From: Valentin, Andrea
To: Uhle, Jennifer; Sheron, Brian
Subject: FW: REVISED TARGETS: More info: ACTION Operating Reactors; NRR requests a response by MONDAY (please give us info by Noon)
Date: Friday, March 18, 2011 9:57:21 AM
Importance: High

FYI (some good news for NRR)

From: Spencer, Ruth
Sent: Friday, March 18, 2011 8:20 AM
To: Armstrong, Kenneth; Rivera-Lugo, Richard; Hudson, Daniel; Ibarra, Jose
Cc: Case, Michael; Richards, Stuart; Gibson, Kathy; Scott, Michael; Coe, Doug; Coyne, Kevin; Stout, Kathleen; Grancorvitz, Teresa; Valentin, Andrea
Subject: REVISED TARGETS: More info: ACTION Operating Reactors; NRR requests a response by MONDAY (please give us info by Noon)
Importance: High

(b)(5)

(b)(5)

****

CH/101

Ruth Spencer, NRC/RES, 301 251 7921

From: Spencer, Ruth
Sent: Thursday, March 17, 2011 2:41 PM
To: Armstrong, Kenneth; Rivera-Lugo, Richard; Hudson, Daniel; Ibarra, Jose
Cc: Case, Michael; Richards, Stuart; Gibson, Kathy; Scott, Michael; Coe, Doug; Coyne, Kevin; Stout, Kathleen; Grancorvitz, Teresa; Valentin, Andrea
Subject: More info: ACTION Operating Reactors; NRR requests a response by MONDAY (please give us info by Noon)
Importance: High

Hi all,

(b)(5)

(b)(5)

(b)(5)

Ruth and Kathleen

****

Ruth Spencer, NRC/RES, 301 251 7921

From: Spencer, Ruth
Sent: Thursday, March 17, 2011 10:52 AM
To: Armstrong, Kenneth; Rivera-Lugo, Richard; Hudson, Daniel; Ibarra, Jose
Cc: Case, Michael; Richards, Stuart; Gibson, Kathy; Scott, Michael; Coe, Doug; Coyne, Kevin; Stout, Kathleen; Grancorvitz, Teresa; Valentin, Andrea
Subject: ACTION Operating Reactors; NRR requests a response by COB
Importance: High

Good morning,

(b)(5)

(b)(5)

(b)(5)

Let us know if you have additional questions.

<< File: Projects greater than 200k for Op Rx.xlsx >> << File: Resources for NRR-Low Priority User Need Work.xlsx >>

Thanks,

Ruth

****

Ruth Spencer, NRC/RES

Mailstop C6-D20M, Washington, DC 20555-0001

Phone 301 251 7921 FAX 301 251 7426

eMail: Ruth.Spencer@NRC.GOV

Office Location: C06-D19

<< OLE Object: Picture (Device Independent Bitmap) >>

From: Gibson, Kathy
To: Sheron, Brian; Uhle, Jennifer
Cc: Wagner, Katie; Lee, Richard
Subject: FW: Effect of Salt
Date: Friday, March 18, 2011 10:53:07 AM
Attachments: Kathy Halvey Gibson2.vcf
Importance: High

Anybody else we need to provide this information to?

Kathy Halvey Gibson
Director
Division of Systems Analysis

Kathy.Gibson@nrc.gov
(301) 251-7499 Work
(b)(6) Cell

US Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Protecting People and the Environment

From: Lee, Richard
Sent: Friday, March 18, 2011 10:49 AM
To: Gibson, Kathy
Cc: Wagner, Katie; Salay, Michael
Subject: RE: Effect of Salt

Sea water affect on fission products:

NaCl affects -

Cs: None that we know of
I: there may be a little more organic iodine from organic materials in sea water, some silver chloride (silver – fission products) may formed.

Overall effects on fission products compositions – very small

Corrosions - very, very long time effects on fuel and reactor components (this is the least of the immediate problems need to be addressed)

Richard

From: Gibson, Kathy
Sent: Thursday, March 17, 2011 7:32 PM
To: Lee, Richard; Salay, Michael
Cc: Wagner, Katie
Subject: FW: Effect of Salt
Importance: High

Richard, Mike,
Do you have any info to answer this question? Effect of salt on cesium release? I'd

CH/102

like to respond to Brian tomorrow.

Thanks,
Kathy

Kathy Halvey Gibson
Director
Division of Systems Analysis

Kathy.Gibson@nrc.gov
(301) 251-7499 Work
(b)(6) Cell

US Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Protecting People and the Environment

From: Sheron, Brian
Sent: Thursday, March 17, 2011 6:56 PM
To: Gibson, Kathy; Scott, Michael
Cc: Uhle, Jennifer
Subject: Effect of Salt

During my meeting today with Secretary Chu, the issue of salt water injection came up. The Japanese are injection seawater into the reactors. The seawater is boiling off, leaving salt. While there are obvious questions about how salt might affect coolability of the core (clogging coolant channels, etc., a question was raised about how the salt might affect the Cesium release. Do we have any info on what the effect might be?

Attachment Kathy Halvey Gibson2.vcf (5196 Bytes) cannot be converted to PDF format.

From: Marshall D Abrams
To: Bill Day; Briney; Sheron, Brian; Mike White; Glenn Downing; Marty McGuirk; Clint Hyde
Subject: Program coordination
Date: Friday, March 18, 2011 11:02:42 AM

This note is about PD Programs, probably starting in September. By the time of our scheduled Board meeting on Saturday, May 14 at Brian's, we will have the Minicon behind us and will have evaluated the results from the questionnaire.

Unless we make a different decision at the May 14 meeting, I would expect the two Assistant Superintendents to continue planning and executing the division's program. Bill and Brian, please make plans to analyze the questionnaire results and present recommendations at the Board meeting. Also, think about enlisting additional members to participate on the Program Committee. This is a good opportunity to involve other members who might some day become officers. Please consider inviting Martin to be a member of the Program Committee. He would provide continuity and, if willing, could handle the reservations at the Fairfax libraries -- having figured out the system.

I think that Martin made some suggestions that we should consider. I repeat them below, with extraneous material removed.

IMHO, the meeting rooms in Fairfax library system is a resource that we shouldn't abandon. Tom Brodrick and Bill Demas tried to find other venues without success. The other source we might consider is community rooms in developed communities. Members living in such communities might be able to get us access to such meeting places.

Despite the existence of the Fairfax Co. Library System and its associated meeting rooms with excellent cost factors, I would suggest that whomever takes over for me continue to look into venues vs. resting on this laurel.

What is sacred about the annual miniCon coupled with the monthly singular open house (clinic) format? Almost all of the other Div's meet quarterly or bimonthly (monthly?) even using a format of 1-3 clinics in the morning, break for lunch on your own, and then 2-3 open houses in the afternoon.

CH/103

From: Sheron, Brian
To: Gibson, Kathy; Scott, Michael; Santiago, Patricia; Zigh, Ghani
Subject: FW: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)
Date: Saturday, March 19, 2011 11:03:18 AM

Please make sure EDO staff are aware of everything we have sent to Commissioner's office.

From: Zigh, Ghani
Sent: Saturday, March 19, 2011 8:32 AM
To: Tadesse, Rebecca
Cc: Sheron, Brian; Uhle, Jennifer; Gibson, Kathy; Scott, Michael; Tinkler, Charles; Santiago, Patricia
Subject: FW: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)

Rebecca,

In addition to the report hard copy that Pat Santiago sent you yesterday (ML071130300) describing the BWR zirc fire experiment performed in SANDIA, these attached reports done by SANDIA give predictions of the coolability limits for different type of fuel arrangements in the spent fuel pool.

Thanks
-----Original Message-----
From: Sheron, Brian
Sent: Saturday, March 19, 2011 7:59 AM
To: Zigh, Ghani; Santiago, Patricia
Cc: Uhle, Jennifer; Gibson, Kathy; Scott, Michael
Subject: RE: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)

IT sounds like this is what the Commissioner wants. Please forward either hard copies or the ML numbers to Rebecca.

From: Zigh, Ghani
Sent: Saturday, March 19, 2011 7:09 AM
To: Sheron, Brian; Santiago, Patricia
Cc: Uhle, Jennifer; Gibson, Kathy; Scott, Michael
Subject: RE: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)

Yes, SNL did perform other studies about 5 years ago.
These studies are in ADAMS under ML062550218, ML082261433, and ML0816800640.
These reports discuss the coolability limits (i.e. age of the assembly) for PWR and BWR assemblies for different configurations (i.e. management).
Five configuration were analyzed (Uniform, Checkerboard, 1X4, Checkerboard with empties, and 1x4 with empties)

for the BWR, the following results were found:

for Uniform configuration, the coolabity limit is 310 days old fuel.
for Checkerboard configuration, the coolability limit is 117 days old fuel.
for 1x4 configuration, the coolability limits is 20 days old fuel.
for Checkerboard with empties configuration, the coolabilaty limit is 25 days oldfuel
for 1x4 with empties configuration , the coolability limit is 20 days old fuel.

The age of the fuel assembly as function of power is as follows for the BWR assembly:
310 days old is 2.7 kWatt
117 days is 5 kWatt
25 days is 10 kWatt
20 days is 10.3 kWatt

CH/104

From: Sheron, Brian
Sent: Friday, March 18, 2011 10:32 PM
To: Santiago, Patricia
Cc: Uhle, Jennifer; Gibson, Kathy; Scott, Michael; Zigh, Ghani
Subject: RE: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)

If this is the BWR fuel bundle ignition test, I do not think this is what they are looking for. Did SNL do a SFP study some time ago? Like 5-10+ years ago?

