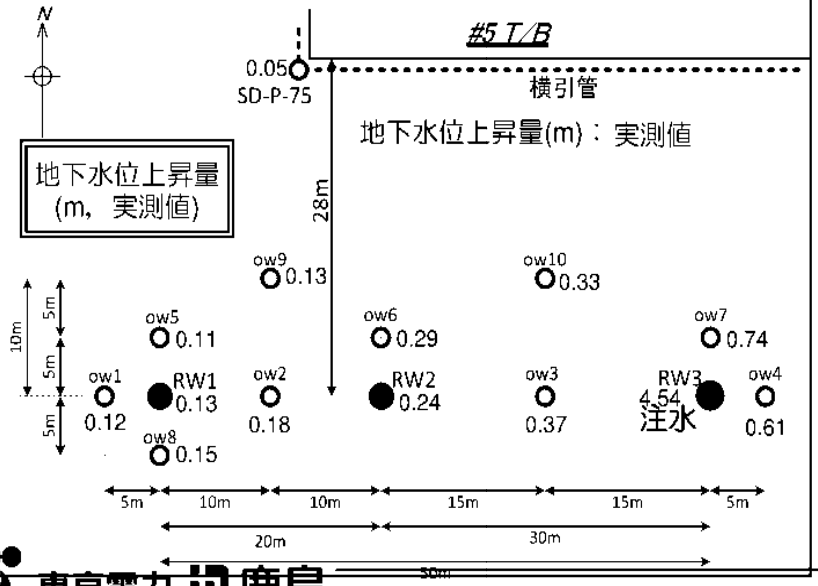
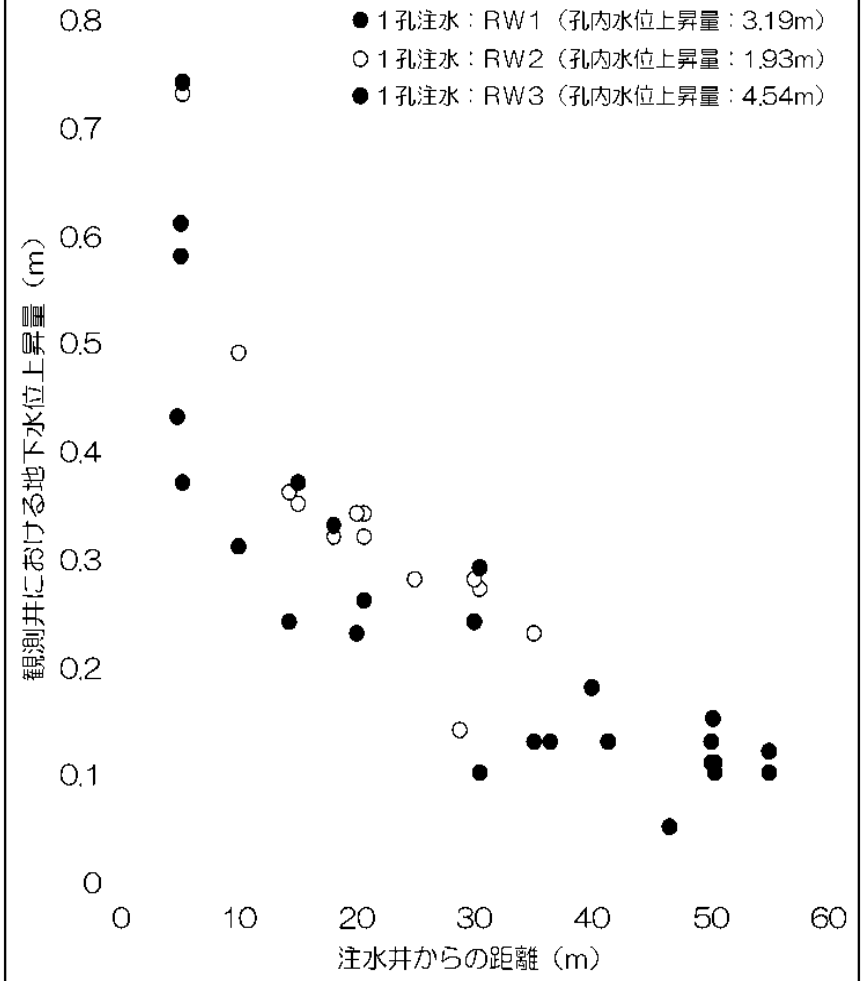
原地盤における注水試験結果（単孔注水：RW3，地下水位上昇量（3試験結果集約））

RW3　単孔注水試験結果







注水井からの距離50m程度まで
注水の影響が達している

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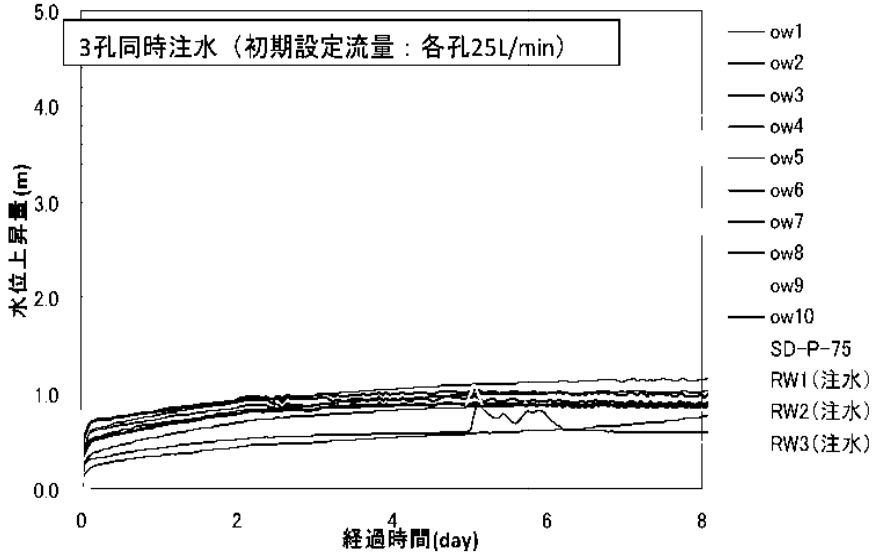
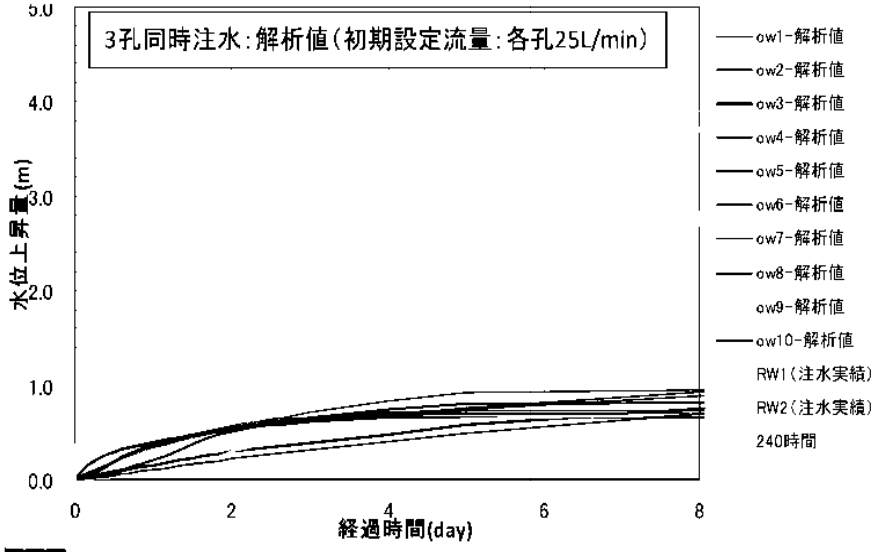
原地盤における注水試験　3孔（RW1～3）からの注水試験結果（実測値 および 解析結果）

◆地下水位上昇量（実測）



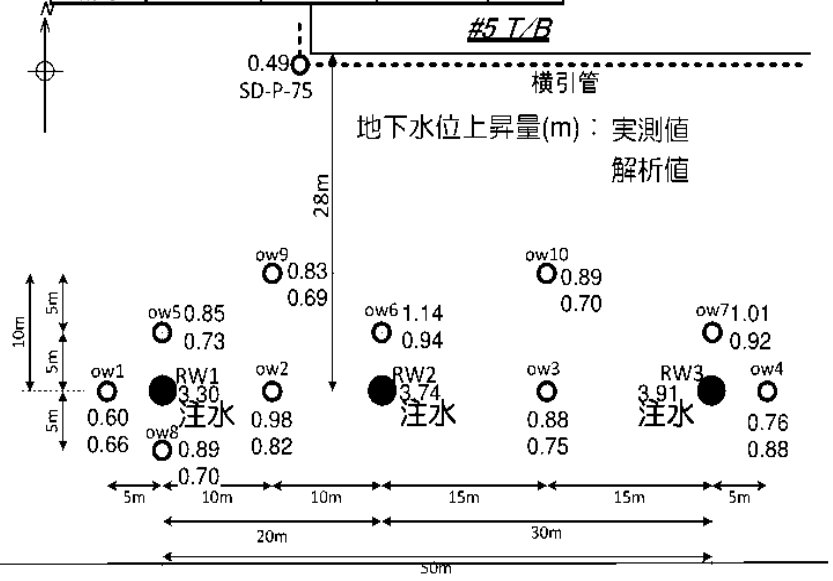
◆地下水位上昇量（解析値）



ほぼ，解析と同程度以上まで注水により水位が上昇している．

地下水位上昇量と注水井からの距離

	水位上昇量：実測値(m)	水位上昇量：解析値(m)	最も近い注水井との距離(m)	備　考
ow1	0.60	0.66	5.0	
ow2	0.98	0.82	10.0	
ow3	0.88	0.75	15.0	
ow4	0.76	0.88	5.0	
ow5	0.85	0.73	5.2	
ow6	1.14	0.94	5.2	
ow7	1.01	0.92	5.2	
ow8	0.89	0.70	4.8	
ow9	0.83	0.69	14.3	
ow10	0.89	0.70	18.1	
SD-P-75	0.49	—	28.7	
RW1	**3.30**	—	—	**注水井**
RW2	**3.74**	—	—	**注水井**
RW3	**3.91**	—	—	**注水井**
備考				



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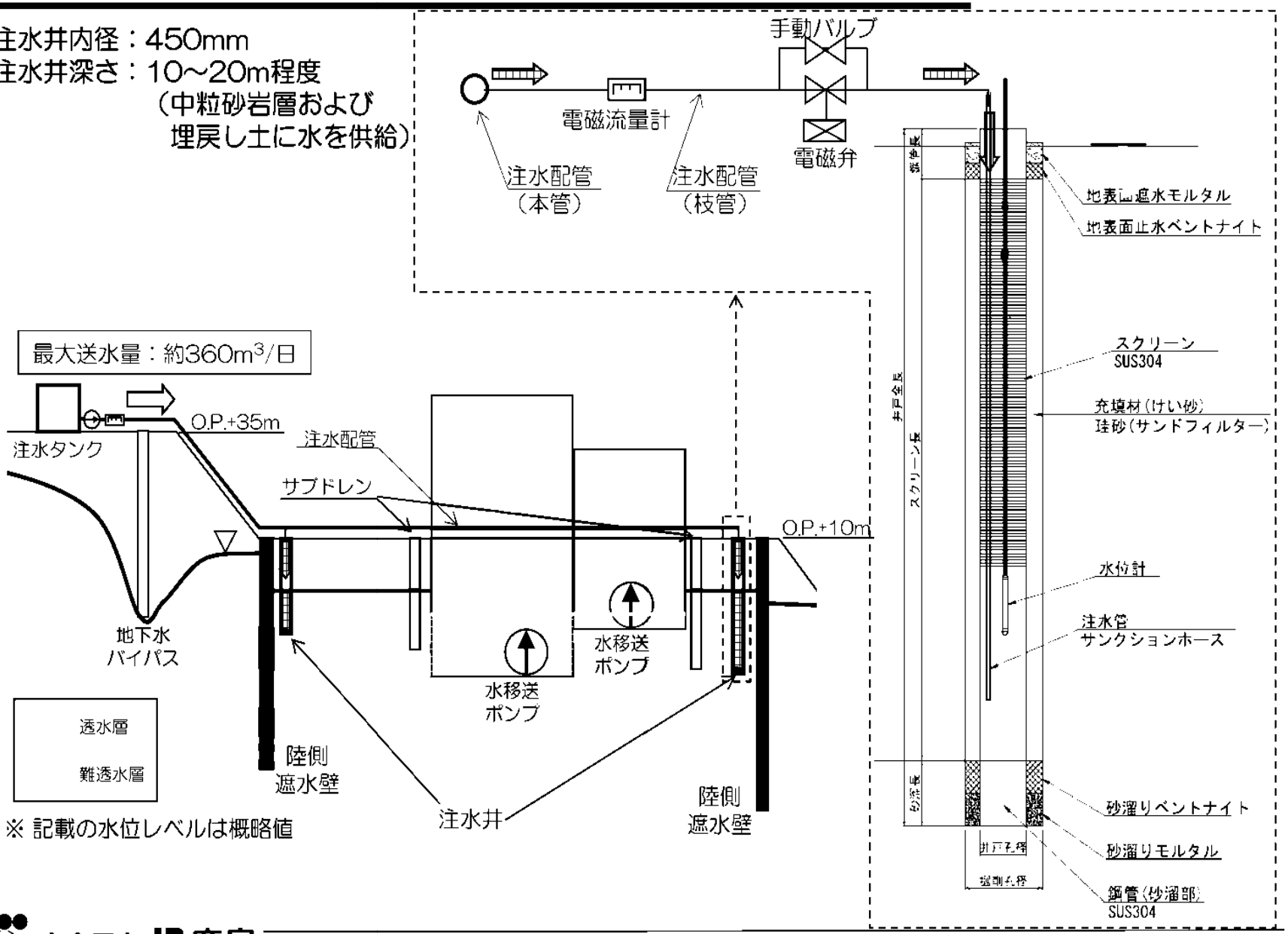
注水設備概要（断面図）

注水井内径：450mm
注水井深さ：10～20m程度
（中粒砂岩層および
埋戻し土に水を供給）



無断複製・転載禁止　東京電力株式会社　鹿島建設株式会社

特定原子力施設 監視・評価検討会
（第31回）
資料3

陸側遮水壁閉合後の水位管理について

平成27年2月9日

東京電力株式会社
鹿島建設株式会社

東京電力 TEPCO　鹿島

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

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1．建屋滞留水の水位管理について
2．陸側遮水壁の遮水性発現後の水位管理
陸側遮水壁造成順序と地下水位変化の想定
1～4号機建屋内外の水位管理方針

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

目次

1．建屋滞留水の水位管理について

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

１．１　現状の建屋滞留水の水位管理

１～４号機建屋内に滞留している高濃度放射性汚染水については，プロセス主建屋・高温焼却炉建屋に移送し，さらに，汚染水処理設備により放射性核種のセシウム及び塩分を除去して淡水を生成し，原子炉への注水に再使用している（循環注水冷却）。

ただし，１～４号機の建屋内には地下水が流入しているため，高濃度放射性汚染水が系外に放出しないよう適切に建屋内水位を管理する必要がある。

現状の1～4号機の建屋滞留水の水位管理の運転上の制限は，以下のとおり。

■２・３号炉の立坑およびタービン建屋の滞留水水位はOP3,500mm以下であること。
■建屋滞留水の水位が各建屋近傍のサブドレン水の水位を超えないこと。

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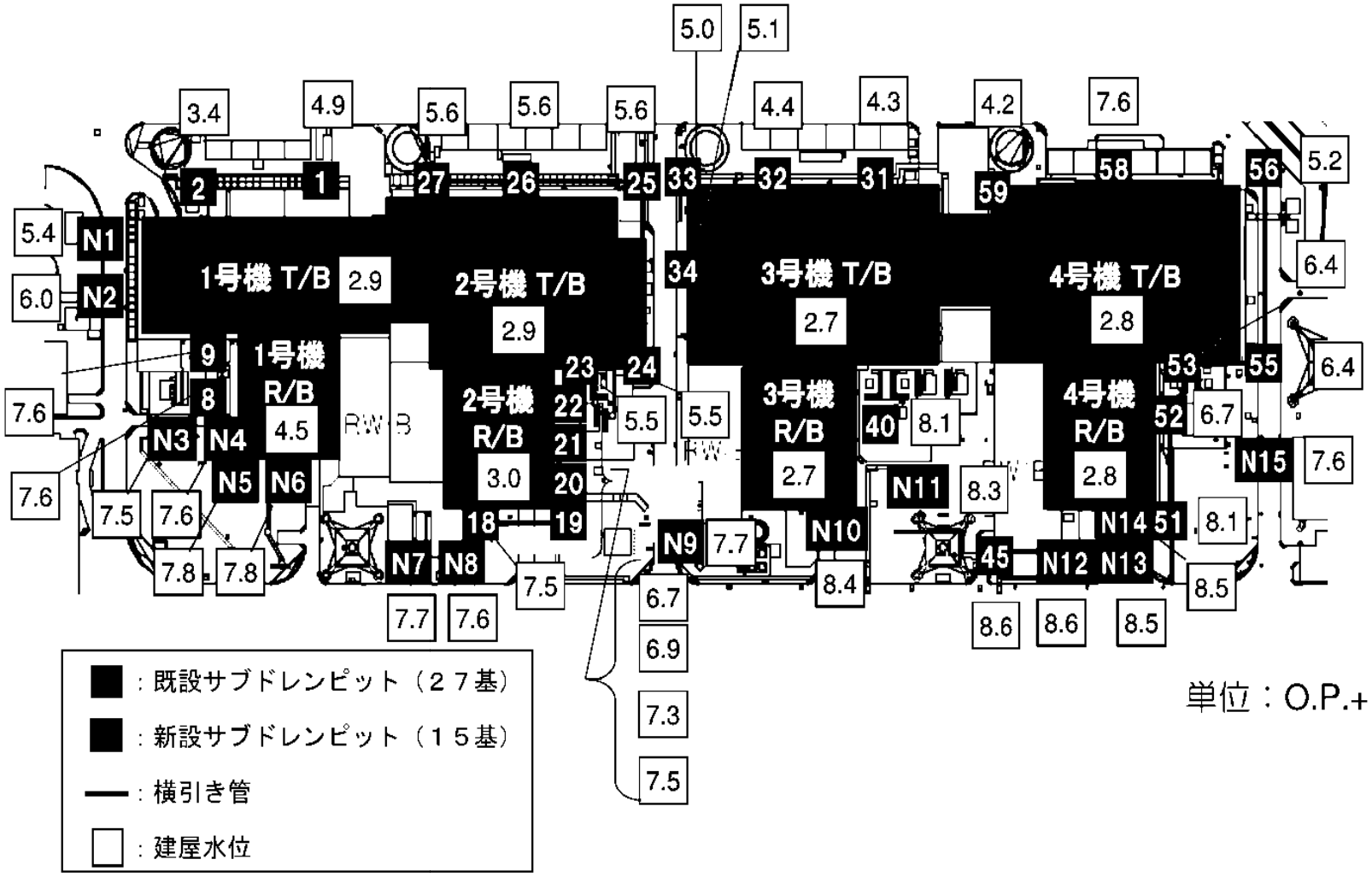
1．2　現状の建屋水位とサブドレン水位（平成26年11月10日）



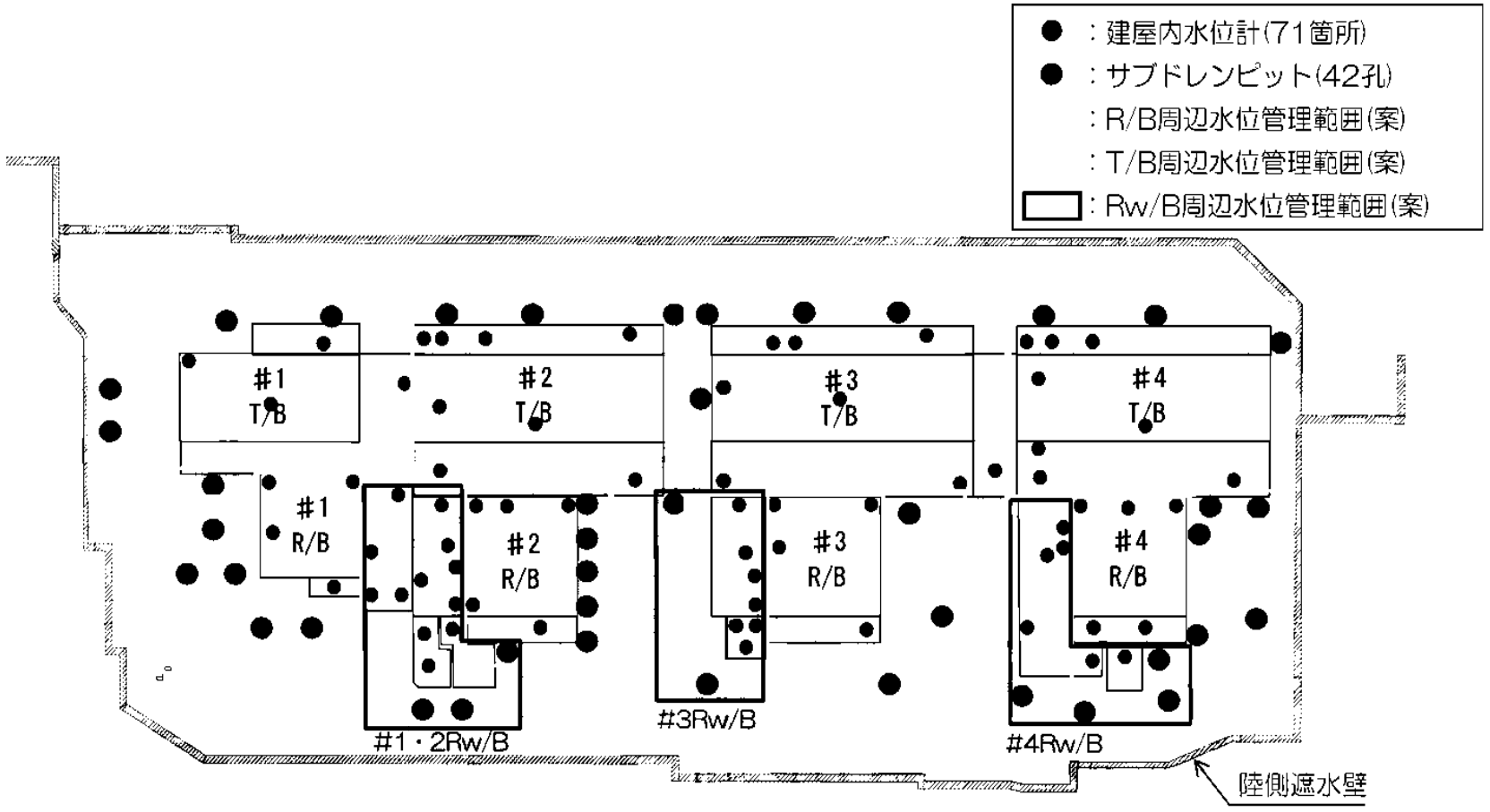
無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

2．建屋内滞留水水位計設置後の水位管理（実施計画変更申請中）

建屋内滞留水水位計を設置した後の水位管理は以下のように行う。

建屋水位と地下水位のデータ管理は，１～４号機の各建屋毎に行う。

各建屋に設置した水位計の水位が近傍のサブドレン水位を上回らないように管理する。



無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

2．陸側遮水壁の遮水性発現後の水位管理

陸側遮水壁造成順序と地下水位変化の想定

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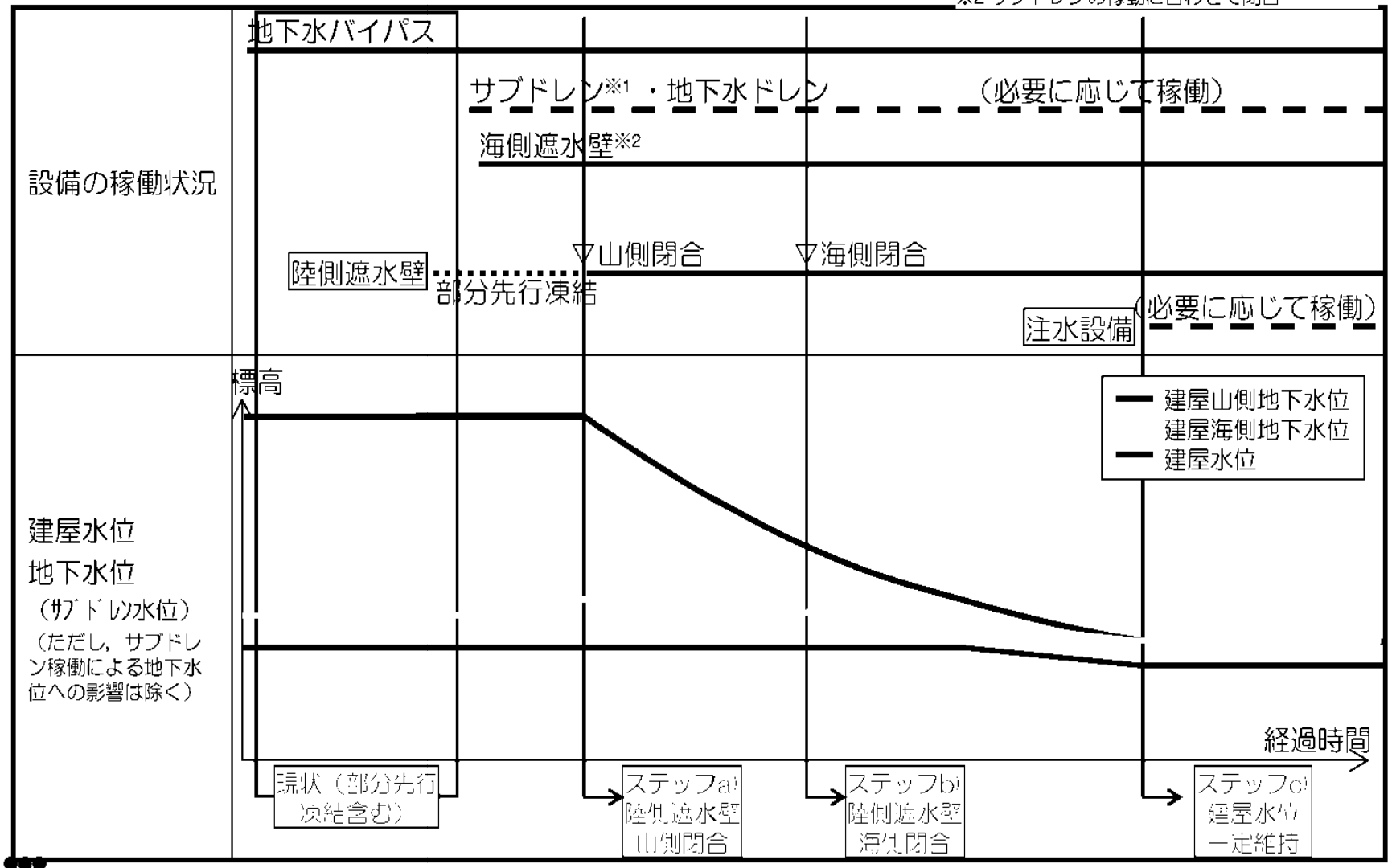
1．陸側遮水壁閉合等に伴う地下水位変化の想定（イメージ）

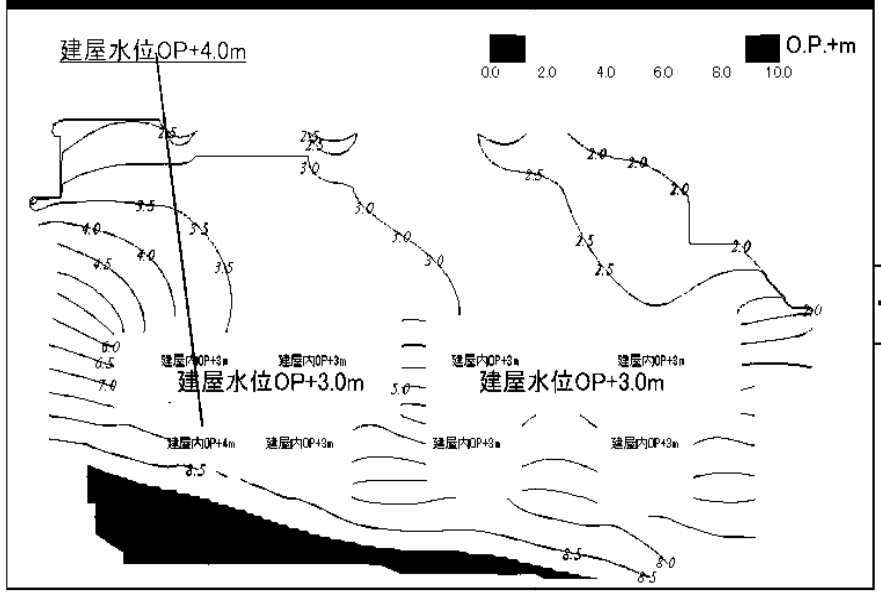
陸側遮水壁造成等に伴い地下水位は以下に示すイメージで変化すると想定される。
以降，各ステップにおける地下水位変化の概要を示す。

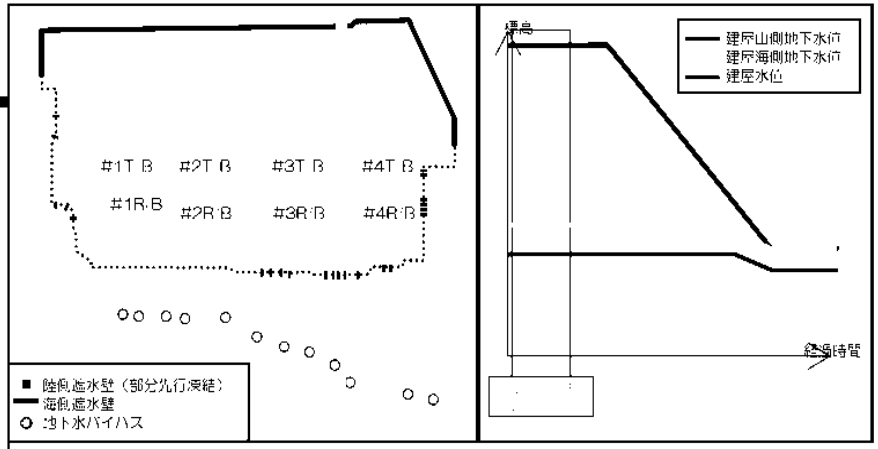
※1 サブドレンの稼動は関係者と調整の上，実施
※2 サブドレンの稼動に合わせて閉合



無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

2．1　現状（部分先行凍結を含む）





稼働中

地下水バイパス

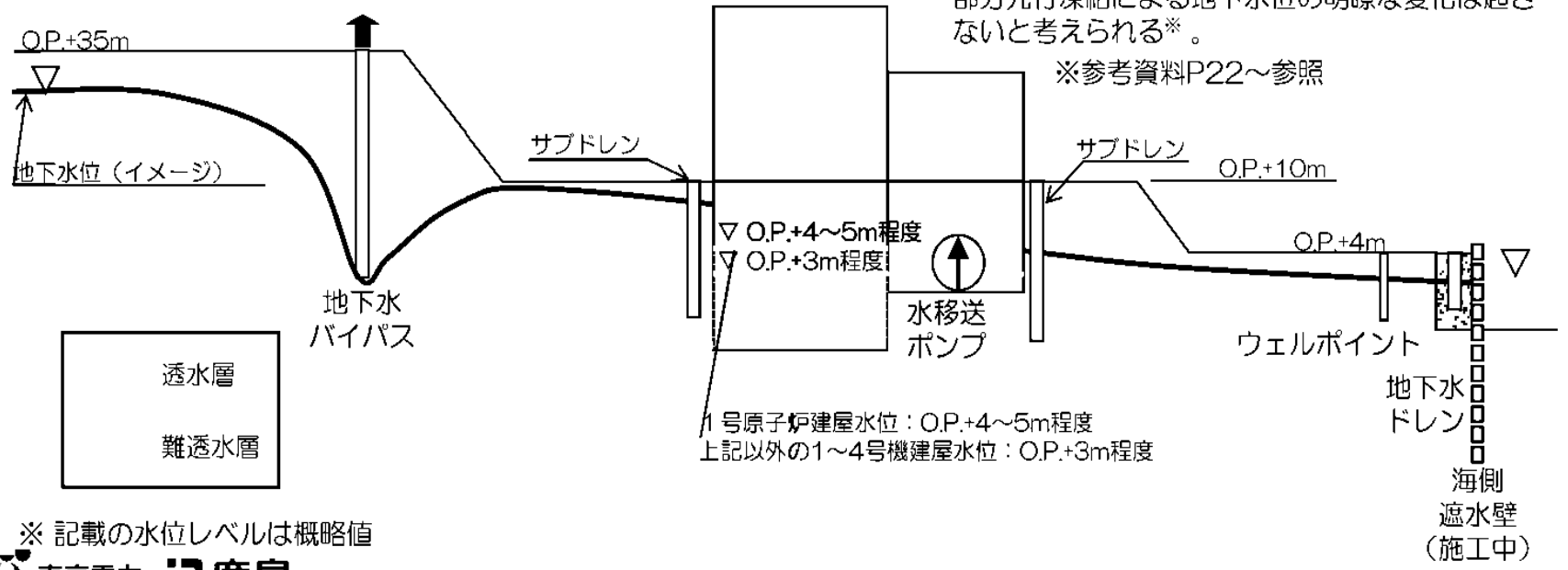
施工中

海側遮水壁未閉合（施工中）

部分先行凍結（今後実施）※

部分先行凍結による地下水位の明瞭な変化は起きないと考えられる※。

※参考資料P22～参照



※ 記載の水位レベルは概略値

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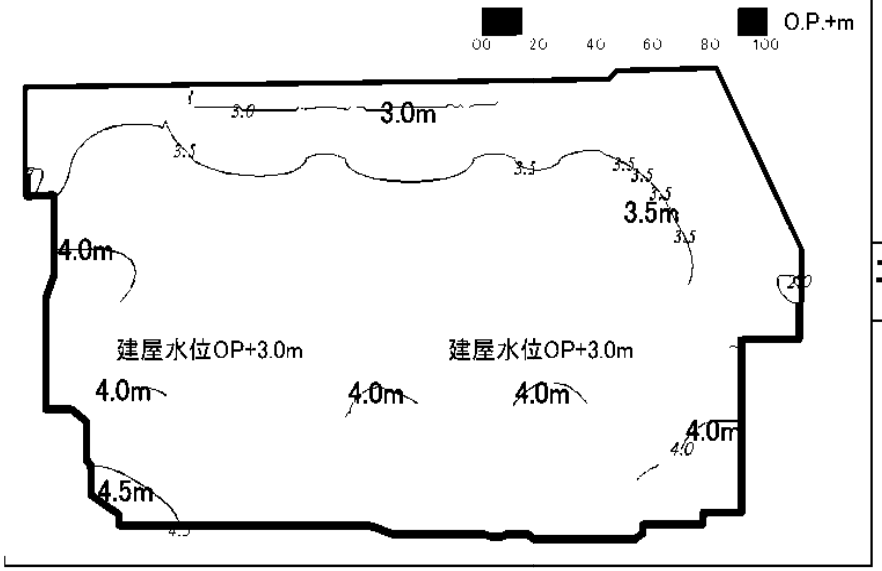
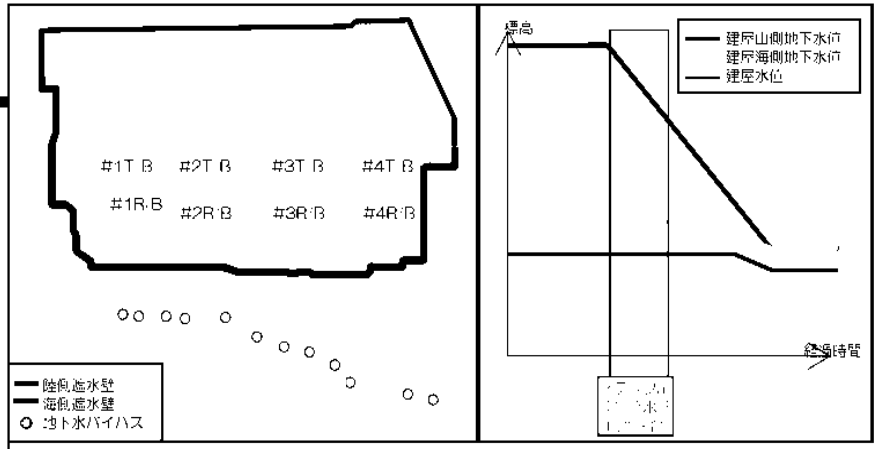
2．2　ステップa）陸側遮水壁山側閉合



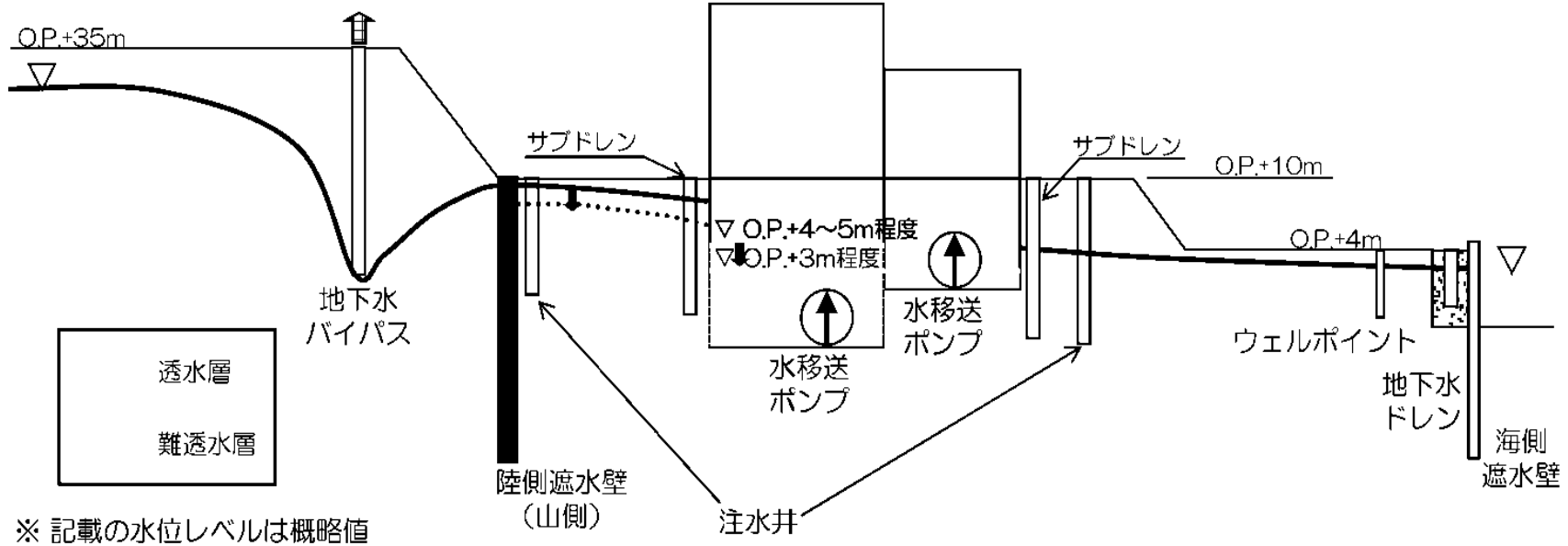


凍結による遮水性の発現に伴って，主に建屋山側の地下水位が低下していく。

建屋海側の地下水位は，海側遮水壁閉合の影響により一旦上昇した後，陸側遮水壁山側閉合により若干低下する。

サブドレン・地下水ドレンは必要に応じ稼動

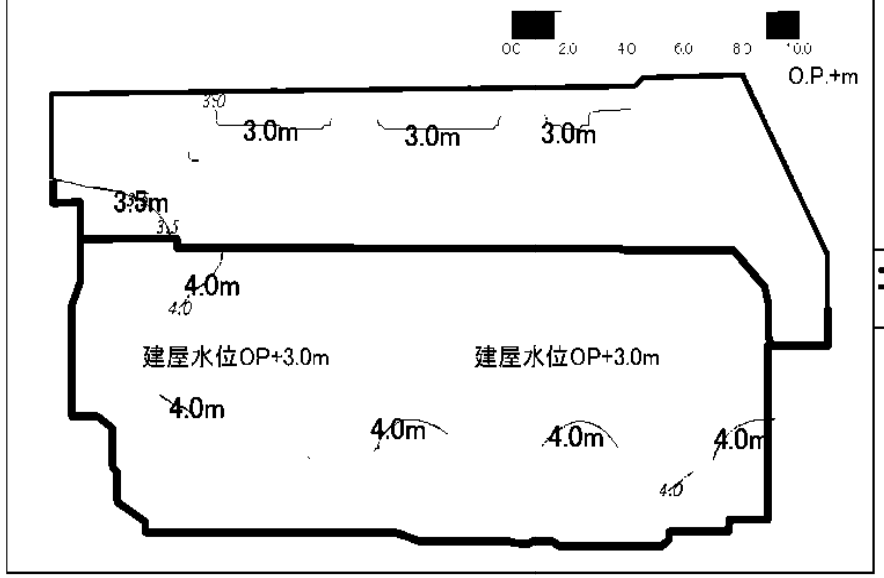
1～4号機の全ての建屋水位をほぼ均一にする。

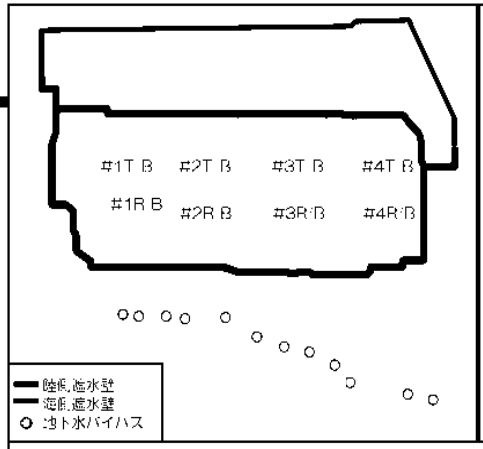


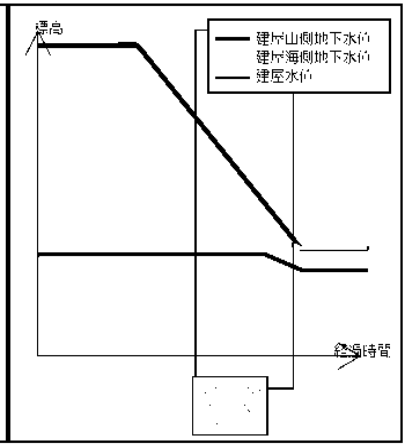
※ 記載の水位レベルは概略値

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

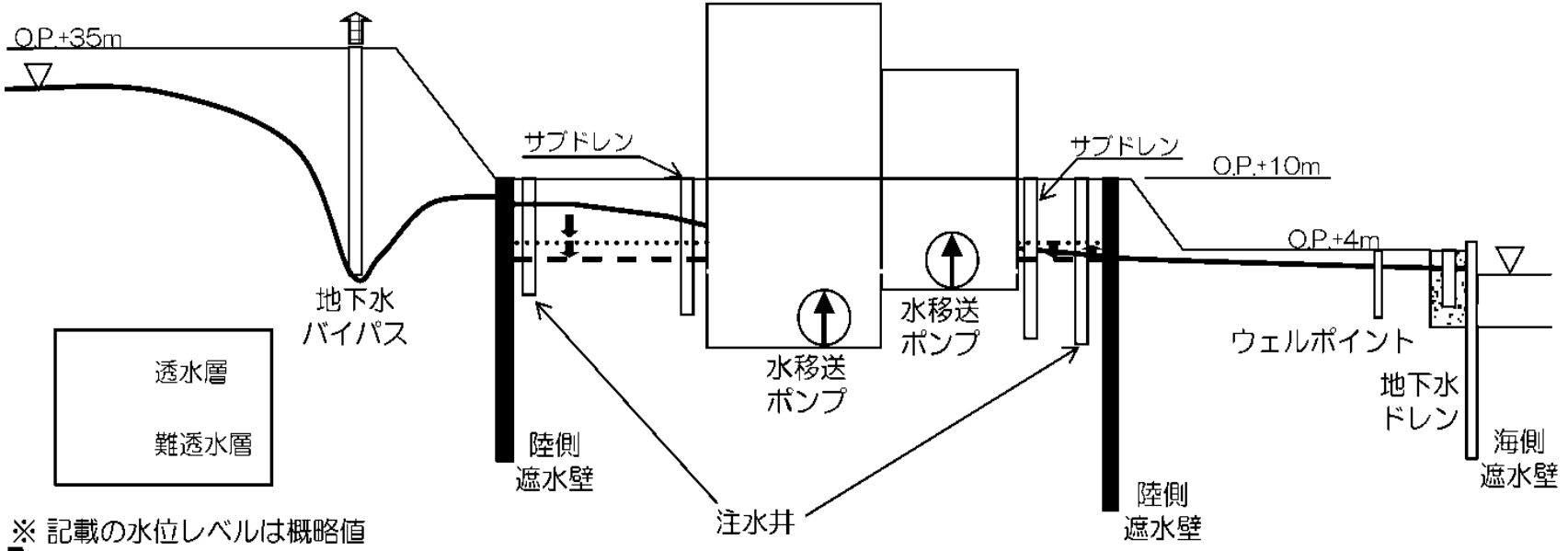
2．3　ステップb）陸側遮水壁海側閉合







陸側遮水壁海側の凍結による遮水性の発現に伴って，遮水壁内の地下水位は均一化しながら低下する。
建屋周辺の地下水位の低下に合わせて，建屋水位を必要に応じ低下させることで建屋水位と地下水位の水位差を確保する。
サブドレン・地下水ドレンは必要に応じ稼動