From: Santiago, Patricia
Sent: Friday, March 18, 2011 6:36 PM
To: Tadesse, Rebecca
Cc: Bubar, Patrice; Sheron, Brian; Rini, Brett; Uhle, Jennifer; Gibson, Kathy; Scott, Michael; Bowman, Gregory; Zigh, Ghani; Navarro, Carlos
Subject: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)

Rebecca,

I believe the attached report is what you are requesting ---- Final BWR Sandia Fuel Project (SFP) Sandia Report.

We also have a time lapse video (OUO as well) that we can make a copy and provide Monday.

If you have additional questions, Ghani Zigh is the best person to assist.

Thanks
Pat

From: Bowman, Gregory
To: Sheron, Brian
Cc: Scott, Michael
Subject: FYI - Scheduling Note
Date: Friday, March 18, 2011 11:12:05 AM
Attachments: 110321 NRC Response to Events in Japan VERSION B Scheduling Note.docx

---

Brian,

Here's the latest version of the scheduling note for the Commission meeting on Monday. I think the Commission is working right now on finalizing things, so it might end up changing (although probably not very much).

I'm going to be out of the office the rest of the day and Monday. Dan Merzke is backing me up, but I'll be checking e-mails periodically. Hope you have a nice weekend.

Greg

CH/105

Draft: 3/17/11

SCHEDULING NOTE

Title: **BRIEFING ON NRC RESPONSE TO RECENT NUCLEAR EVENTS IN JAPAN (Public Meeting)**

Purpose: To provide the Commission a status on the recent events in Japan, NRC's response, and planned actions.

Scheduled: **March 21, 2011**
9:00 am

Duration: Approx. 2 hours

Location: Commissioners' Conference Room OWFN

Participants:	**Presentation**
NRC Staff Panel	**50 mins.***

Bill Borchardt, Executive Director for Operations

Topics:

- Overview of Japanese event and U.S. response
- Discussion of expectation of no harm to U.S. population
- Discussion of general radiation health effects
- Discussion of current regulatory approaches for reactors
- Path forward; near term and longer term

Commission Q & A	**50 mins.**
Discussion – Wrap-up	**5 mins.**

Documents:
Background materials due to SECY: prior to the briefing.
Slides due to SECY: prior to the briefing.

From: SCHU
To: Lyons, Peter; Adams, Ian; Aoki, Steven; Bob Budnitz; Sheron, Brian; DAgostino, Thomas; Dick Garwin; Dick Garwin; Grossenbacher, John (INL); Hurlbut, Brandon; John Holdren; Kelly, John E (NE); Koonin, Steven; McFarlane, Harold; Owens, Missy; Per Peterson; Phil Finck; Poneman, Daniel; Rolando Szilard; Steve Fetter
Subject: RE: (b)(5)
Date: Friday, March 18, 2011 11:33:29 AM

Pete,

Good work.

(b)(5)

Steven Chu
Department of Energy

-----Original Message-----
From: Lyons, Peter
Sent: Thursday, March 17, 2011 8:19 PM
To: SCHU; Poneman, Daniel; DAgostino, Thomas
Subject: (b)(5)

(b)(5)

pete

CH/106

From: Flory, Shirley
To: Sheron, Brian
Subject: IN VIEW OF MONDAY"s COMMISSION BRIEFING, I"ll GO AHEAD AND CANCEL MONDAY"s STAFF MEETING. OK?? Thanks - Shirley
Date: Friday, March 18, 2011 11:34:21 AM
Importance: High

CH/107

From: Ronaldo H Szilard
To: Adams, Ian
Cc: Hurlbut, Brandon; Sheron, Brian; McFarlane, Harold; (b)(6) Kelly, John E (NE); Grossenbacher, John (INL); Owens, Missy; peterson@nuc.berkeley.edu; Lyons, Peter; Phillip.Finck@inl.gov; (b)(6) RJBudnitz@lbl.gov; SCHU; Aoki, Steven; Koonin, Steven; (b)(6) DAgostino, Thomas
Subject: Re: Japan Nuclear Meeting - attendees list
Date: Friday, March 18, 2011 12:19:22 PM
Attachments: Secretary Chu Presentation - March 18, 2011 Lab final.pdf

---

Ian,
Attached is a pdf copy of the items I presented during yesterday's meeting. The presentation has a lot of background slides for everybody's information.
Sincerely
Ronaldo

"Adams, Ian" <Ian.Adams@hq.doe.gov>

03/18/2011 07:11 AM

To "Lyons, Peter" <Peter.Lyons@Nuclear.Energy.gov>, (b)(6) (b)(5) "Aoki, Steven" <Steven.Aoki@nnsa.doe.gov>, "Grossenbacher, John (INL)" <john.grossenbacher@inl.gov>, (b)(6) (b)(6) "peterson@nuc.berkeley.edu" <peterson@nuc.berkeley.edu>, "Phillip.Finck@inl.gov" <Phillip.Finck@inl.gov>, "RJBudnitz@lbl.gov" <RJBudnitz@lbl.gov>, (b)(6) "DAgostino, Thomas" <Thomas.DAgostino@nnsa.doe.gov>, "Kelly, John E (NE)" <JohnE.Kelly@Nuclear.Energy.gov>, "ronaldo.szilard@inl.gov" <ronaldo.szilard@inl.gov>, "McFarlane, Harold" <harold.mcfarlane@inl.gov>, "Brian.sheron@nrc.gov" <Brian.sheron@nrc.gov>, "Koonin, Steven" <Steven.Koonin@science.doe.gov>, SCHU <SCHU@hq.doe.gov>, "Owens, Missy" <Missy.Owens@hq.doe.gov>, "Hurlbut, Brandon" <Brandon.Hurlbut@hq.doe.gov>
cc
Subject Japan Nuclear Meeting - attendees list

Good morning,

The list below contains the attendees of yesterday's Japan Nuclear Meeting, as well as those invited but unable to attend. This group is also copied in the address line of this email.

Regards,
Ian

First	Last	Affiliation	Email
Pete	Lyons	DOE	Peter.Lyons@Nuclear.Energy.gov<mailto:Peter.Lyons@Nuclear.Energy.gov>
John	Holdren	WH	(b)(6)
Steve	Aoki	NNSA	Steven.Aoki@nnsa.doe.gov<mailto:Steven.Aoki@nnsa.doe.gov>
John	Grossenbacher	INL	john.grossenbacher@inl.gov<mailto:john.grossenbacher@inl.gov>
Dick	Garwin	WH	(b)(6)
Per	Peterson	Berkeley	peterson@nuc.berkeley.edu<mailto:peterson@nuc.berkeley.edu>
Phil	Finck	INL	Phillip.Finck@inl.gov<mailto:Phillip.Finck@inl.gov>
Bob	Budnitz	LBL	RJBudnitz@lbl.gov<mailto:RJBudnitz@lbl.gov>
Steve	Fetter	WH	(b)(6)
Tom	D'Agostino	NNSA	Thomas.DAgostino@nnsa.doe.gov
John	Kelly	NE	JohnE.Kelly@Nuclear.Energy.Gov
Ronaldo	Szilard	INL	Ronaldo.szilard@inl.gov
Harold	McFarlane	INL	harold.mcfarlane@inl.gov<mailto:harold.mcfarlane@inl.gov>
Brian	Sheron	NRC	Brian.sheron@nrc.gov<mailto:Brian.sheron@nrc.gov>
Steve	Koonin	DOE	Steven.Koonin@science.doe.gov<mailto:Steven.Koonin@science.doe.gov>
Steven	Chu	DOE	schu@hq.doe.gov

Ian Adams
Office of the Secretary
Department of Energy

C4/108

(202) 586-9585
ian.adams@hq.doe.gov

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pan Accident Meeting
1 Update

arch 17, 2011 1:00 PM – 5:00 PM
E, Washington, DC

Steven Chu, DOE
John Holdren, WH
Steve Koonin, DOE
Pete Lyons, DOE
Steve Aoki, NNSA
John Grossenbacher,INL
Dick Garwin, WH
Per Peterson, Berkeley
Bob Budnitz, LBL
Steve Fetter, WH
Tom D'Agostino, NNSA
John Kelly, NE
Ronaldo Szilard, INL
Harold McFarlane, INL
Brian Sheron, NRC

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Fukushima Dai-ichi Event

Chernobyl Lessons Learned
Salt Buildup Analysis
Background Information

Ronaldo Szilard

Idaho National Laboratory

March 17, 2011

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Specific questions + background information

- Post-Chernobyl Actions
- Salt Buildup Analysis for Fukushima
- Background information compiled by DOE laboratories

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Chernobyl – Responses That Worked

- Drained water away to avoid molten corium-water interactions that could have led to vapor explosions and further dispersal
  - Used volunteer divers to open gate valve and used fire brigade to pump/suck radioactive water
- Filled room designed for equipment with concrete
- Dumped 500 metric tons of materials (sand, lead, boric acid) in bags
- Used water to extinguish fire
- Used 600,000 liquidators (army personnel) for 40 sec each to disperse the debris/fuels fragments

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Chernobyl – Responses That Did Not Work

- Tried to freeze the ground beneath the floor by injecting liquid nitrogen (using oil drilling equipment)
  - required 25 metric tons of nitrogen/day
  - soon abandoned
- Public mitigation measures were delayed
  - Iodine pill distribution
  - Sheltering
  - Evacuation

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Salt Buildup Analysis

- Question: If 1600 tons of seawater enters and the water leaves as steam, 56 tons of salt remain in the reactor vessel. What are the impacts on future recovery actions?
- Response by Japan
  - BWR Owners Group Procedure and Severe Accident Guidelines have provisions for using fire system to supply coolant when conditions warrant.
  - Operators' decision to use seawater was necessary and appropriate
  - Core decay heat removal is done by "feed and bleed"

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Salt Buildup Analysis - 2

- Consequences
  - NaCl is a neutron absorber; no recriticality concern as a result of this action
  - Substantial thermal-hydraulics impact
    - Crud deposition
    - Insolubility of chemicals in vapor
    - Small impact of higher temperature on solubility
    - Crud layer decreases thermal conductivity and increases hydraulic resistance, both causing increase in fuel temperature
    - During reflooding, salt deposition is intensive at evaporating front
    - Salt deposition grows as evaporative cooling continues

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Salt Buildup Analysis - 3

- Consequences (cont.)
  - Boric acid also deposits in much the same way, but at lower quantity
  - Reactor core is a perfect desalination machine
    - Unit 1 decay heat removal over 3 days ~ 1500 GJ
    - Causes evaporation of 600 tons of seawater
    - Deposits ~ 10 m^3 of salt
  - Salt will plug the coolant channels, perhaps after 1 day in seawater regime
    - Units 2 & 3 higher power – accelerated effect
    - 1 day sufficient to cause blockage of channel
    - NaCl deposits will be melted (1686K) as core heats up

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Salt Buildup Analysis - 4

- Recommendations
  - Establish path to supply fresh water to plant's coolant pool
  - Switch to fresh water as soon as practical
    - Given efficiency of water usage (due to liquid entrainment) 200 t/day required in Unit 1; 400 t/day in Units 2 and 3 (1000 tons/day total)
    - Requires 50 m3/hour, 6 large helicopter buckets every 30 minutes to each unit
  - Ensure that water is borated before supplying to reactor system

Backup Slides

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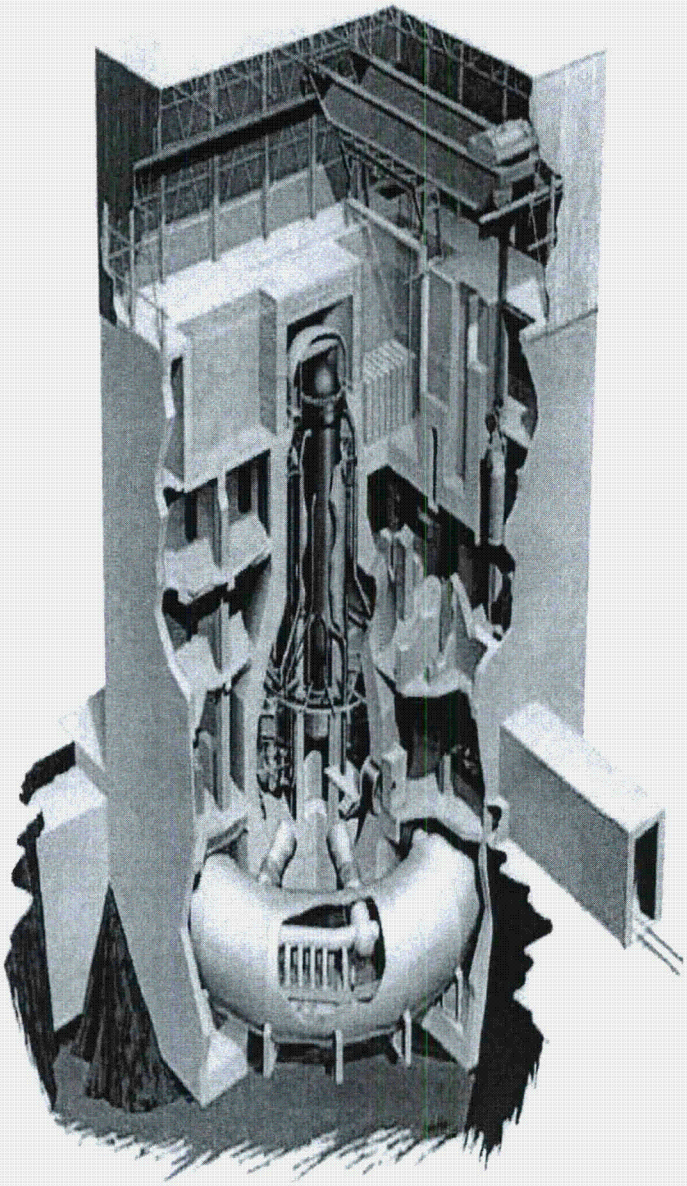
Mark I Containment



- Twenty-three reactors in the United States utilizing Mark I containments
- Available data suggest similarities exist in the design and operation of Japanese and US Mark I containments.
- Following TMI-2 and 9/11, NRC required licensee's to develop comprehensive beyond design basis mitigation strategies (i.e. procedures, staging of portable equipment).
- NRC Generic Safety Issue 157 – "Containment Performance"

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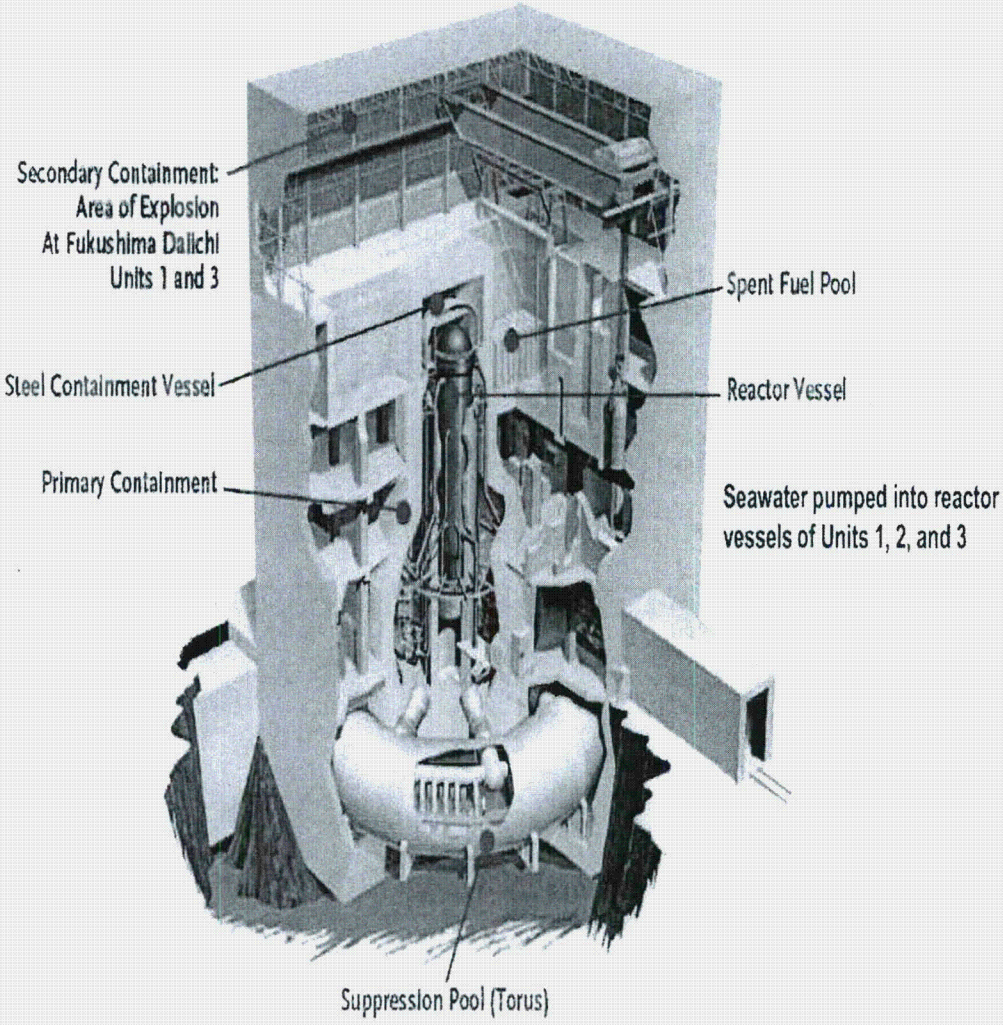
Reactor Plant Details

Boiling Water Reactor Design At Fukushima Daiichi



Updated 3/16/11

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Spent Fuel Event Progression