※ 記載の水位レベルは概略値

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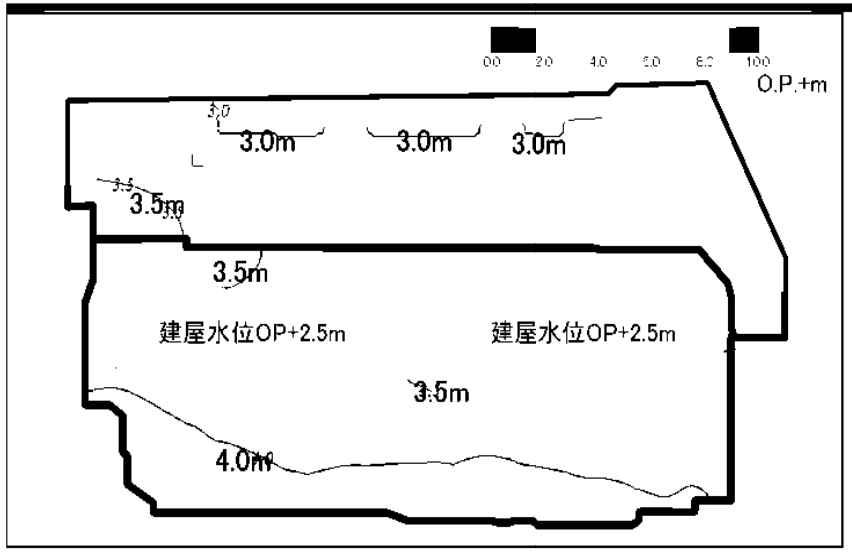
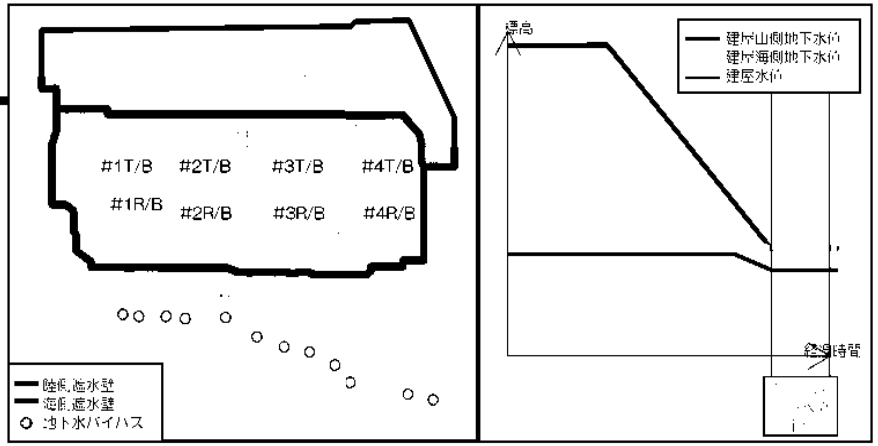
2．4　ステップc）建屋水位一定維持

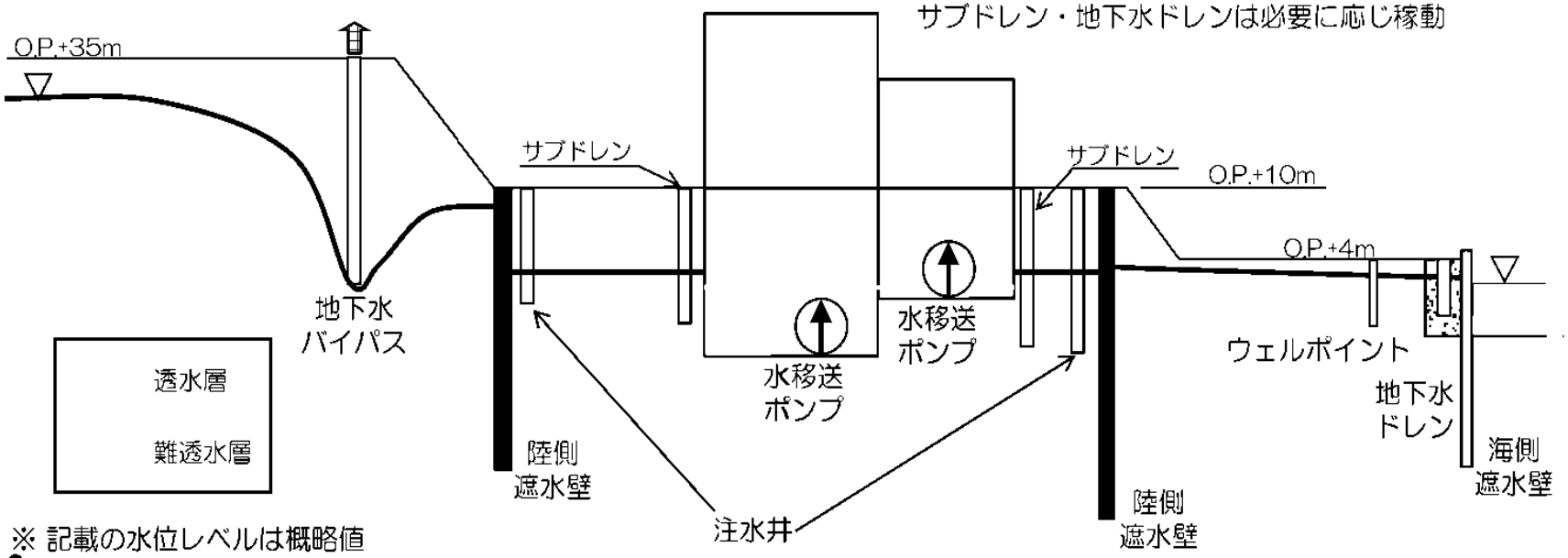




降雨等による地下水涵養と建屋への地下水流入とのバランスにより地下水位の低下は緩慢となり，建屋周辺の地下水位はある一定の水位に落ち着く。

必要に応じ注水井からの注水を実施することで建屋水位と地下水位の水位差を確保する。

サブドレン・地下水ドレンは必要に応じ稼動



※ 記載の水位レベルは概略値

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

2．陸側遮水壁の遮水性発現後の水位管理

1～4号機建屋内外の水位管理方針

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

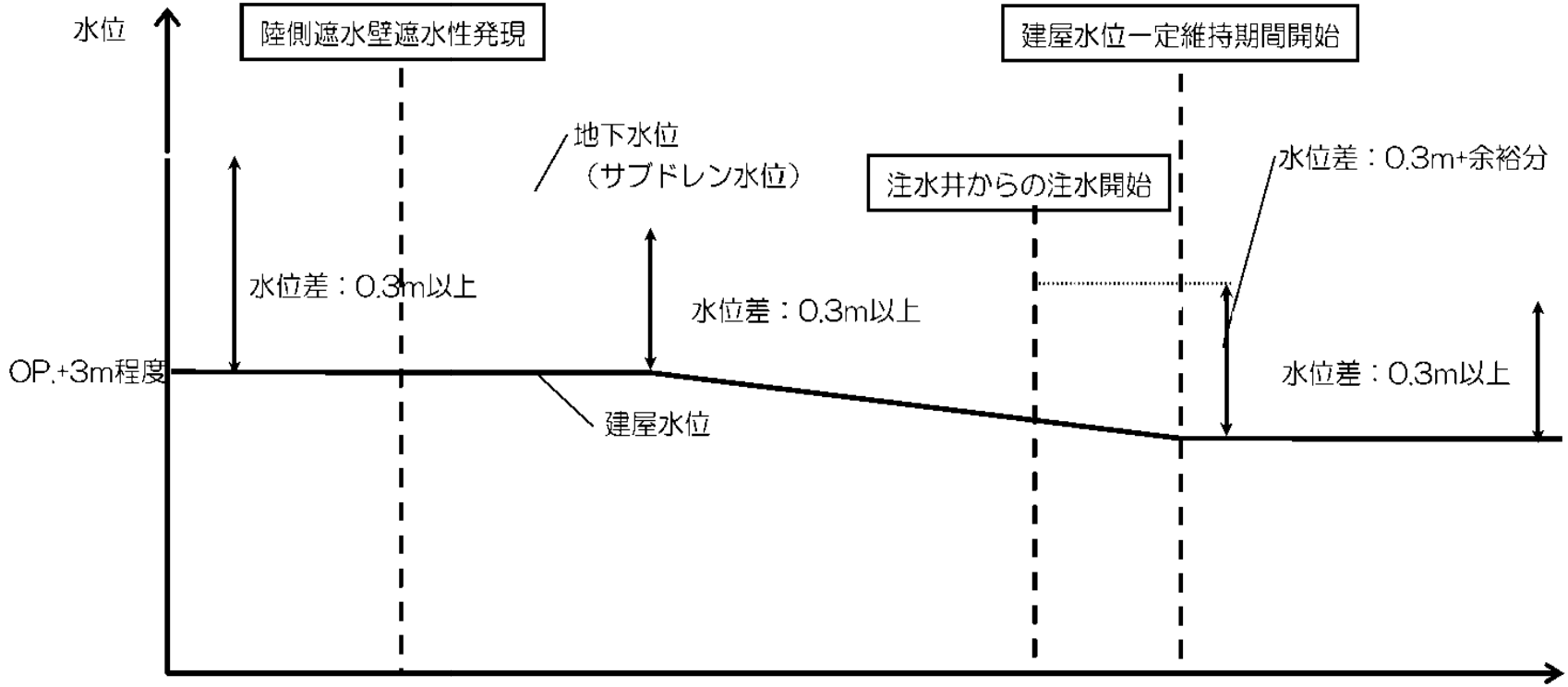
1．陸側遮水壁の遮水性発現後の1～4号機建屋内外の水位管理方針

建屋水位が地下水位を上回ることがないよう管理する。

地下水位の低下に合わせて必要に応じ建屋水位を低下させ，建屋水位と地下水位の水位差を確保する。

建屋水位一定維持期間において，降雨等による地下水涵養と建屋への地下水流入とのバランスにより建屋周辺の地下水位はある一定の水位に落ち着くが，必要に応じ注水井からの注水を行うことにより，建屋水位と地下水位の水位差を確保する。

サブドレンは，降雨時などに建屋への地下水流入量低減のために必要に応じ稼働する。



地下水位低下に伴う建屋内外の水位管理（イメージ）

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2．1　陸側遮水壁山側閉合〔ステップa）〕後の地下水位低下　解析条件

解析の目的

陸側遮水壁山側３辺の遮水性発現後を想定しシミュレーション解析をすることで，地下水位低下量および地下水位低下時期について解析・評価する。

解析モデルおよび手法

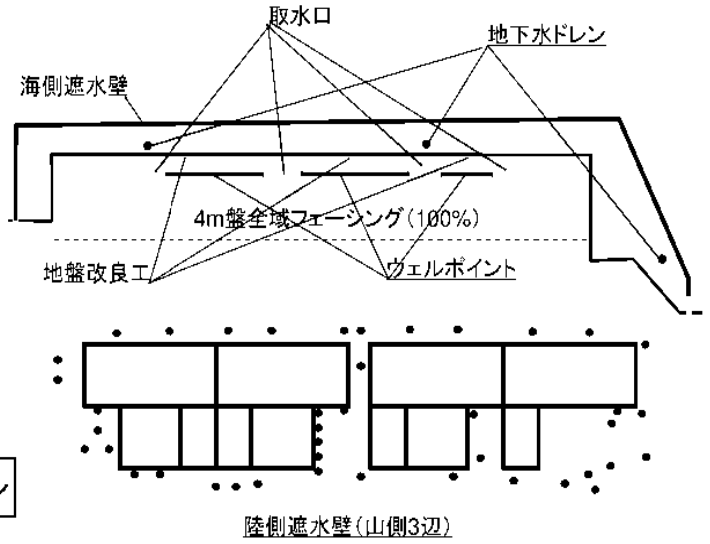
解析モデル化領域：海側遮水壁と陸側遮水壁山側３辺で囲まれた領域

解析手法：準３次元解析（GWAP）による非定常解析

建屋水位と地下水位の水位差が小さい（制御上厳しい）条件について解析を行った。

各設備		解析条件
海側（鋼管）遮水壁		閉合
4m盤	地盤改良	完了
	揚水工（ｳｪﾙﾎﾟｲﾝﾄ）	稼動（稼働水位：GL-1.0m（O.P.+3.0m）
	地下水ドレン	
	フェーシング	100%
4～10m盤間	フェーシング	0%
10m盤（陸側遮水壁内）	フェーシング	0%
	サブドレン	稼動（稼動水位：建屋水位+1m）
	陸側遮水壁	山側3辺閉合（海側未閉合）
	注水井からの注水	無

降雨量	約4mm/日　一定（建屋以外の領域に降雨）	年平均降雨量1,545mmより設定
降雨浸透率	55%	汚染水処理対策委員会報告より



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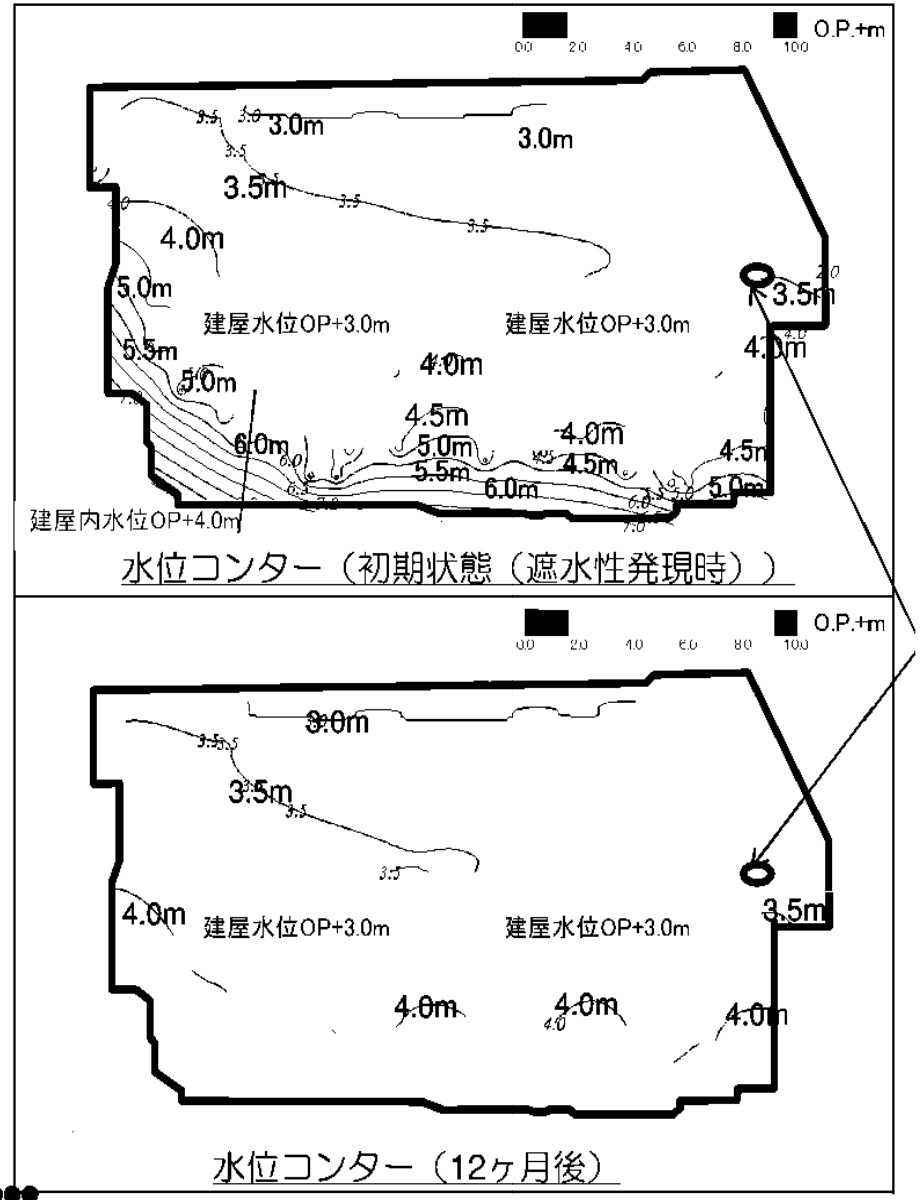
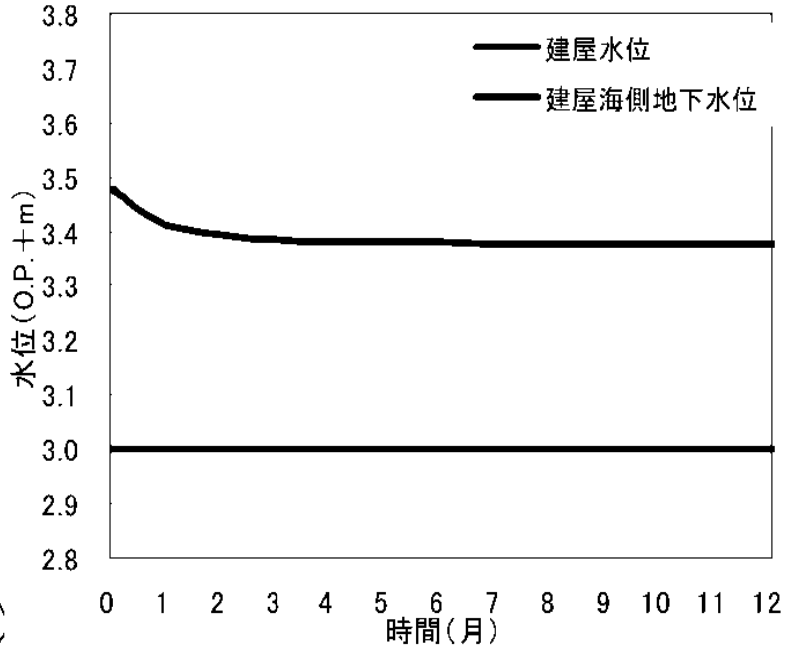
2．2　陸側遮水壁山側閉合〔ステップa）〕後の地下水位低下　解析結果





建屋水位に対する地下水位の経時変化
（解析上，水位差が小さいサブドレンNo.56の水位変化について抽出した。）

陸側遮水壁山側３辺閉合後の建屋海側の地下水位の低下量は0.1～0.3m程度である。

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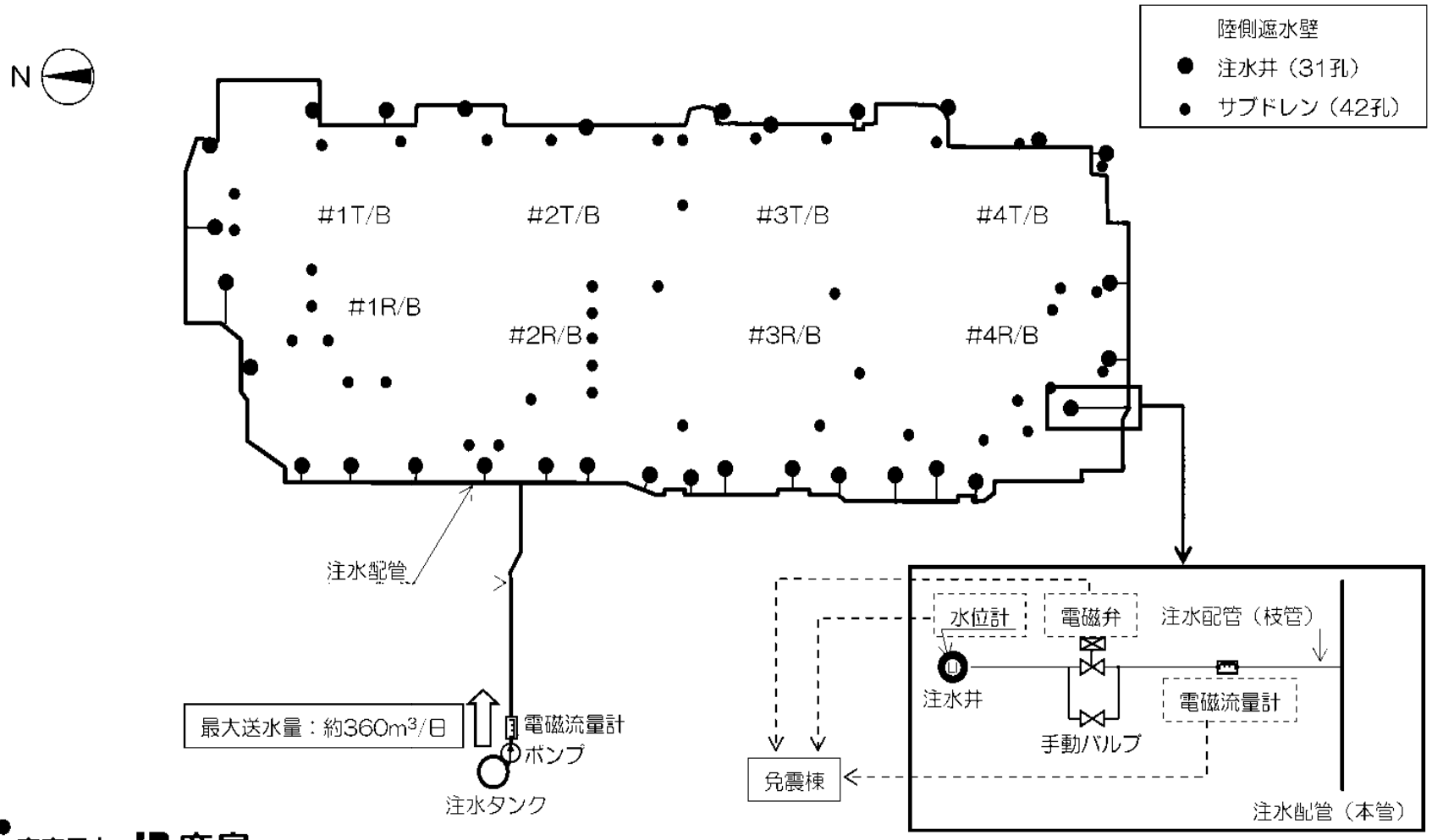
3.1　注水井および関連設備の配置

注水井配置

注水井１孔毎の計測データ（水位・注水量・電磁弁稼働状況）を取り込み，免震棟にて遠隔監視・操作が可能

電磁弁が故障した場合には手動バルブの開閉により注水井への注水が可能



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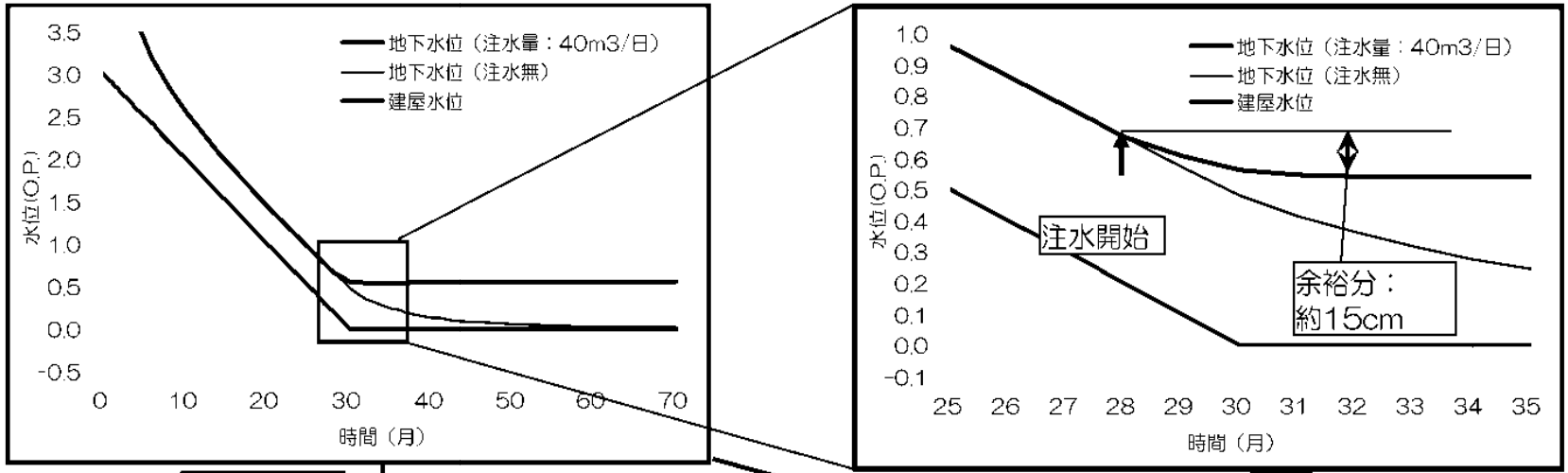
3．2　注水井からの注水効果に関する解析結果（降雨浸透率：0mm/日）

ケース	建屋水位	建屋周辺地下水位（初期）	注水井（孔）	注水総量（m^3/日）	1孔当り注水量（L/分/孔）	降雨浸透(mm/日)
1	O.P. +3 m →0m	サブドレン稼動	31	0	0	0
2				40	0.9	



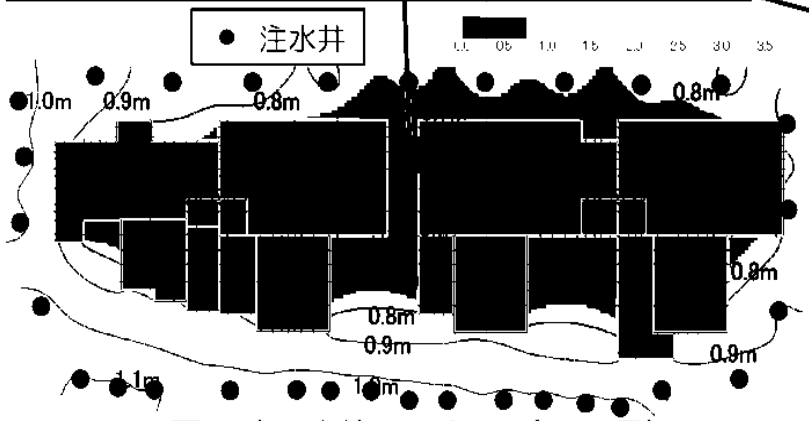


図　地下水位コンター（30ヶ月）

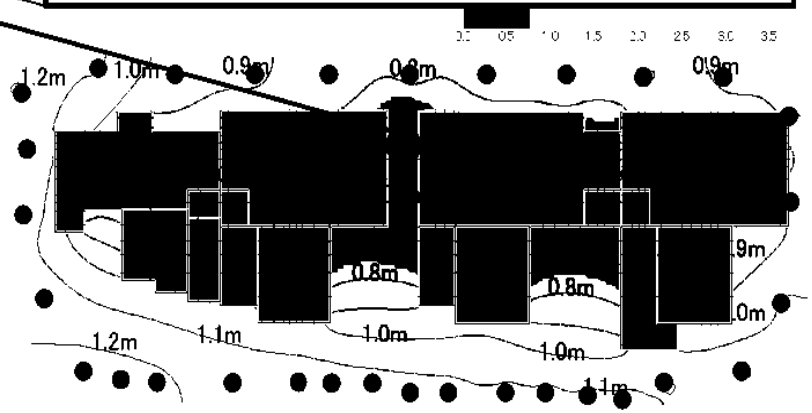


図　地下水位コンター（60ヶ月）

水位差50cmを目標として，15cm程度の余裕を持って注水井からの注水を行うことで水位差を確保できる。

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3．3　注水井からの注水による地下水位の維持について

5・6号機建屋周辺で実施した「注水試験結果（フィージビリティ・スタディ）」より，下記の結論が得られている。

注水井１本当りの注水量：10L/分以上確保することが可能

注水井からの注水により，解析結果と同程度の地下水位上昇を確認

これらを基に解析を実施して，現計画の注水井配置による地下水位維持を確認した。

陸側遮水壁山側凍結開始前に，各注水井において上記の注水量が確保出来ることを注水試験により確認する。なお，十分な注水を行うことが出来ない場合には注水井の再設置等必要な対応を行う。

陸側遮水壁閉合後，現地において注水効果を確認し，不足する場合には注水井の増設等必要な対応を行う。

無断複製・転載禁止　東京電力株式会社・鹿島建設株式会社

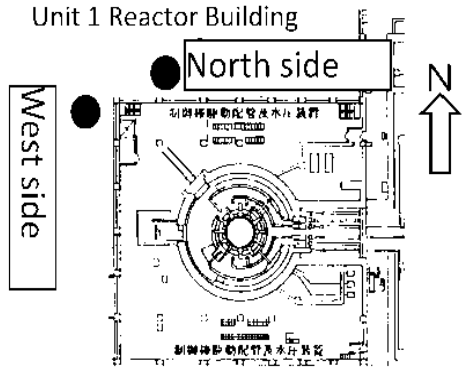
Development for fuel debris detection technology for reactor at Fukushima Daiichi Nuclear Power Station (Unit 1)

<Reference>
February 9, 2015
Tokyo Electric Power Company

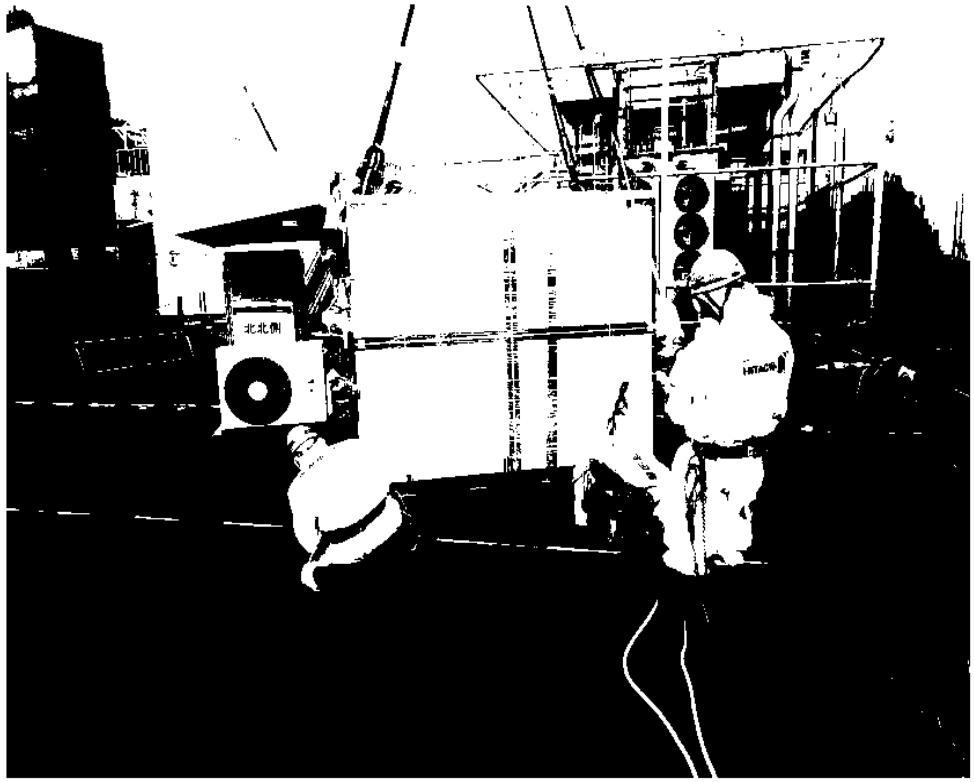
Installation of measuring device at Unit 1 (2 equipment to be set at north-west of Reactor Building)

-Carrying-in and installing the first measuring device on the north side today (Feb. 9).

-The second device is scheduled to be installed on the west side tomorrow (Feb. 10).



Installation scene (I)



Installation scene (II)

Photo is taken by: Tokyo Electric Power Company, dated Feb. 9, 2015

Norton, Charles

From: Tateiwa, Kenji <tateiwa.kenji@tepco.co.jp>
Sent: Thursday, February 12, 2015 10:38 PM
To: Tateiwa, Kenji
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 13, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 13, 2015 at 3 pm Eastern Standard Time
(**No Call Next Week.** Next call will be on **Fri, Feb. 27** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. NRA Special Facilities Monitoring and Evaluation Committee (2/9/2015)
(only in Japanese)
1-1. Closure of Seawater Piping Trenches of Units 2, 3, 4
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_02.pdf

1-2. Water Level Management after Operation of Frozen-Soil Wall (summary)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_03.pdf

1-3. Water Level Management after Operation of Frozen-Soil Wall (reference information)
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0031_08.pdf

2. Installation of Muon Detectors for Fuel Debris Detection at Unit 1 (2/9/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1248057_6844.html
(photos)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150209_01-e.pdf

3. *"The Great Race: The Global Quest for the Car of the Future"*
http://amzn.com/B00LD1OP0Q
This book features TEPCO's current Chief Nuclear Officer, Takafumi Anegawa, as a visionary who jump started Japan's electric vehicle industry.

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037

tel: +1-202-457-0790 (ext.)116
mobile: +1-202-412-2860

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, February 05, 2015 9:24 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Feb. 6, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Feb. 6, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 13** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. On-Site Coordination Meeting on Decommissioning & Contaminated Water Issues (1/30/2015)
(only in Japanese)
1-1. Water Contamination Monitoring and Effectiveness of Groundwater Bypass System
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_03-j.pdf

1-2. Wind Velocity Simulation Inside Unit 1 Reactor Building Cover
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_04-j.pdf

1-3. Response to Various Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/l150130_07-j.pdf
(page 6/116) ALPS Status
(page 10/116) Various Water Treatment Systems
(page 19/116) Filling Up Seawater Piping Trenches
(page 38/116) Subdrain System
(page 41/116) Frozen Soil Wall
(page 85/116) Radioactivity in Units 1-3 Discharge Canal

2. Causes of Significant Occupational Safety Issues at 1F/2F/KK and Countermeasures (2/3/2015)
(only in Japanese)
http://www.tepco.co.jp/cc/press/betu15_j/images/150202j0301.pdf

3. Nuclear Safety Reform Plan 2014 Q3 Progress Report (2/3/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247946_6844.html

4. IAEA OSART Preparatory Meeting at Kashiwazaki Kariwa (2/2~5/2015)
(only in Japanese)
http://www.tepco.co.jp/kk-np/data/publication/pdf/2014/270205.pdf

5. Removal of Highly Contaminated Water Inside Seawater Piping Trenches (1/28/2015)
(video clip)
http://www.tepco.co.jp/en/news/library/archive-e.html?video_uuid=iwz87j2v&catid=69631

6. TEPCO Official English YouTube
https://www.youtube.com/user/OfficialTEPCOen

** If you cannot display Japanese characters, please install the following font packs:*
http://www.adobe.com/support/downloads/detail.jsp?ftpID=4881

(Feel free to forward this email to your colleagues or have them contact me to be added to the distribution list.)

All the best,
Kenji

Kenji Tateiwa
Manager, Nuclear Power Programs
Tokyo Electric Power Company
Washington Office
2121 K Street, NW Suite 910
Washington, DC 20037
tel: +1-202-457-0790 (ext.)116
mobile: +1-202-412-2860

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 29, 2015 8:53 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 30, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 30, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Feb. 6** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (1/29/2015)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_05-j.pdf
(English translation as of 12/25/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141225_01-e.pdf

1-3. Retrieval of Thermocouple Installed in Unit 2 RPV Bottom via SLC Line
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_08-j.pdf

1-6. Work Condition Improvement
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_09-j.pdf

1-7. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_10-j.pdf

1-8. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_11-j.pdf

1-9. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_12-j.pdf

1-10. Status Update of Study on Alternate Core Debris Retrieval Methods (METI)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_14-j.pdf

1-11. Strategic Plan and Risk Mitigation (Nuclear Damage Compensation and Decommissioning Facilitation Corporation)
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d150129_15-j.pdf

2. Updated Schedule on Completion of Contaminated Water Treatment (1/23/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150123_02-e.pdf

3. Occupational Safety Corrective Actions (1/26/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150126_01-e.pdf

4. National Academy of Sciences Fukushima Lessons Learned Committee Phase 2 #3 (1/29/2015)
http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=7732
Attached is a compact version of TEPCO's presentation.
Let me know if you would like to receive the original sized file.

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji (mobile)
To: Tateiwa, Kenji
Sent: Thursday, January 22, 2015 10:09 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 23, 2015 at 3pm EST

Nuclear Sector Colleagues,

Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 23, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 30** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. Briefing Materials for Fishermen's Association of Iwaki City (1/16/2015)
(only in Japanese)
1-1. Addition of Sr-Removal Capability to KURION and SARRY Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150119_03-j.pdf
1-2. Illustration of Contaminated Water Removal Process from Underground Piping Trenches
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_10-j.pdf

1-3. Treated Water Discharge Criteria for Subdrain and Groundwater Drain Systems
http://www.tepco.co.jp/nu/fukushima-np/handouts/2015/images/handouts_150116_07-j.pdf

2. Contract Worker Dies After Falling Into Rainwater Receiving Tank at Fukushima Daiichi (1/19/2015)
http://www.tepco.co.jp/en/nu/fukushima-np/handouts/2015/images/handouts_150119_01-e.pdf

All the best,
Kenji

----- Original Message -----
From: Tateiwa, Kenji
To: Tateiwa, Kenji
Sent: Thursday, January 15, 2015 8:41 PM
Subject: [TEPCO Weekly Fukushima Update Call] Fri, Jan. 16, 2015 at 3pm EST

Nuclear Sector Colleagues,

Happy New Year!
Please find below information for tomorrow's Weekly Fukushima Update Call.

[Date/time]
Fri, Jan. 16, 2015 at 3 pm Eastern Standard Time
(Next call will be on **Fri, Jan. 23** at 3 pm EST.)

[call-in information] (Please record your name and organization when joining the call.)
call number: 718-354-1184
passcode: 25057200#

[Major topics]
1. Working-level Meeting of Decommissioning & Contaminated Water Issues Team (12/25/2014)
(only in Japanese)
1-1. Plant Status
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf

1-2. Summary Status of Decommissioning Roadmap
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_04-j.pdf
(English translation as of 11/27/2014)
http://www.tepco.co.jp/en/nu/fukushima-np/roadmap/images/d141127_01-e.pdf

1-3. Shortening the Length of Circulating Water Cooling System Loop
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_06-j.pdf

1-4. Contaminated Water Treatment
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_07-j.pdf

1-5. Environmental Radiation Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_08-j.pdf

1-6. Spent Fuel Pool Issues
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_10-j.pdf

1-7. Preparation for Fuel Debris Removal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_11-j.pdf

1-8. Radioactive Waste Disposal
http://www.tepco.co.jp/nu/fukushima-np/roadmap/images/d141225_12-j.pdf

2. NRA Special Facilities Monitoring and Evaluation Committee (12/26/2014)
(only in Japanese)
2-1. Status of Filling Up Underground Seawater Piping Trenches
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_01.pdf

2-2. Measures to Achieve Incremental Effective Dose Limit at Site Boundary
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_03.pdf

2-3. Completion of Fuel Transfer from Unit 4 Spent Fuel Pool
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_05.pdf

2-4. Leakage of ALPS-Treated Water from J6 Tank Farm
http://www.nsr.go.jp/committee/yuushikisya/tokutei_kanshi/data/0030_06.pdf

3. IAEA to Review Fukushima Daiichi Decommissioning and Kashiwazaki Kariwa Operational Safety (1/7/2015)
http://www.tepco.co.jp/en/press/corp-com/release/2015/1247076_6844.html

4. Figures and Video Clips Describing Various Water Management Measures
http://www.tepco.co.jp/en/decommision/planaction/waterprocessing-e.html

5. Overview of Fukushima Daiichi Accident and Lessons Learned (33 MB)
http://www.tepco.co.jp/en/decommision/accident/images/outline01.pdf

All the best,
Kenji

特定原子力施設監視・評価検討会
（第32回）
資料1

海水配管トレンチ
汚染水対策工事の進捗について

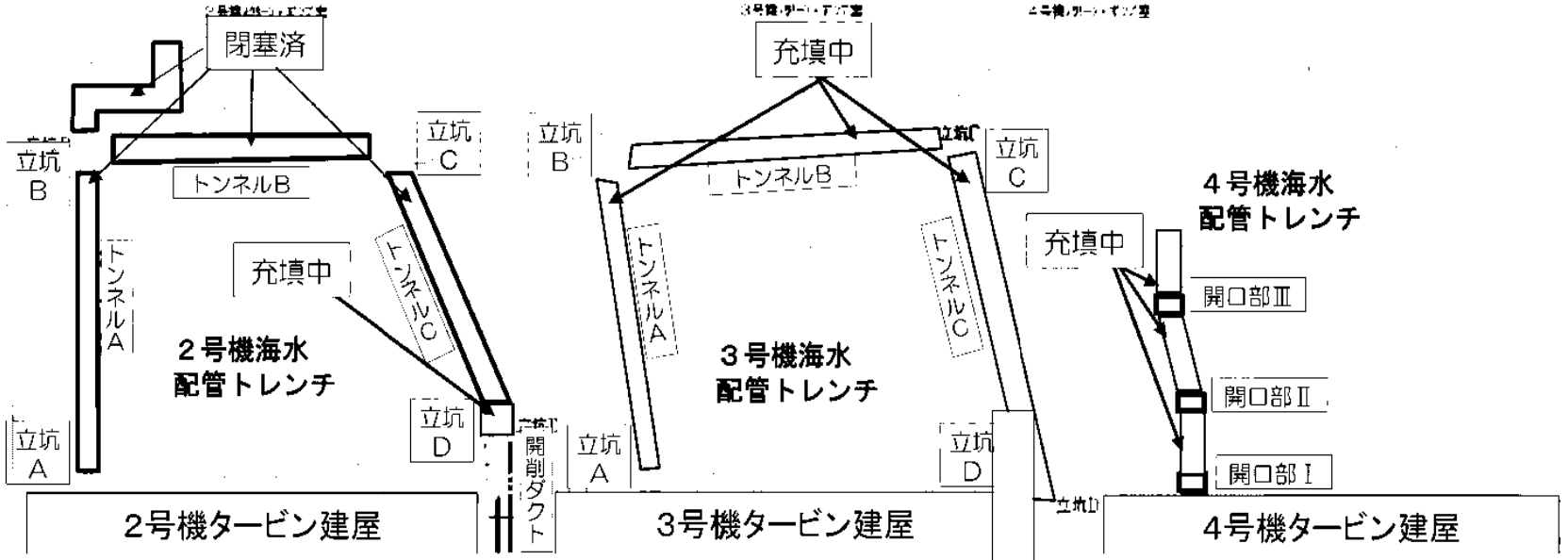
平成２７年３月４日

東京電力株式会社

東京電力
TEPCO

1. 海水配管トレンチ汚染水対策工事の進捗状況

■位置図

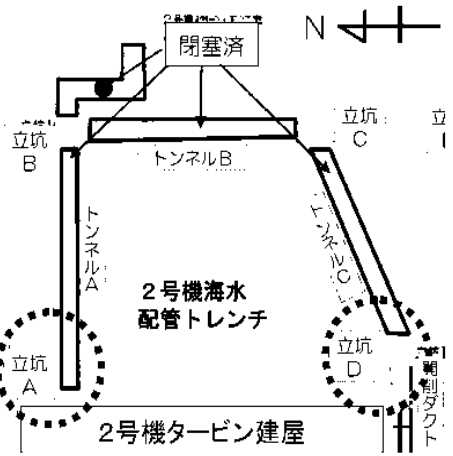


■進捗状況(平成27年3月2日現在)