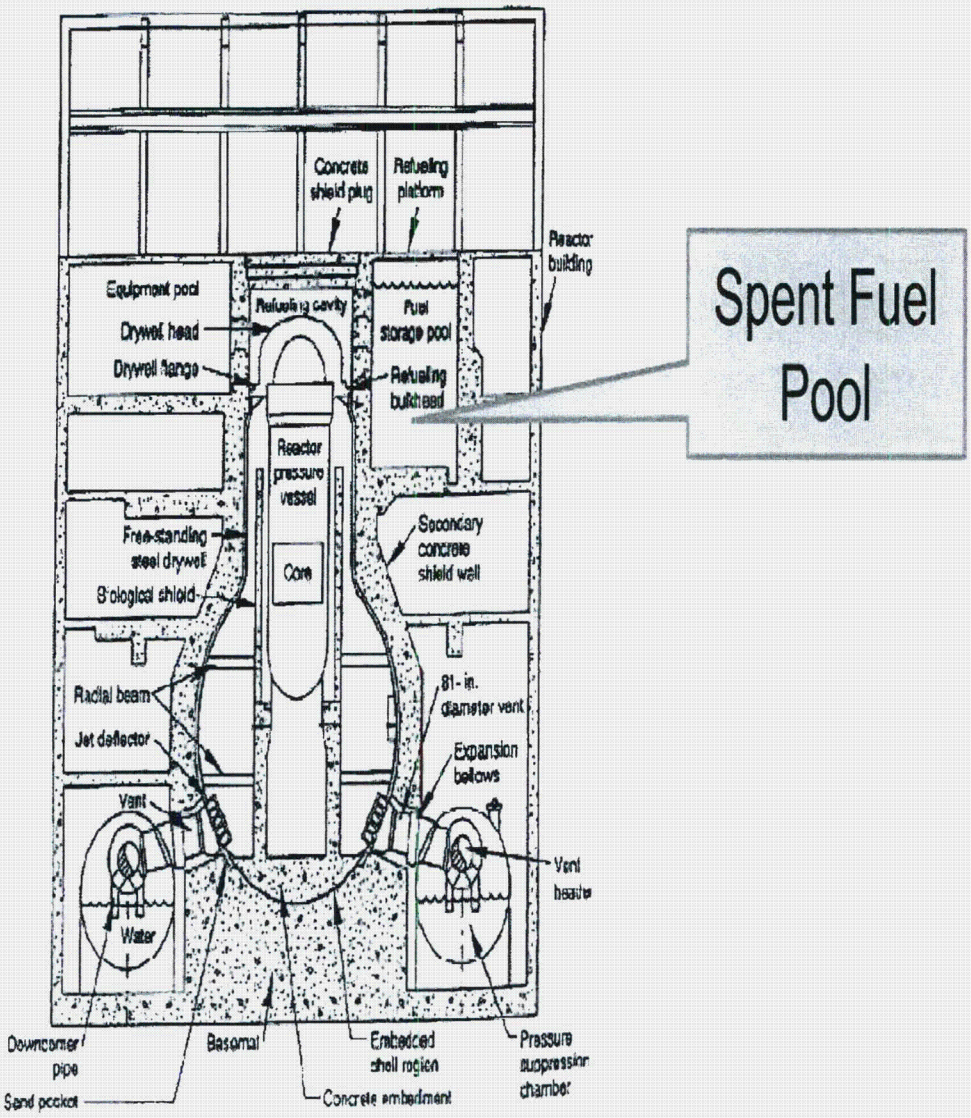

Figure 20. Mark I General Electric,GE BWR Containment.

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US Response to Dai-ichi Event

- **US still needs coordinated effort to quickly gain insights and implement lessons learned**
- **Benefit maximized if effort is coordinated**
  - DOE labs (ANL, BNL, INL, LANL, ORNL, and SNL)
  - NRC, FEMA
  - Industry (EPRI, NEI, Owner Groups)
- **Similar response to activities after TMI-2, but focused on issues specific to Dai-ichi plant and events**
- **Some aspects of international interest**
  - Similar to programs established after TMI-2 and Chernobyl

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Dai-ichi Event Offers Key Opportunities for Insights and Lessons Learned

- Advance methods and tools to identify, assess, and manage key phenomena associated with:
  - Spent fuel storage pool response (seismic response, accident progression)
  - Gen II and III reactor severe accident progression and multiple unit response:
    - BWR fuel degradation
    - Containment response
    - Current accident management strategies (borated water injection effects, aging, human response under duress, seawalls, venting, inertion)
    - Risk and recovery actions associated with multiple threats and multiple units

- Advanced risk-informed design improvements to increase safety margin ("loading vs. capacity") characterization, focusing on key vulnerabilities, i.e. scenarios where "loading" exceeds "capacity".
    - Integrated capacity must factor in training, emergency response preparedness and resourcefulness, infrastructure (and its loss), crew psychology and performance under abnormal/catastrophic conditions

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Several Tasks Required

- **Reconstruct accident progression**
  - Detailed instrumentation data (pressure, water level, hydrogen concentration, etc.) with supporting analyses
  - Operator Initial Actions and Emergency Response
  - Video footage (H_2 explosion, building damage)
  - Post-accident examinations (damaged fuel, structures, etc.)
  - Government Response to events
- **Reactor and spent fuel analysis tool assessment and enhance with validation experiments of key aspects of this event (as needed)**
  - Accident progression
  - Adequacy of accident management procedures/backfits
  - Impact of alternate/advanced mitigation actions
  - Reactor cleanup and decommissioning experience
  - Environmental assessment s and impact

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Several Tasks Required (continued)

- **US contribution to recovery effort:**
  - Unique insights and data from TMI-2 recovery/remediation actions, fuel damage, H_2 explosion, and core/concrete interaction tests
  - Simulation tools
  - Robotics
  - Reactor Cleanup, Decontamination, and Decommissioning Experience
  - Environmental Assessments and Impact
- **Existing and advanced LWR US fleet assessments and enhancements**
  - Short-term actions for continued operation
    - *External Events (seismic, geography, long duration loss of power)*
    - *Common Cause Events*
    - *BWR Mark I and Spent Fuel Pool Design*
    - *Accident Management Actions / Public Communications*
  - Long-term implementation of lessons learned
- **Future reactor programs and innovative design options**

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Innovations to Enhance Safety

- **Passive cooling system for spent fuel storage pools**
  - Air cooled heat exchangers
- **Primary containment venting system that minimizes hydrogen combustion risk**
  - Design issues (distributive outlet, hardened vents, etc.)
  - Hydrogen mitigation in the secondary containment building
- **In-vessel retention of corium backfit implementation for Gen II plants**
- **Core catcher for to mitigate ex-vessel core relocation (preventing corium-concrete interactions)**
  - Heat-absorbing, non-gas-emitting, sacrificial materials
  - External natural circulation-cooled externally
- **Advanced mitigation methods**
  - Cloud seeding
  - Slurry bombers

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Summary

- As with all past events, the nuclear power community must learn from this experience to improve safety.
- DOE can play an important role by using its national laboratories to analyze the event, develop improved technologies, and support NRC and industry in their efforts to incorporate lessons learned.
- The national laboratories are already working cooperatively with NRC, industry, and each other to create and implement a rational long-term response.

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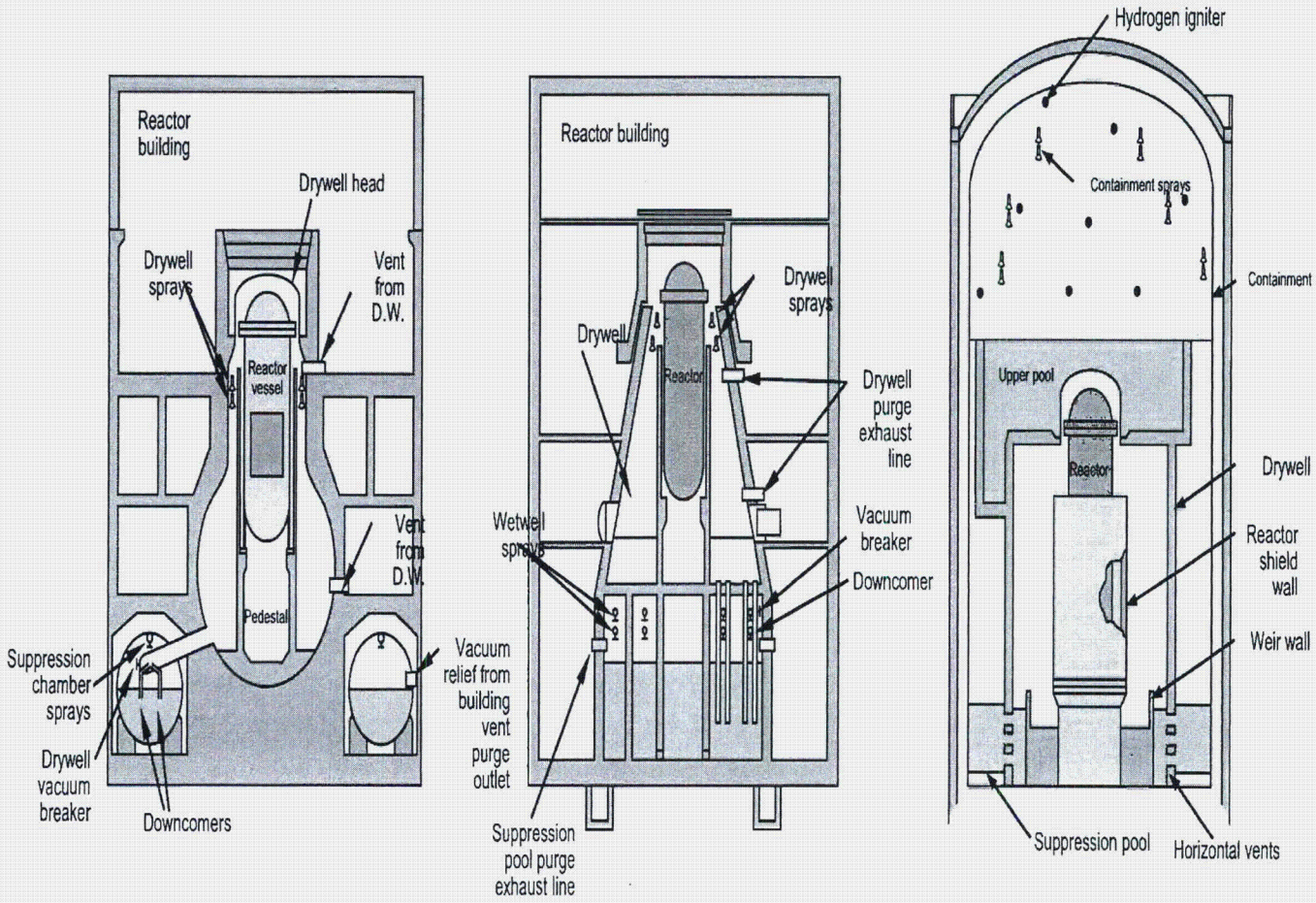
Difference in BWR Containment Designs



Mark I

Mark II

Mark III

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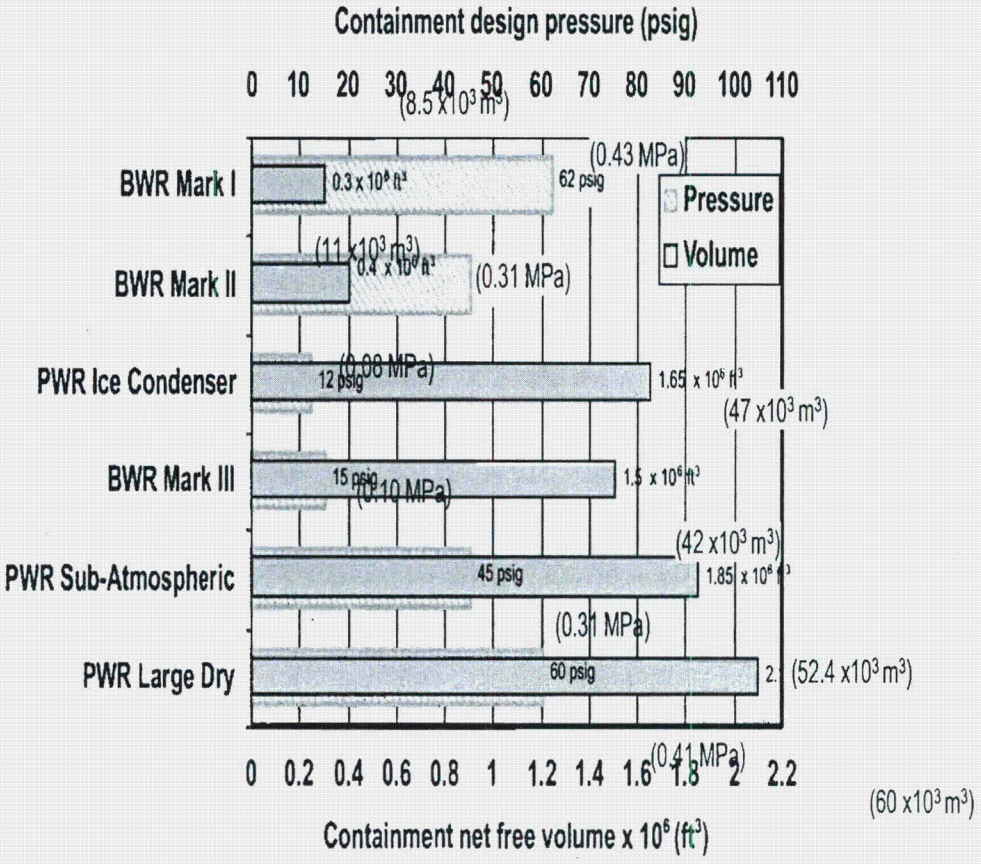
Containment Free Volumes and Design Pressures Differ



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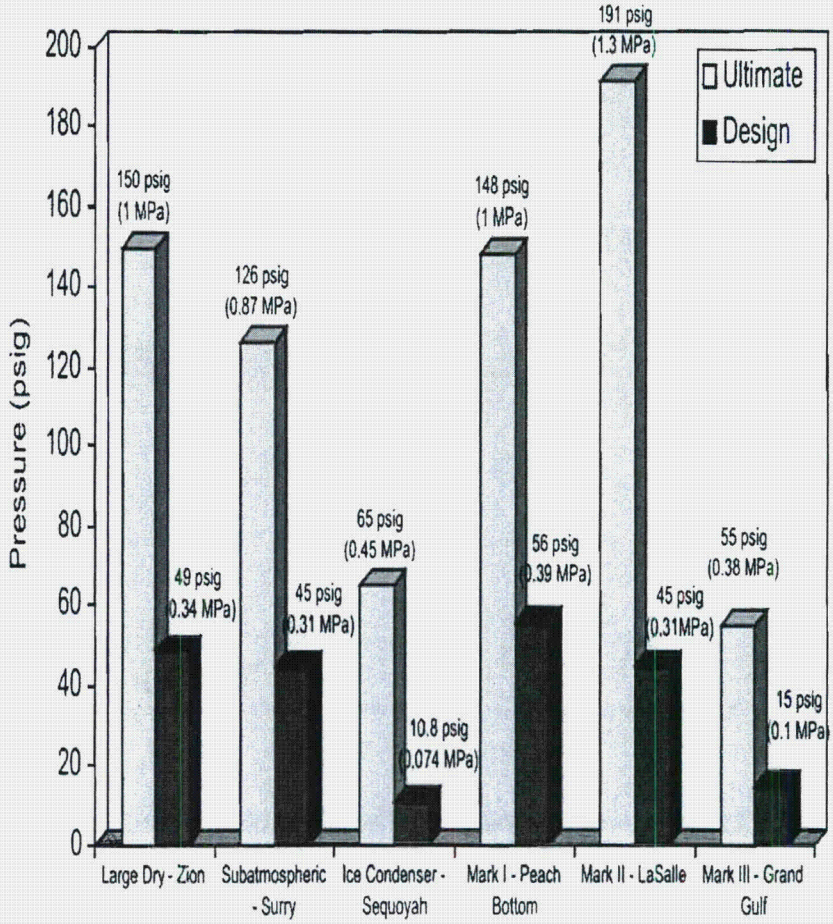
Failure Pressures Significantly Higher than Design Pressures



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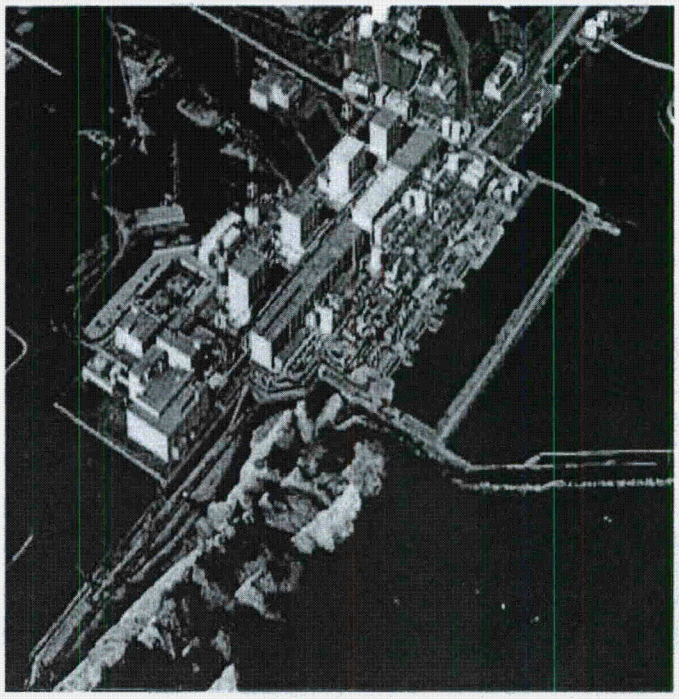
Six BWR Units at the Fukushima Nuclear Station

- **Unit 1**: 439 MWe BWR, 1971 (unit was in operation prior to event)
- **Unit 2**: 760 MWe BWR, 1974 (unit was in operation prior to event)
- **Unit 3**: 760 MWe BWR, 1976 (unit was in operation prior to event)
- **Unit 4**: 760 MWe BWR, 1978 (unit was in outage prior to event)
- **Unit 5**: 760 MWe BWR, 1978 (unit was in outage prior to event)
- **Unit 6**: 1067 MWe BWR, 1979 (unit was in outage prior to event)