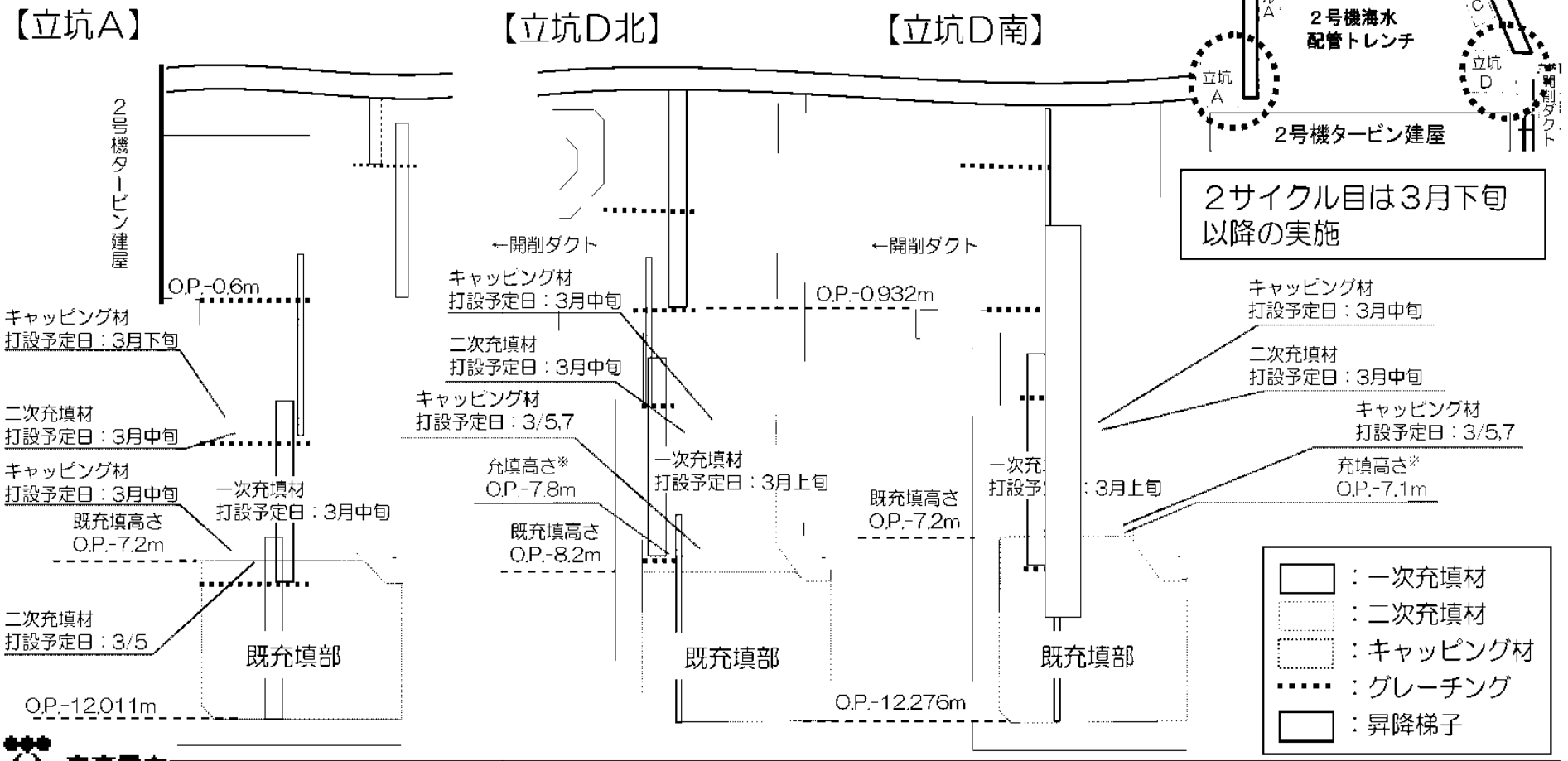
号機	2号機	3号機	4号機
状況	・トンネル部充填：12/18完了 (約2,510m³/約2,510m³) ・立坑充填：立坑D 2/24日開始 二次充填材１回目打設完了(約10m³)	・トンネル部充填：2/5開始 トンネル部 約36% 充填完了 (約1,200m³/約3,300m³)	・T／B接続部調査中 ・トンネル部充填：2/14開始 トンネル部 約63% 充填完了 (約290m³/約460m³)
残滞留水量	約1,980m³	約4,700m³	約610m³
充填量	約2,520m³	約1,200m³	約290m³

2.　2号機:立坑充填の進捗状況

- 立坑Dについては2月２４日より充填を開始しており，２５日，3月2日で既充填部分の表面に二次充填材を打設。今後，キャッピング材を打設後，一次充填材～二次充填材～キャッピング材の１サイクル目を順次実施。
- 立坑Aについては3月５日より二次充填材を打設予定。



2サイクル目は3月下旬以降の実施

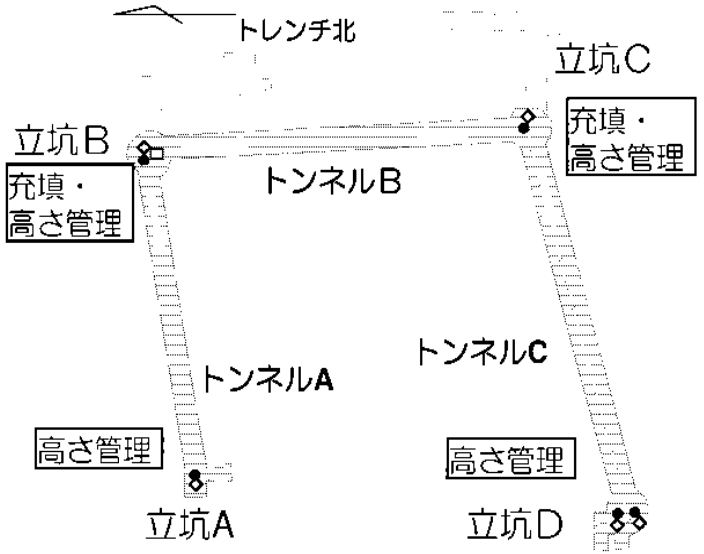


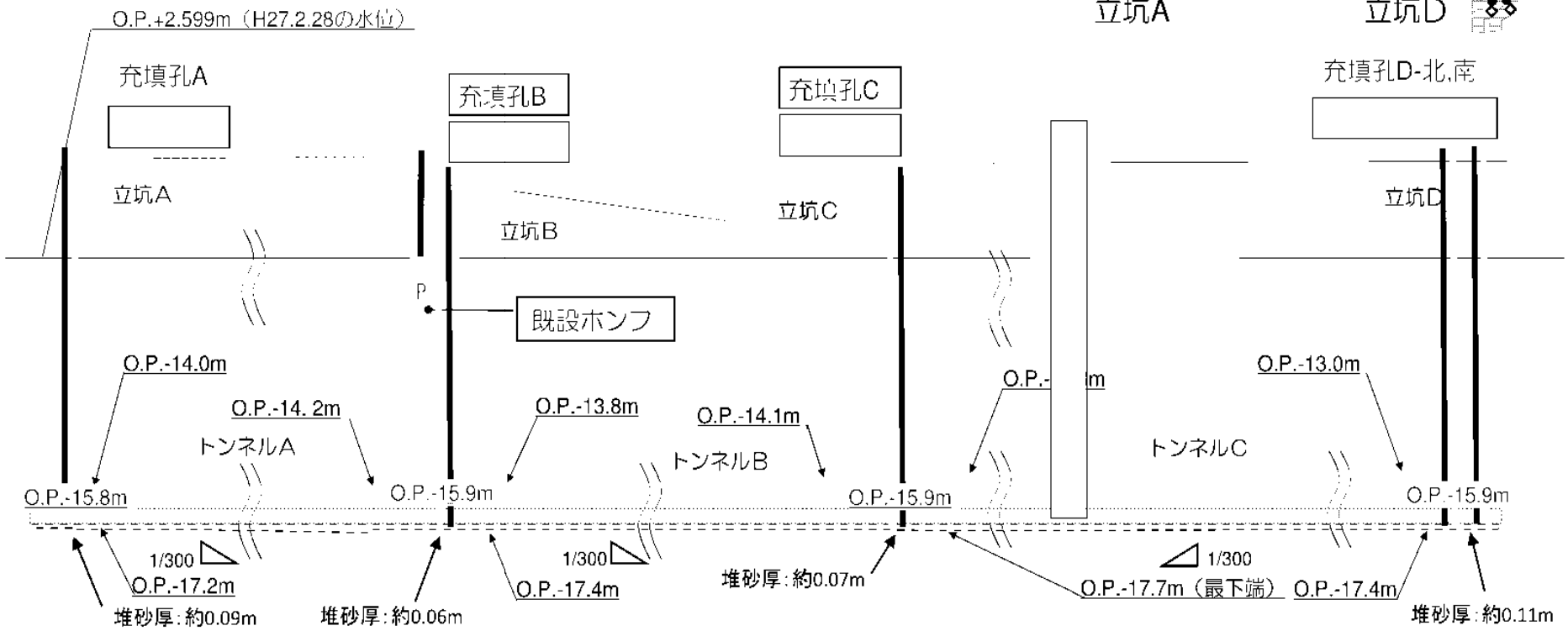
※充填高さは3/3計測値

3.　3号機:トンネル充填の進捗状況

- 3号機海水配管トレンチのトンネル部充填を2月5日より開始。
- 3月2日現在，約1,200m³打設完了しており，同量の滞留水を除去。
- 水位については管理水位（O.P.+3.25m）以下で推移。

※　図中の各充填孔･観測孔･ポンプにおいて枠で囲まれているものは，現状使用中のもの。
※　赤字は打設高さ（2月28日計測）





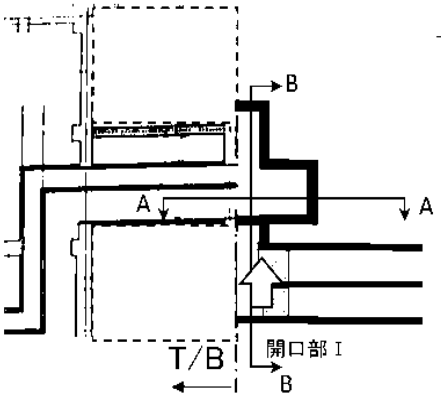
【3号機海水配管トレンチ概略断面展開図）】

東京電力

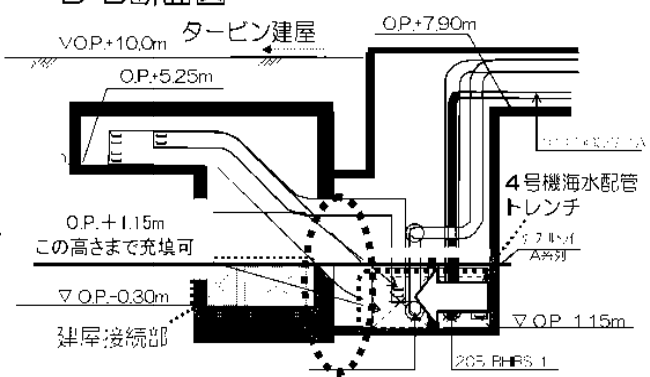
打設高さは速報版であり，精査中

4．1　4号機:トレンチ～建屋間の調査状況

－平面図－



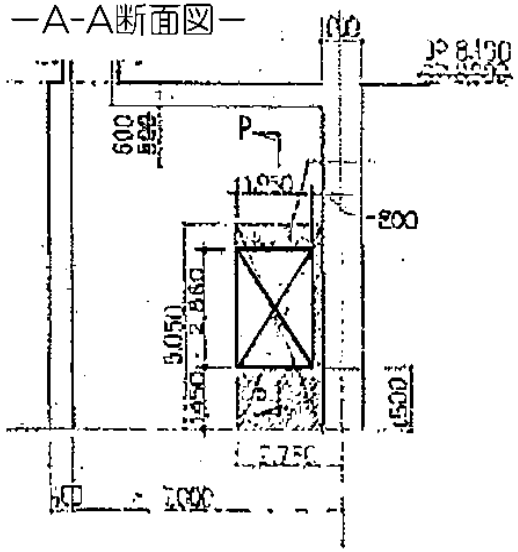
－B-B断面図－

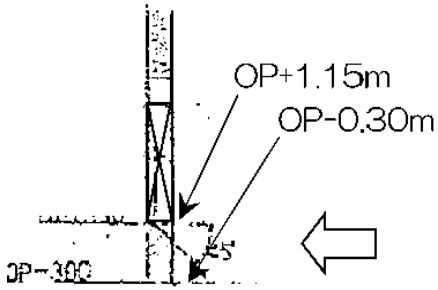


（4号機海水配管トレンチをタービン建屋から望む）

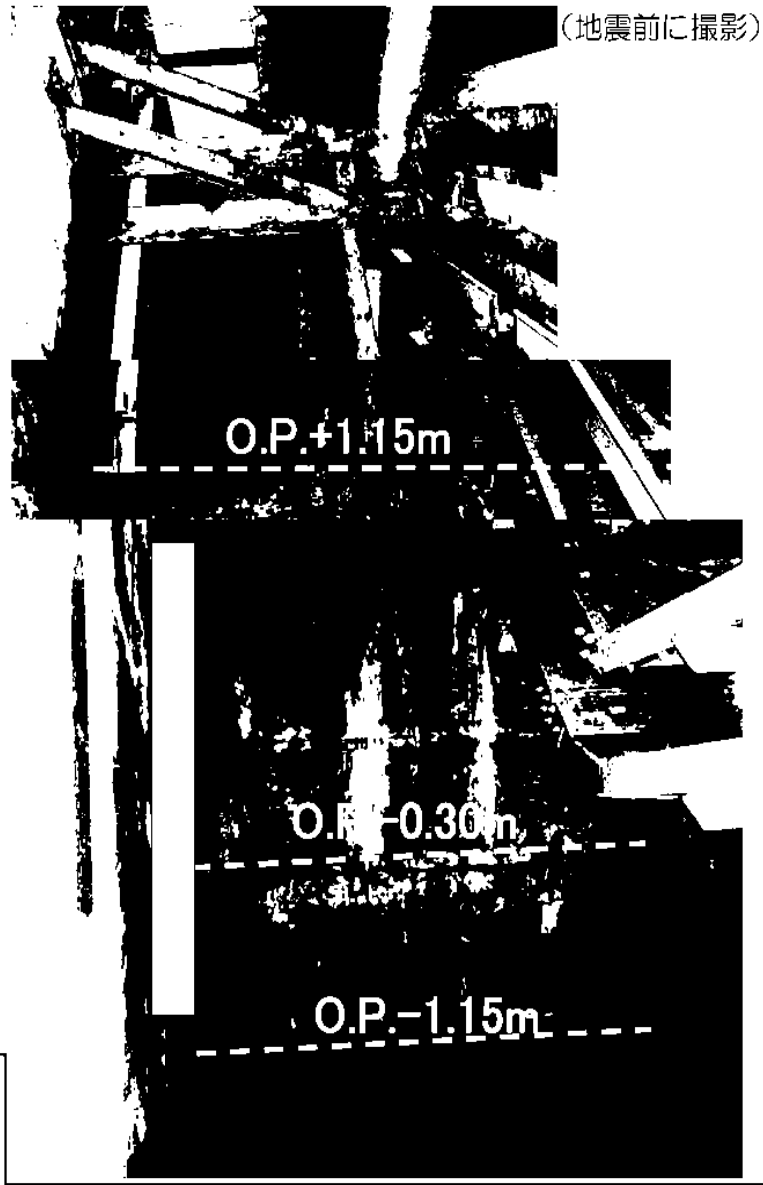
拡大図

－A-A断面図－





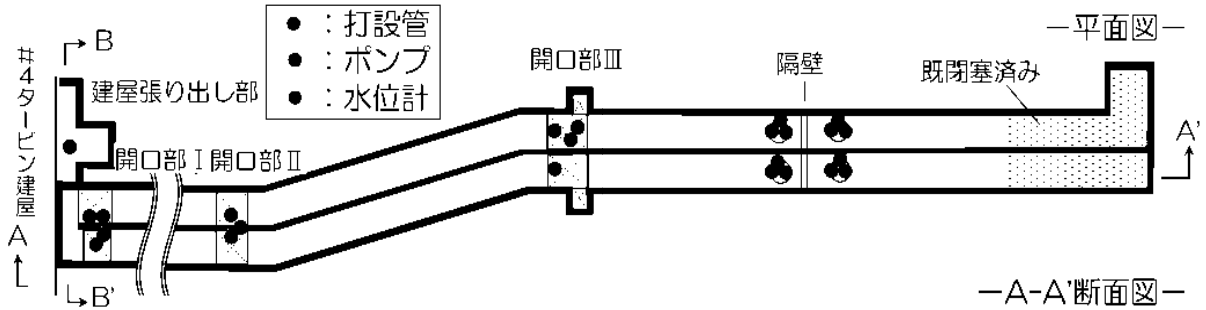
：写真撮影方向

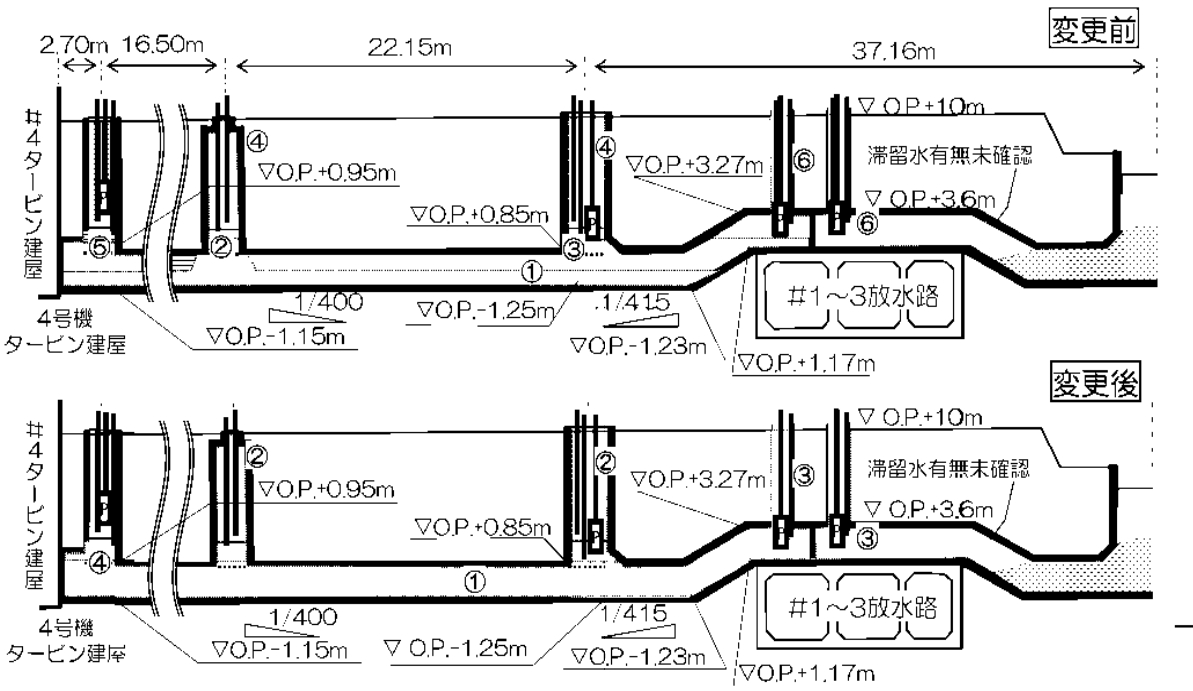


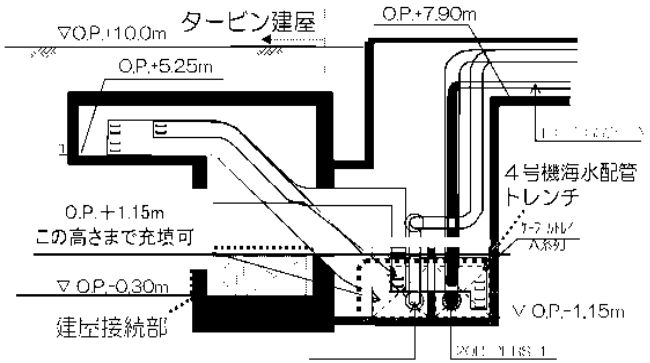
調査・ヒアリングの結果，O.P.+1.15mまでは壁があることを確認できたことから，天井部まで充填を実施する。
（トレンチ天端はO.P.+0.95m）

4．2　4号機：調査状況を考慮した施工改善案

調査・ヒアリングに基づき，O.P.-0.3mより上部についても開口部Ⅲから材料を打設し，天井部まで充填する方法に変更。
充填に際しては，開口部Ⅰおよび Ⅲにて打設高さを確認し，建屋側への流出がないことを確認しつつ充填を実施する。







（4号機海水配管トレンチをタービン建屋から望む）

変更前：前回ご報告内容（番号は左図と対応）

① トンネル部についてO.P.-0.3mまで充填
② 開口部Ⅱにて間詰め充填
③ 開口部Ⅱ～Ⅲ間を天井部まで充填
④ 開口部ⅡおよびⅢを充填
⑤ 建屋張り出し部にて間詰め充填を行い、開口部Ⅰ～Ⅱ間および開口部Ⅰ充填
⑥ 放水路上部を充填

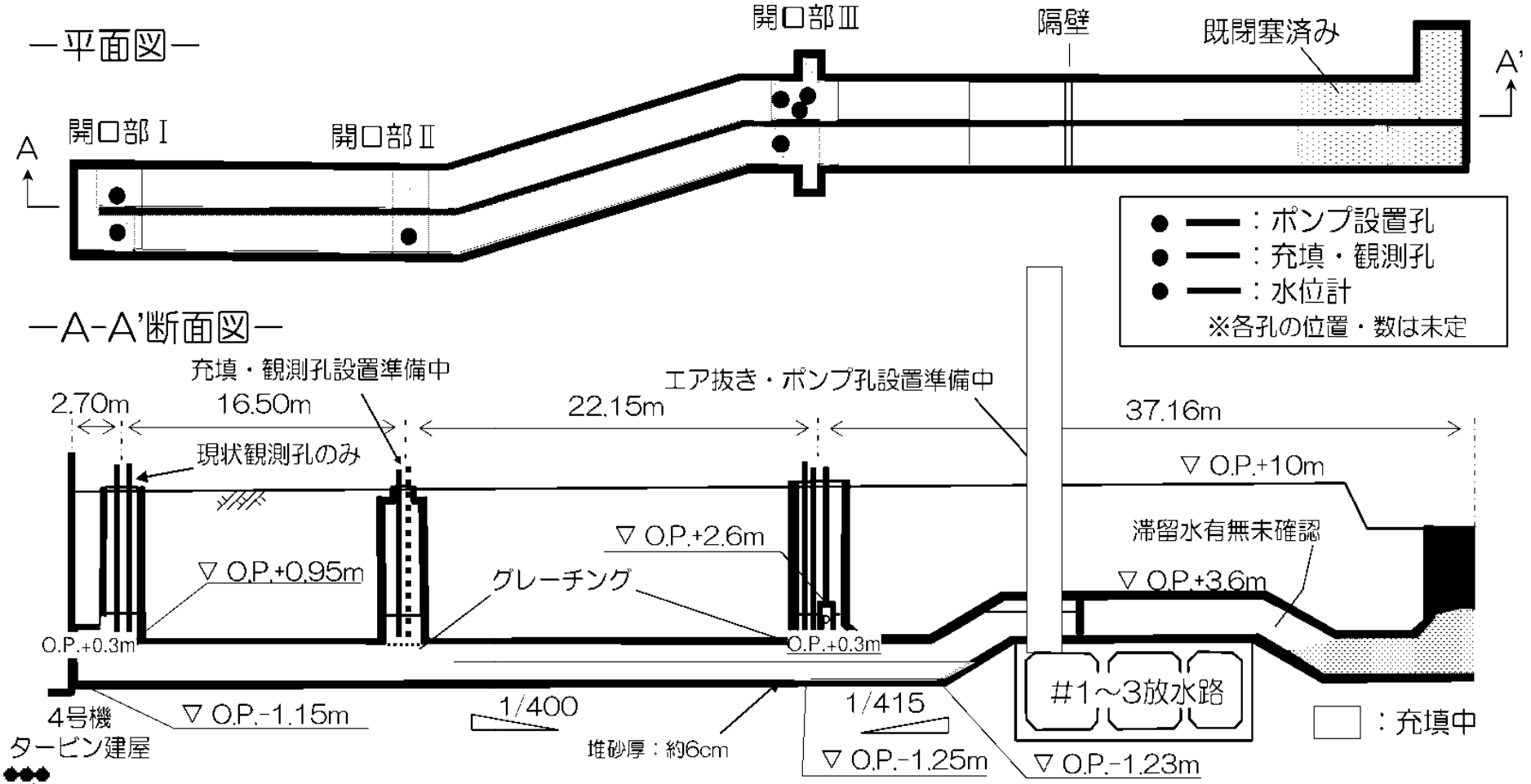
変更後（番号は左図と対応）※

① トンネル部について天井部まで充填
② 開口部ⅡおよびⅢを充填
③ 放水路上部を充填
④ 開口部Ⅰ充填

※②～④の実施時期については，周辺工事等と調整の上決定

4．3　4号機:トンネル充填の進捗状況

- 2月１４日より充填を開始しており，2月１４日，２８日で計290m^{3}を打設，同量の汚染水を除去。
- 打設に際しては，開口部ⅠおよびⅢの観測孔を用いて，打設中の打ちあがり高さの監視を実施。
- 現在、O.P.+0.3mまで打設済み（3月2日計測値）。



東京電力

打設高さは速報版であり，精査中

5. 今後の予定

- ２号機は，２月２４日より立坑部の充填を開始。立坑Ａ，Ｄの１サイクル目の充填後，揚水試験を３月中～下旬頃実施予定。引き続き２サイクル目の充填を行い，立坑Ｂ，Ｃを含め，５月中に滞留水の除去完了を目指す計画。
- ３号機は，引き続きトンネル部の充填を行う。トンネル部の充填が完了次第，揚水試験を行い，引き続き立坑の充填を実施予定。
- ４号機トンネル部は，２月１４日から充填を開始。３月末頃までに充填を完了する計画。

		～H27.1	H27.2	H27.3	H27.4	H27.5	H27.6	H27.7
２号機	トンネル部 （計：約2,510m³）	完了 ▲2510						
	立坑部 （計：約1,990m³）			▲200	▲1000	▲790		
３号機	トンネル部 （計：約3,300m³）		▲1200	▲1400	▲700			
	立坑部 （計：約2,600m³）				▲200	▲900	▲1500	
４号機	トンネル部 （計：約460m³）		▲290	▲170	（開口 については実施時期調整中）			

※　工程調整等により、除去時期の変動可能性あり
※　表中の数字は当該月のトレンチ内滞留水除去量の見込み（m³）
（滞留水の水質による処理設備側への影響を考慮しない場合）

（参考） 水質を考慮した施工改善案

水処理装置（セシウム吸着装置、第二セシウム吸着装置）のセシウム・ストロンチウム吸着塔の交換周期は，滞留水の水質に依存する。塩分濃度の濃いトレンチ滞留水がタービン建屋に流入すると塩分濃度が上昇し，吸着塔交換周期が短くなることが考えられる。

現在、タービン建屋へのトレンチ滞留水の移動量を抑えながらグラウトを充填することにより，影響の緩和を図っているものの，今後タービン建屋の塩分濃度が急上昇し，水処理が継続できない状態となる可能性がある。これにより、トレンチ水の受け入れが不可能となり、トレンチ閉塞作業を一時的に中断する可能性もある。

対策としてトレンチ滞留水を一時的に受け入れるバッファーを用意し，バッファーから徐々に建屋に移送することにより，建屋の急激な水質変動を抑止する。これにより、トレンチ充填作業の中断リスクを回避し，トレンチ滞留水除去を可能な限り早期に完了させる。

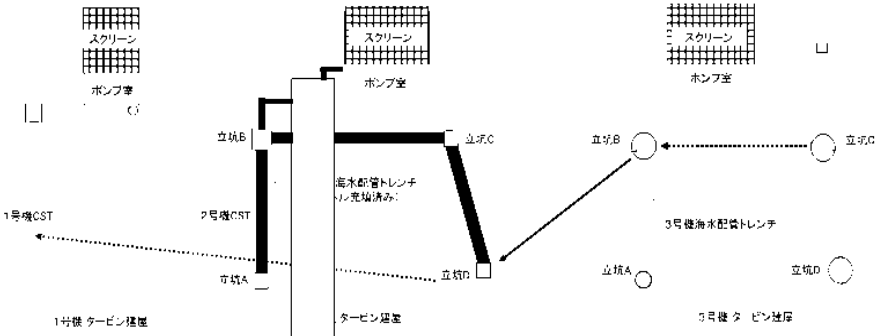
バッファー先として1,2号復水貯蔵タンク（以下、CST）※を候補とし，ＣＳＴに移送したトレンチ滞留水は最終的に建屋に移送する。

※1,2号CST（復水貯蔵タンク）は、震災当初から汚染水を保有しており，今後、原子炉注水系の水源として使用する予定。

各号機トレンチ・建屋塩分濃度・水量(トレンチ充填開始前・H26.11月当時)

		2号機	3号機	4号機
海水配管トレンチ	塩分濃度(ppm)	約4,000	約18,000	約400
	水量(m^3)	約5,000	約6,000	約800
タービン建屋	塩分濃度(ppm)	約200	約200	約400
	水量(m^3)	約8,000	約8,000	約7,000

CST活用案概要（1号機CSTを使用する場合の例）



バッファーとしてCST[illegible]活用することに関する主なメリット・デメリット

メリット	デメリット
✓ 滞留水除去の早期完 ✓ トレンチ充填作業の中断回避 ✓ T/B滞留水処理の継続性確保	✓ 新設ラインの布設に伴う漏えいリスク →漏えい対策・拡大防止策を講ずることにより解消可能

（参考） CSTの状況と今後について

１／２号CSTは、現状、汚染水を保有

１号：塩素約400ppm、２号：塩素約4800ppmと想定

CST容量　１号：約1900m^3、２号：約2500m^3

排水先：CSTの保有水は、１号Rw/Bまたは２号T/Bに排水

海水配管トレンチからCSTの移送ラインの安全対策

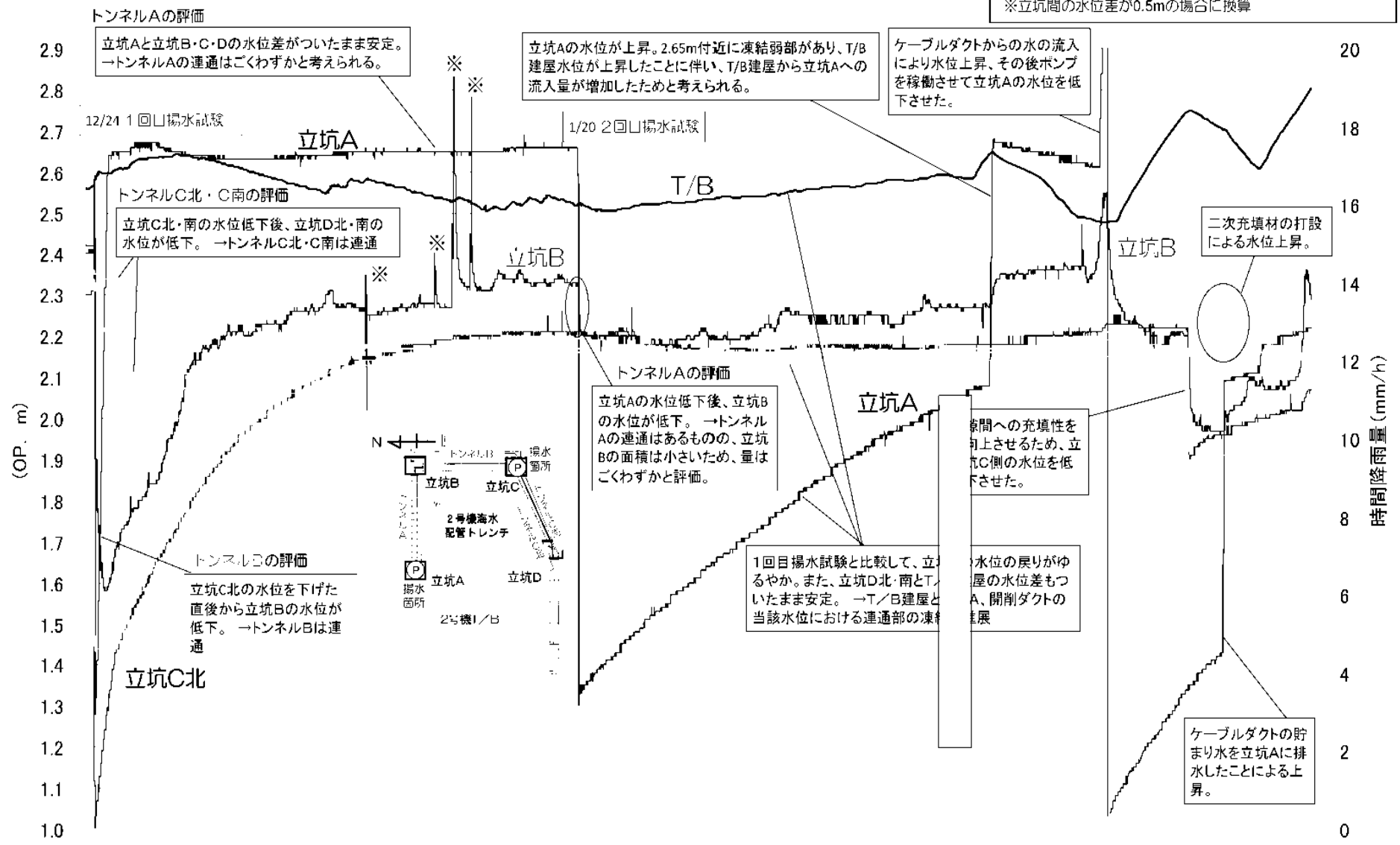
海水配管トレンチ滞留水をCSTに移送するラインについては、必要に応じた対策（二重管化，抜け防止金具，受皿設置，鉛毛マット設置など）を実施することで、漏えいのないように移送する計画。

受入後の対応

ＣＳＴについては、保有する海水配管トレンチ滞留水を建屋へ排水し、その後、ＣＳＴを原子炉注水系の水源の一つとして使用していくため準備していく。

（参考） 2号機：揚水試験後の水位変化

12/24と1/20の2回の揚水試験結果から推定される概算連通量※は概ね以下の通り。
・トンネルA：0.003-0.008m³/h
・トンネルB：0.01-0.02m³/h
・トンネルC北・C南の合計：0.19-0.22m³/h
※立坑間の水位差が0.5mの場合に換算

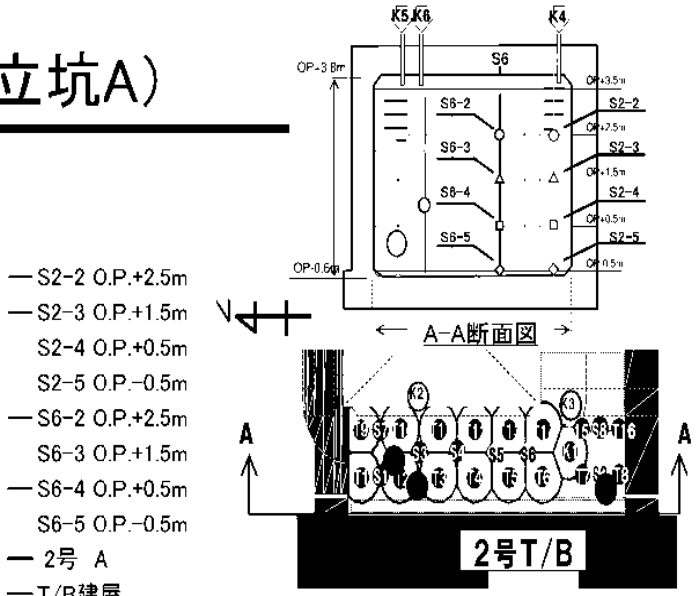


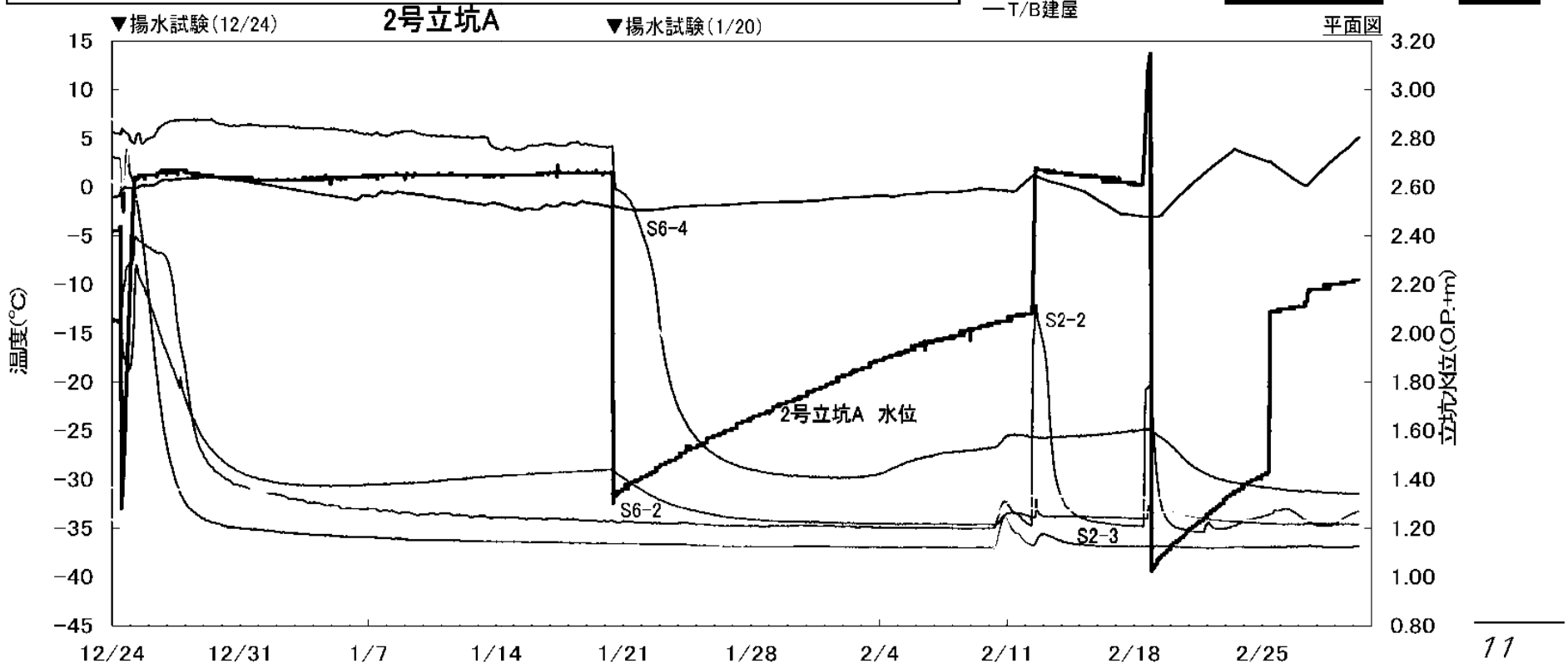
※削孔に伴う注水及びコア回収のため，一時的に水位が変化

（参考）2号機：凍結止水箇所の温度変化（2号立坑A）

１月20日の揚水試験（２回目）に伴い、立坑Aの水位がO.P.＋1.3m程度まで低下したため、測温管S6の温度が低下。その後の水位上昇に伴い、S6-5付近に水みちができ、温度が上昇。

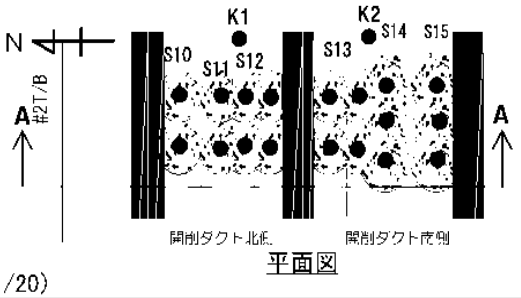
２月12日については、２号機T/Bの水位上昇に伴い、S2-2の温度が上昇。0℃を上回っているS6-5とともに、凍結が融解してT/Bから立坑Aへ水が流れ、立坑Aの水位が上昇と推定。



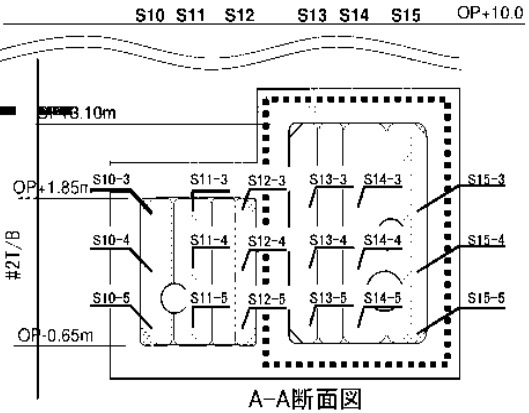


（参考）2号機：凍結止水箇所の温度変化（2号開削ダクト）

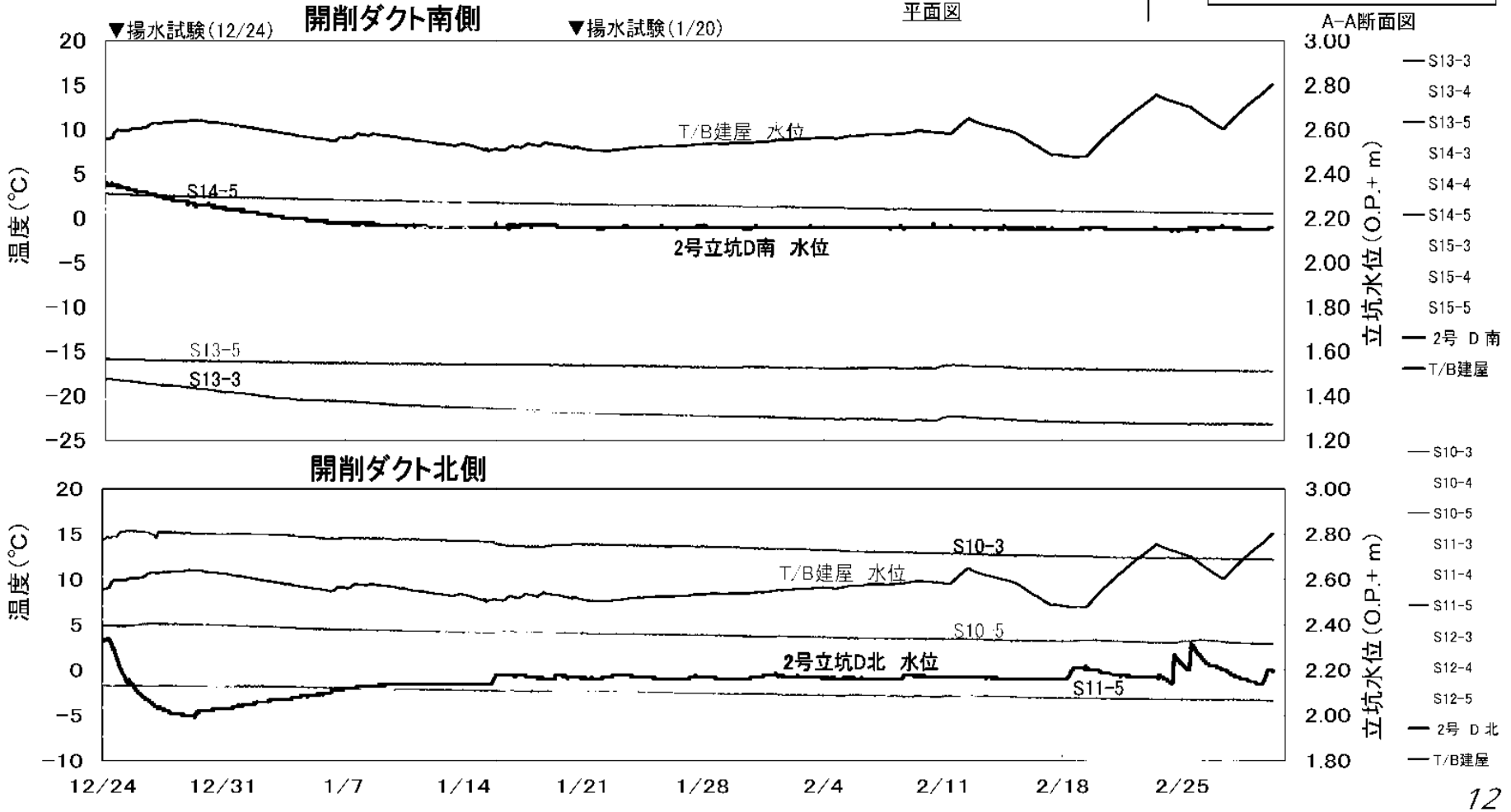
2号開削ダクトは徐々に凍結が進展していると推定。



平面図

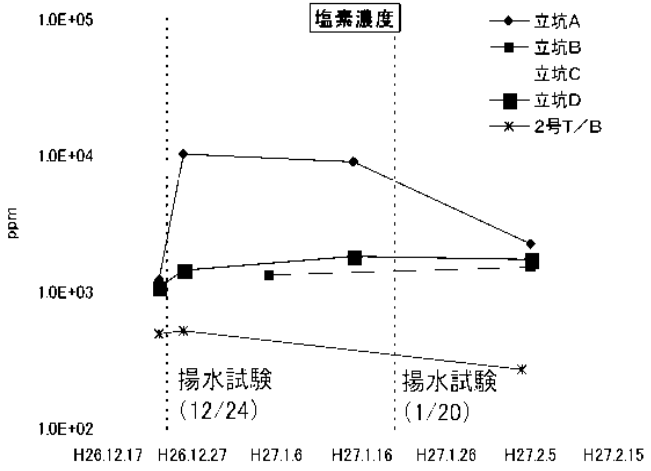


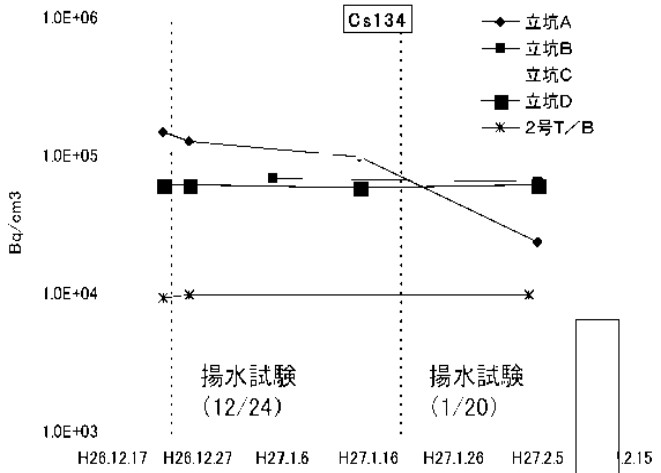
A-A断面図

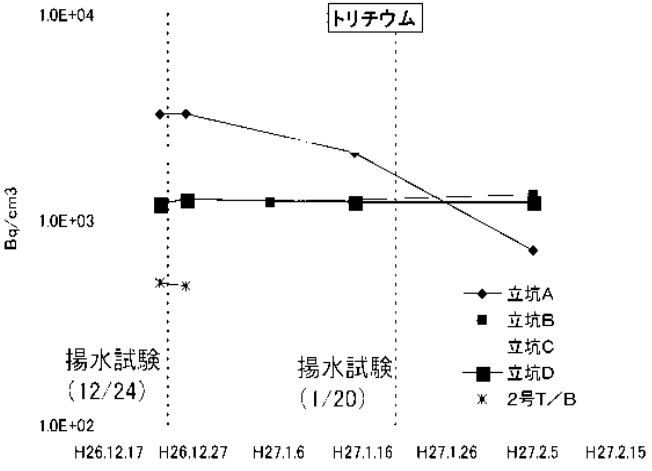


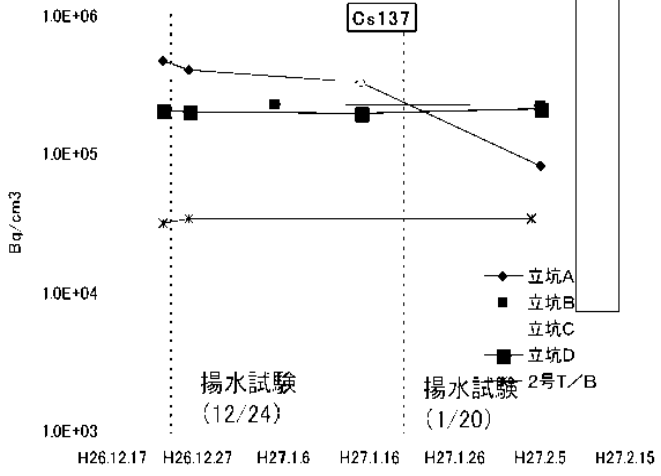
（参考） 2号機：水質分析結果

立坑A：2回目揚水試験（1/20）前後では、全ての濃度が低下しT/B建屋濃度に近づいている。
→ 2回目の揚水試験における立坑Aの水位の戻りは、主にT/B建屋からと考えられる（下図：連通量の計算参照）
立坑B・C・D：塩素濃度・Cs・トリチウムの濃度に変化はない。T/B建屋濃度に近づく傾向もない。
→ 水質データからは、地下水流入の形跡は認められない。（あってもごくわずかで水質データに出てこない）
→ T/B建屋からの滞留水の移動はなく、水位が維持されていることから、流出の可能性も低いと考えられる。

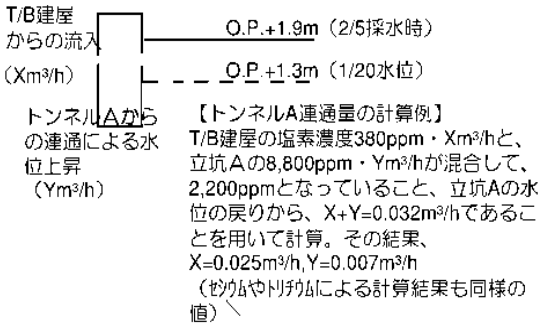




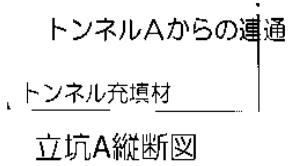




連通量の計算



【トンネルA連通量の計算例】
T/B建屋の塩素濃度380ppm・Xm³/hと、立坑Aの8,800ppm・Ym³/hが混合して、2,200ppmとなっていること、立坑Aの水位の戻りから、X+Y=0.032m³/hであることを用いて計算。その結果、
X=0.025m³/h,Y=0.007m³/h
（ｾｼｳﾑやﾄﾘﾁｳﾑによる計算結果も同様の値）



立坑A縦断図

2/5に採水した水は、T/B建屋からの流入と、トンネルAからの連通による水位上昇分が混ざったものとした場合、トンネルAの連通量は水位差0.5mに換算して0.004～0.006m³/h程度。これは、水位データによる計算結果と概ね一致。

特定原子力施設監視・評価検討会
（第３２回）
資料２

K排水路の排水濃度低減対策状況について

2015年 3月 4日

東京電力株式会社

東京電力
TEPCO

１．　経緯

構内排水路を流れる排水については、昨年１月の特定原子力施設監視・評価検討会等において、敷地境界における実効線量の制限に関する検討の中で議論がなされ、当時の各排水路の測定データについて報告されている。

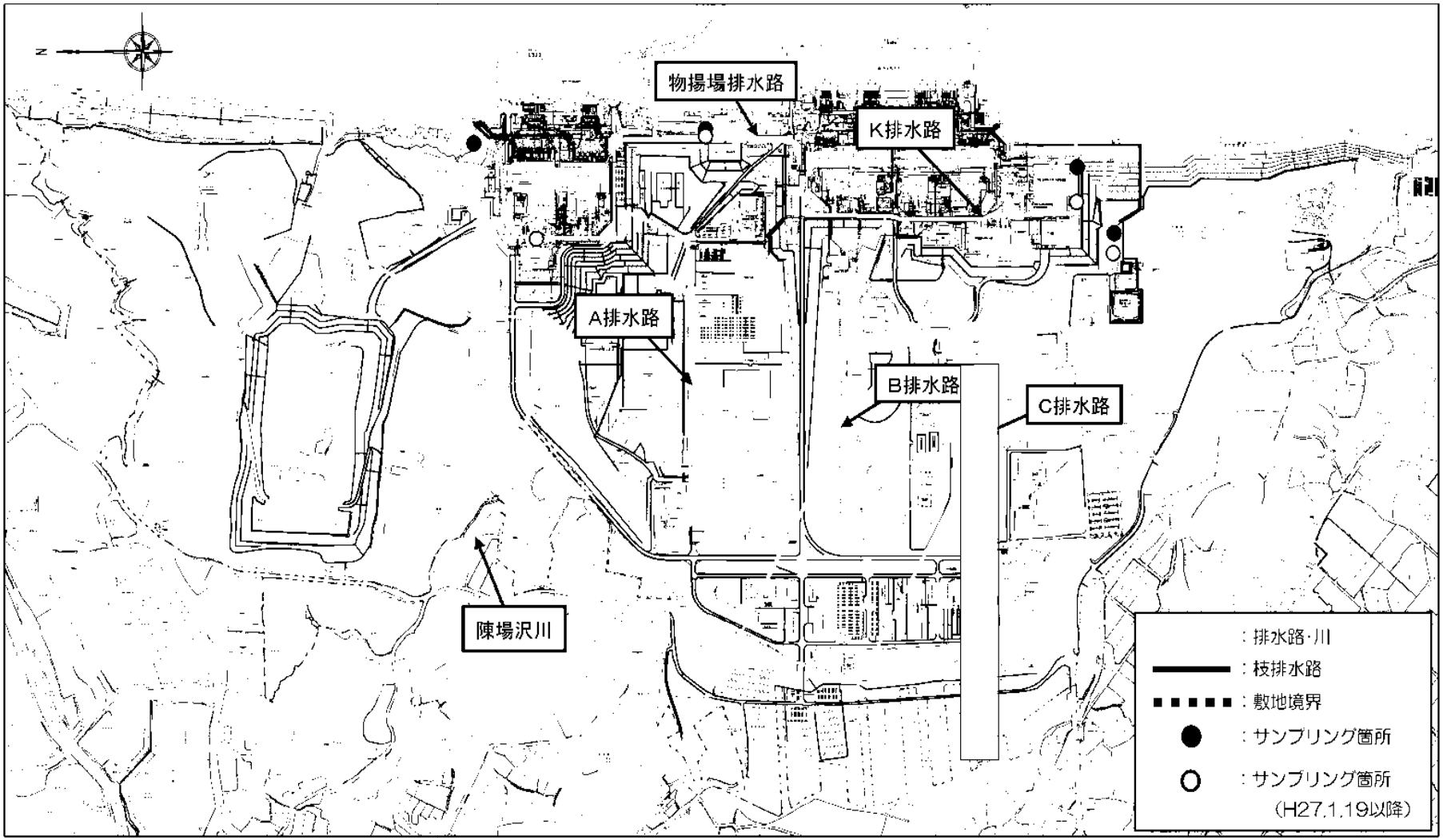
・第１０回　汚染水対策検討ワーキンググループ（Ｈ２６年１月２４日）
・第１７回　特定原子力施設監視・評価検討会（Ｈ２６年１月３１日）
・第１８回　特定原子力施設監視・評価検討会（Ｈ２６年２月１４日）
・第１９回　特定原子力施設監視・評価検討会（Ｈ２６年３月３１日）

当時の測定結果からもＫ排水路については、他排水路と比べて、比較的高い放射能濃度が確認されていた。

Ｈ２６年２月２６日に排水路からの排水も含めた敷地境界における実効線量の制限に関する規制要求が出され、当社は、これら要求事項を達成させるための実施計画をＨ２６年３月２６日に補正申請し、これまでに除染、清掃等の作業を実施してきている。

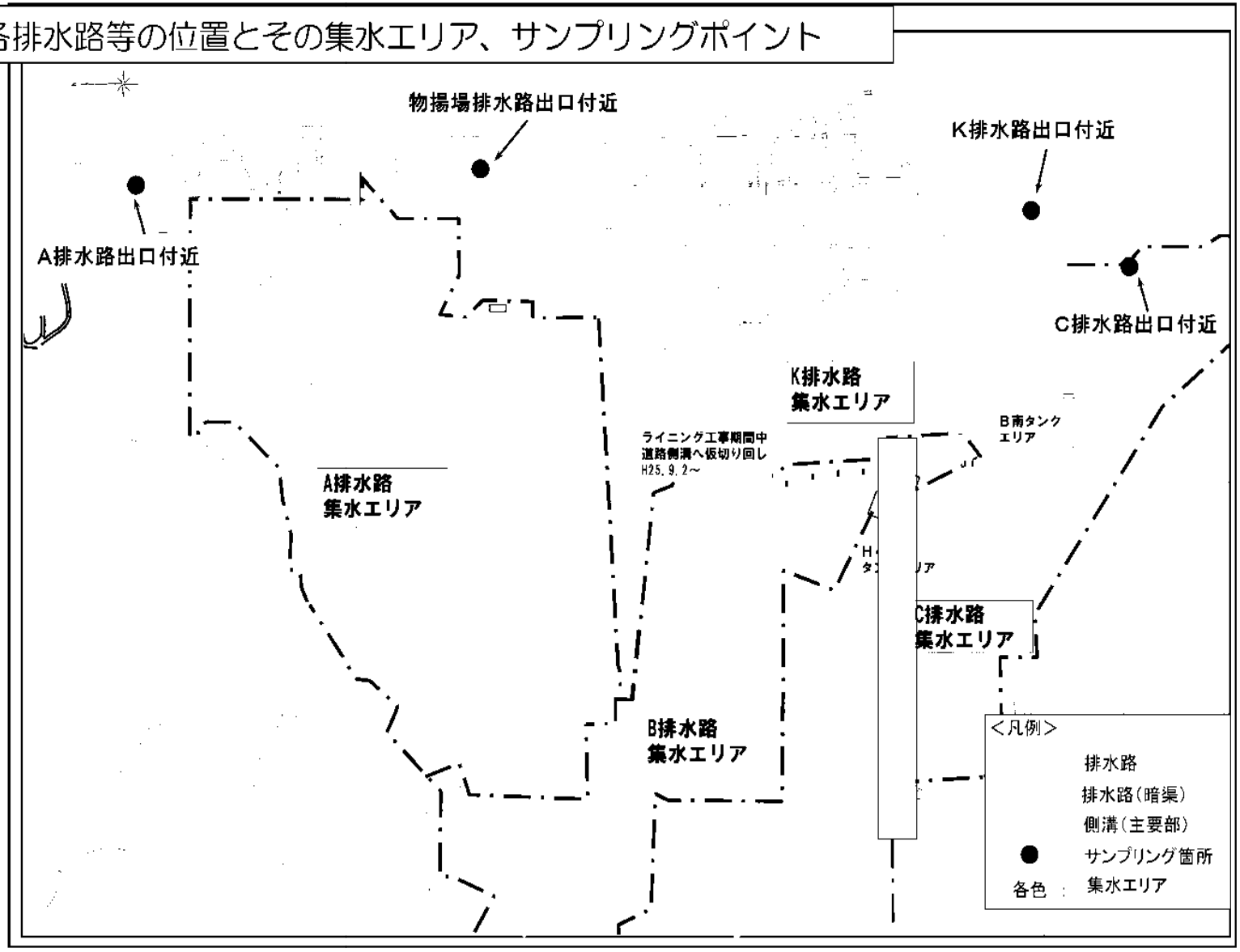
2. 排水路位置

排水路、河川、枝排水路の位置を下図に示す。



3．既往の報告内容　サンプリング位置

各排水路等の位置とその集水エリア、サンプリングポイント



3．既往の報告内容　排水路分析結果（1/2）

○A排水路については、昨年12月に開渠部等を清掃し、排水口の濃度の低下が確認された。
さらに、2月7日に採取した試料について、検出限界値を下げた分析を行った結果、告示濃度比は0.16であった。（なお、12月26日～2月7日の間、清掃は行っていない。）

A排水路

地点名	A排水路排水口付近 清掃前　降雨なし	A排水路排水口付近 清掃後　降雨なし	A排水路排水口付近 清掃後　降雨なし
採取日	13/11/29	13/12/26	14/2/7
Cs-134(Bq/L)	4.0	＜　4.0	1.7
Cs-137(Bq/L)	14	＜　3.3	4.9
全β(Bq/L)	25	8.6	11
H-3(Bq/L)	19	19	－
告示濃度比	0.35	0.26	0.16

※H-3は過去の分析の結果、告示濃度に比べ十分低いため、測定していない。

【告示濃度】：Cs-134　（60 Bq/L）
Cs-137（90 Bq/L）
Sr-90　（30 Bq/L）（Y-90　（300Bq/L））
H-3　　（60,000 Bq/L）

【告示濃度比の算出方法について】
・NDの場合は、ND値で検出と仮定。
・全β＝(Sr-90)+(Y-90)+(Cs-134)+(Cs-137)（式①）と仮定。
・(Sr-90)＝(Y-90)（式②）と仮定。
・①、②式でSr-90を算出する際、Cs-134、Cs-137がNDの場合は、Cs-134、Cs-137の値は0を代入。
（Sr-90の濃度が高くなる方向であり、安全側の仮定）

【13/11/29の測定値を用いた計算例】
○Sr-90濃度、Y-90濃度の算出
Cs-134=4.0
Cs-137=14
全β　=25
上記と式①より、
25=(Sr-90)+(Y-90)+4.0+14
式②より、
(Sr-90)=(Y-90)=5
○告示濃度比の算出
告示濃度比= Cs-137濃度/Cs-134告示濃度
+Cs-137濃度/Cs-137告示濃度
+Sr-90濃度　/Sr-90告示濃度
+ Y-90濃度　/ Y-90告示濃度
+ H-3濃度　/ H-3告示濃度
=4.0/60+14/90+3.5/30+3.5/300+19/60000
≒0.35

（注）記載した評価値については現時点の測定データに基づいており、データ拡充等により変わりうるものである。

第18回　特定原子力監視評価検討会
2014年2月14日　より抜粋

3．既往の報告内容　排水路分析結果（2/2）

○K排水路については、2月7日に採取した試料について、検出限界値を下げた分析を行った結果、告示濃度比は0.48であった。

K排水路

地点名	K排水路排水口付近 清掃前　降雨なし	K排水路排水口付近 清掃前　降雨なし
採取日	13/12/2	14/2/7
Cs-134(Bq/L)	＜　6.3	5.8
Cs-137(Bq/L)	16	19
全β(Bq/L)	41	34
H-3(Bq/L)	360	－　※
告示濃度比	0.75	0.48

※H-3は過去の分析の結果、告示濃度に比べ十分低いため、測定していない。

○C排水路、物揚場排水路の各排水口付近の告示濃度比は、それぞれ0.27、0.48～0.58であった。

C排水路

	C排水路排水口付近 暗渠化工事中　降雨無し
採取日	14/1/29
Cs-134(Bq/L)	0.78
Cs-137(Bq/L)	2.5
全β(Bq/L)	16
H-3(Bq/L)	19
告示濃度比	0.27

物揚場排水路

地点名	物揚場排水路排水口付近 清掃前　降雨なし	物揚場排水路排水口付近 清掃前　降雨なし
採取日	13/11/15	14/2/7
Cs-134(Bq/L)	4.6	8.3
Cs-137(Bq/L)	14	20
全β(Bq/L)	32	40
H-3(Bq/L)	13	－　※
告示濃度比	0.48	0.58

※H-3は過去の分析の結果、告示濃度に比べ十分低いため、測定していない。

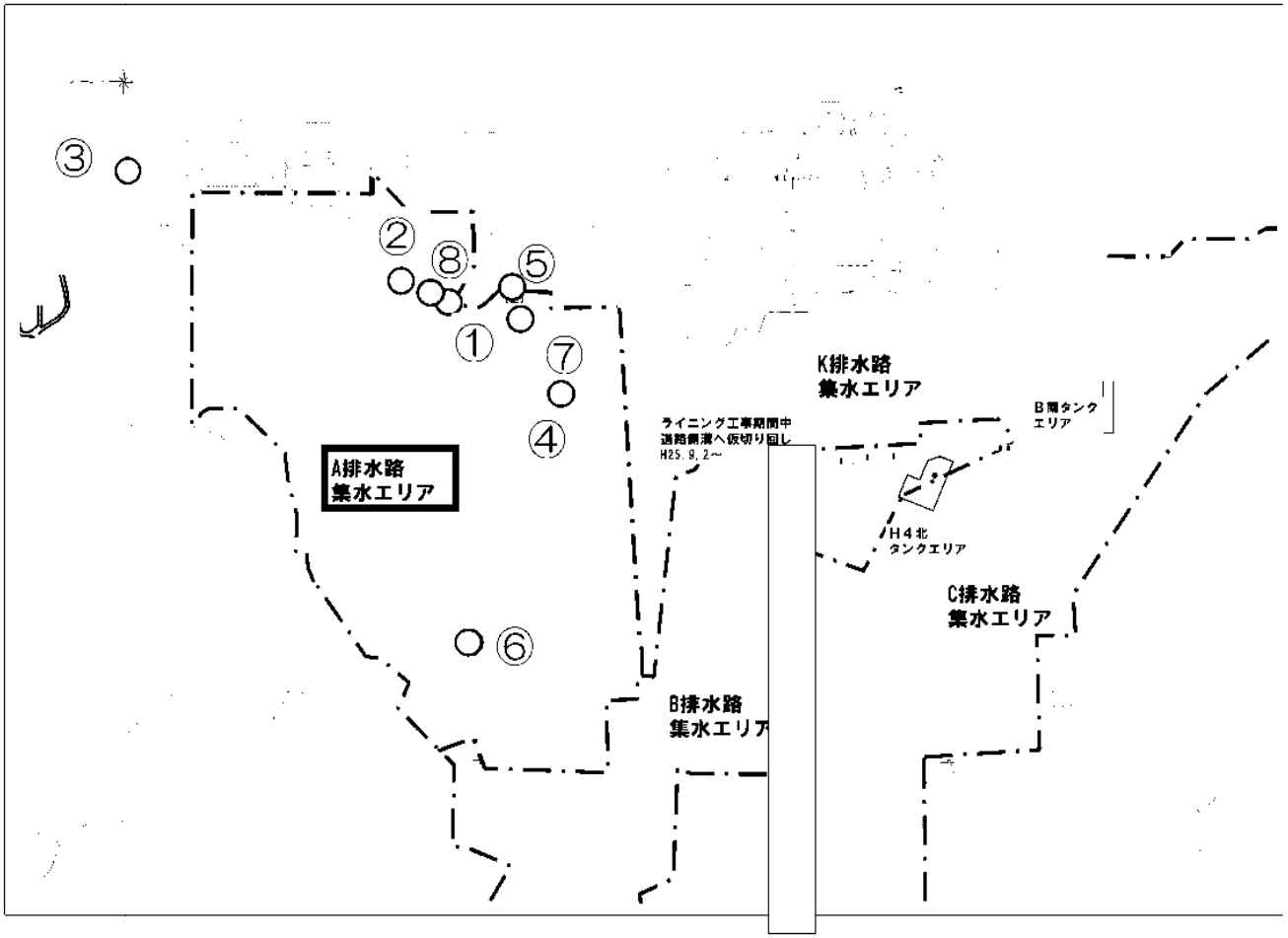
（注）記載した評価値については現時点の測定データに基づいており、データ拡充等により変わりうるものである。

3．既往の報告内容　A排水路調査状況

第10回　汚染水対策検討WG
2014年1月24日　より抜粋

採水ポイント
①35m盤合流点免震棟側
②35m盤合流点出口
③排水口
④免震棟浄化槽出口
⑤事務本館浄化槽出口
⑥ろ過水タンク近傍
⑦事務本館東側側溝

採泥ポイント
⑧35m盤合流点

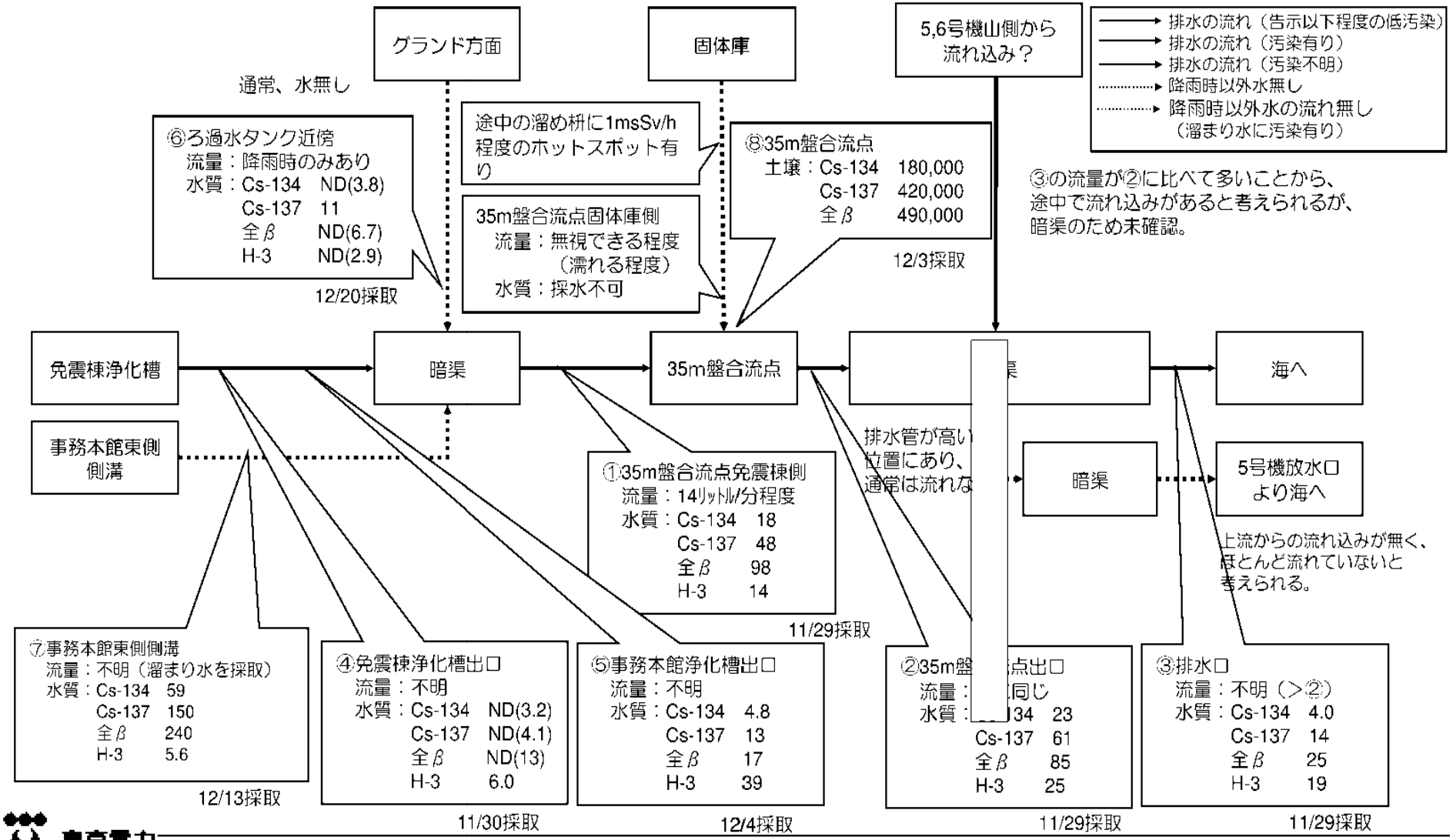


3．既往の報告内容　A排水路調査結果（模式図）

第10回　汚染水対策検討WG
2014年1月24日　より抜粋

・汚染等の状況から、A排水路の汚染の発生源は、事務本館東側側溝、固体廃棄物貯蔵庫（以下、固体庫）近傍のホットスポット（汚染が吹きだまり状になっている箇所）の影響と推定。
・A排水路開渠部と溜め枡部の清掃完了(H25.12.17)。

水質の単位: Bq/L
土壌の単位: Bq/kg乾土

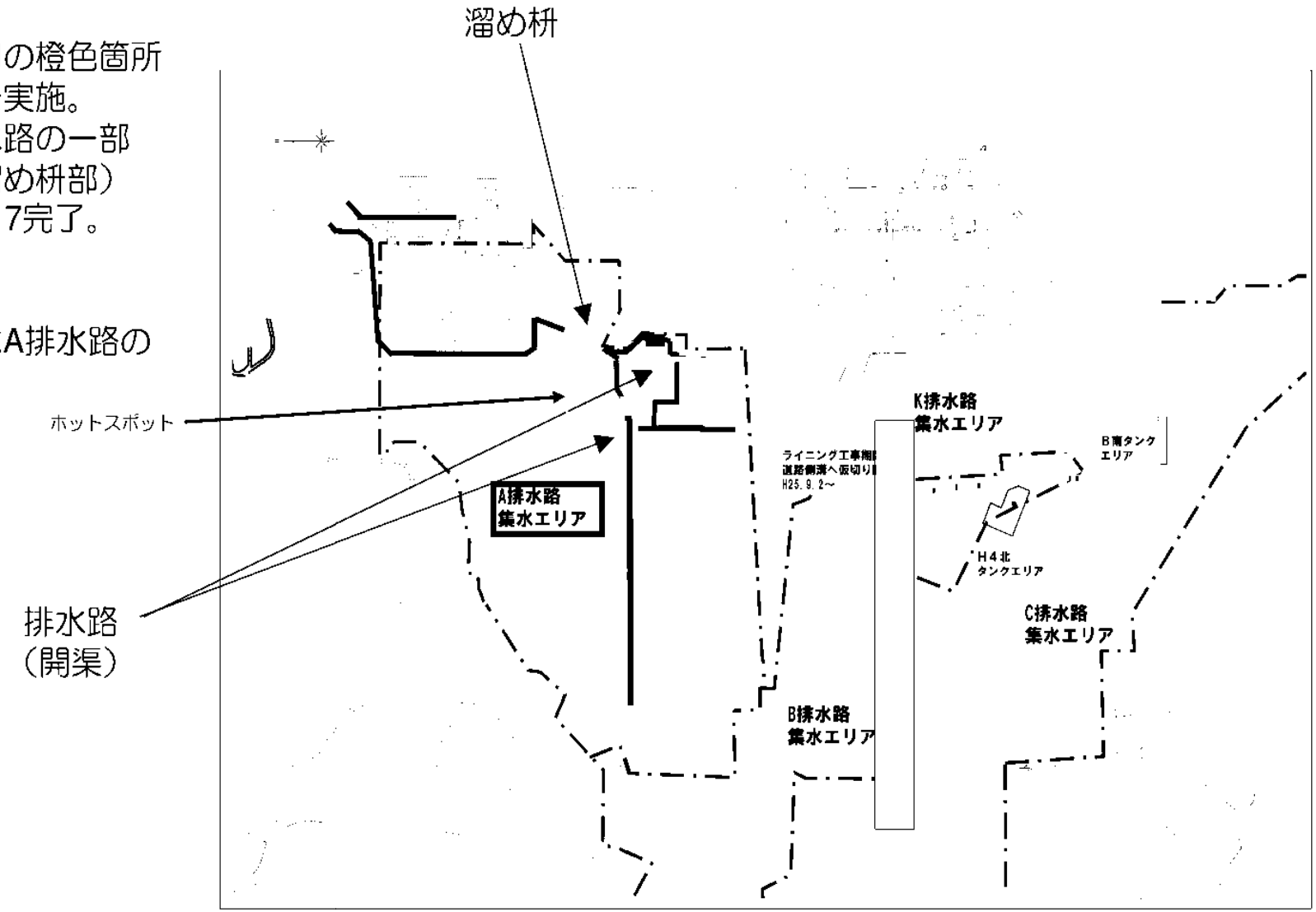


3．既往の報告内容　A排水路の清掃箇所

第10回　汚染水対策検討WG
2014年1月24日　より抜粋

右図矢印の橙色箇所の清掃を実施。
（A排水路の一部および溜め枡部）
H25.12.17完了。

【参考】
茶色線はA排水路の暗渠部



3．既往の報告内容　A排水路の清掃結果

第10回　汚染水対策検討WG
2014年1月24日　より抜粋

（単位：Bq/L）

試料名	⑦事務本館東側側溝	⑦事務本館東側側溝【清掃後】	①35m盤合流点免震棟側	①35m盤合流点免震棟側【清掃後】	③排水口	③排水口【清掃後】
サンプリング日時	13/12/13 10:25	14/1/9 15:30	13/11/29 14:30	13/12/26 10:10	13/11/29 15:50	13/12/26 10:25
Cs-134	59	2.9	18	9.6	4.0	ND (4.0)
Cs-137	150	7.8	48	23	14	ND (3.3)
全β	240	31	98	50	25	8.6
H-3	5.6	ND (2.9)	14	13	19	19

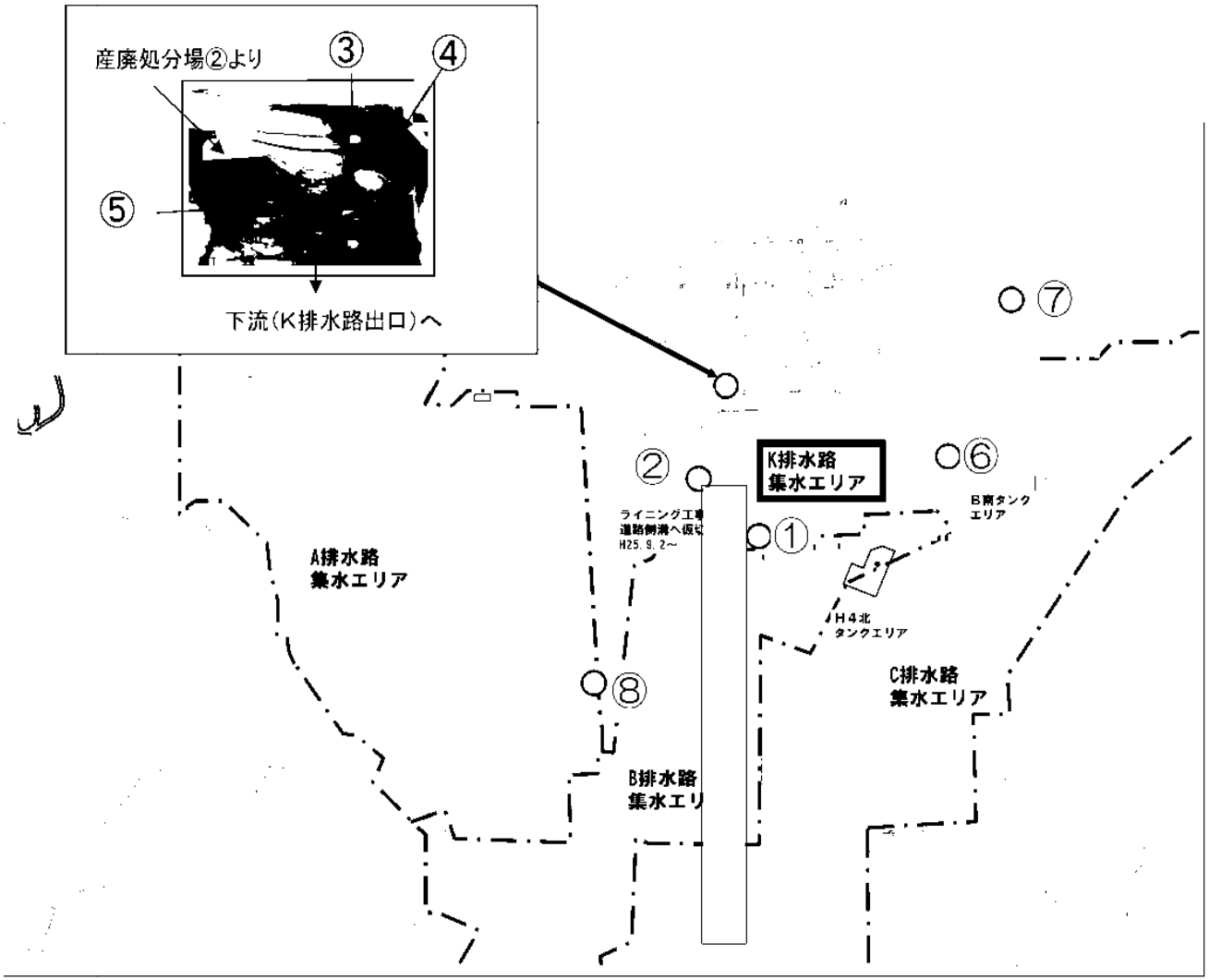
・清掃後、汚染は低下している。

・排水口では、告示濃度を十分下回っている状況である。

3．既往の報告内容　K排水路調査状況

第10回　汚染水対策検討WG
2014年1月24日　より抜粋

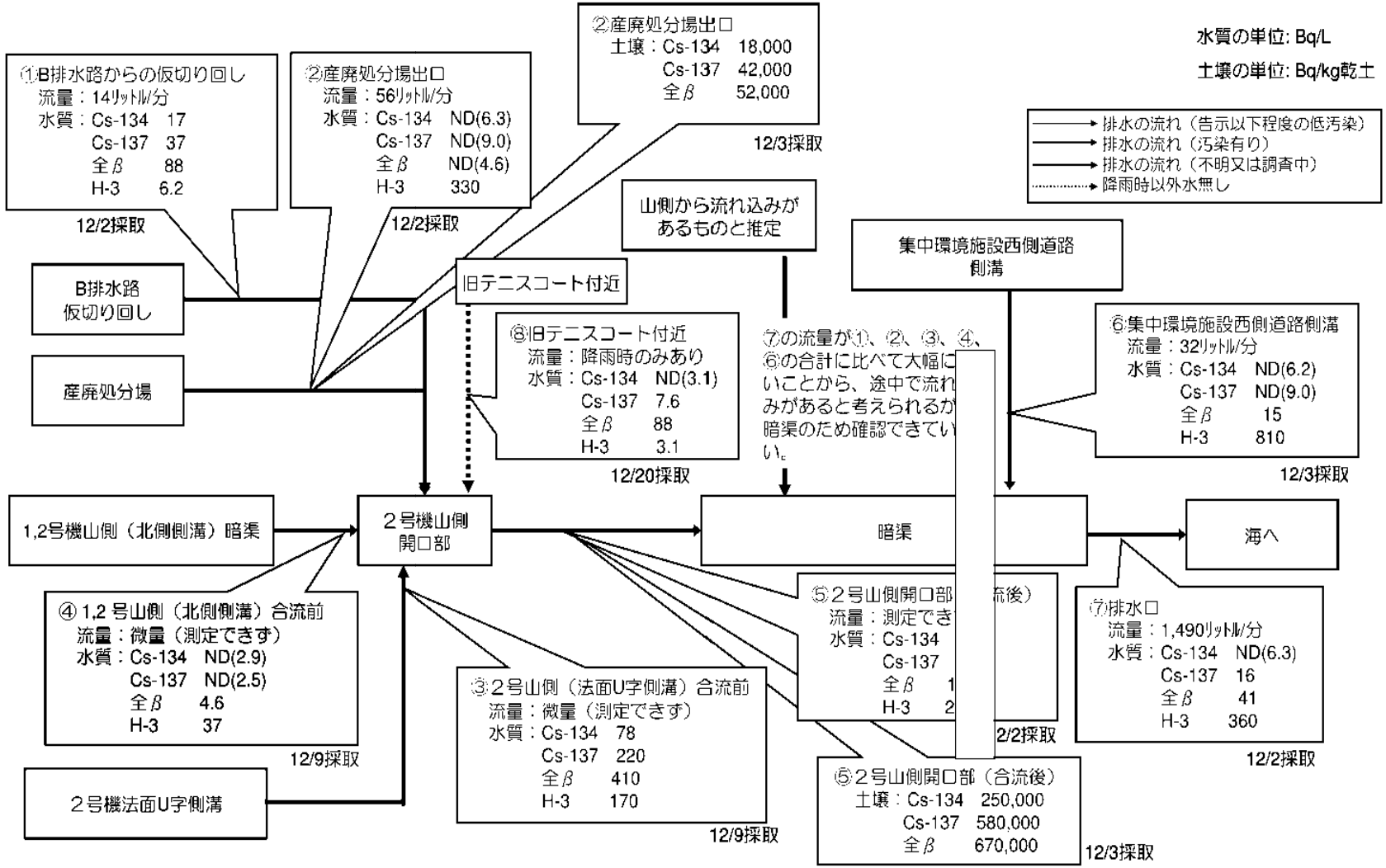
採水
①B排水路からの仮切り回し
②産廃処分場出口
③2号山側（法面U字側溝）合流前
④1，2号山側（北側側溝）合流前
⑤2号山側開口部（合流後）
⑥集中環境施設西側道路側溝
⑦排水口
⑧旧テニスコート付近
採泥ポイント
②産廃処分場出口
⑤ 2号山側開口部（合流後）



3．既往の報告内容　K排水路調査結果（模式図）

第10回　汚染水対策検討WG
2014年1月24日　より抜粋

・2号機法面U字側溝から比較的高濃度の汚染が流入しており、主たる汚染源になっているものと推定。
・2号機法面U字側溝近傍は高線量であり、敷地内線量低減計画と合わせて清掃を実施予定。

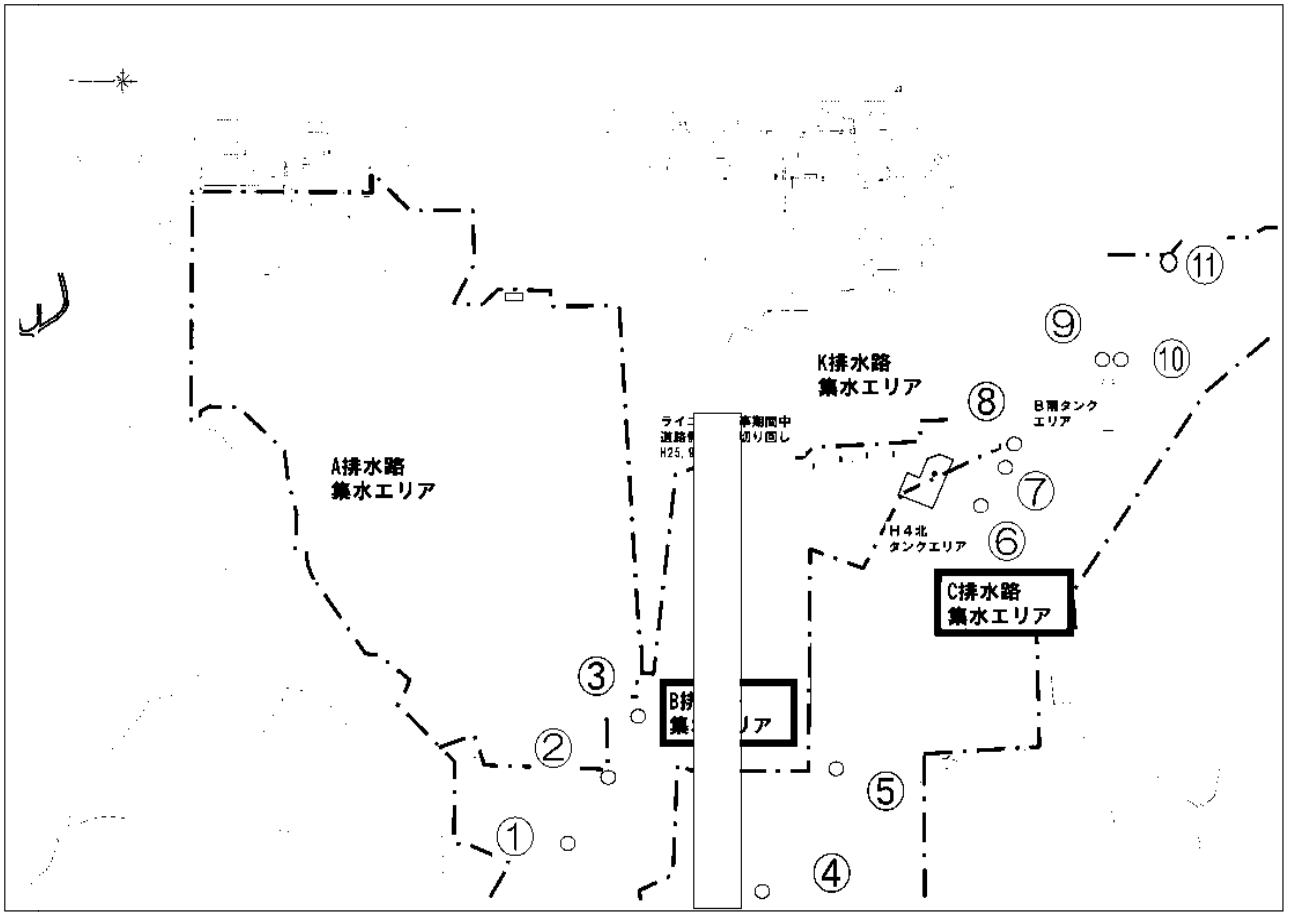


3．既往の報告内容　B,C排水路の調査

第10回　汚染水対策検討WG
2014年1月24日　より抜粋

採水
B排水路
①B排水路上流（登録センター西側）
②B-O-1上流
③ふれ合い交差点付近（B-O-1）

採水
C排水路
④C排水路上流（C-O）の上流
⑤C排水路上流（C-O）
⑥C排水路暗渠内
⑦C排水路暗渠出口（C-1上流）
⑧B-C排水路合流点（C-1）
⑨C-1-1の上流
⑩C排水路合流点（C-1-1）
⑪C排水路出口（C-2）

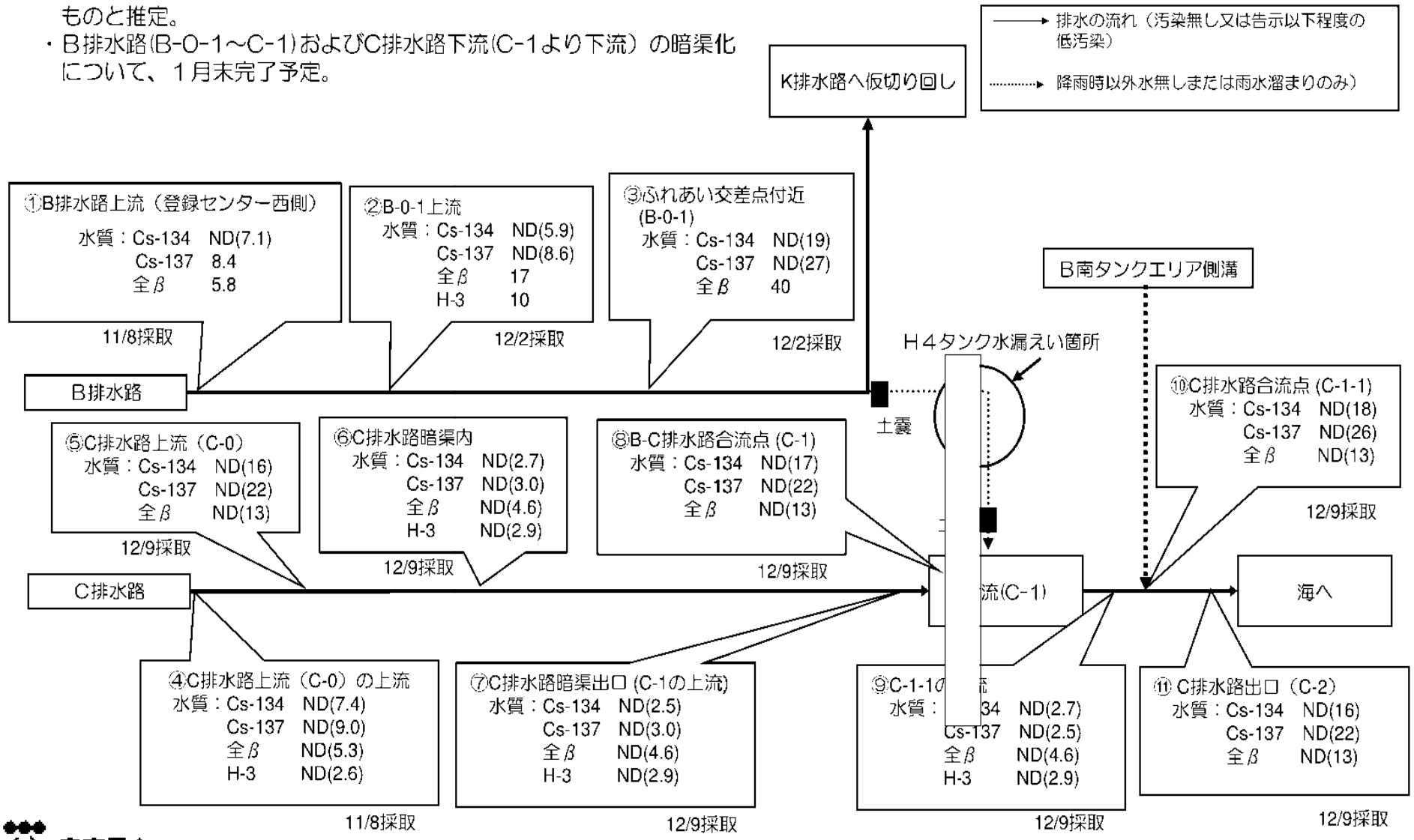


3．既往の報告内容　B,C排水路調査結果（模式図）

第10回　汚染水対策検討WG
2014年1月24日　より抜粋

・B排水路上流で、告示濃度を下回る程度の低濃度の汚染が混入しているものと推定。
・B排水路(B-0-1～C-1)およびC排水路下流(C-1より下流）の暗渠化について、１月末完了予定。