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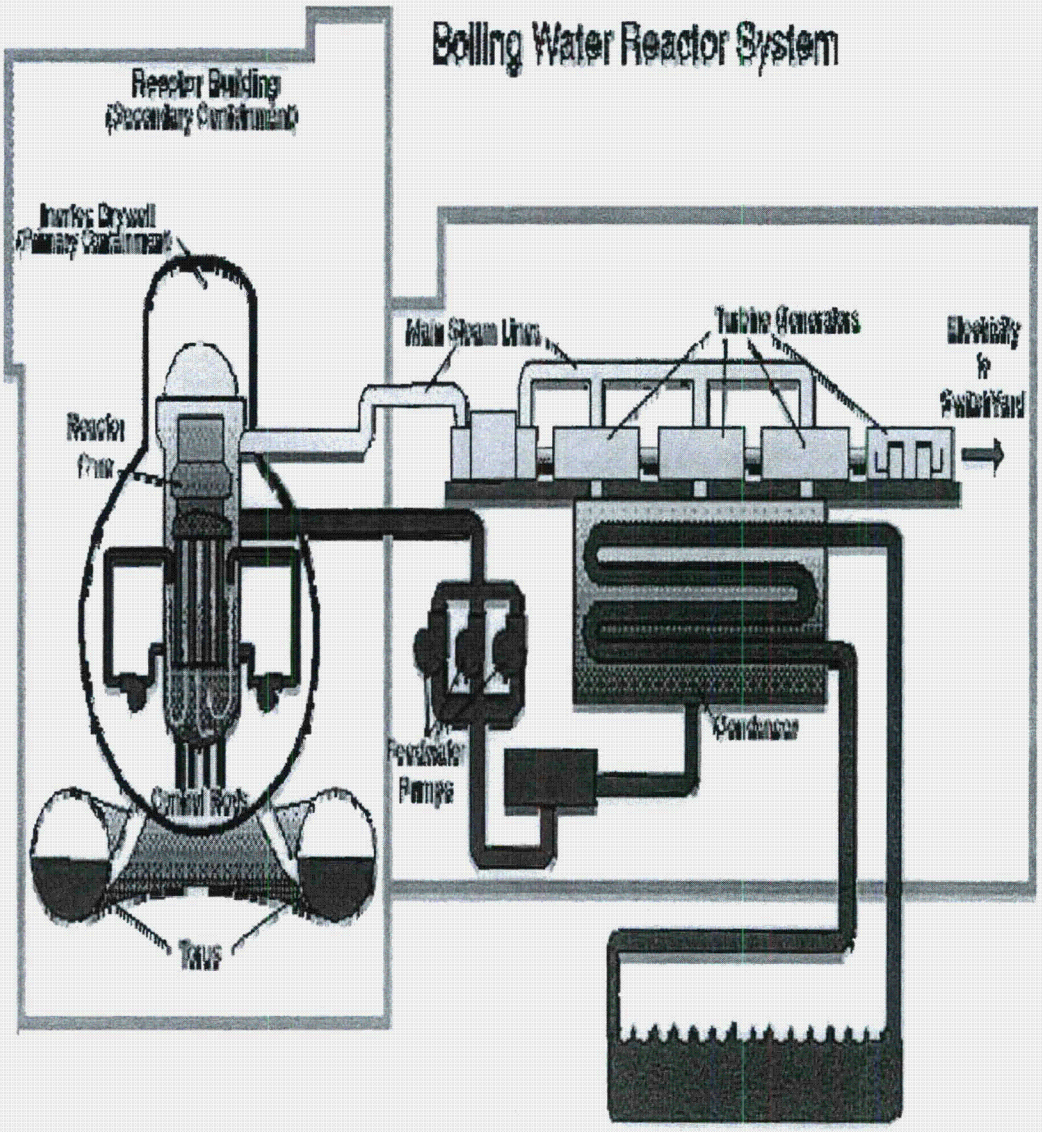
Fukushima Dai-ichi Unit 1

Typical BWR 3 and 4 Reactor Design



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Dai-ichi Plant Design Features

Mechanism of Boiling Water Reactor Power Station

Primary Containment Vessel(Dry Well)

It would confine radioactive substances discharged from the reactor facilities if some pipes were broken by accident.

Reactor Pressure Vessel

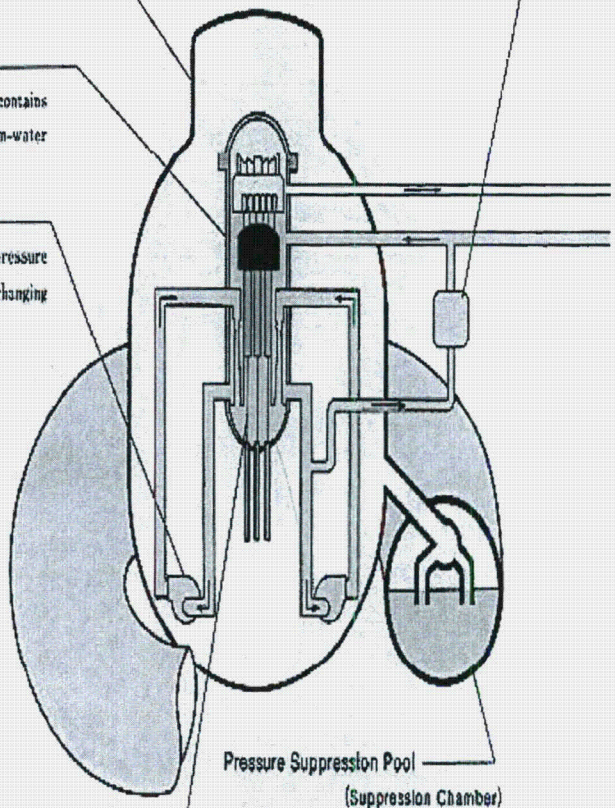
It is made of 12cm thick steel and contains fuel, control rods, jet pumps, steam-water separator and steam dryer.

Primary Recirculation pump

It circulates water in the reactor pressure vessel and changes reactor power by changing water quantity.

Cleanup Water System

It maintains the purity of the water circulating through the reactor.



Pressure Suppression Pool (Suppression Chamber)

It always contains water. Should pipes in the primary containment vessel ever break, leaked steam would be conducted into the pool, where it would be cooled down and condensed with a large amount of water to suppress any rise in pressure in the primary containment vessel.

Control Rods

They are used to start and stop the reactor and to change reactor power (amount of nuclear fission) by individually inserting and extracting from the bottom of the reactor.

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Initial Response

- Nuclear reactors tripped. Within seconds, the control rods were inserted into the core.
- Cooling systems were activated to remove decay heat. The decay heat load is about 3% of the heat load under normal operating conditions.
- Earthquake resulted in the loss of offsite power which is the normal supply to plant.
- Emergency Diesel Generators (EDGs) started and powered station emergency cooling systems.
- One hour later, the station was struck by the tsunami. EDG operation ceased shortly afterwards.
- Reactor operators were able to utilize emergency battery power to provide control and instrumentation power for the steam driven RCIC system that provides cooling for 8 hours.
- Operators followed normal operating procedures and emergency operating procedures.

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Loss of Makeup

- Offsite power could not be restored, and delays occurred obtaining and connecting portable generators.
- After the batteries depleted, residual heat could not be carried away any more.
- Reactor temperatures increased; and water levels in the reactor decreased, eventually uncovering and overheating the core.
- Hydrogen was produced from metal-water reactions with zircaloy cladding and possibly channel boxes.
- Operators vented the reactor pressure vessel to relieve steam pressure - energy (and hydrogen) was released into the primary containment (drywell) causing primary containment temperatures and pressures to increase.
- Operators took actions to vent the primary containment to control containment pressure and hydrogen levels. Required to protect the primary containment from failure.
- Primary Containment Venting is through a filtered path that travels through duct work in the secondary containment to an elevated release point on the refuel floor (on top of the reactor building).
- A hydrogen detonation subsequently occurred while venting the secondary containment. Occurred shortly after an aftershock at the station. Spark likely ignited hydrogen.

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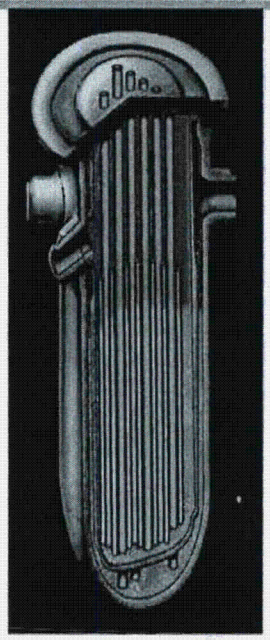
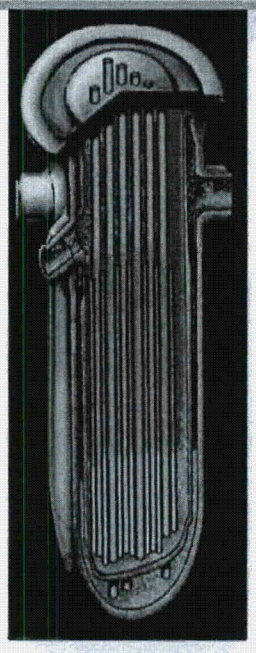
Core Damage Sequence