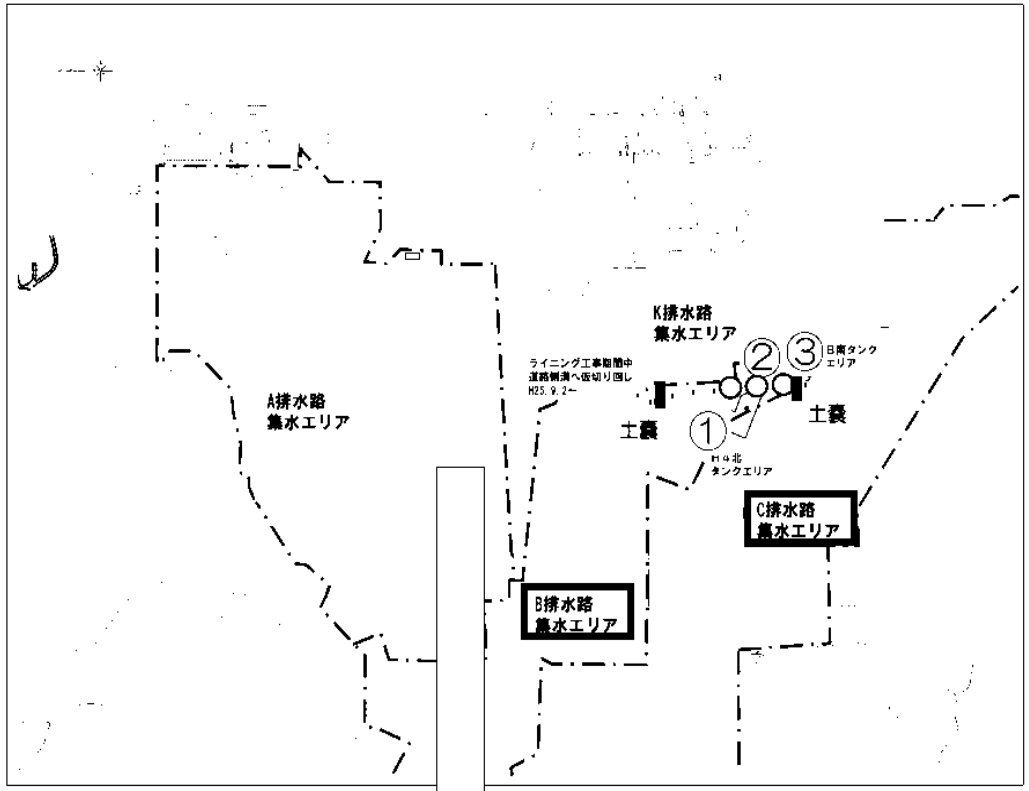
水質の単位: Bq/L



3．既往の報告内容　B,C排水路の調査（H4ﾀﾝｸ漏えい箇所）（模式図）

第10回　汚染水対策検討WG
2014年1月24日　より抜粋

採水
B排水路
① B-1（H4タンクエリアからの漏えい推定箇所）
② B-2（B-1とB-3の中間）
③ B-3（C排水路との合流点手前）



水質の単位: Bq/L

① B-1
水質：Cs-134　ND(19)
Cs-137　ND(26)
全β　32
12/20採取

② B-2
水質：Cs-134　ND(17)
Cs-137　ND(23)
全β　45
12/20採取

土嚢

土嚢

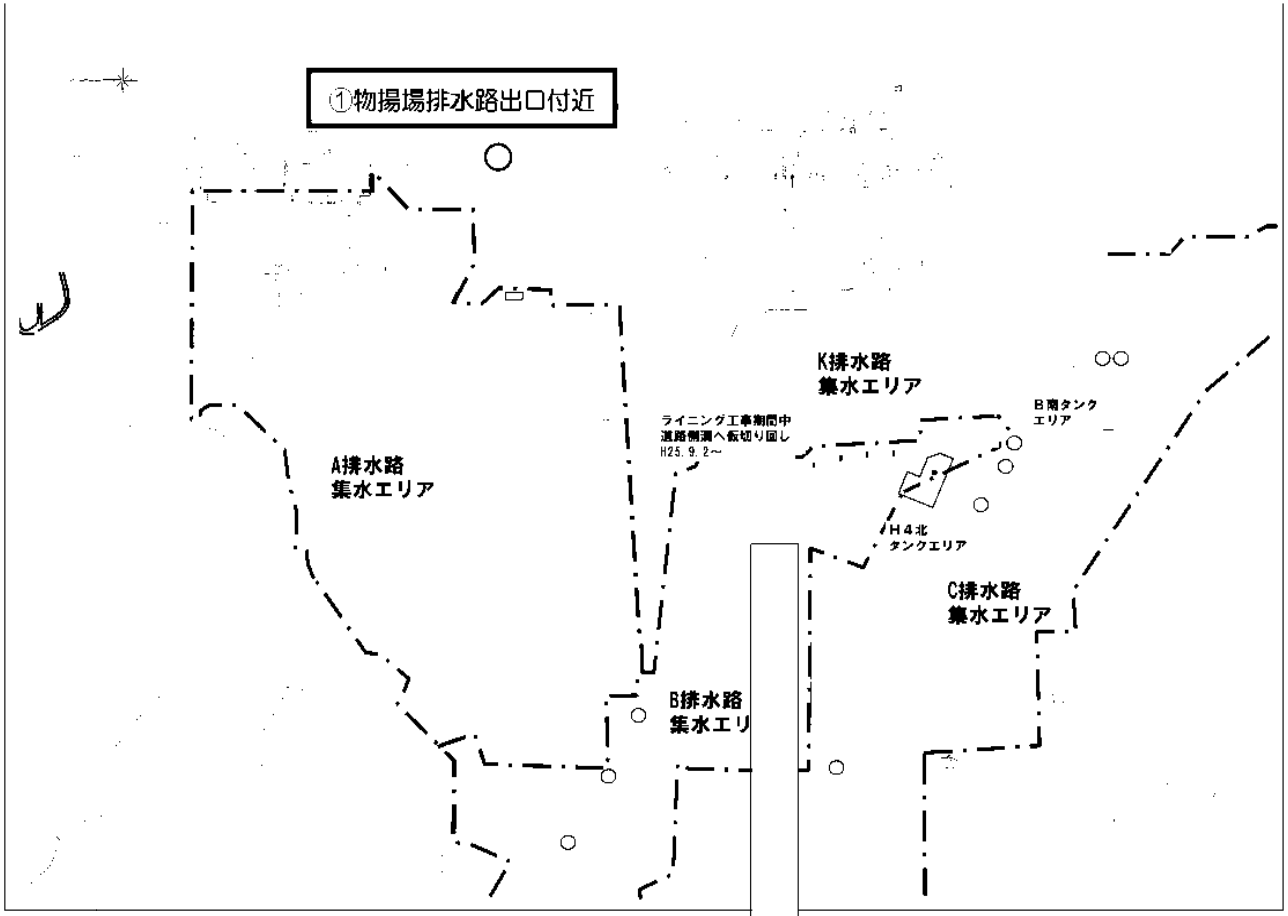
③ B-3
水質：Cs-134　ND(16)
Cs-137　42
全β　67
12/20採取

・当[redacted]水路は、降雨が無いと空である。
・降雨直後の水たまりデータは告示濃度レベル程度。
・１月末に暗渠化が完成予定であり、暗渠化後は通水再開が可能であると考える。

3．既往の報告内容　物揚場排水路の調査箇所と調査結果（模式図）

第10回　汚染水対策検討WG
2014年1月24日　より抜粋

採水
①物揚場排水路出口付近



水質の単位：Bq/L

①物揚場排水路出口付近
水質：Cs-134　4.6
Cs-137　14
全β　32
H-3　13

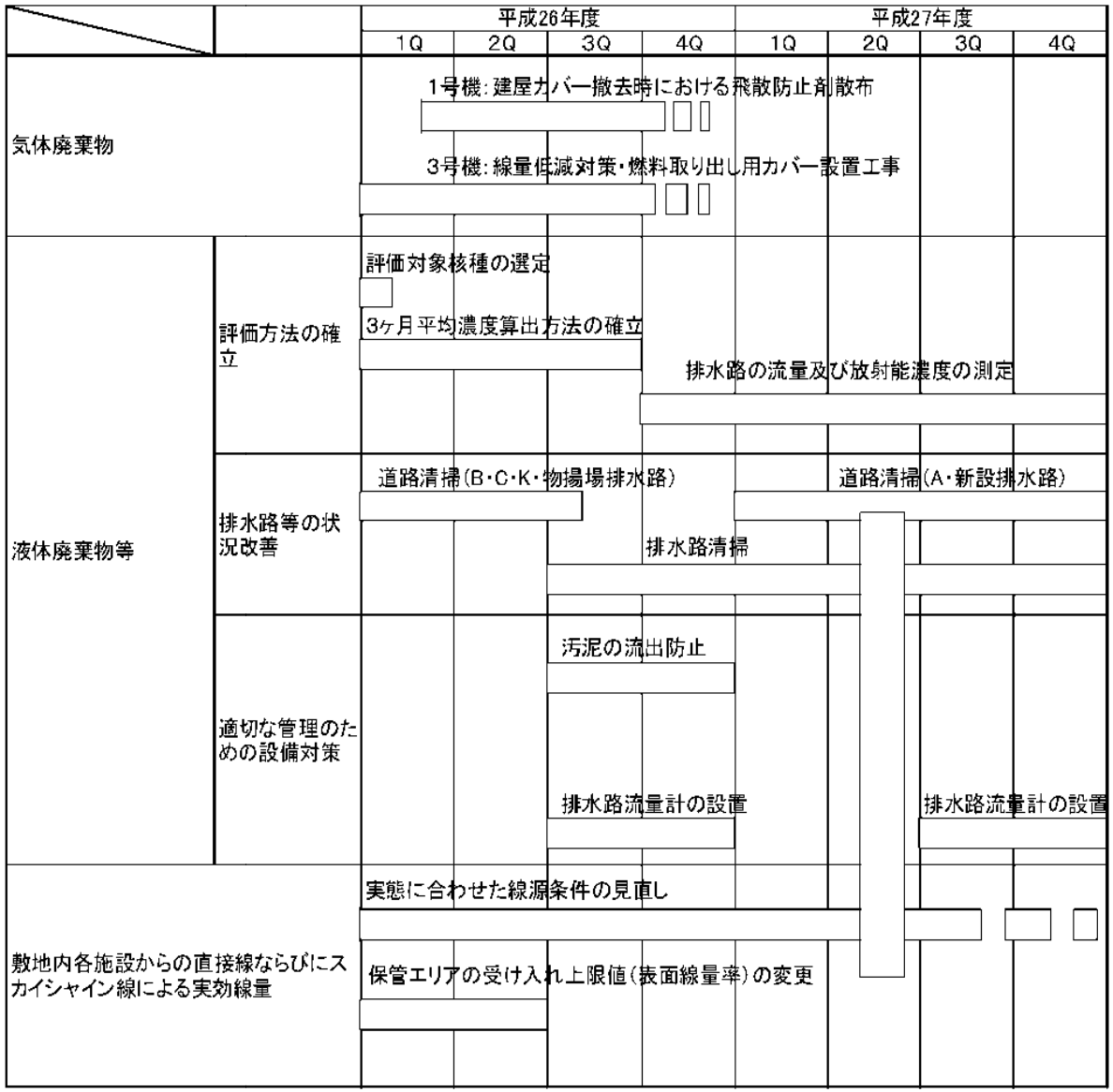
11/15採取

物揚場排水路 → 港湾内へ

・試料採取地点上流[illegible]路であり、汚染源を特定できていないが、高汚染エリアの雨水等が港湾内へ流れ込む排水路であり、敷地内線量低減計画と合わせてエリアの清掃を行うことにより、濃度は低減していくものと推定。

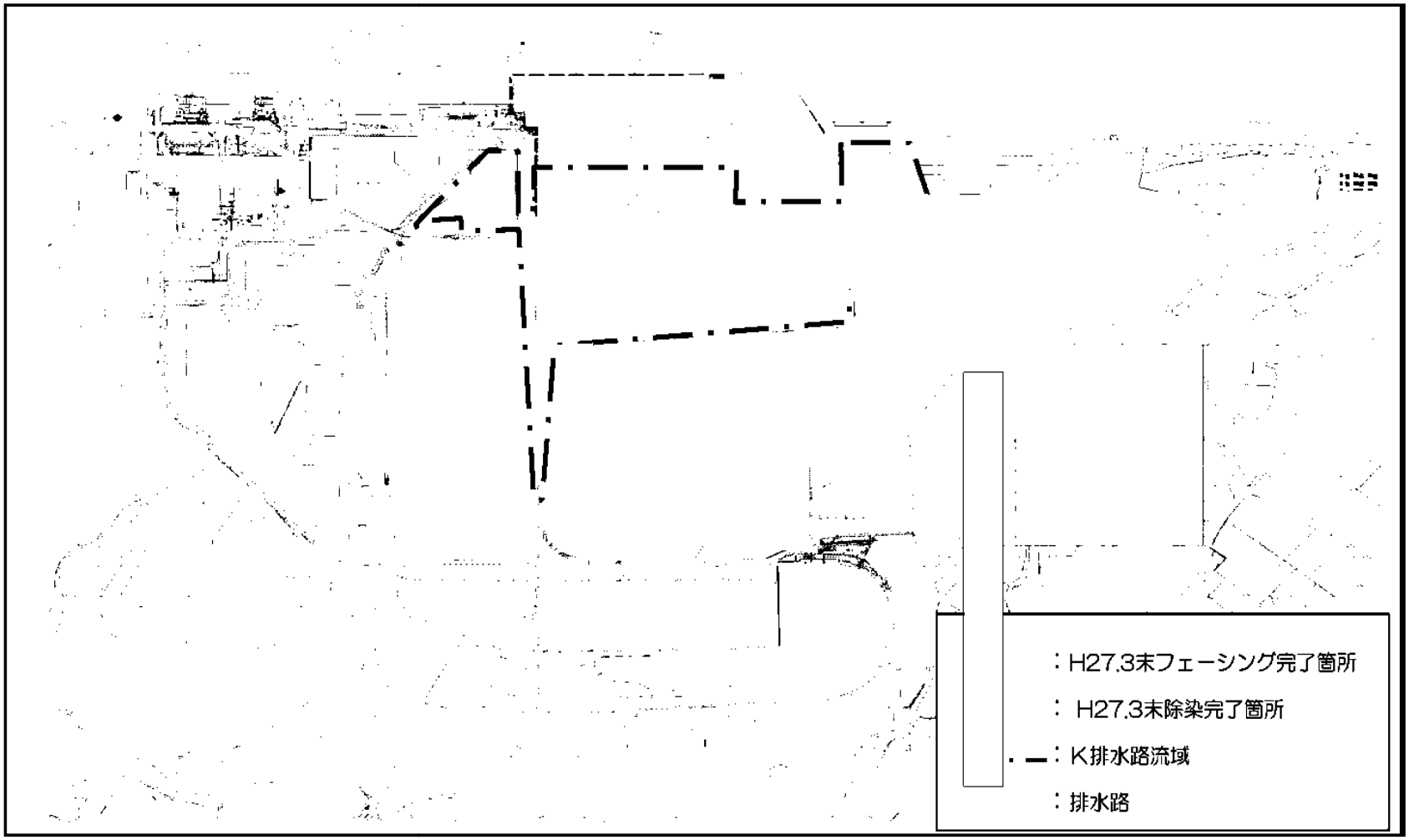
3．既往の報告内容　スケジュール

第19回　特定原子力監視評価検討会
2014年3月31日　より抜粋



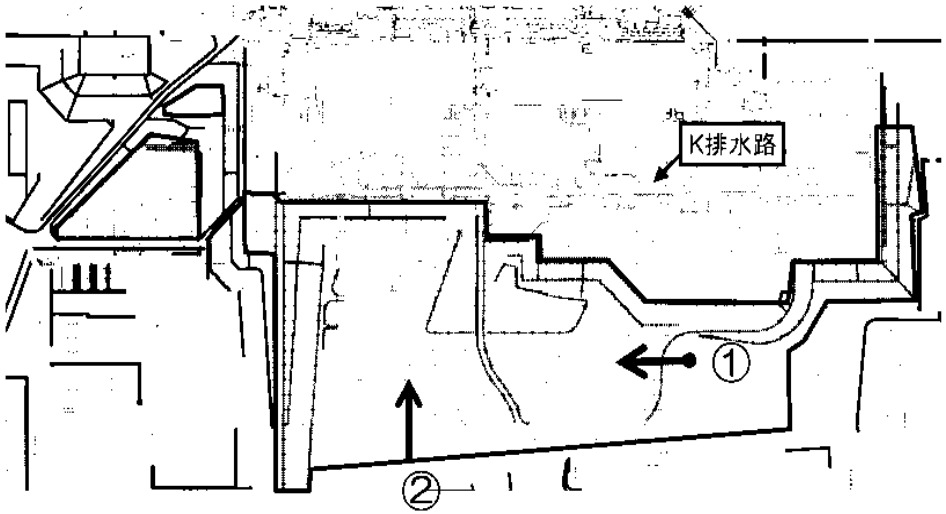
4．排水濃度低減対策の実施状況　(1)除染の実施状況

除染、フェーシングの実施状況は下図の通り。



4．排水濃度低減対策の実施状況　(1)除染の実施状況（K排水路周辺）

除染（フェーシング含む）の実施状況は写真①の通り。



：H27.3末除染終了
：K排水路流域
：排水路
：枝排水路

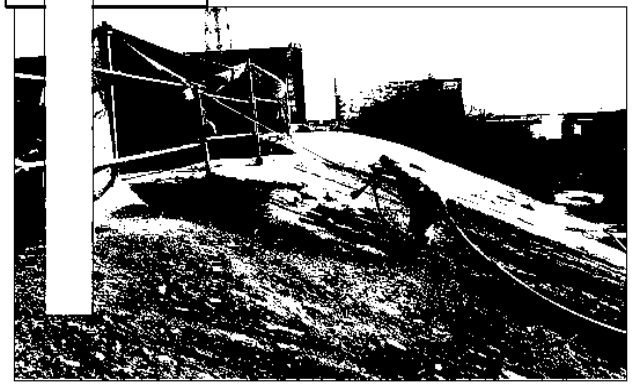
【写真①】

施工前

施工後

【写真②】

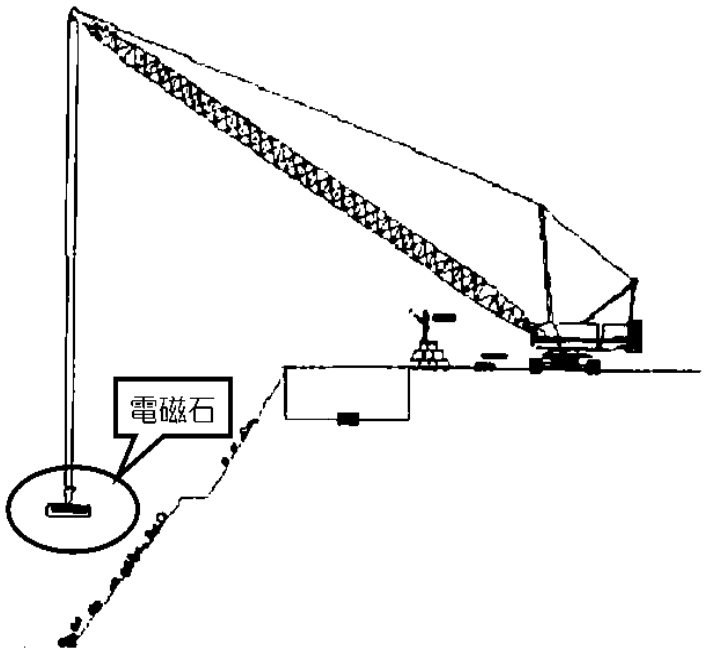
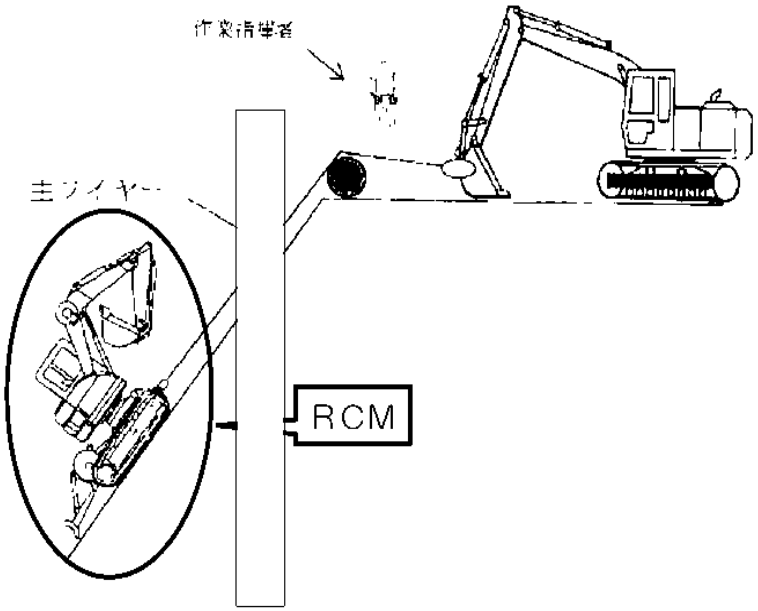
状況



※本エリアについては、除染工事の実施後に雨水浸透防止のためのフェーシングを施工済み

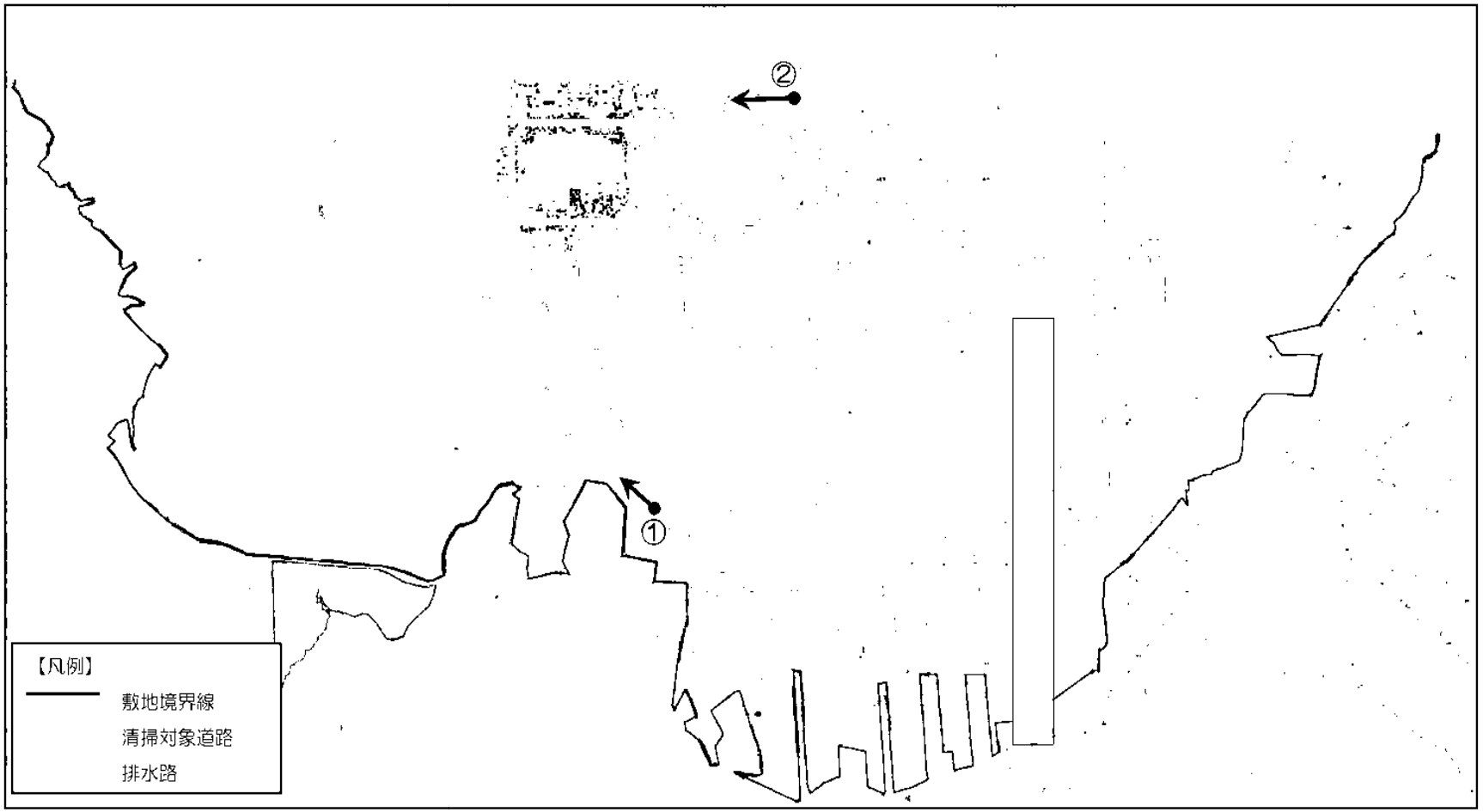
【参考】除染方法（35m盤法面）

工法選定は、作業員の被ばく量低減対策を踏まえ以下の機械化工法を選定。

	ガレキ撤去	ガレキ撤去・表土除去
概要	・バックホウ又はクレーン先端に電磁石を取り付け，ガレキ（金属類）を撤去する。  （リフティングマグネットによる工法）	・RCM（ロッククライミングマシン：リモコン）を用いて，ガレキ撤去・表土除去を実施する。  （RCM工法）

4．排水濃度低減対策の実施状況　(2)清掃（道路）

道路清掃の実施状況は下図の通り（平成26年10月末完了）。

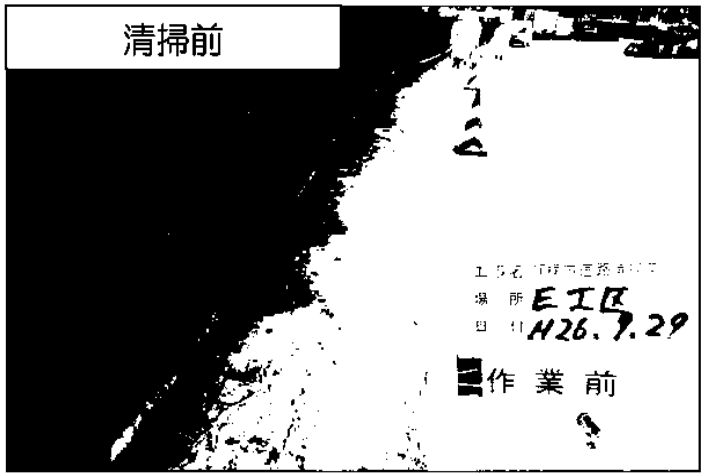


4．排水濃度低減対策の実施状況　(2)清掃（道路）

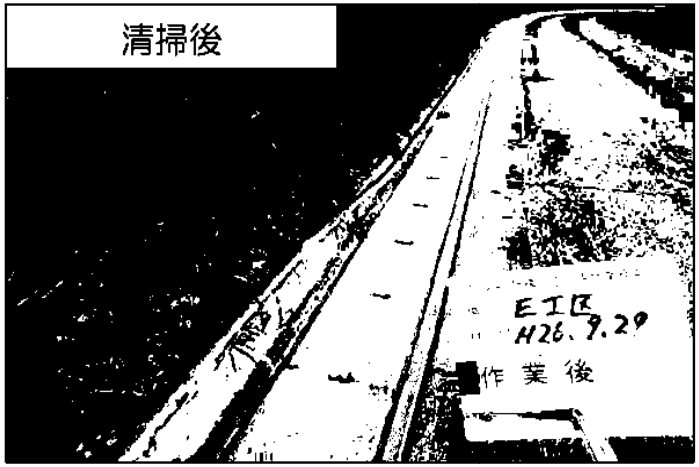
道路清掃の実施状況は写真の通り。

【写真①】

清掃前

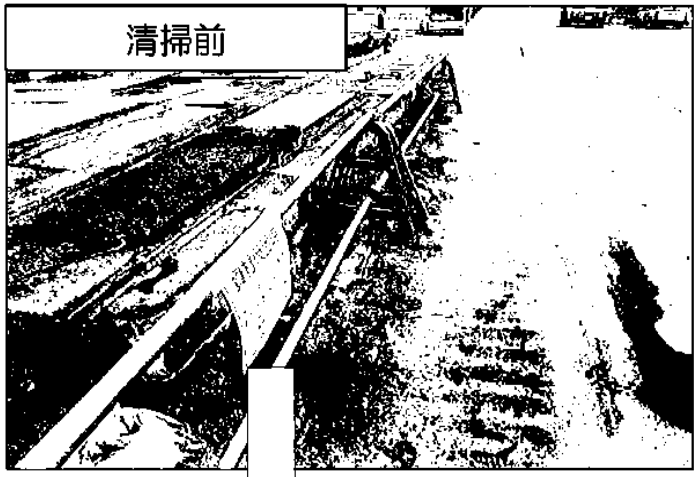


清掃後

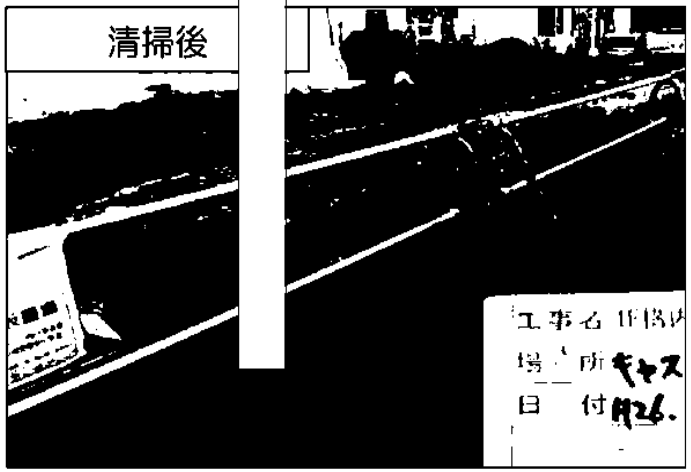


【写真②】

清掃前



清掃後



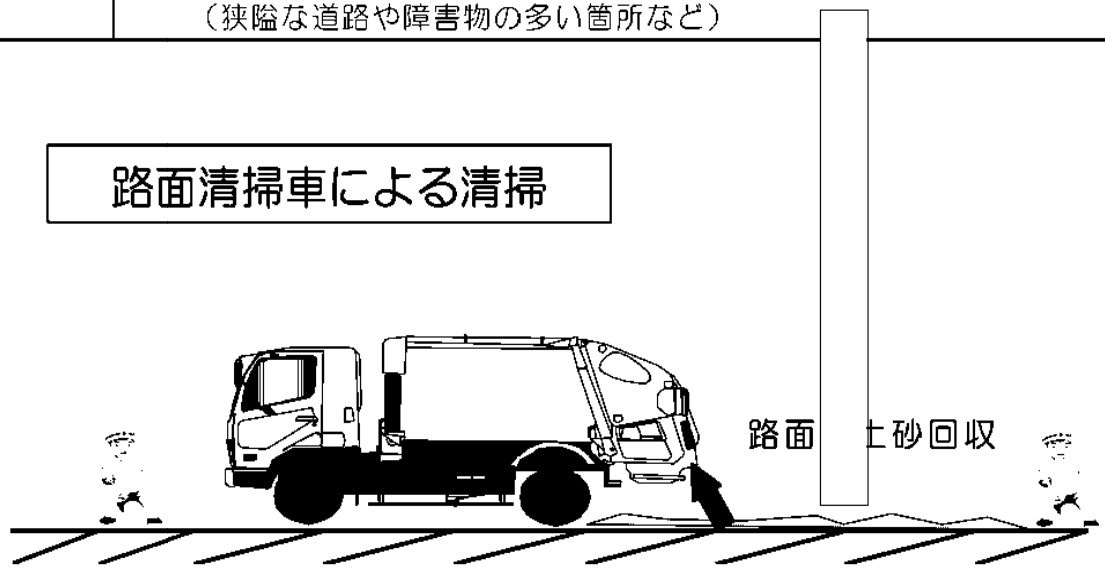
【参考】道路清掃

構内舗装道路に対して，道路清掃車，バキューム車，人力により土砂を回収する。

清掃方法

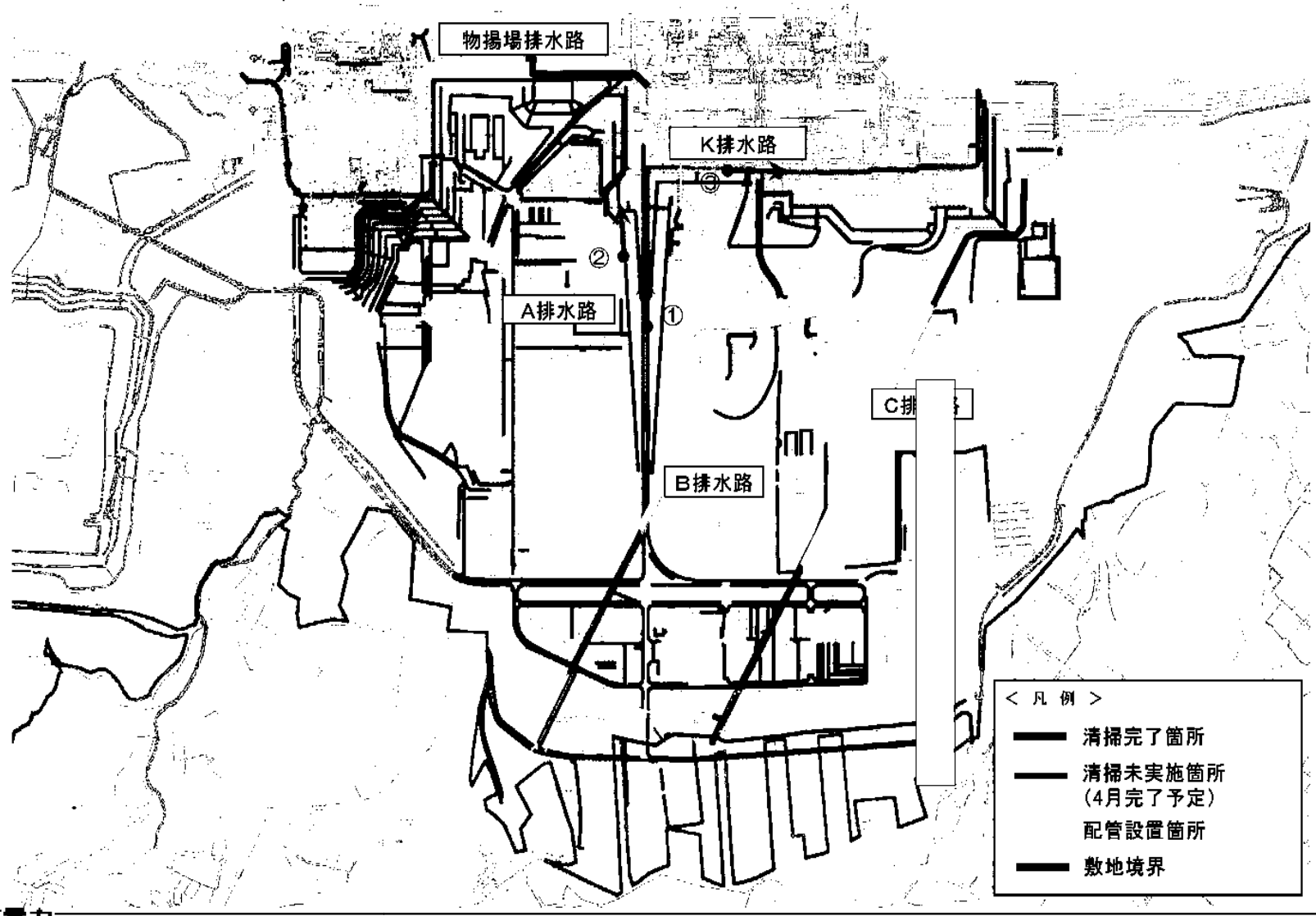
道路清掃	① 道路清掃車のブラシとバキュームにより舗装路面上の土砂回収を実施する。
	② 路面清掃車のブラシ使用が困難な場所についてはバキュームにて土砂を回収する。
	③ 路面清掃車の進入が困難な場所は人力で土砂の回収を行う。（狭隘な道路や障害物の多い箇所など）

路面清掃車による清掃



4．排水濃度低減対策の実施状況　(2)清掃（排水路）

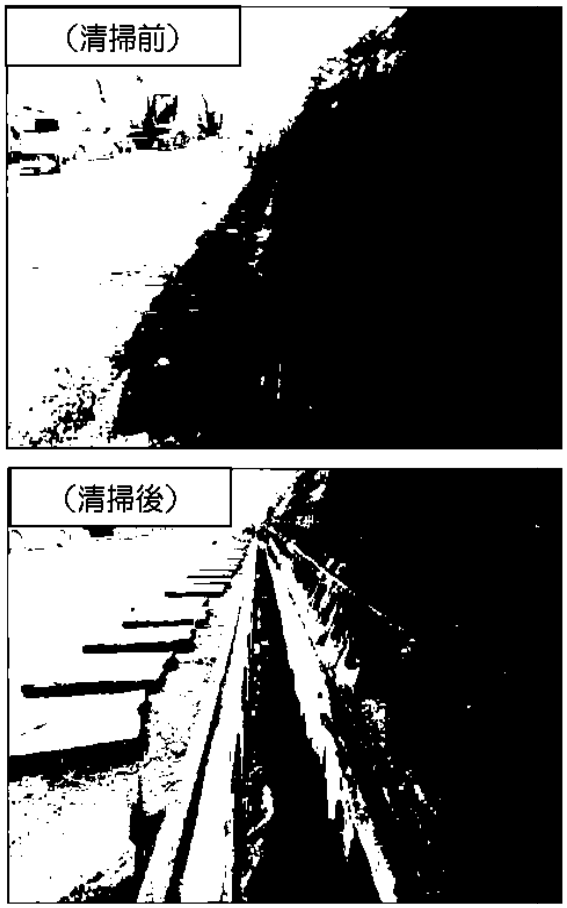
排水路清掃の実施状況は下図の通り（３月末までの完了予定状況）。



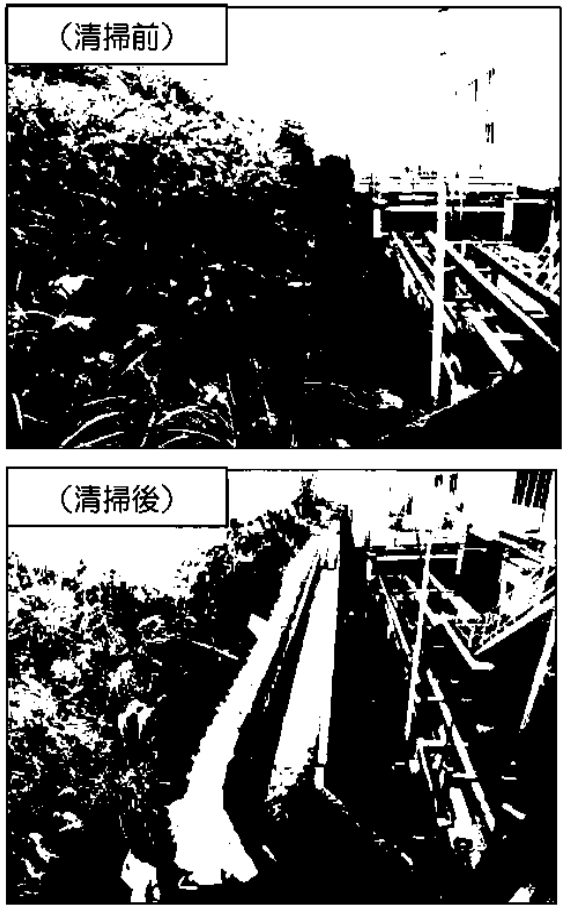
4．排水濃度低減対策の実施状況　(2)清掃（排水路）

排水路清掃の実施状況は写真の通り。

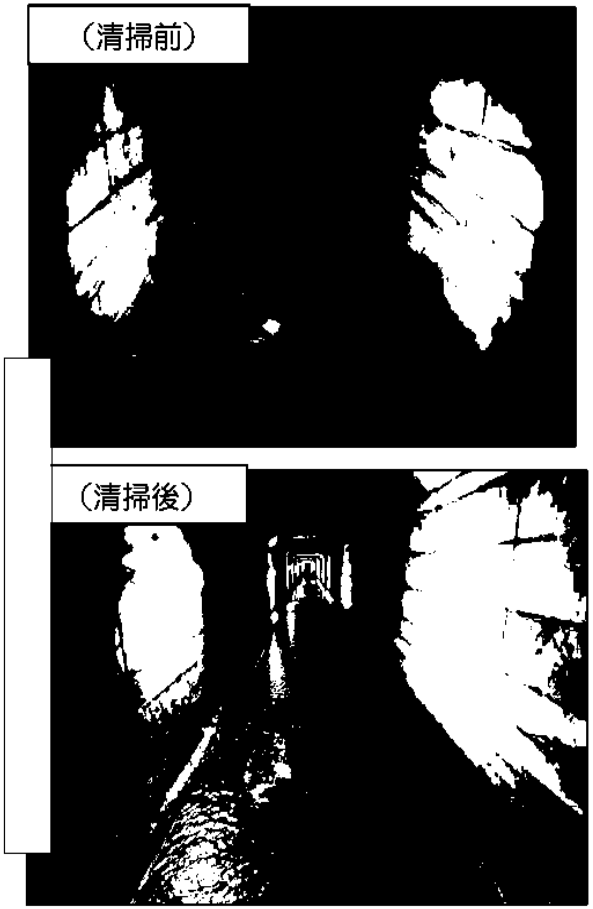
【写真①】大熊通り



【写真②】旧事務本館北側



【写真③】K排水路内部

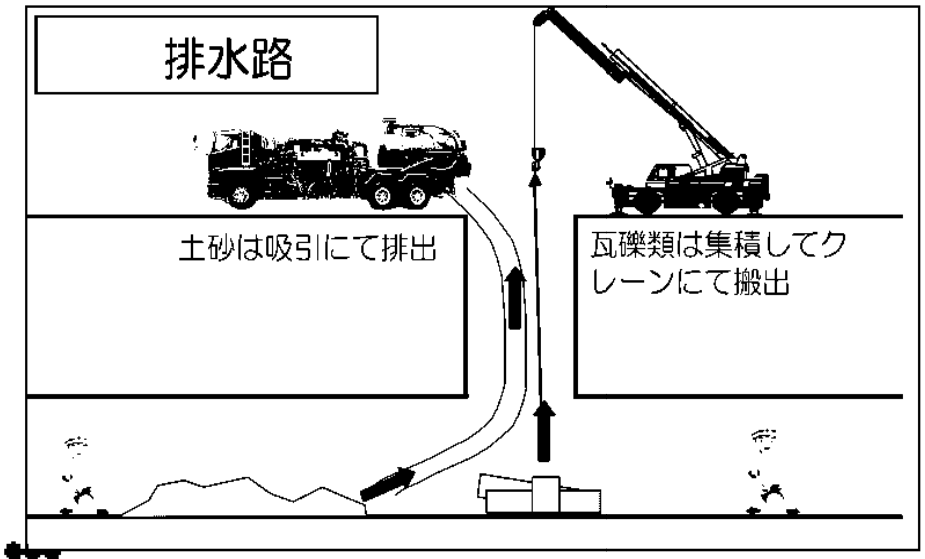


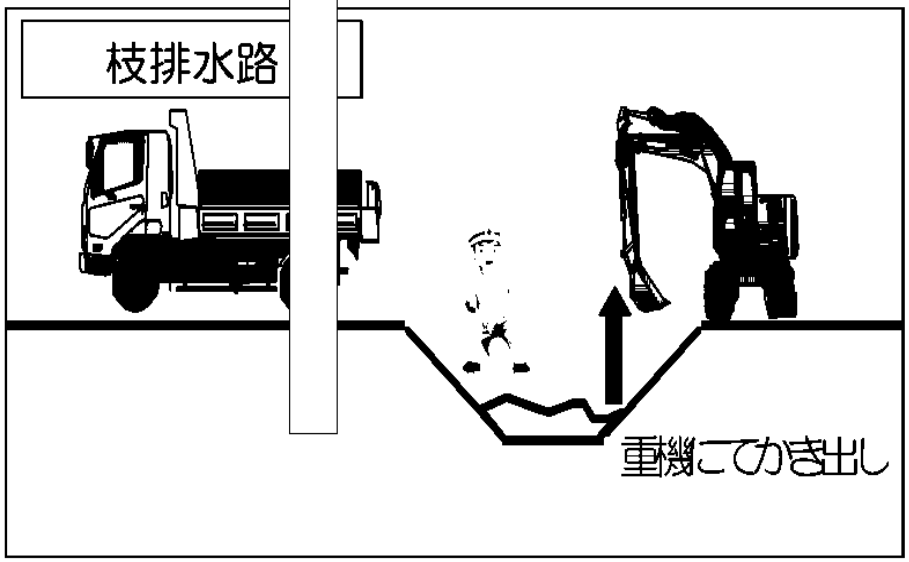
【参考】排水路清掃

排水路，枝排水路，道路側溝に対して，バキューム車，バックホウ，人力により土砂を回収する。

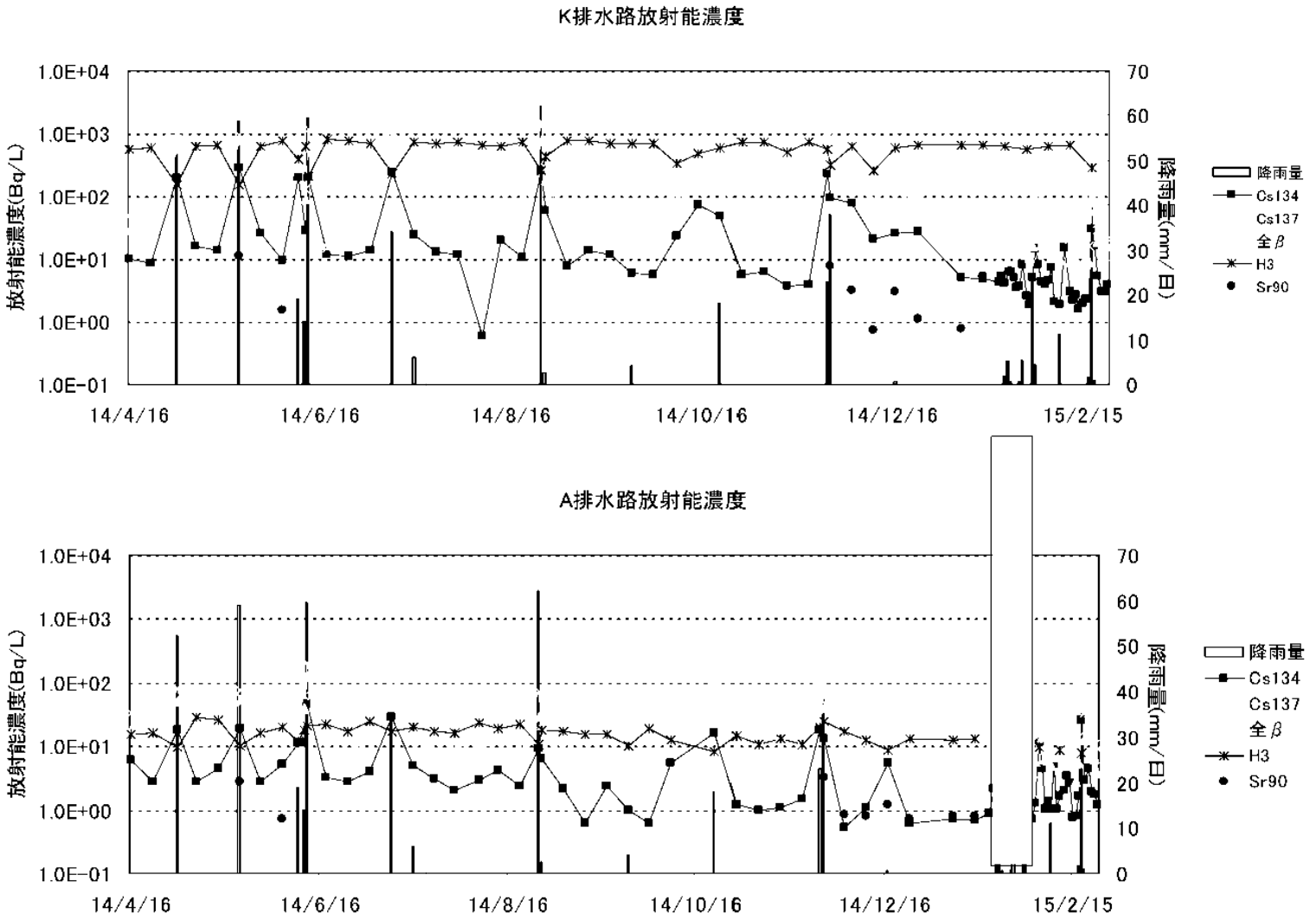
排水路別清掃方法

排水路 （暗渠）	① 吸引作業車により堆積土砂を吸引し排出する。また、土砂吸引時には水を十分切って堆積土砂のみを吸引する。
	② 吸引できない堆積物（瓦礫など）については、MHまで人力で運搬しクレーンにて搬出する。
排水路（開渠） 枝排水路（側溝）	① バックホウ及び人力にて堆積している土砂を掘り起こし必要に応じて土嚢にて搬出する。
	② 排水路規模によりバックホウ・人力を使い分けて搬出を行う。