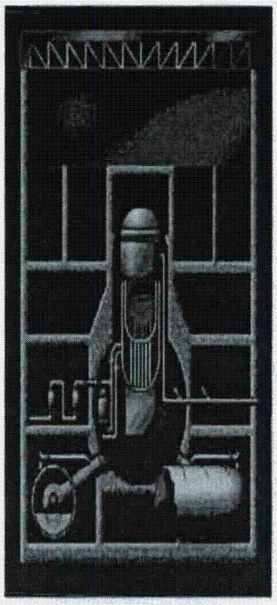


Core Uncovered

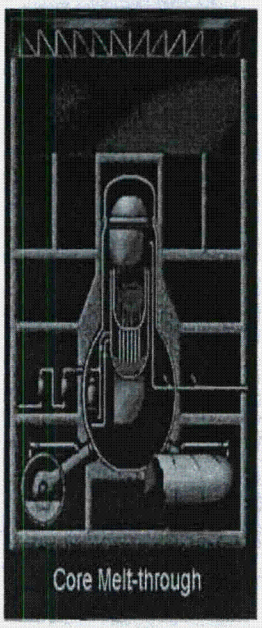


Fuel Overheating

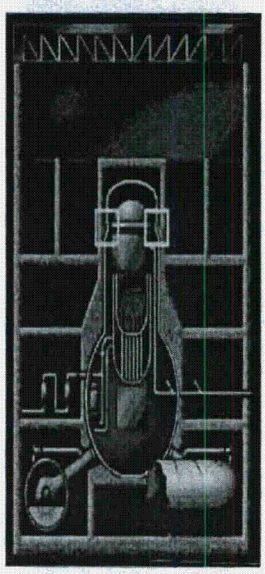
Fuel melting - Core Damaged



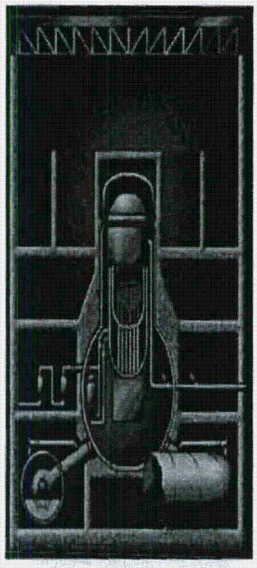
Core Damaged but retained in vessel



Some portions of core melt into lower RPV head



Containment pressurizes. Leakage possible at drywell head



Releases of hydrogen into secondary containment

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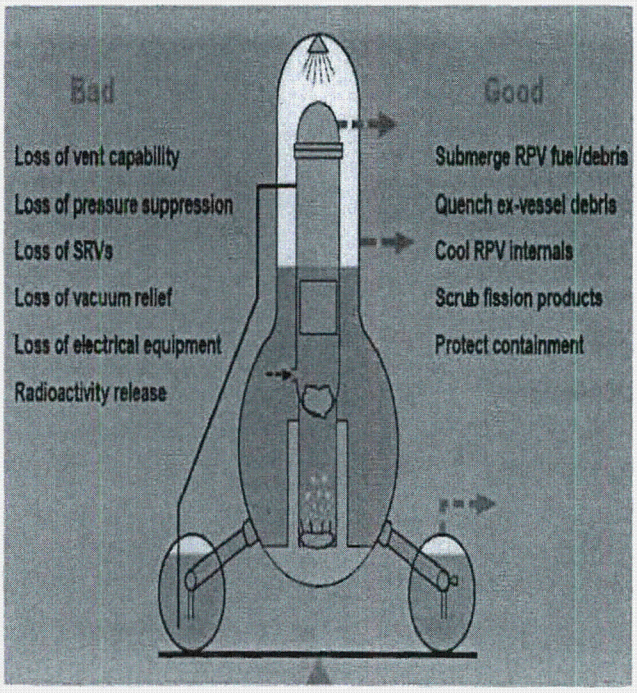
Mitigating Actions

- The station was able to deploy portable generators and utilize a portable pump to inject sea water into the reactor and primary containment.
- Station was successful in flooding the primary containment to cool the reactor vessel and debris that may have been released into the primary containment.
- Boric acid was added to the seawater used for injection. Boric acid is "liquid control rod". The boron captures neutrons and speeds up the cooling down of the core. Boron also reduces the release of iodine by buffering the containment water pH.

Containment Flooding Effects



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Emergency Response

- Equivalent of General Emergency declared for the event at Unit 1.
- Evacuation of public performed within 20 km (13 miles) of plant; approximately 200,000 people evacuated.
- Similar hydrogen detonation subsequently occurred at Unit 3 on Sunday, March 14th (Japan time). Primary containment remained intact at Unit's 1 and 3 throughout the accident. There was considerable damage to the secondary containment (reactor building).
- Highest recorded radiation level at the Fukushima Dai-ichi site was 155.7 millirem. Radiation levels were subsequently reduced to 4.4 millirem after the after the containment was flooded. The NRC's radiation dose limit for the public is 100 millirem per year.
- One fatality occurred at the station along with numerous injured workers.
- Authorities distributed potassium-iodide tablets to protect the public from potential health effects of radioactive isotopes of iodine that could potentially be released. This is quickly taken up by the body and its presence prevents the take-up of iodine-131 should people be exposed to it.
- Over 300 after shocks have occurred and continue to challenge station response.

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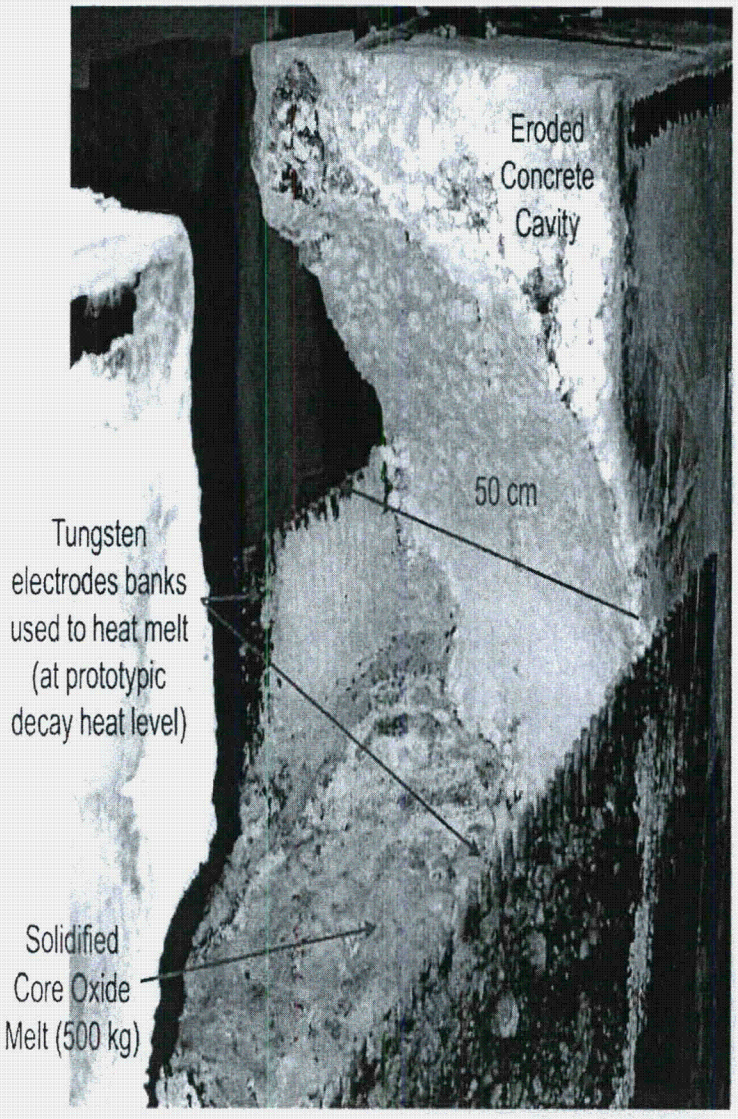
Argonne Support to NRC and International Community: Melt Coolability and Concrete Interaction (MCCI) Program

- **Work organized by the OECD.**
- **Participating countries: Belgium, Czech Republic, Finland, France, Germany, Hungary, Japan, Norway, South Korea, Spain, Sweden, Switzerland, and the United States of America.**
  - All experiments are conducted at Argonne
  - NRC functions as the project Operating Agent.
- **Current program focus is on ex-vessel debris coolability**
  - Viewed internationally as an important technical challenge impacting accident management strategy for LWR plants

Post-test Debris from Core-Concrete Interaction Tests



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ANL Support to NRC and International Community - MCCI Program (cont'd)

- **Large-scale reactor material experiments and associated analysis conducted to achieve the following technical objectives:**
  - ✓ Assess the effectiveness of various mechanisms for cooling core debris under top flooding conditions that could arrest the accident progression and minimize the potential for radiological release.
  - ✓ Address remaining uncertainties related to long-term 2-D core-concrete interactions that may lead to containment failure by over-pressurization or basemat penetration resulting in fission product release to the environment.
  - ✓ Provide reactor material test data to verify new design features that enhance coolability (e.g., EPR core catcher and ESBWR BiMac)
- **In total, 21 experiments conducted over the course of this program (2002-present) that support accident management planning for existing as well as advanced plant designs**
- **A key element of the project has been development and validation of phenomenological models for use in system-level codes (e.g., MELCOR and MAAP in the US) that form the technical basis for extrapolating the results to plant conditions.**

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Potential Crisis Management Actions

- **Situation analysis**
  - Minimize dose consequence during recovery operations to responders and offsite impacts
  - Support the emergency response
  - Assume site will be re-scoped to D&D
- **Priority on Stabilizing the SFPs (especially in Unit 4, followed by 3)**
  - Air drop additional material with appropriate heat capacity and shielding (best from 30-100' and after application of a water or foam curtain to filter particulates that could dose responders)
  - Best candidates: sand, silicate (glass beads), ice, MgO slurry, concrete
  - Boron inclusion is useful but re-criticality risks are low.
  - Issue is whether drops could achieve proper penetration with precision
  - Remote and Unmanned solutions are available
    - *Robotics*
    - *Unmanned helicopters*

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Looking beyond the immediate crisis: Current status of Technical Basis for Severe Accident Management

- **Current nuclear reactor severe accident M&S capabilities are based on empirically calibrated models**
- **TEPCO's response (SAMGs) has been technically informed by the large volume of experimental data and modeling of severe accident work done in the 1980s and 1990s.**
  - This knowledge base is captured into a set of single processor, parametric codes and a decreasing set of nuclear safety experts
- **No useful, truly transient data from reactors as severe accidents are rare events**
- **While these scenarios are likely more difficult to model than nuclear weapons, there are parallels**
  - NNSA-ASC: 1992 test ban; must certify for safety/performance annually; aging (retiring) designer staff
  - Nuclear reactor safety: no real full system tests; license for safety and operation; most experts retired or within a decade of retirement

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Continual Improvement – Beyond the Dai-ichi Event

'...the administration is committed to learning from Japan's experience as we work to continue to strengthen America's nuclear industry.'