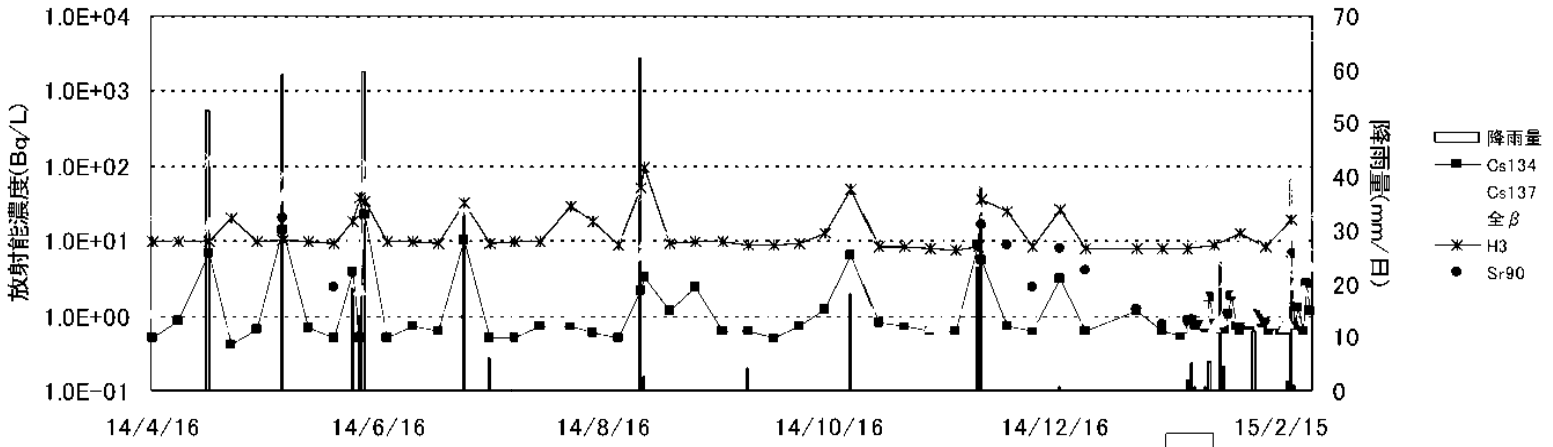
5．排水路の放射能濃度と降雨量の状況①（K排水路，A排水路）



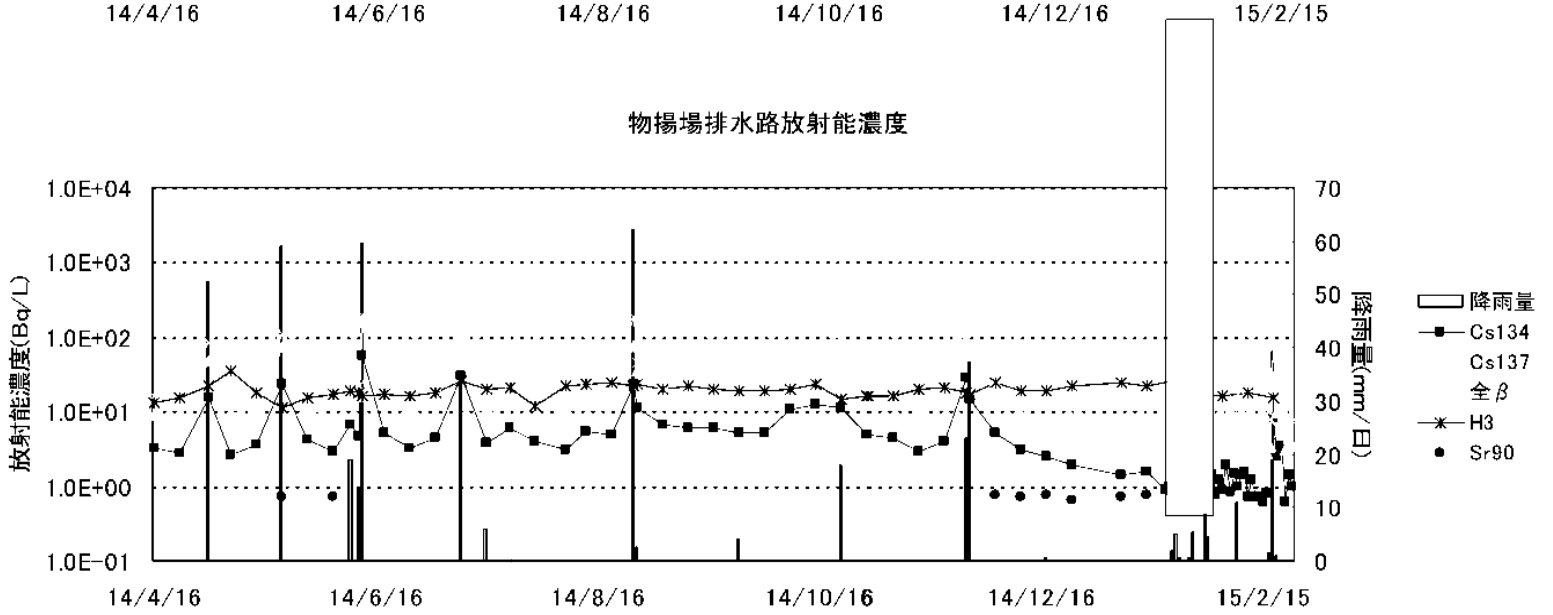
各排水路ともに、15/1/19より自動採水器を採用。採水器の性能を確認中。

5．排水路の放射能濃度と降雨量の状況②（C排水路，物揚場排水路）

C排水路放射能濃度



物揚場排水路放射能濃度



各排水路ともに、15/1/19より自動採水器を採用。採水器の性能を確認中。

６．１　Ｋ排水路の枝排水路水の調査

2014年11月から12月にかけて、降雨時にK排水路への流入が確認される枝排水路の排水を測定した。その結果、比較的濃度の高い枝排水路が確認された。

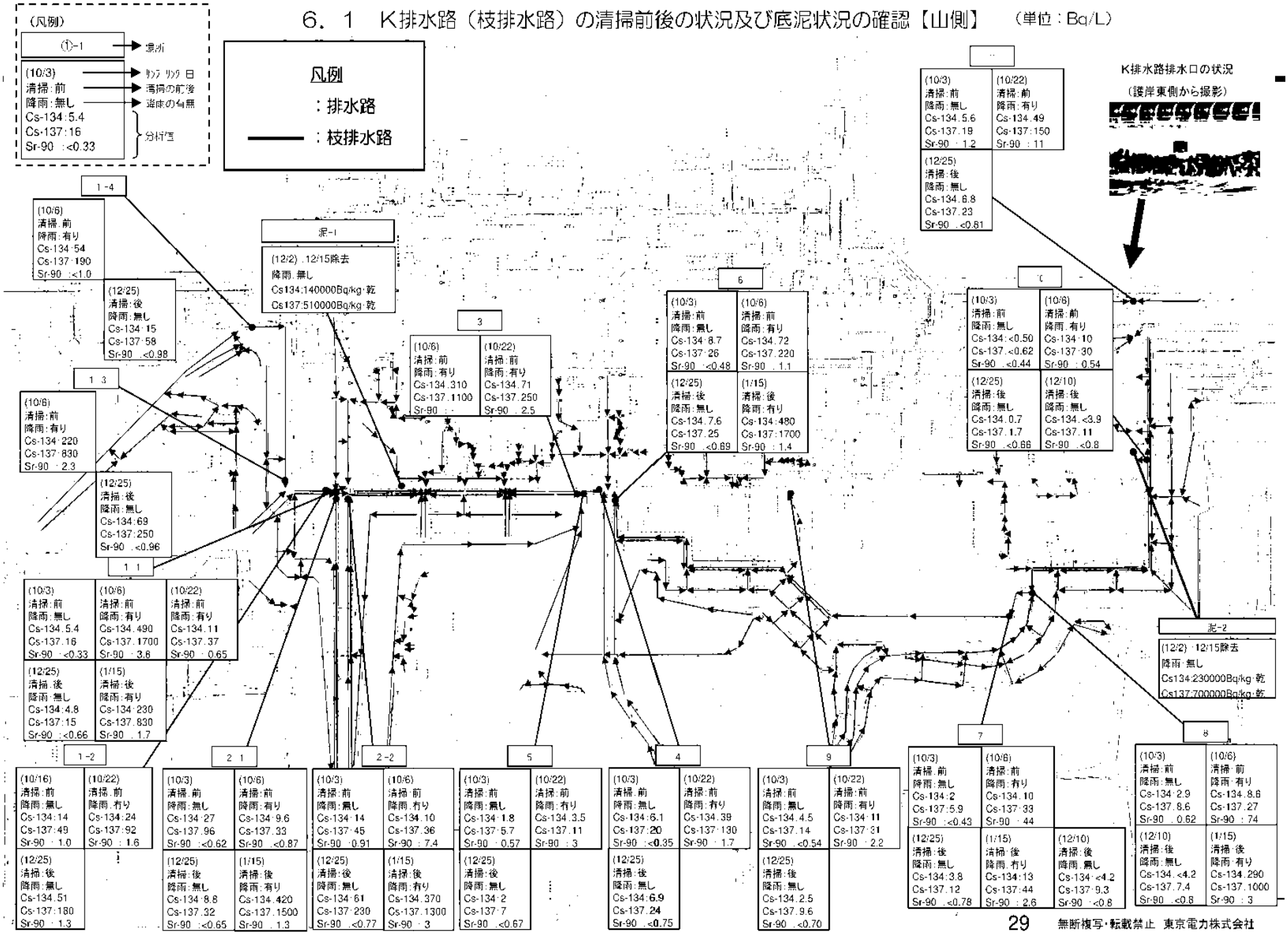
濃度が高い枝排水路の原因を追求するため、2015年１月よりその上流部を調査した。

建屋屋上からの流入調査においては、被ばくの観点から2号機R/B屋上・大物搬入口屋上を代表箇所に選定した。

調査の結果，　２月１９日に採取した2号機大物搬入口屋上の溜まり水の濃度が高いことが確認された（例：Cs137　約2万3千Bq/L）。このことから、排水濃度が未だ高い要因として、これらの箇所から濃度の高い水が流入してくると考察した。

２号機大物搬入口屋上の溜まり水の濃度は高いものの、排水路排水口付近は２号機大物搬入口屋上より低く（例：2月19日　排水口付近のCs137濃度は58Bq/L）、排水口付近の海域であるT－２（K排水口より約１００m）は、さらに遠く排水の影響を受けにくいT－２－１（K排水口から約１Km）と比較してもCs137で同等であり、環境への影響は見られない。

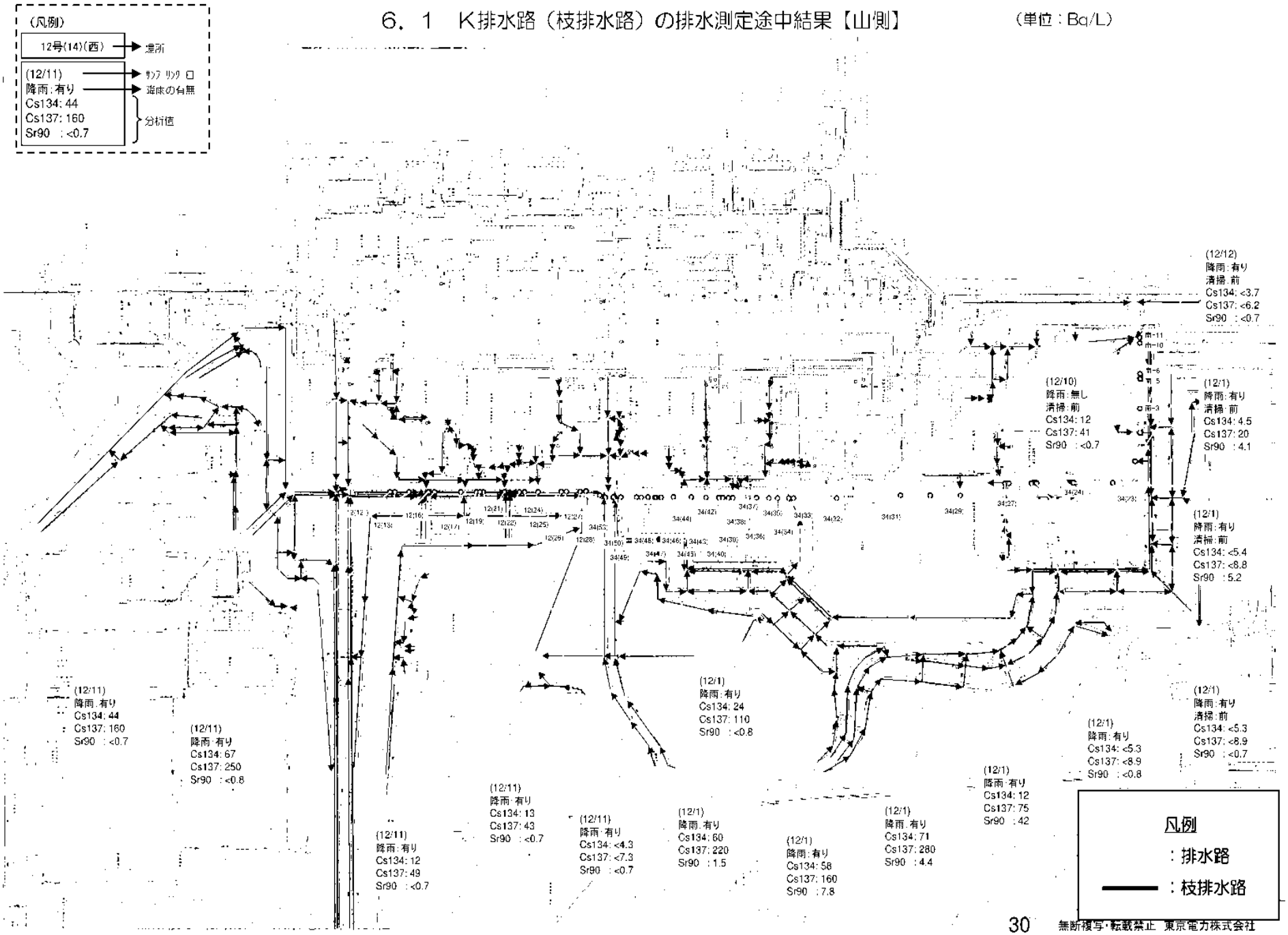
6．1　K排水路（枝排水路）の清掃前後の状況及び底泥状況の確認【山側】　（単位：Bq/L）



無断複写・転載禁止　東京電力株式会社

6．1　K排水路（枝排水路）の排水測定途中結果【山側】

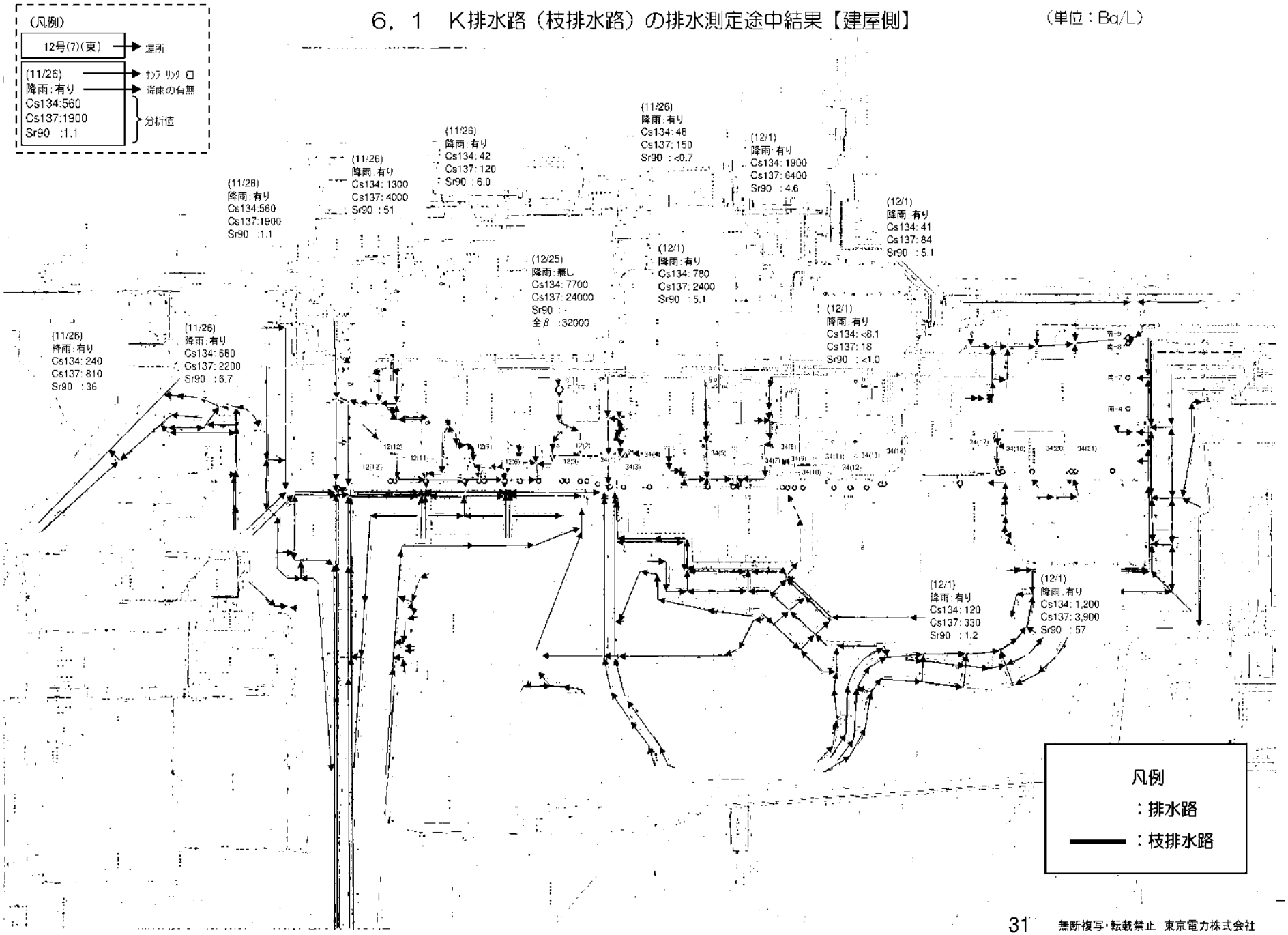
（単位：Bq/L）



無断複写・転載禁止　東京電力株式会社

6．1　K排水路（枝排水路）の排水測定途中結果【建屋側】

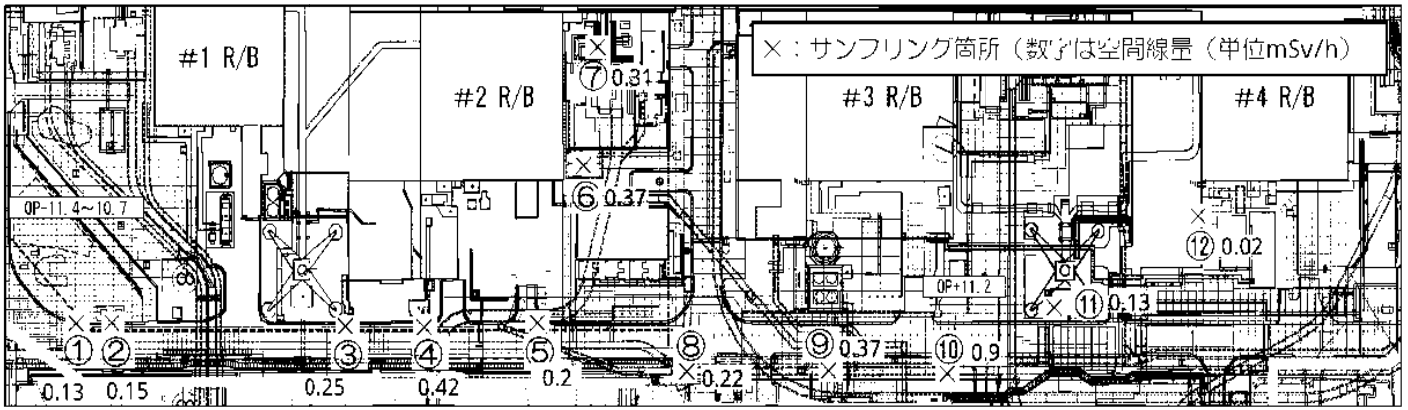
（単位：Bq/L）



無断複写・転載禁止　東京電力株式会社

6．2　10m盤砕石の状況調査

1～4号機原子炉建屋周辺に震災後に敷設した砕石の汚染の状況を確認するため試料を採取した。
分析の結果Cs濃度は数千～数百万Bq/kg･湿であり，３号機周辺の砕石は比較的高い値となっている。



分析結果※　一覧表　　（単位：Bq/kg･湿）

No.	砕石調査箇所	Cs-134	Cs-137	採取日
①	1号R／B西側（1）	1.8E+04	6.8E+04	H27.2.17
②	1号R／B西側（2）	4.2E+04	1.5E+05	
③	2号R／B西側（1）	3.8E+04	1.2E+05	
④	2号R／B西側（2）	4.2E+04	1.4E+05	
⑤	2号R／B西側（3）	7.0E+04	2.4E+05	
⑥	2，3号道路（1）	6.5E+05	2.1E+06	
⑦	2，3号道路（2）	7.4E+02	2.6E+03	
⑧	3号R／B西側（1）	3.3E+05	1.1E+06	
⑨	3号R／B西側（2）	3.4E+05	1.1E+06	
⑩	3号R／B西側（3）	1.7E+06	5.4E+06	
⑪	4号R／B西側（1）	1.8E+05	5.6E+05	
⑫	4号R／B西側（2）	2.5E+03	9.2E+03	

※ 試料が砕石のため分析結果は参考値扱い
※ 採取日の天候：小雨

6．3　建屋屋根面の水質分析結果（2号機原子炉建屋屋上，大物搬入口屋上）

２号機原子炉建屋屋根面から採水した試料の水質分析調査の結果，大物搬入口屋上で降雨後に採水した試料から比較的高い放射性物質の濃度を検出した。

大物搬入口屋上のルーフドレン周辺で採取した泥のCs濃度は，K排水路で採取した泥よりも高濃度であり，屋根面のフォールアウトが雨水排水濃度上昇の要因となっている可能性が高い。

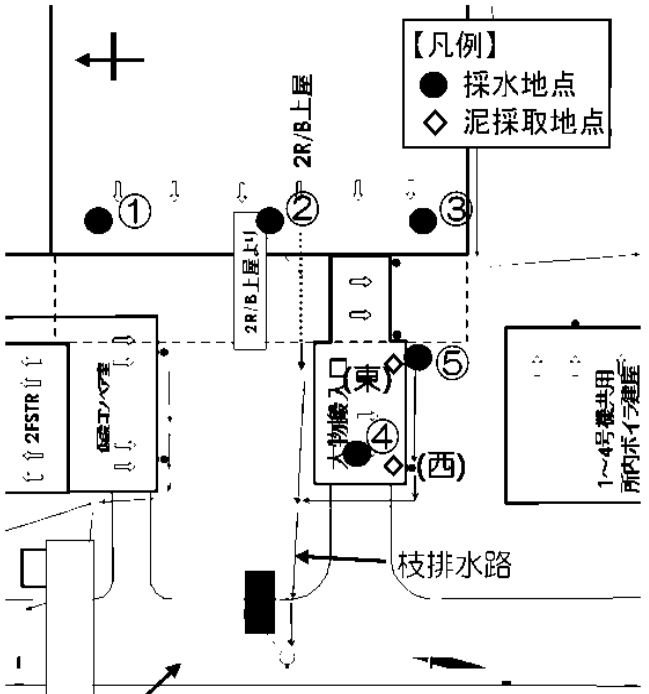
表１　水質分析結果一覧表　（単位：Bq/L）

No.	水質調査箇所	Cs134	Cs137	全β	Sr90	H-3	採水日
①	2号R/B屋上（北）	200	650	920	10	ND(＜100)	H27.1.16
②	2号R/B屋上（中）	340	1,100	1,900	12	ND(＜100)	H27.1.16
③	2号R/B屋上（南）	300	990	1,900	20	ND(＜100)	H27.1.16
④	大物搬入口屋上	6,400	23,000	52,000	分析中	600	H27.2.19
⑤	大物搬入口竪樋（東）	920	3,200	9,700	分析中	ND(＜100)	H27.2.18

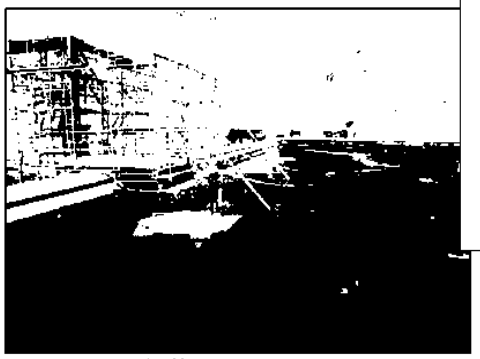
表２　泥 分析結果一覧表　（単位：Bq/kg･湿）

泥　採取箇所	Cs134	Cs137	採取日
大物搬入口屋上 ルーフドレン周辺（東）	6.3E+06	2.0E+07	H27.2.6
大物搬入口屋上 ルーフドレン周辺（西）	1.3E+07	4.0E+07	H27.2.6

（H27.2.6：降雨無し）



サンプリング位置図

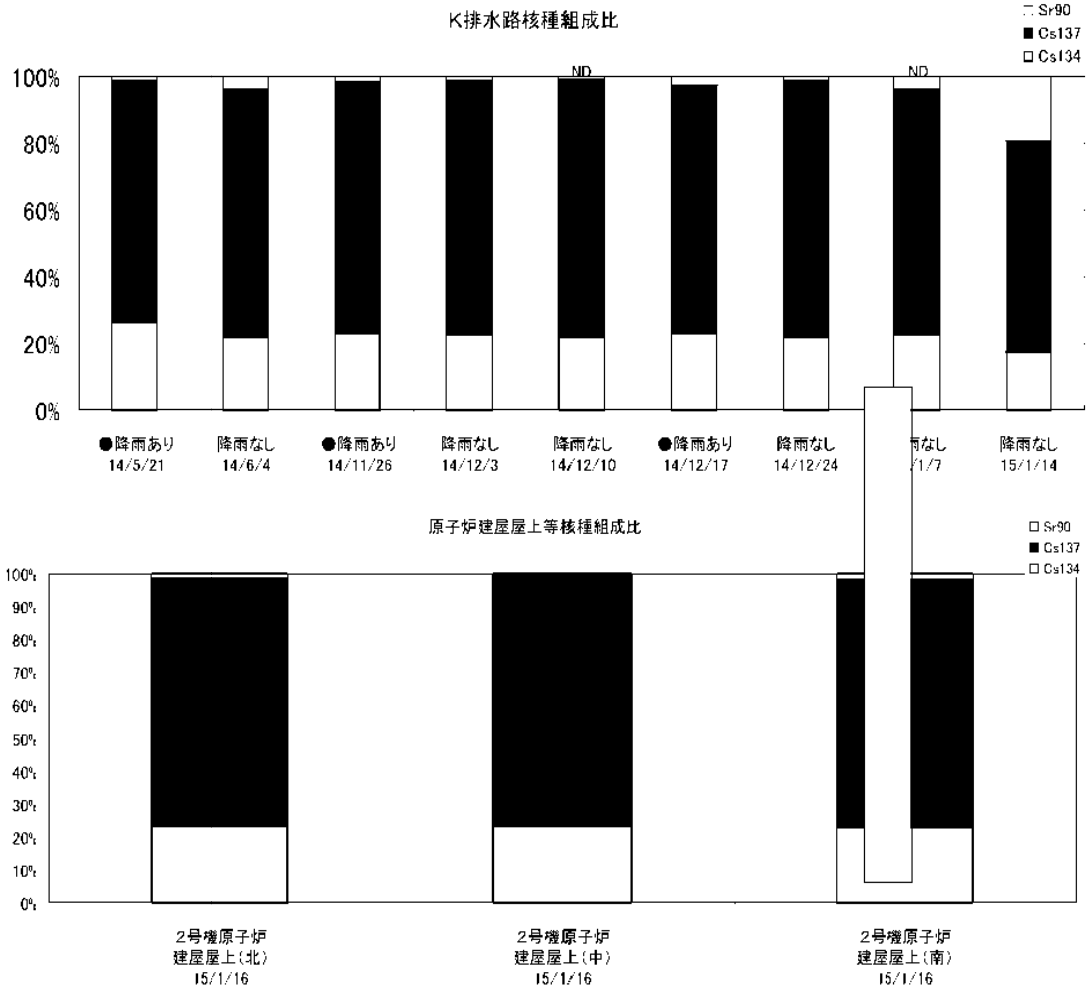


写真②：2号R/B屋上

写真④：大物搬入口屋上

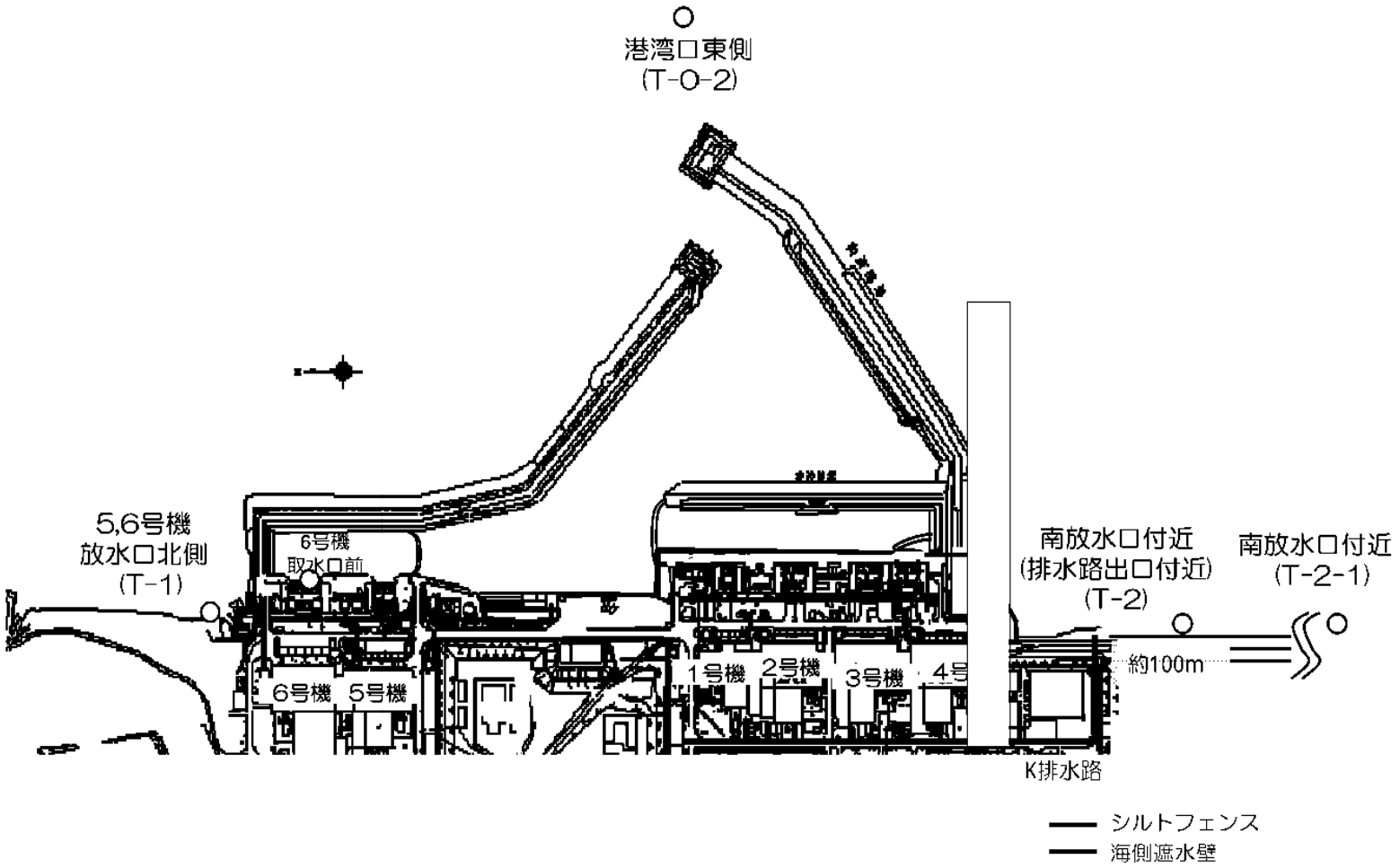
6．4　排水路等の核種組成について

K排水路の核種組成比と、フォールアウト由来と考えられる原子炉建屋等の屋上の核種組成比を以下に示す。K排水路の核種組成比は、原子炉建屋等の屋上の核種組成比と類似しており、フォールアウト由来であると推定される。



【参考】海水の状況

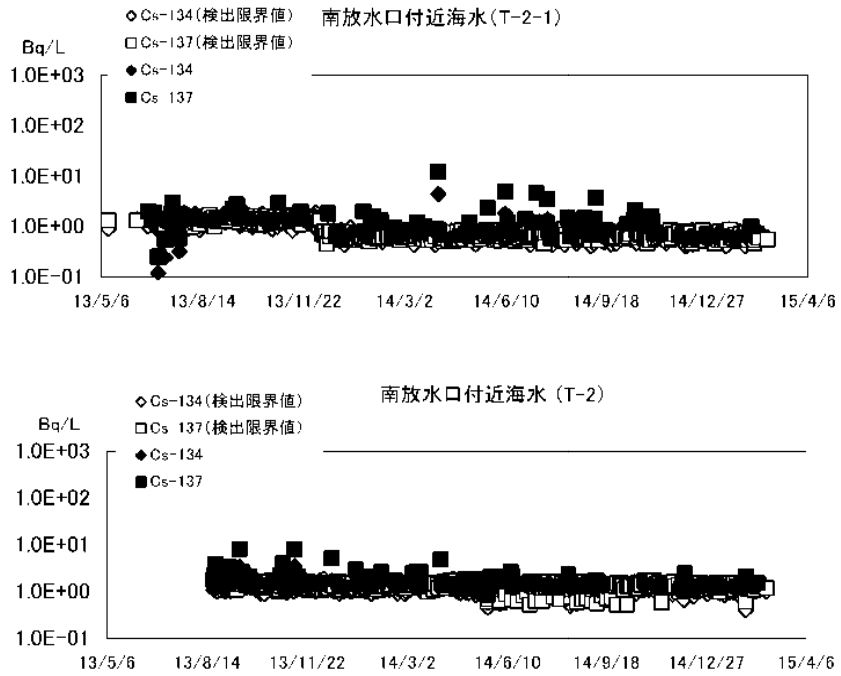
海水については、以下の地点において放射能濃度のモニタリングを行っているが、大きな変動は見られていない状況。



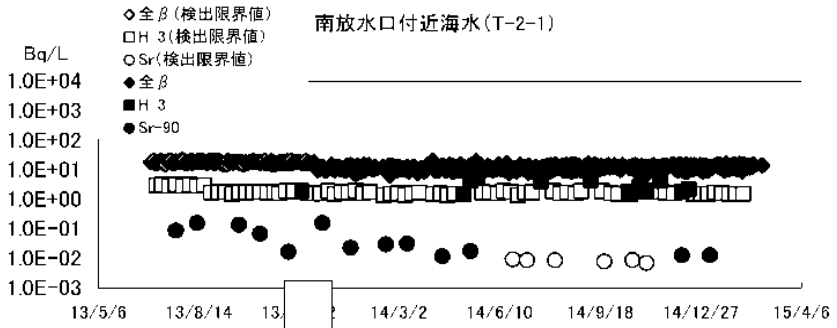
【参考】海水の状況（港湾外海水核種分析結果推移：γ核種, 全β, H-3, Sr-90）

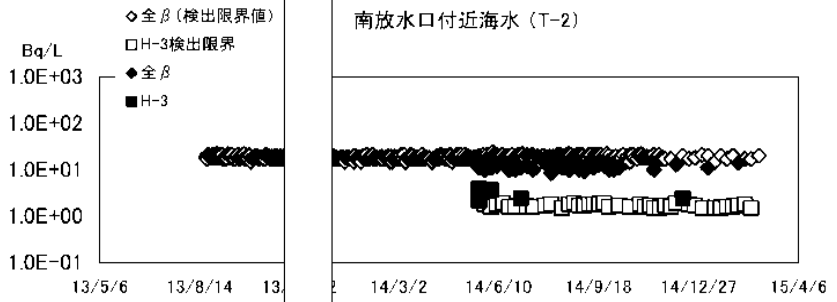
沿岸等、海への影響は確認されていない。

港湾内海水核種分析結果推移（γ核種）



港湾内海水核種分析結果推移（全β、H-3、Sr-90）

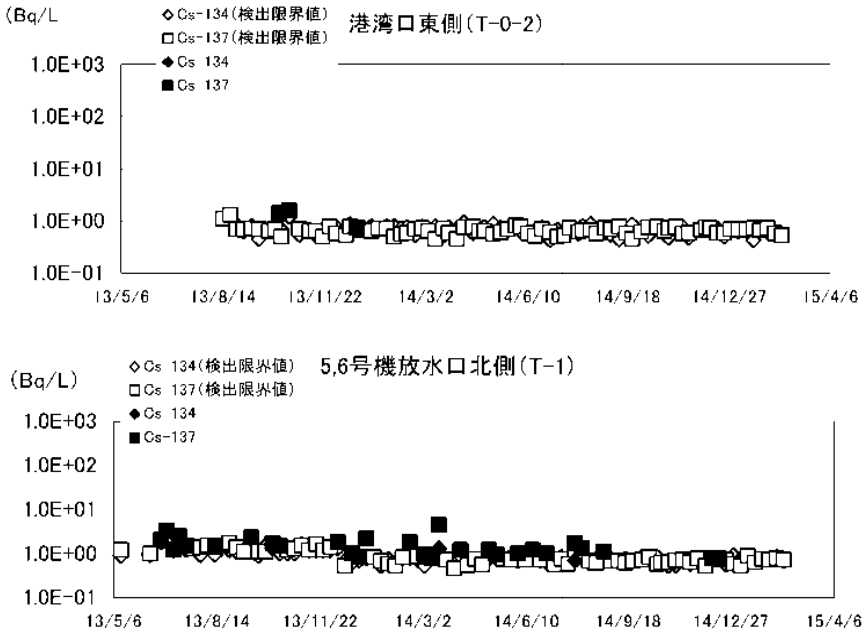




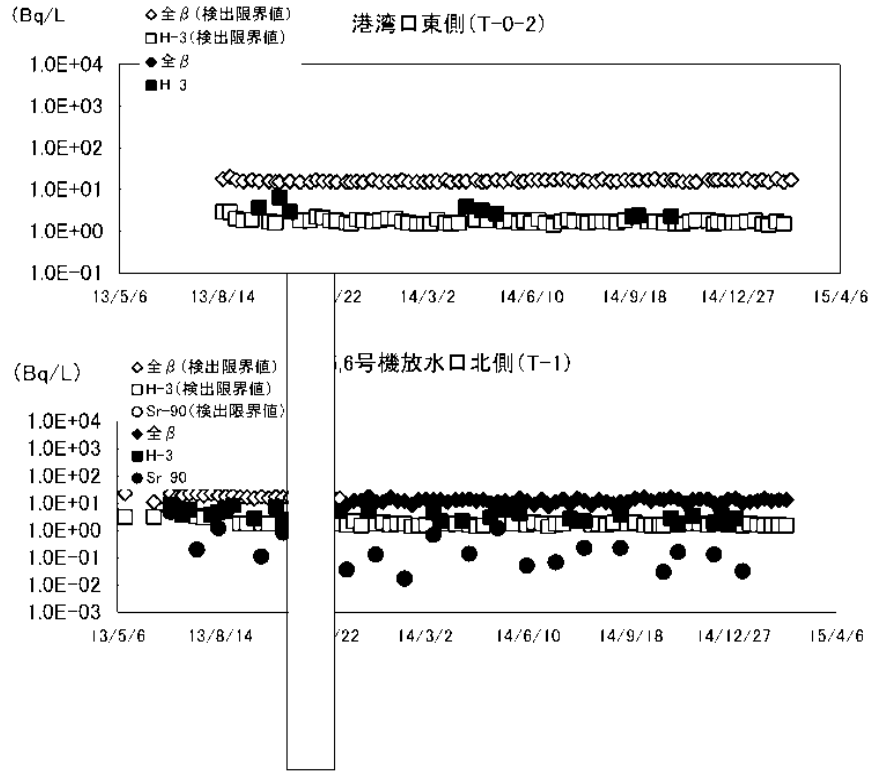
【参考】海水の状況（港湾外海水核種分析結果推移：γ核種, 全β, H-3, Sr-90）

沿岸等、海への影響は確認されていない。

港湾内海水核種分析結果推移（γ核種）



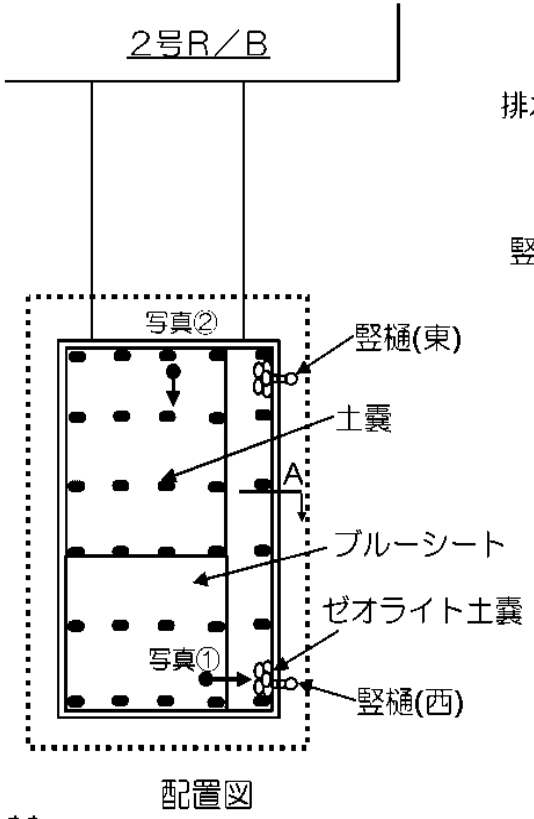
港湾内海水核種分析結果推移（全β、H-3、Sr-90）



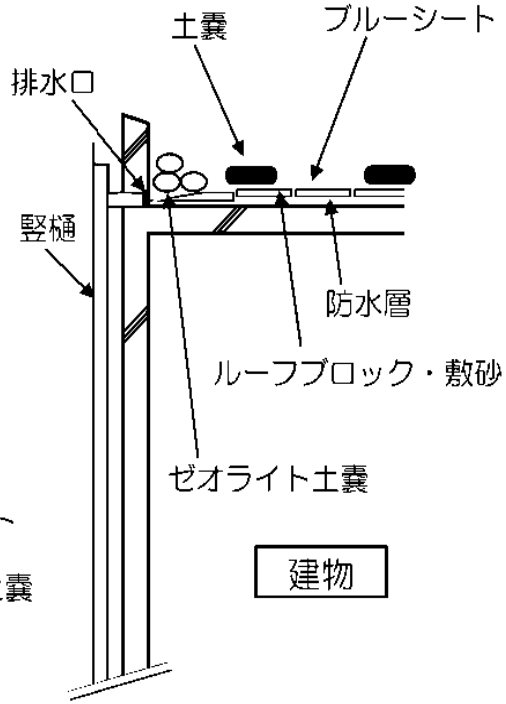
7. K排水路への対策①　2号機原子炉建屋 大物搬入口屋上部

2号機原子炉建屋 大物搬入口屋上部の雨水の汚染防止対策を実施する
- 屋根排水口廻りにゼオライト土嚢を設置する。（2月27日設置済み）
- 屋上ルーフブロック上へのブルーシート掛けを実施する。（3月2日実施済み）
- 屋上ルーフブロック上面に防水塗料を塗布する。（3月中旬までに実施予定）
- 汚染源と考えられる屋上のルーフブロック、敷き砂等の撤去を実施する。（3月末までに実施予定）

凡例　汚染防止対策を実施する範囲

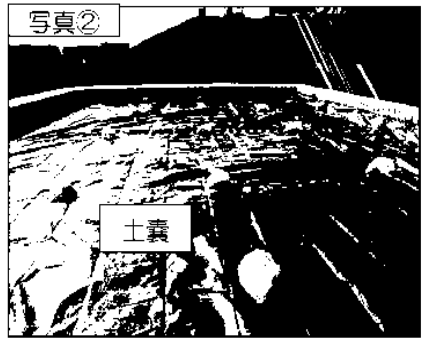


配置図



A断面図

ゼオライト土　設置状況



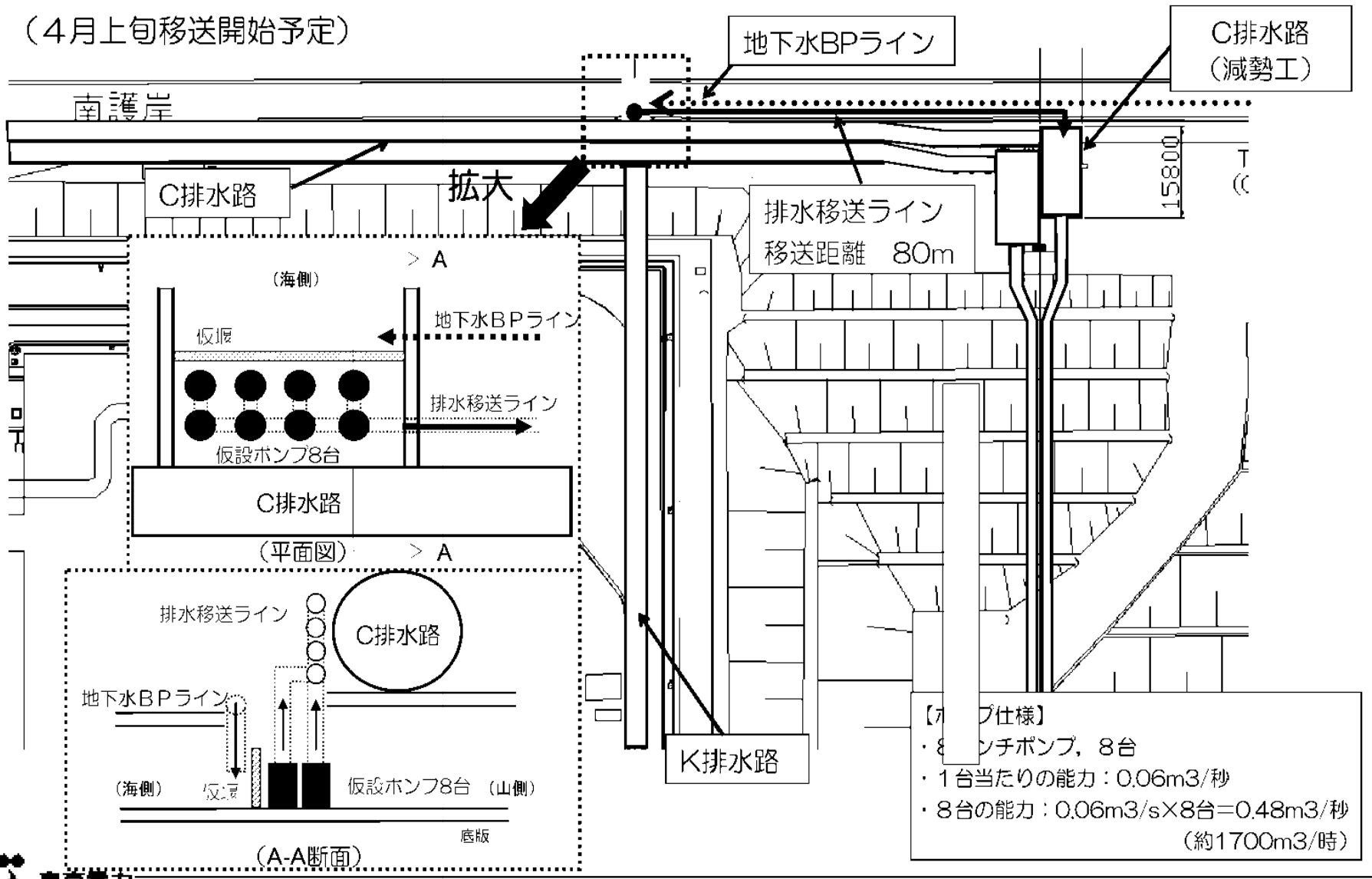
ブルーシート掛け実施状況

ルーフブロック・砂撤去予定

7．K排水路への対策②　K排水路から港湾内に繋がるC排水路へのポンプ移送

仮設ポンプによるK排水路から港湾内に繋がるC排水路（減勢工）への排水移送ライン設置

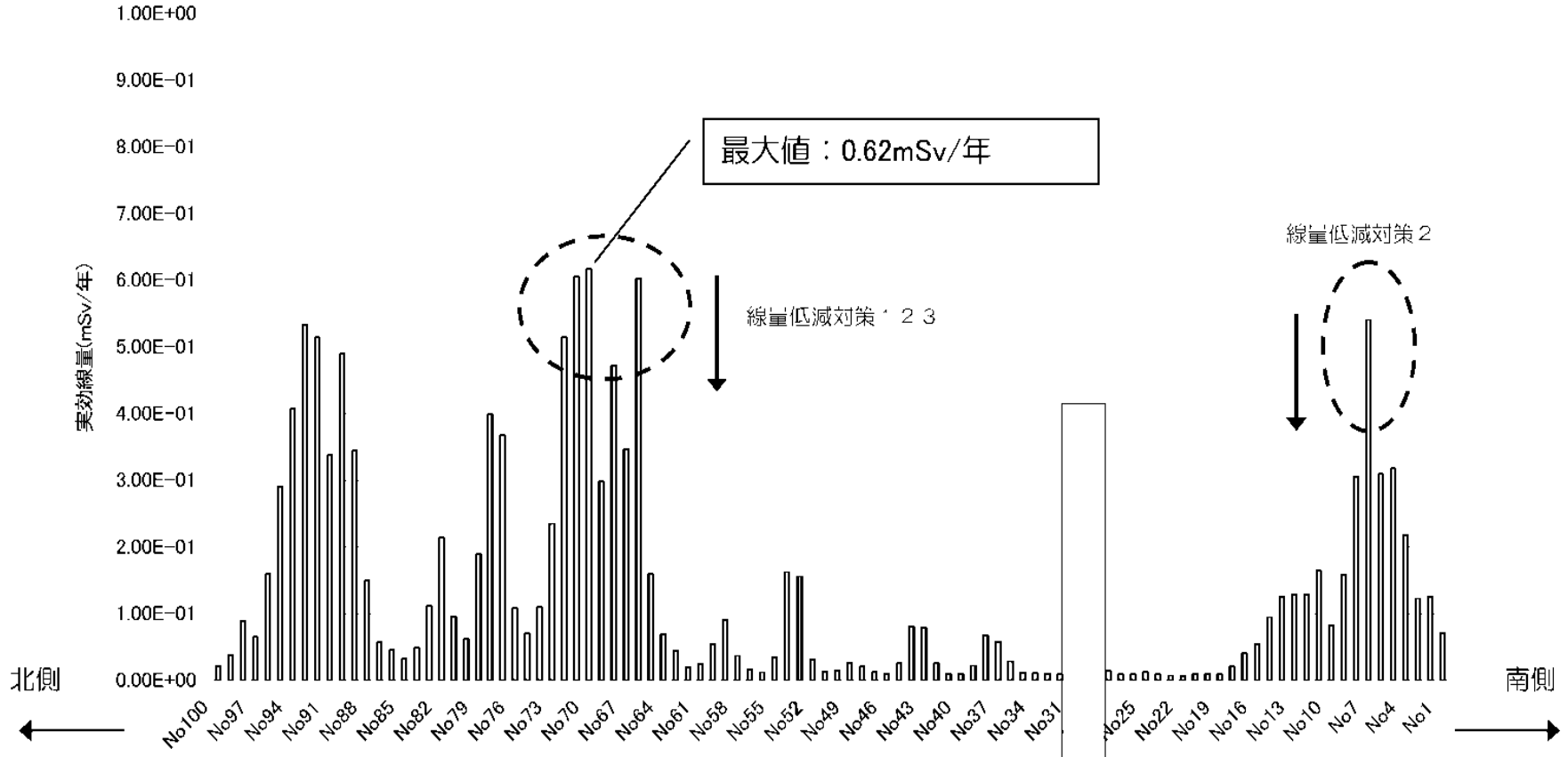
（４月上旬移送開始予定）



【敷地境界実効線量低減に向けたその他の対策】

8. 固体廃棄物及び設備

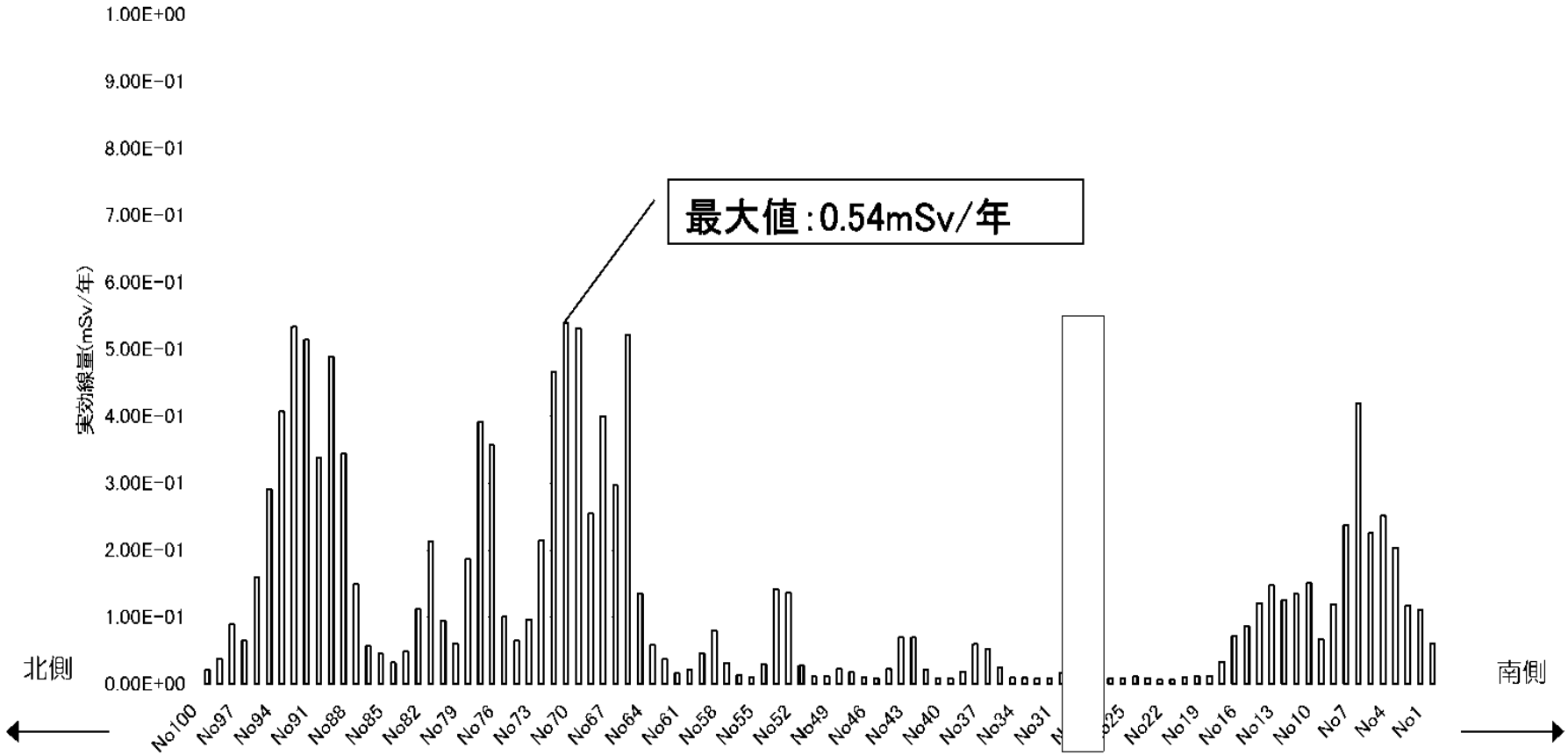
平成２７年１月認可時の評価値



【線量低減対策】
①ドラム缶等仮設保管設備（ドラム缶、大型廃棄物）、一時保管エリアVの線源条件を見直し
→補正申請準備中。
②使用済セシウム吸着塔の線源条件を見直し →変更認可申請中
③ブルータンク「資機材」置き場を敷地境界から離すことによる低減 →変更認可申請中

8．固体廃棄物及び設備

平成２７年３月末の評価値（見込み）



9．気体廃棄物

【放出量評価の精度向上】

⇒現在，行っている放出量評価の精度を向上する。

気体廃棄物の放出量 = ①放射性物質濃度×②流量
⇒放出量から敷地境界における年間の実効線量を評価

	現状	今後
①放射性物質濃度	月１回の測定を用いた評価	連続データを用いた評価
②流量		

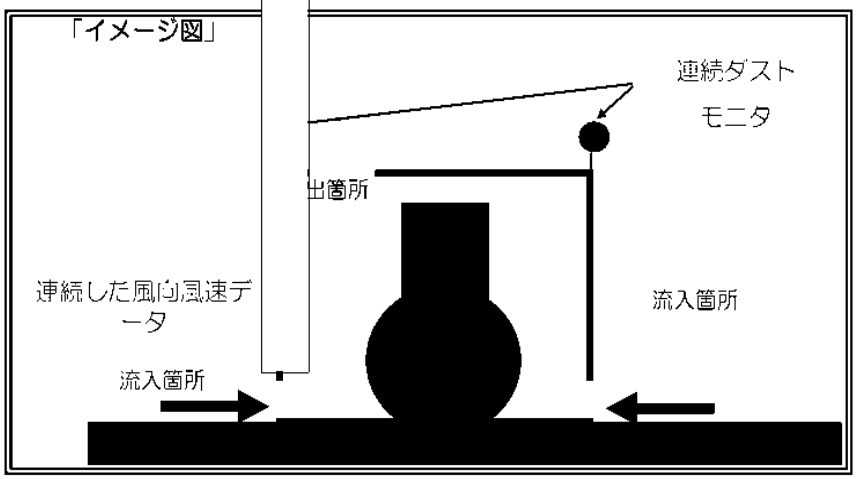
＜今後の評価手法（案）＞

①放射性物質濃度

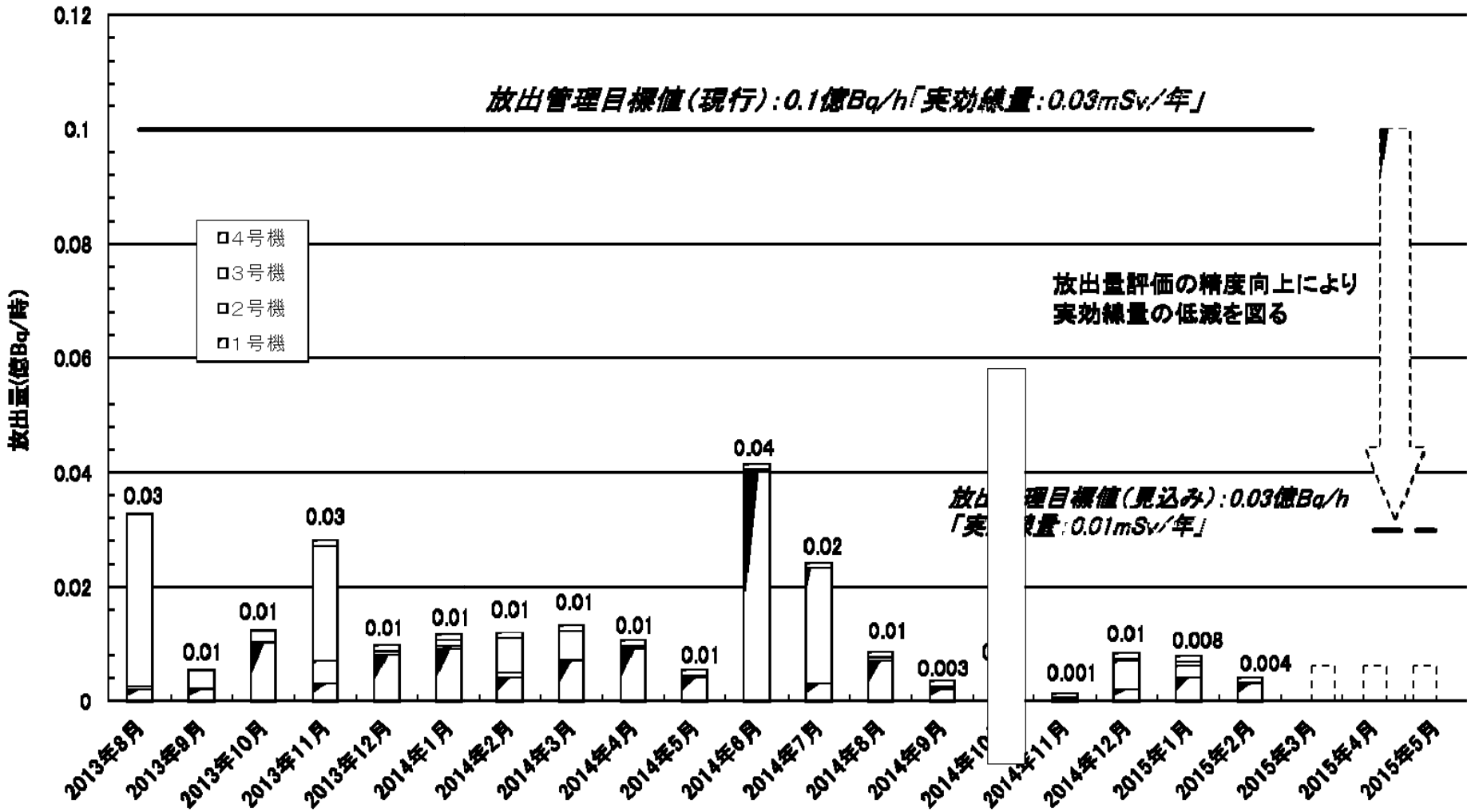
原子炉建屋上部における連続ダストモニタの値を参考とする評価方法を検討中。

②流量

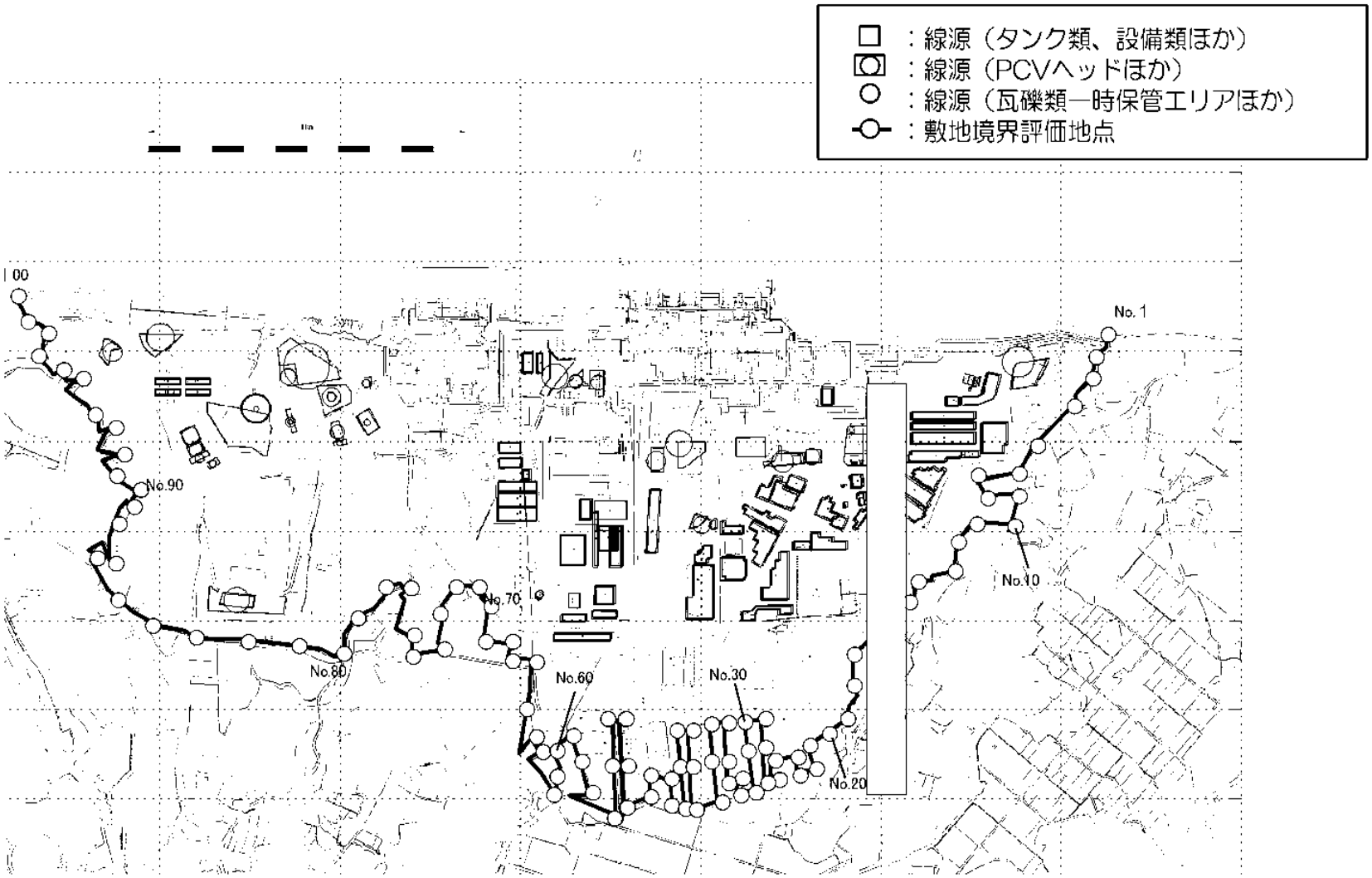
連続した風向風速データを用いて，開口部から流出する流量を算出することを検討中。



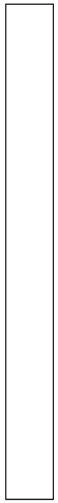
9．気体廃棄物


放出管理目標値（現行）：0.1億Bq/h「実効線量：0.03mSv/年」
放出量評価の精度向上により
実効線量の低減を図る
放出管理目標値（見込み）：0.03億Bq/h
「実効線量：0.01mSv/年」
□4号機
□3号機
□2号機
□1号機
放出量(億Bq/時)
0.12
0.1
0.08
0.06
0.04
0.02
0
0.03
0.01
0.01
0.03
0.01
0.01
0.01
0.01
0.01
0.04
0.02
0.01
0.003
0.001
0.01
0.008
0.004
2013年8月
2013年9月
2013年10月
2013年11月
2013年12月
2014年1月
2014年2月
2014年3月
2014年4月
2014年5月
2014年6月
2014年7月
2014年8月
2014年9月
2014年10月
2014年11月
2014年12月
2015年1月
2015年2月
2015年3月
2015年4月
2015年5月

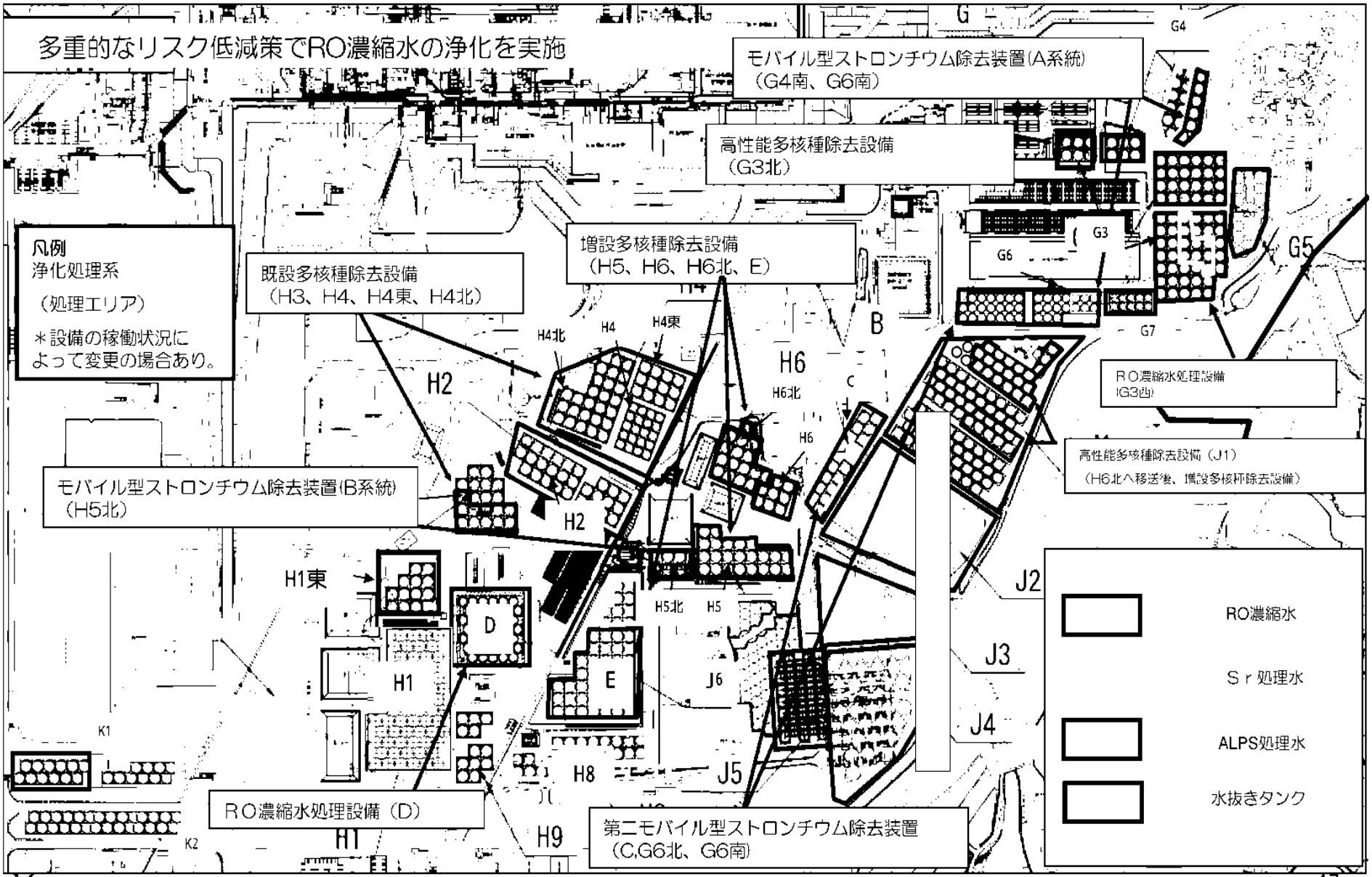
【参考】敷地境界における直接線・スカイシャイン線の評価地点



【RO濃縮水貯槽に起因する実効線量低減に向けた取り組み状況】

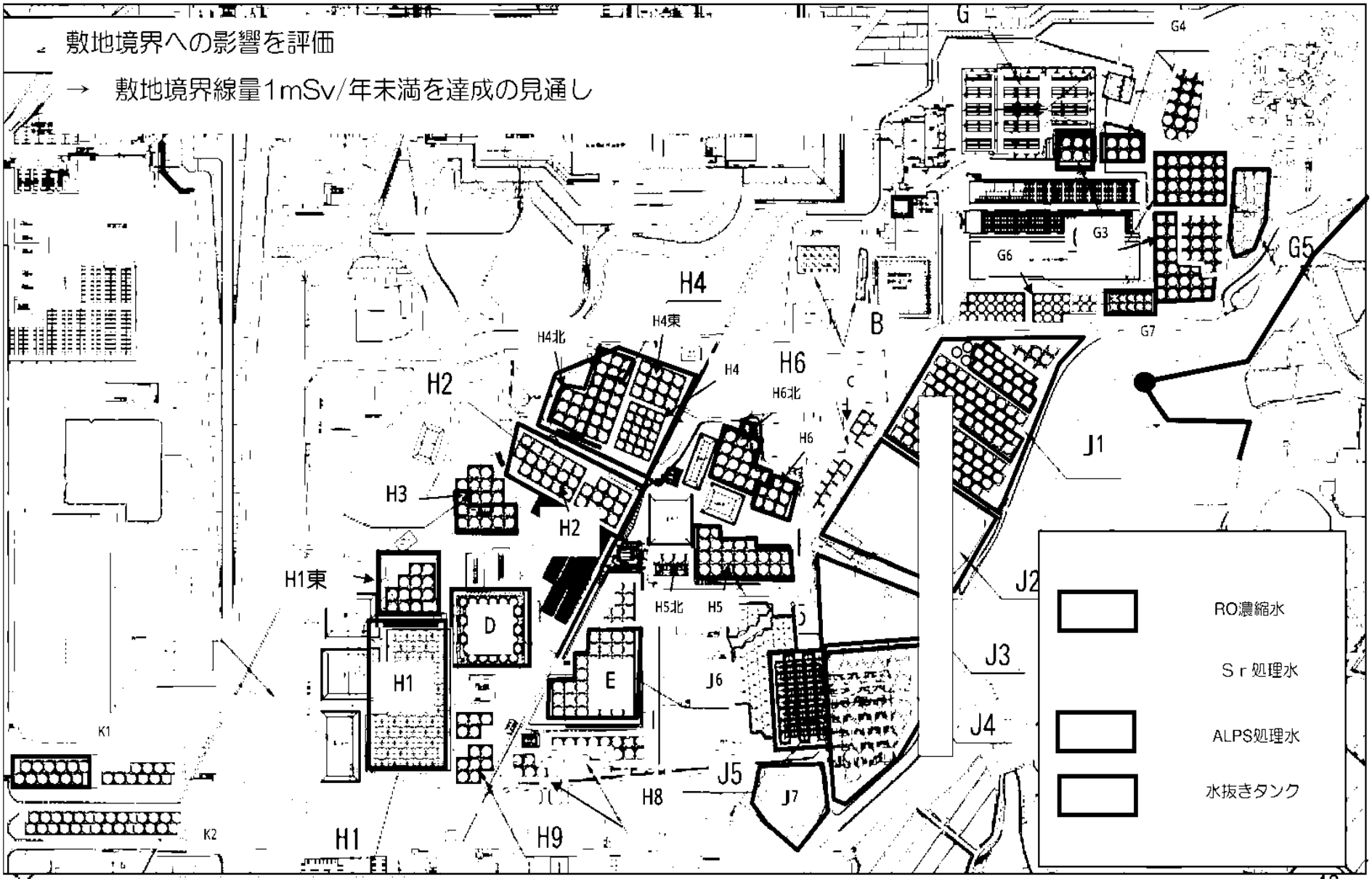


１０．目標達成に向けた対策：RO濃縮水貯槽に起因する実効線量
① 現在のタンク内保有水の状況（２／１９現在）



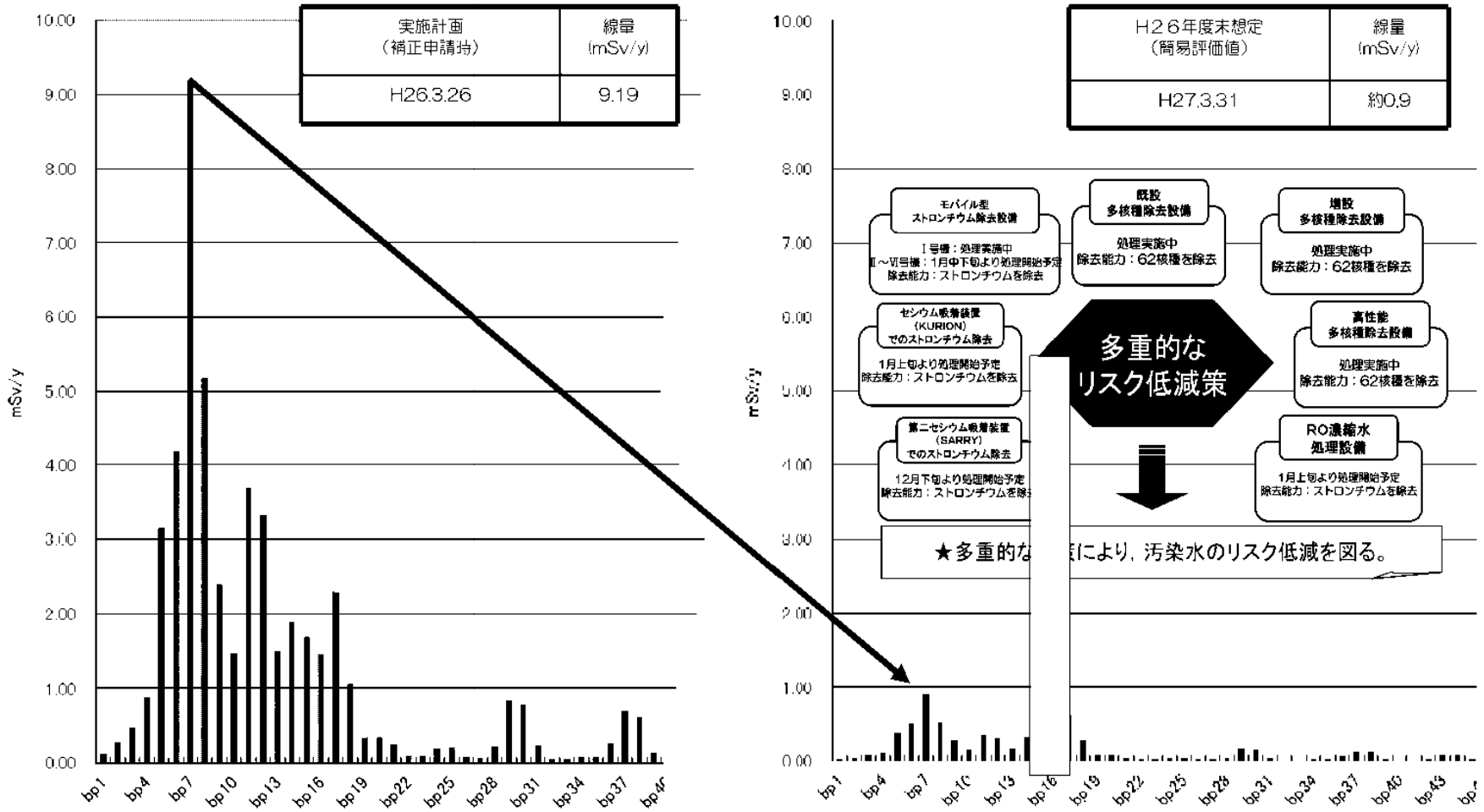
１０．目標達成に向けた対策：RO濃縮水貯槽に起因する実効線量
② 平成26年度末時点のタンク内保有水の見通し

- 敷地境界への影響を評価
  - → 敷地境界線量1mSv/年未満を達成の見通し



１０．目標達成に向けた対策：RO濃縮水貯槽に起因する実効線量
③ 敷地境界の実効線量の評価結果

H２６年度末の想定値は、約0.9mＳｖ／年



１１．１　Ｈ２７年３月末における敷地境界実効線量の見通し

○RO濃縮水貯槽以外に起因する実効線量

RO濃縮水貯槽以外に起因する実効線量は、気体廃棄物・固体廃棄物（直接線・スカイシャイン線）・構内散水・液体廃棄物等の合計で1mSv/年とすることを目指している。

現状は、H27年3月末の見通しとして、液体廃棄物等以外で0.625mSv/年であり、1mSv/年以下を達成する場合は、液体廃棄物等で0.375mSv/年以下である必要がある。

	評価値		
	現在	H27年3月末	1mSv/年を達成させるための液体廃棄物等に割り当てられる値
気体廃棄物	0.03mSv/年	0.01mSv/年	0.625mSv/年
固体廃棄物及び設備（直接線・スカイシャイン線）	0.62mSv/年	0.54mSv/年	
構内散水	0.075mSv/年	0.075mSv/年	
液体廃棄物等	0.22mSv/年		***0.375mSv/年***
計	0.94mSv/年		1mSv/年

○RO濃縮水貯槽に起因する実効線量

	評価値	
	現在	H27年3月末
RO濃縮水貯槽（直接線・スカイシャイン線）	9.19mSv/年	0.9mSv/年（※）

※H27年3月末の値は簡易評価値であり、年度末の段階で詳細評価を実施予定。

（注）四捨五入した数値を記載しているため，合算値が合計と合わない場合がある。

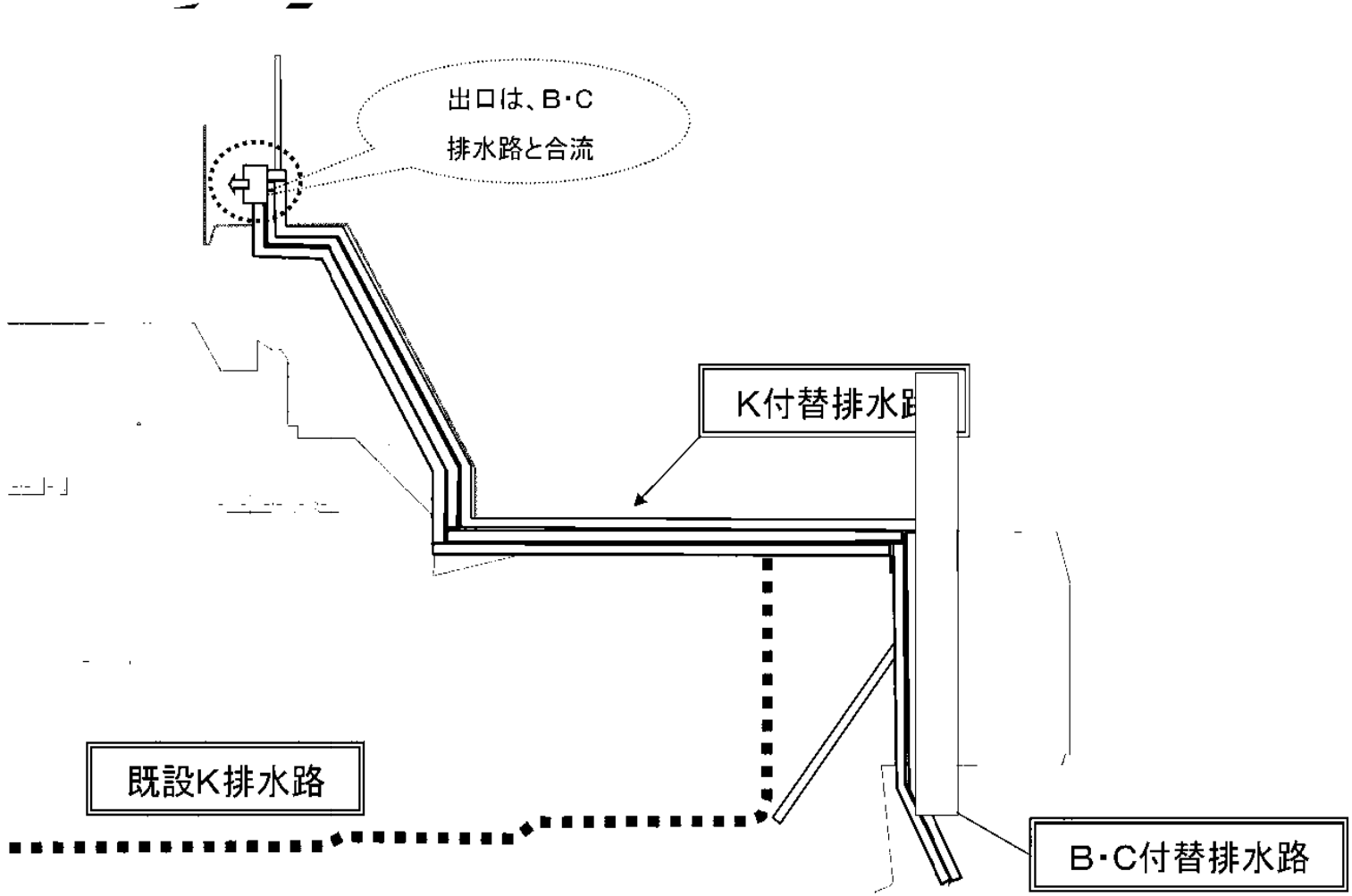
１１．２　平均告示濃度比の算出（昨年４月からのデータで評価）

昨年４月からの１年間近くのデータ（H26.4.16～H27.1.31）を用いて、４種類の告示濃度比算出案で試算した結果を以下に示す。

	K排水路	C排水路	物揚場排水路	A排水路
【案１】 日々の告示濃度比を日数平均して算出。	2.2	0.42	0.48	0.35
【案２】 平常時（降雨のない日）の日々の告示濃度比を日数平均して算出。	1.0	0.30	0.38	0.20
【案３】 総放出量（Bq）を総排出量（L）で割って算出。	4.5	0.57	0.52	0.45
【案４】 平常時（降雨のない日）の総放出量（Bq）を総排出量（L）で割って算出。	1.2	0.41	0.38	0.22

１２．Ｋ排水路への更なる対策①　港湾内での排水管理（Ｋ排水路の付替案）

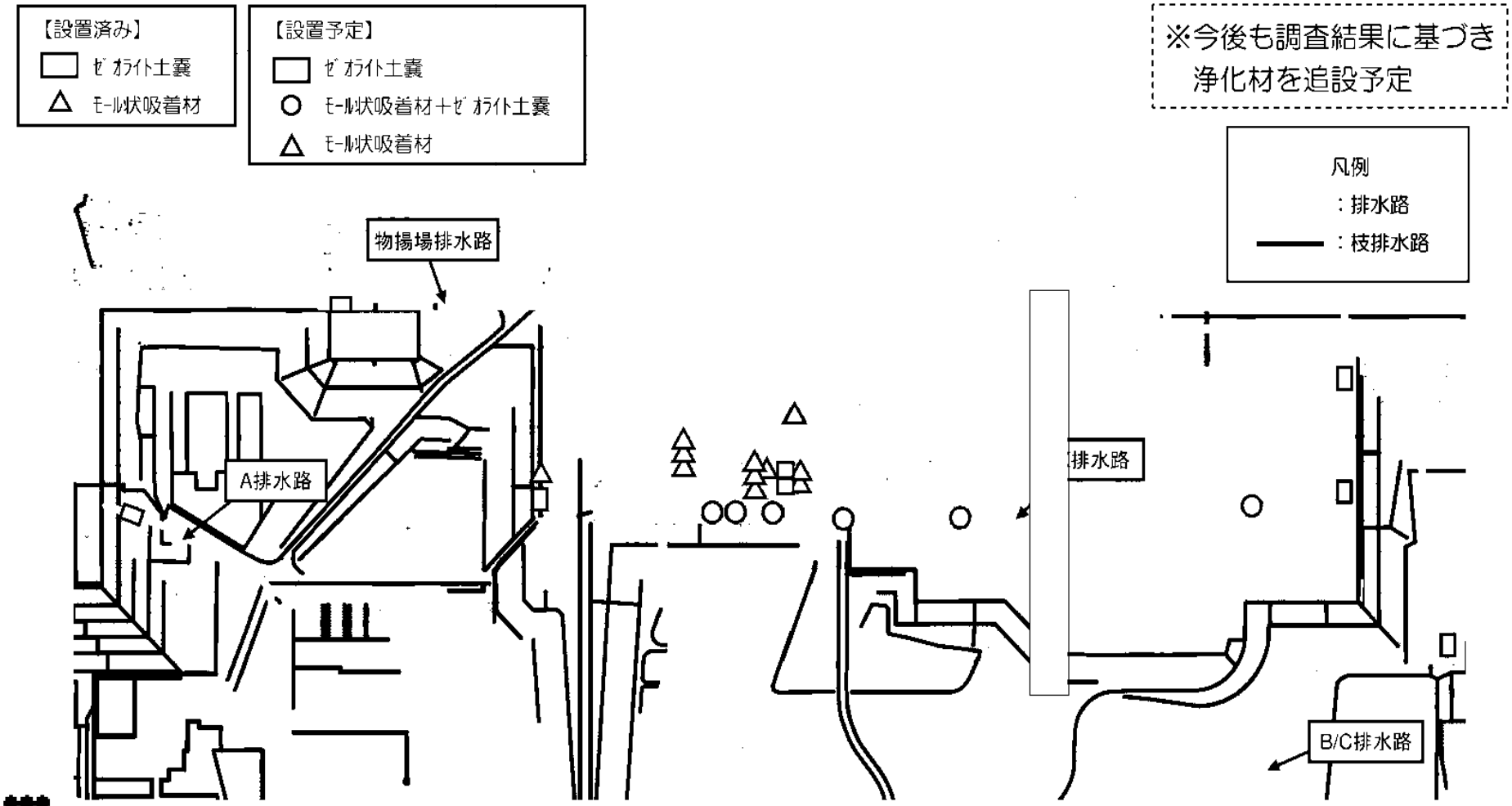
Ｋ排水路を港湾内へ平成27年度内に付替え、港湾内での排水管理を実施予定（配管ルート案策定中）



１２．K排水路への更なる対策②　浄化材の設置状況（現状と今後）

現在の浄化材の設置箇所：K排水路主要部（１箇所），ルーフドレン（２箇所），雨水枡・側溝（９箇所），
旧事務本館北側側溝（２箇所）

今後の浄化材の設置予定：主要部（４箇所），枝排水路（６箇所），集水枡（１箇所）

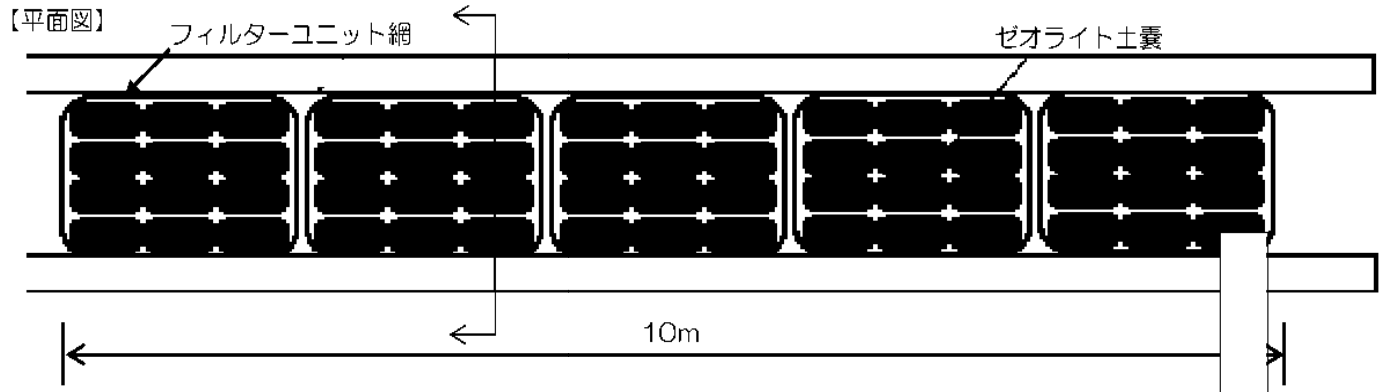


【参考】浄化材の設置（K排水路主要部）

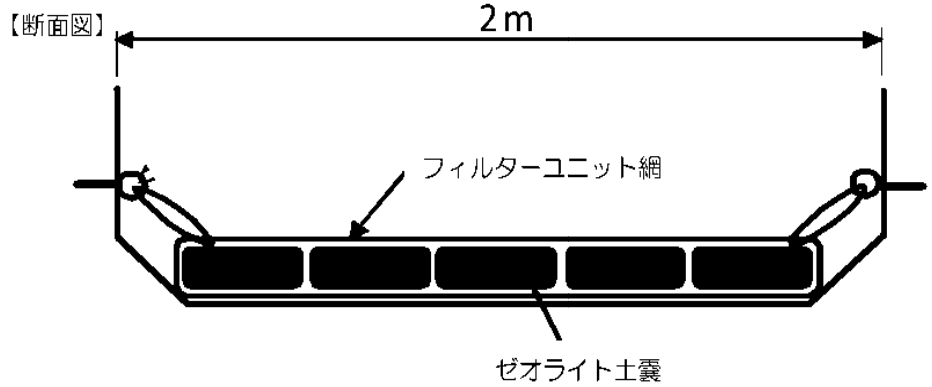
＜排水路主要部＞　3月末までに設置予定。（2月9日に１箇所設置）

■ゼオライト土嚢を排水路底面部へ敷き詰める。流出防止のためフィルターユニット網に複数個単位で入れて、網をボルトで固定。

■設置後に土嚢通過前後の濃度を確認。Cs濃度の減少傾向を確認中。



2/10撮影（K排水路）



【ゼオライト土嚢通過前後の分析結果】

	ゼ　ト上流	ゼオライト下流②	ゼオライト上流①	ゼオライト下流②
採取日時	0日	2月10日	2月19日	2月19日
採取時刻	00	11:55	10:00	11:00
Cs-134(約2年)		9	16	14
Cs-137(約30年)	28	31	58	48
全β	40	50	110	97

単位 Bq/L

【参考】浄化材の設置（K排水路東側枝排水路）

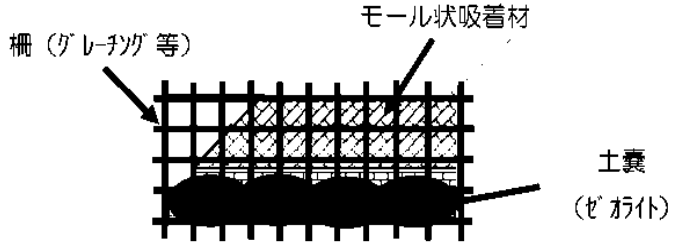
＜枝排水路流入部＞　3月末までに設置予定（雨水桝･側溝９箇所，ルーフドレン２箇所設置済み）

堰（土嚢）を設置し、モール状吸着材全体が浸るように水位をあげる。

雨天時には越流するよう、上部は十分に開けておくと共に、流出防止のため金網等に入れて固定する。

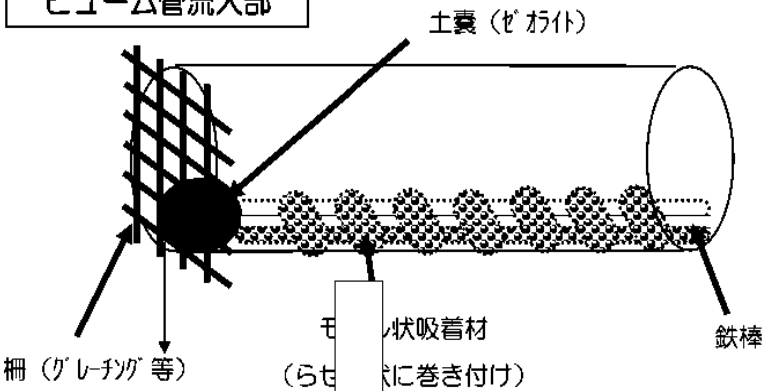
流入部全体の下部を、流量に応じて塞ぐようにモール状吸着材を設置する。

矩形流入部



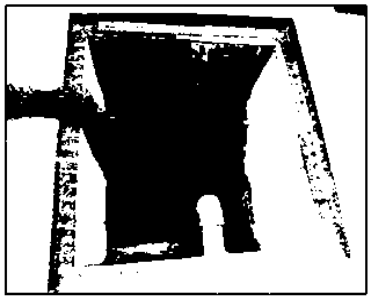
K排水路（主要部）

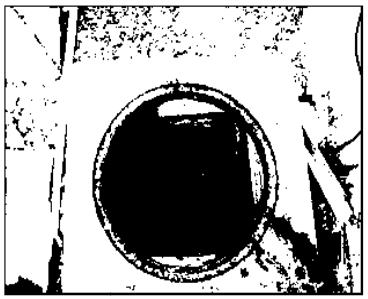
ヒューム管流入部



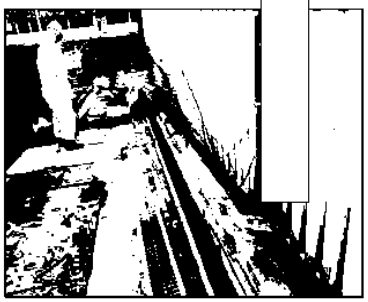
＜雨水桝・側溝＞　雨水桝：８箇所，側溝：１箇所　設置済み

雨水桝





側溝



※今後も調査結果に基づき
浄化材を追設予定

１３．Ｋ排水路への雨水排水エリアの今後の調査と対策①

【建屋屋上からＫ排水路への雨水排水の調査と対策】

【雨水サンプリング調査】：排水経路，雰囲気線量を考慮し，アクセスが可能な屋上エリアや雨水配管端部等を優先的に調査する。（図１参照）

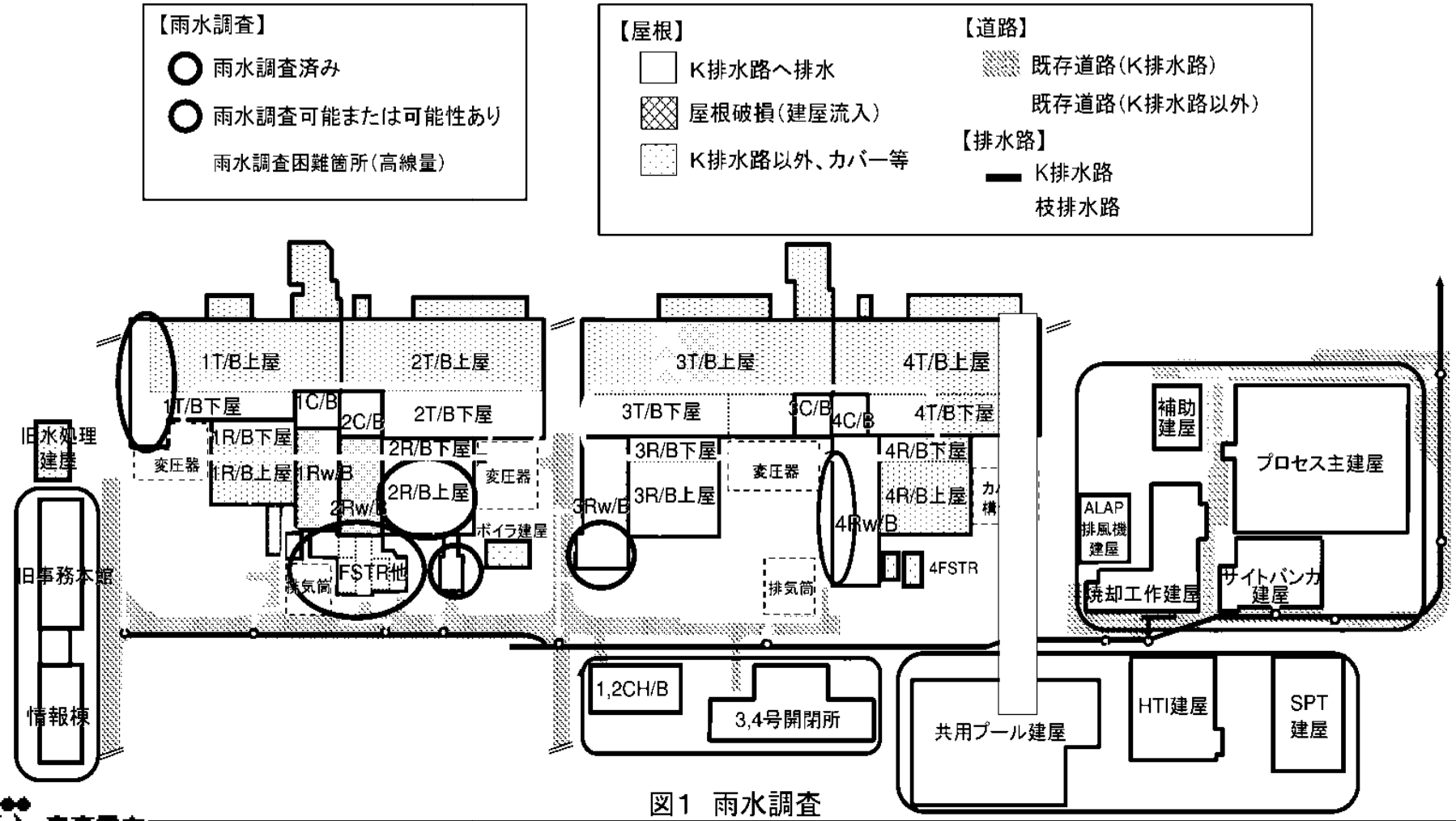


図1　雨水調査

１３．K排水路への雨水排水エリアの今後の調査と対策②

【線量調査】：１～４号機でアクセスが難しい高線量エリアを対象に，マルチコプター等を用いて線量調査を実施する。（図２参照）

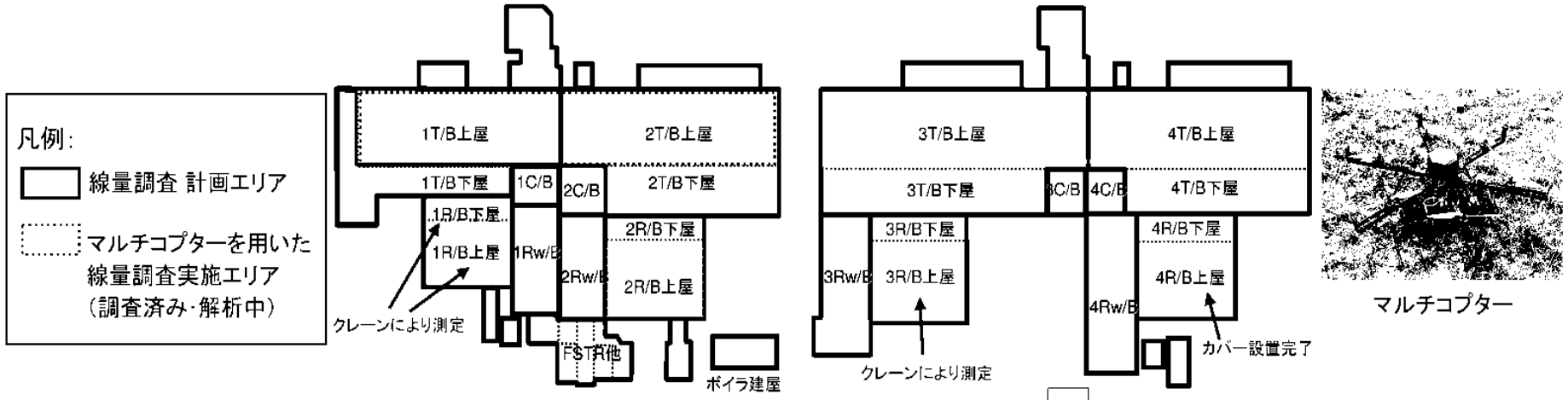


図2 線量調査

【建屋屋上の対策】：「汚染源を取り除く対策（瓦礫・ルーフブロック・敷き砂撤去等）」または「汚染源に触れさせない対策（カバリング等）」を検討する。

【浄化材等の設置】：高線量（屋根面：数～数十mSv/h），重機のアクセスが困難等，対策の早期実施が難しいエリアは，排水経路への浄化材等を設置するとともに，モニタリングを継続する。

【K排水路東側の既存道路からの雨水排水の調査と対策】

【道路排水口の調査】：降雨時のサンプリングが可能な既存道路の排水口を調査する。

【道路の対策】：「汚染源を取り除く（道路清掃等）」を基本とするが、１～４号機周辺の砕石・敷き鉄板エリアは「汚染源に触れさせない（敷き鉄板の間詰め、舗装等）」を優先して実施する。

１４．敷地全体の低減対策（継続対策）

排水路の排水濃度低減に係わる今後の継続的な取り組みは下記の通り

(1)除染

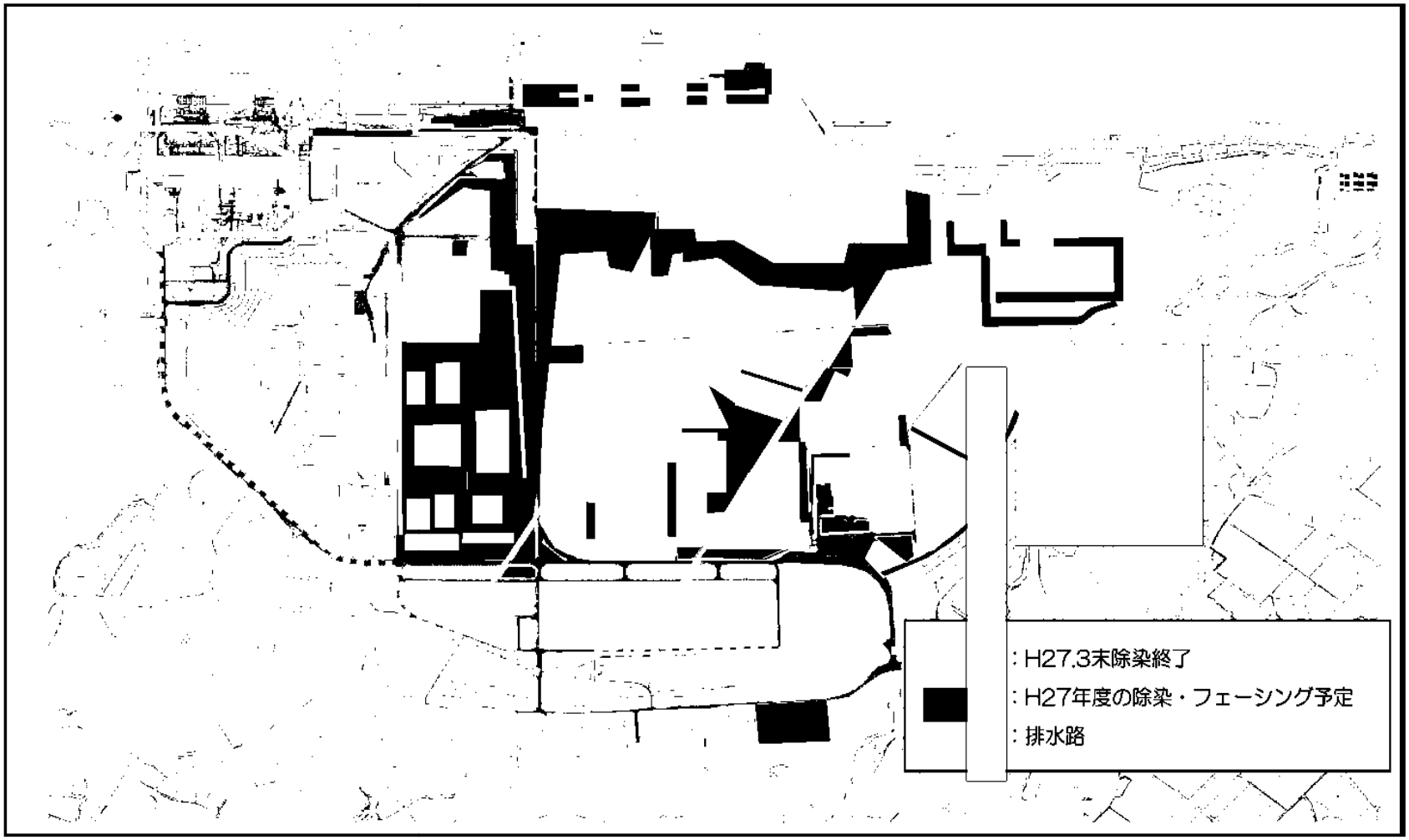
→除染（がれき撤去、表土除去、天地返し）

(2)清掃（排水路、道路）

→重点清掃実施箇所等の年度の清掃計画を立て、清掃を継続

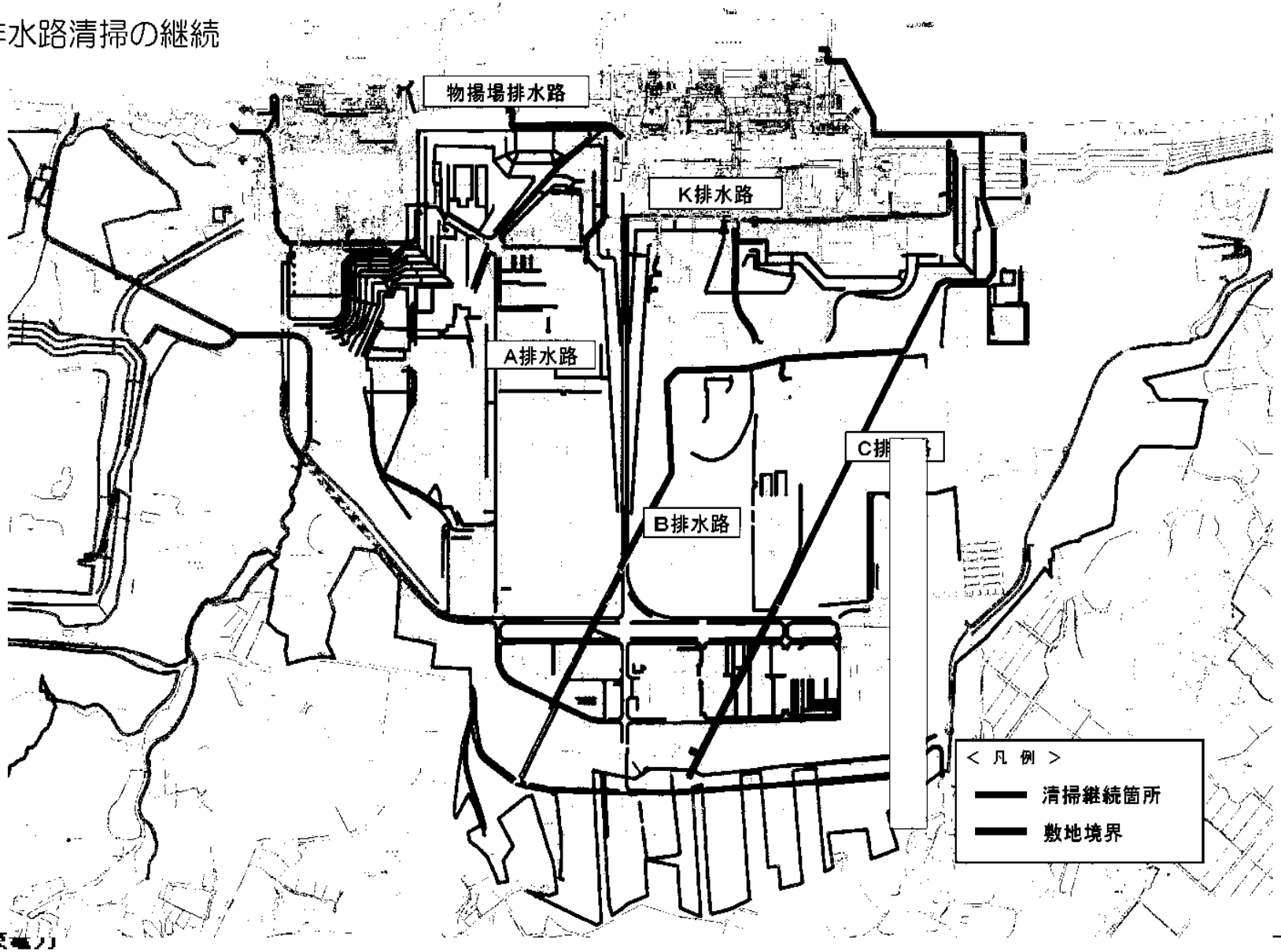
１４． 敷地全体の低減対策（継続対策） (1)除染：平成27年度分

除染、フェーシングの平成27年度分の実施エリアは下図の通り。



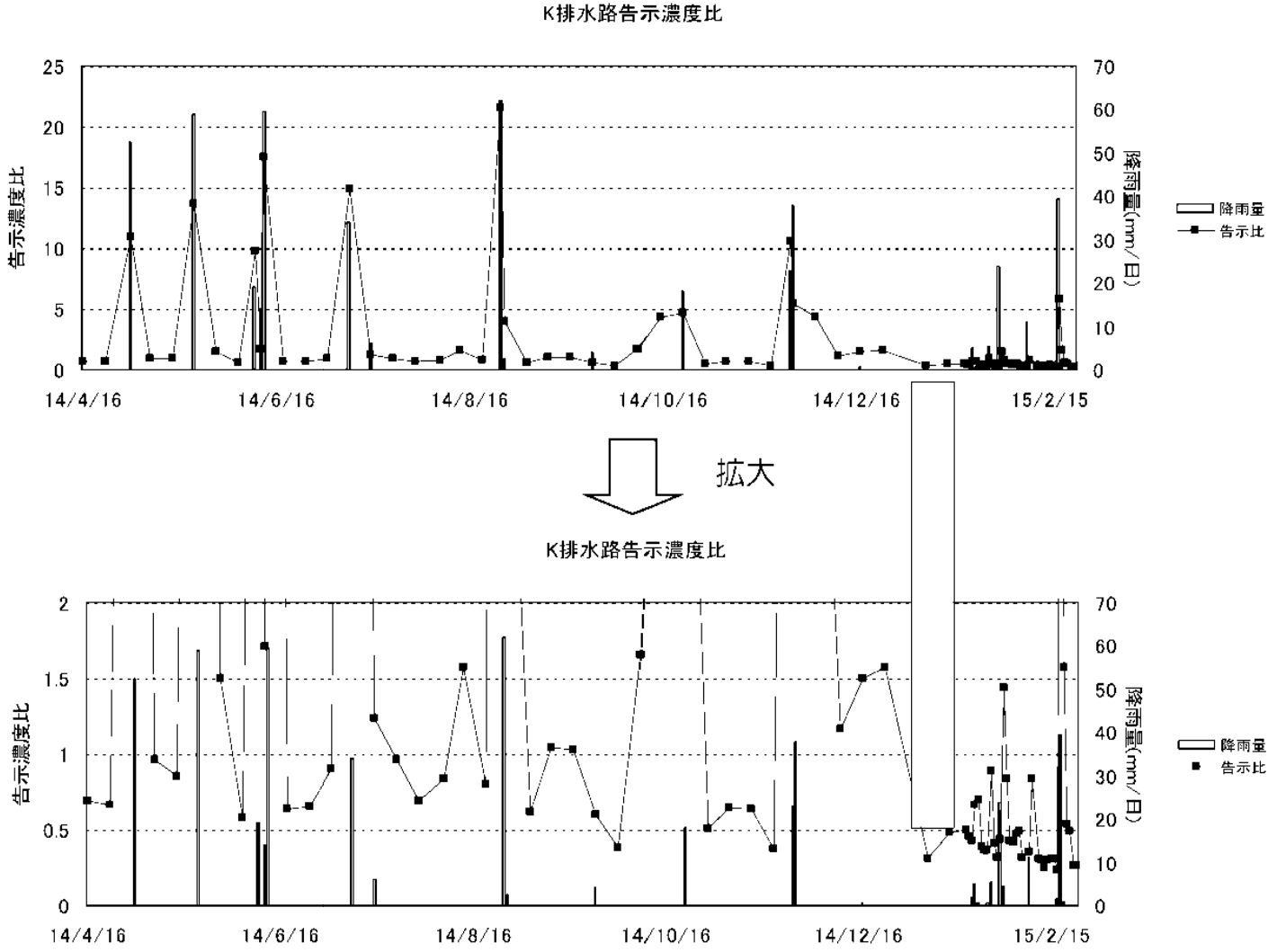
１４．排水濃度低減対策（継続対策）　(2)清掃（排水路）：平成27年度分

排水路清掃の継続



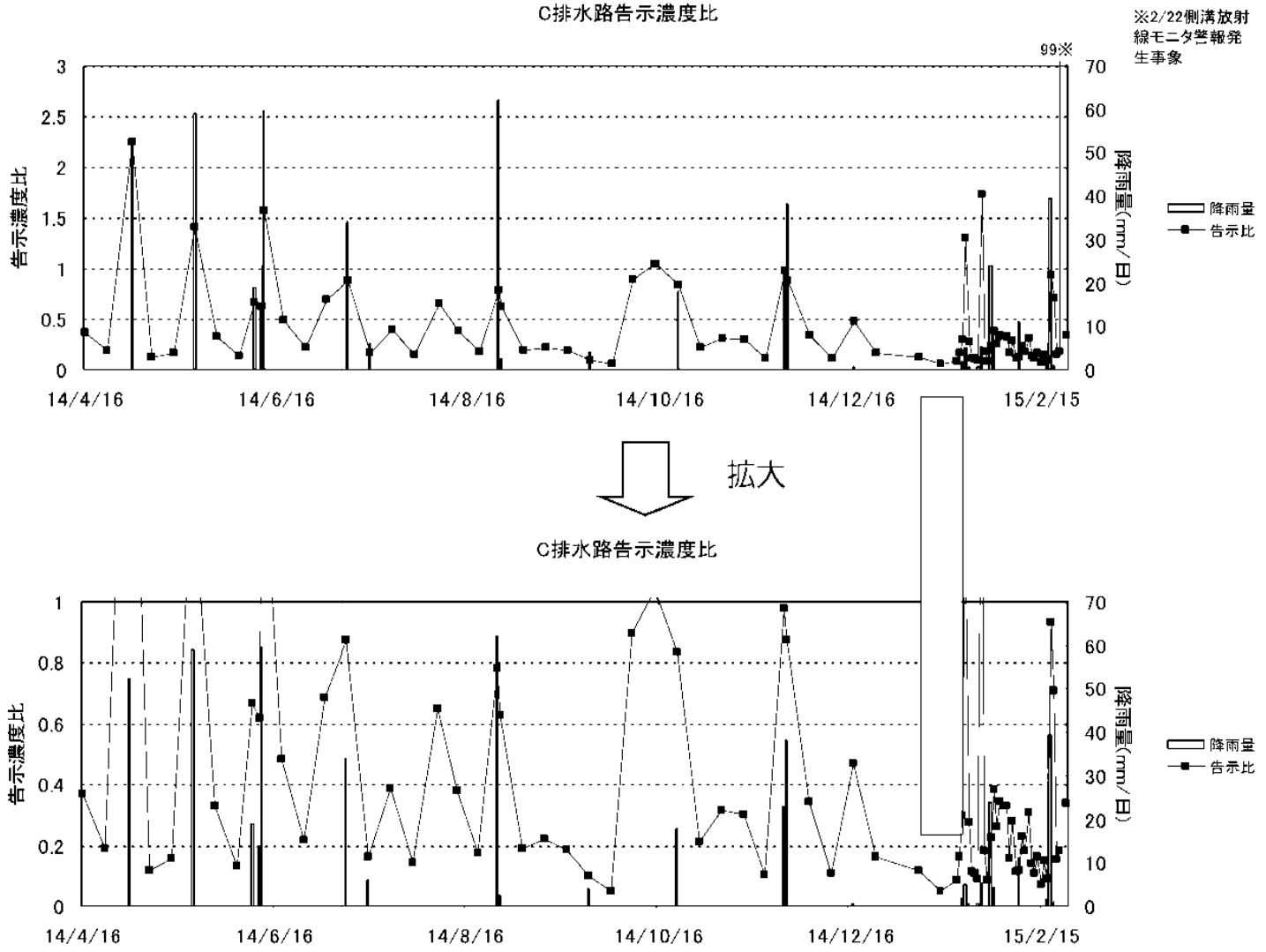
【参考】告示濃度比の状況（K排水路）

平常時（降雨のない日）にあっても、告示濃度比は0.4～1.0程度で推移している状況。
降雨時には、告示濃度比が上昇する傾向にある。



【参考】告示濃度比の状況（C排水路）

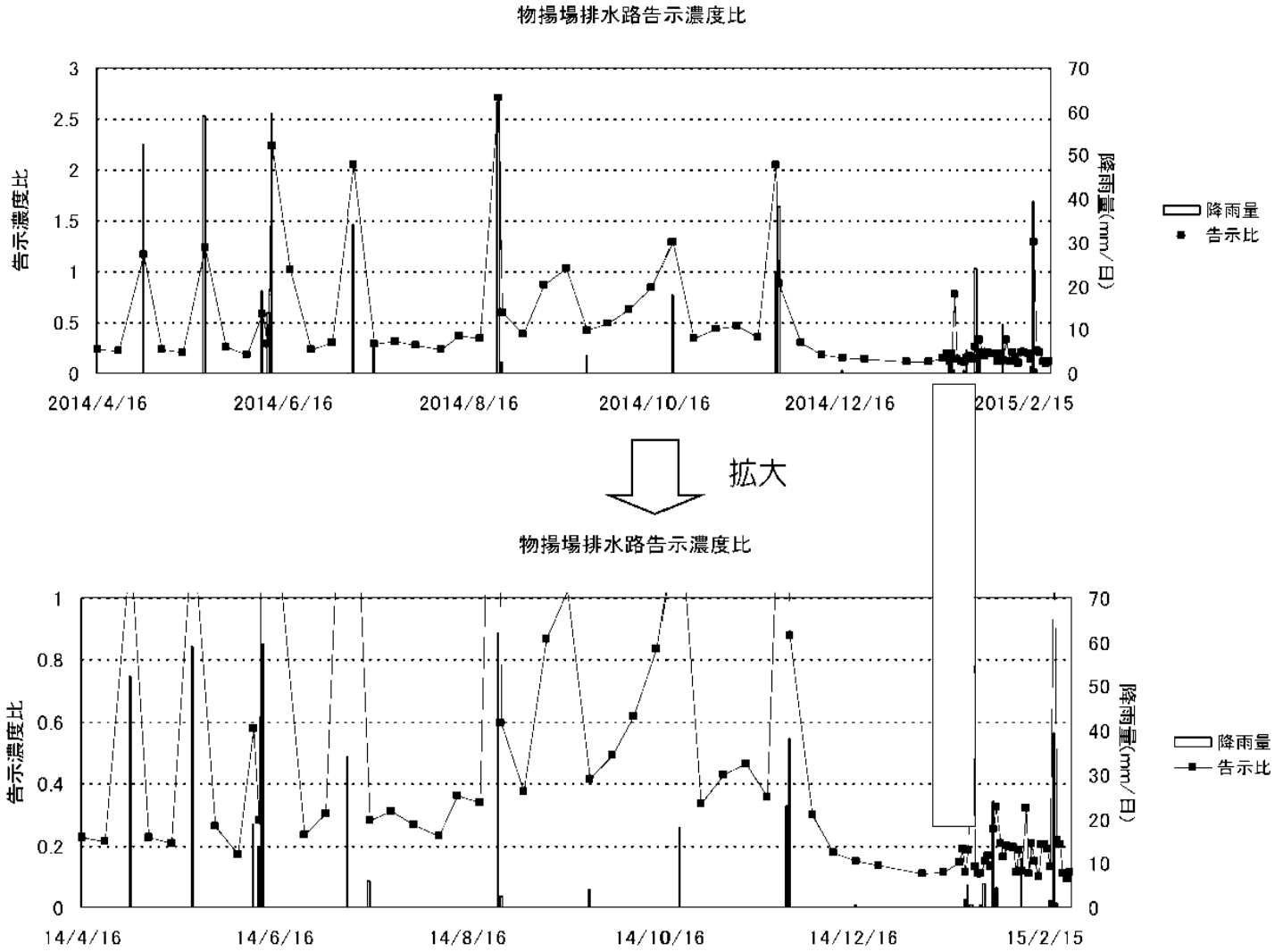
平常時（降雨のない日）にあっては、0.1～0.4程度で推移している状況。
降雨時には、告示濃度比が上昇する傾向にある。



東京電力

【参考】告示濃度比の状況（物揚場排水路）

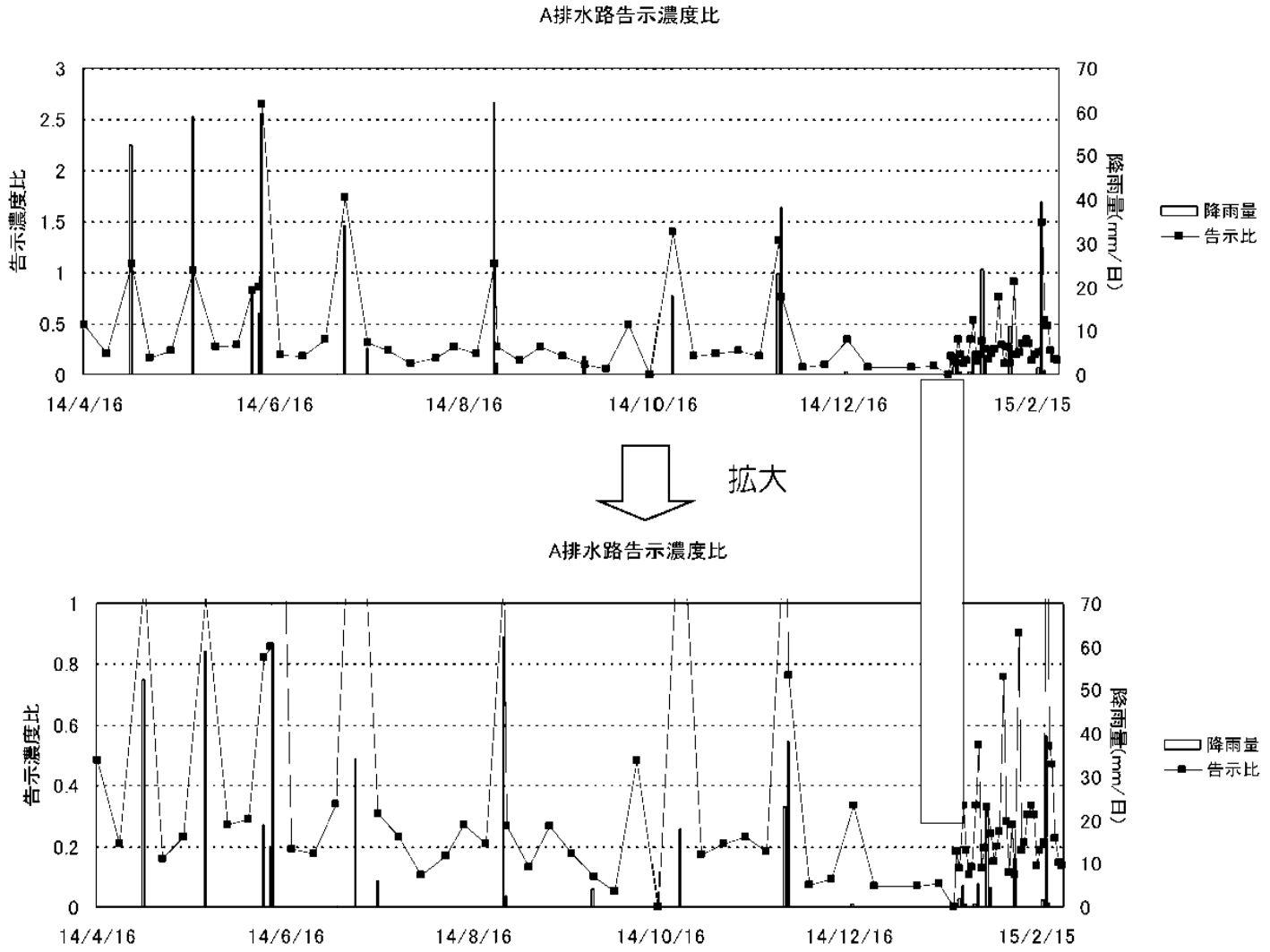
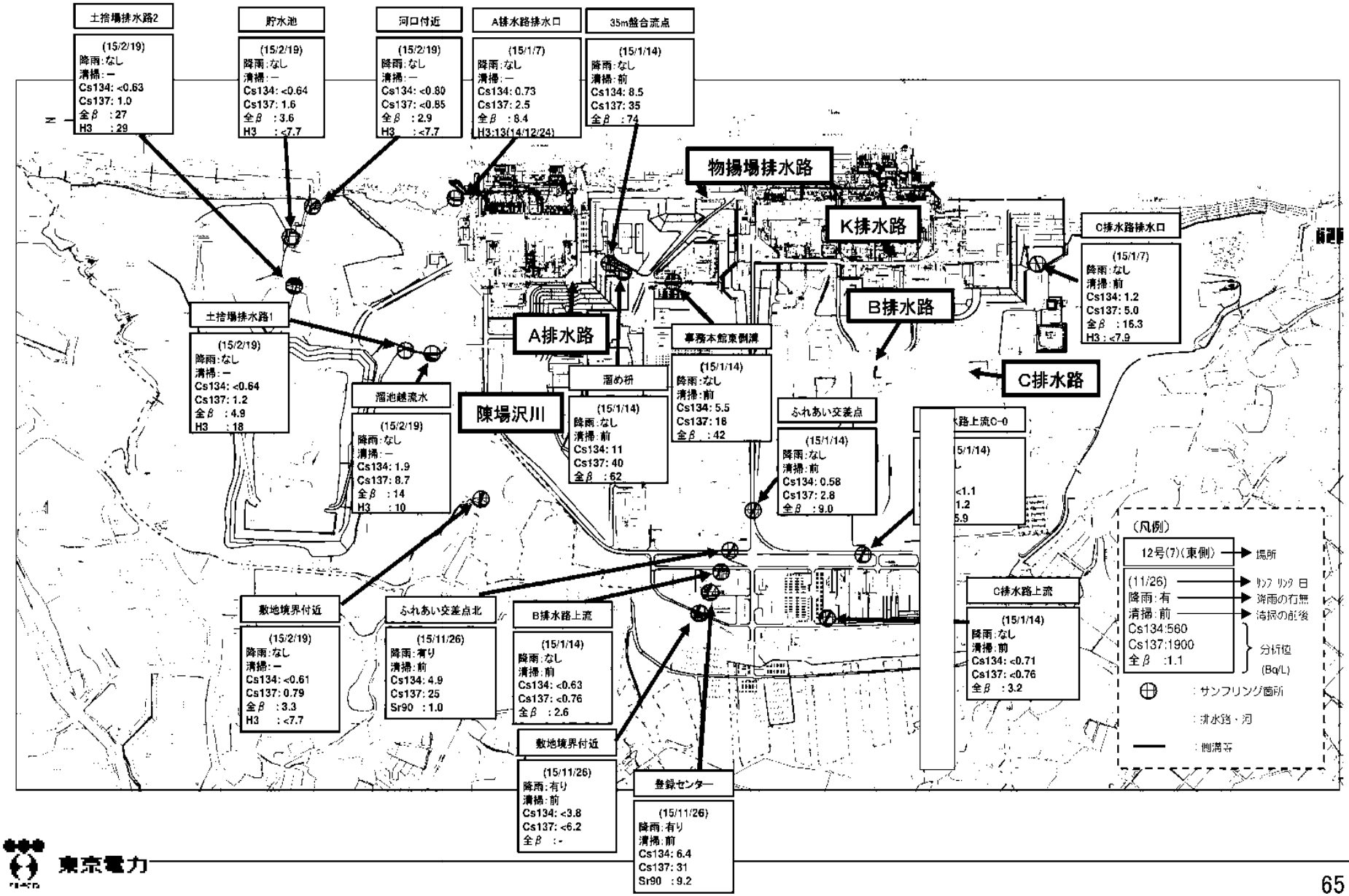
平常時（降雨のない日）にあっては、0.1～0.4程度で推移している状況。
降雨時には、告示濃度比が上昇する傾向にある。



東京電力

【参考】告示濃度比の状況（A排水路）

平常時（降雨のない日）にあっては、0.1～0.4程度で推移している状況。
降雨時には、告示濃度比が上昇する傾向にある。



【参考】発電所敷地内の排水路、陳場沢川、枝排水路位置図及び採水分析結果