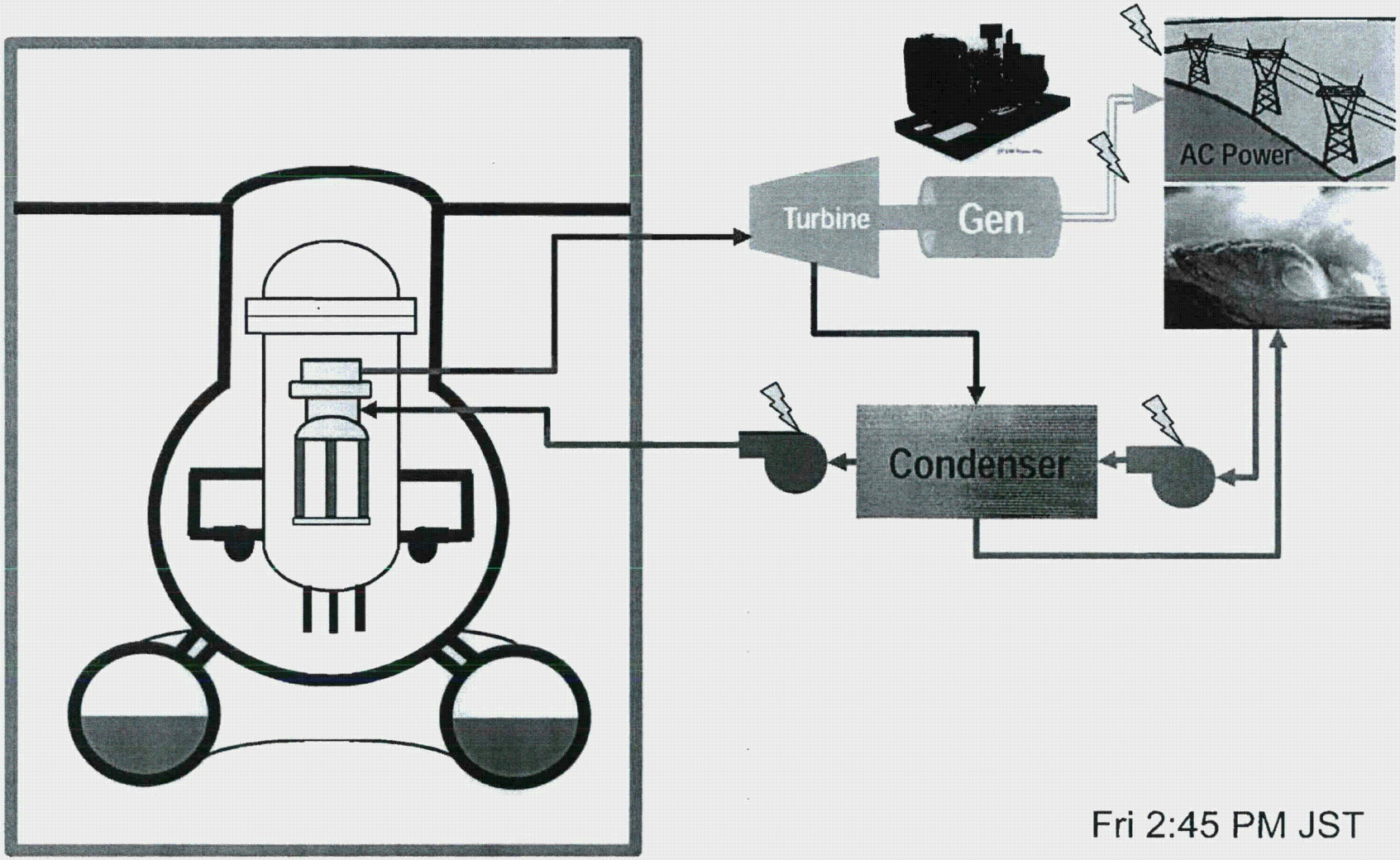
---Steven Chu, March 16, 2011

- **This event will represent the largest set of prototypic experimental severe accident data ever assembled**
  - There is tremendous opportunity to capture this information to improve safety understanding.
- **M&S is a tool to capture and improve the fidelity of NPP accident response prediction by taking the information learned from the Fukushima event.**
  - Full fidelity in geometry (3D), physical models, numerical algorithms, uncertainty quantification
  - Cover all bases: reactor core transients; source term, plume transport, spent fuel pool response, "popcorn" effects of neighboring reactor cores
  - Spent fuel storage questions
- **It is also has a secondary benefit of developing a new generation of nuclear safety knowledgeable expertise.**
- **Bottom line: virtualize the nuclear power transient**

Timing of Events

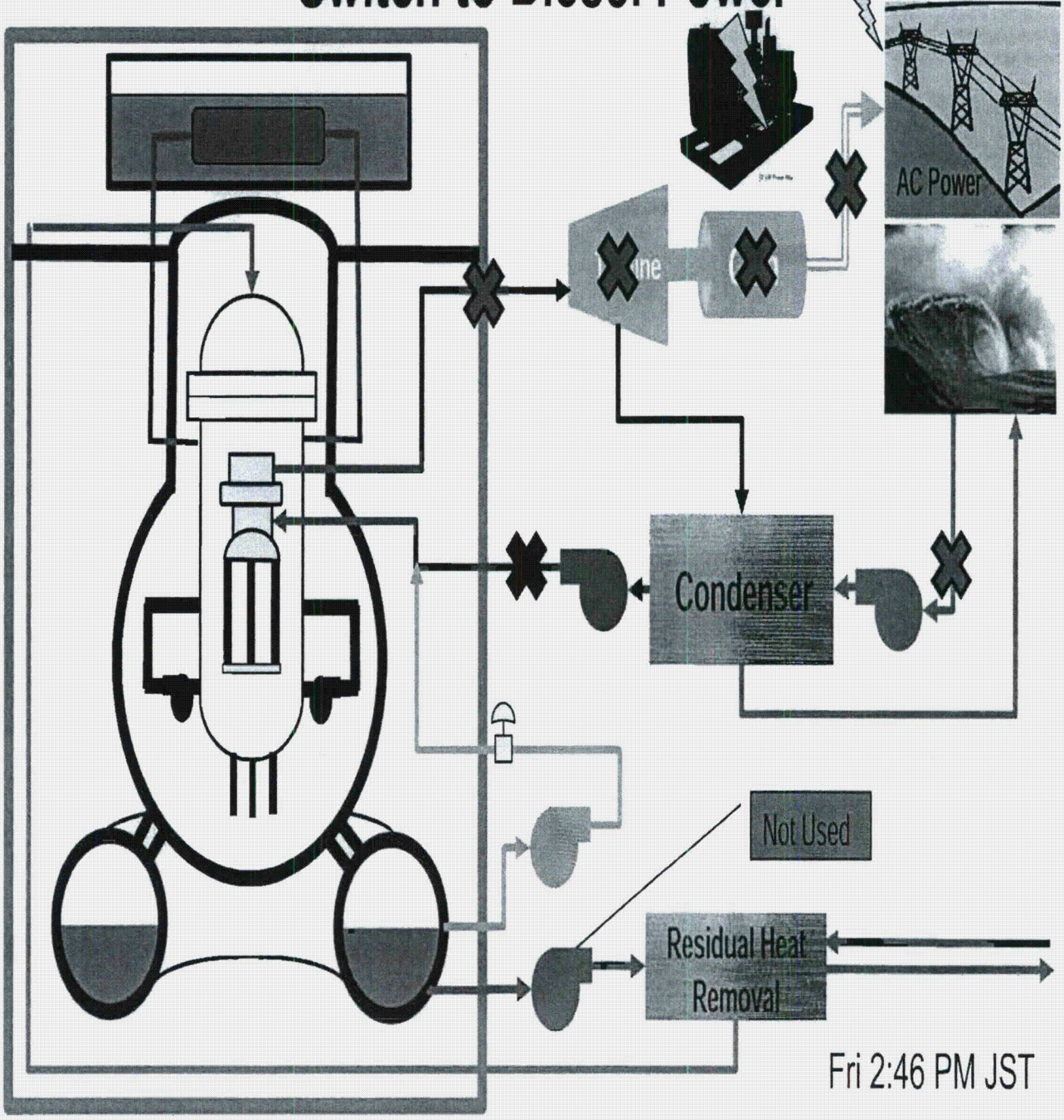
Earthquake Begins	Fri. 2:46 PM JST
Reactor shuts down	Fri. 2:48 PM JST
Off-grid, diesels provide power	Seconds later
Reactor cooled by emergency systems	After diesels start
Tsunami fails diesel generators	Fri. ~3:45 PM JST
Battery powers control of steam-driven Reactor Core Isolation Cooling (RCIC) and automatic depressurization	After diesels fail
Battery power exhausted	Sat. ~12:00 AM JST
Report of suppression pool (wet well) becoming saturated	Sat. ~2:00 AM JST
Containment pressure 0.6 MPa (0.4 MPa normal)	Sat. ~2:00 AM JST
Steam vented from reactor to Refueling Bay	Sat. 5:30 AM JST
Water level drops to top of active fuel	-
Core oxidation occurs, releasing hydrogen	-
Hydrogen Explosion/Deflagration	Sat. 3:36 PM JST
Seawater injection begins	Sun 8:20 PM JST

Normal Operating Configuration

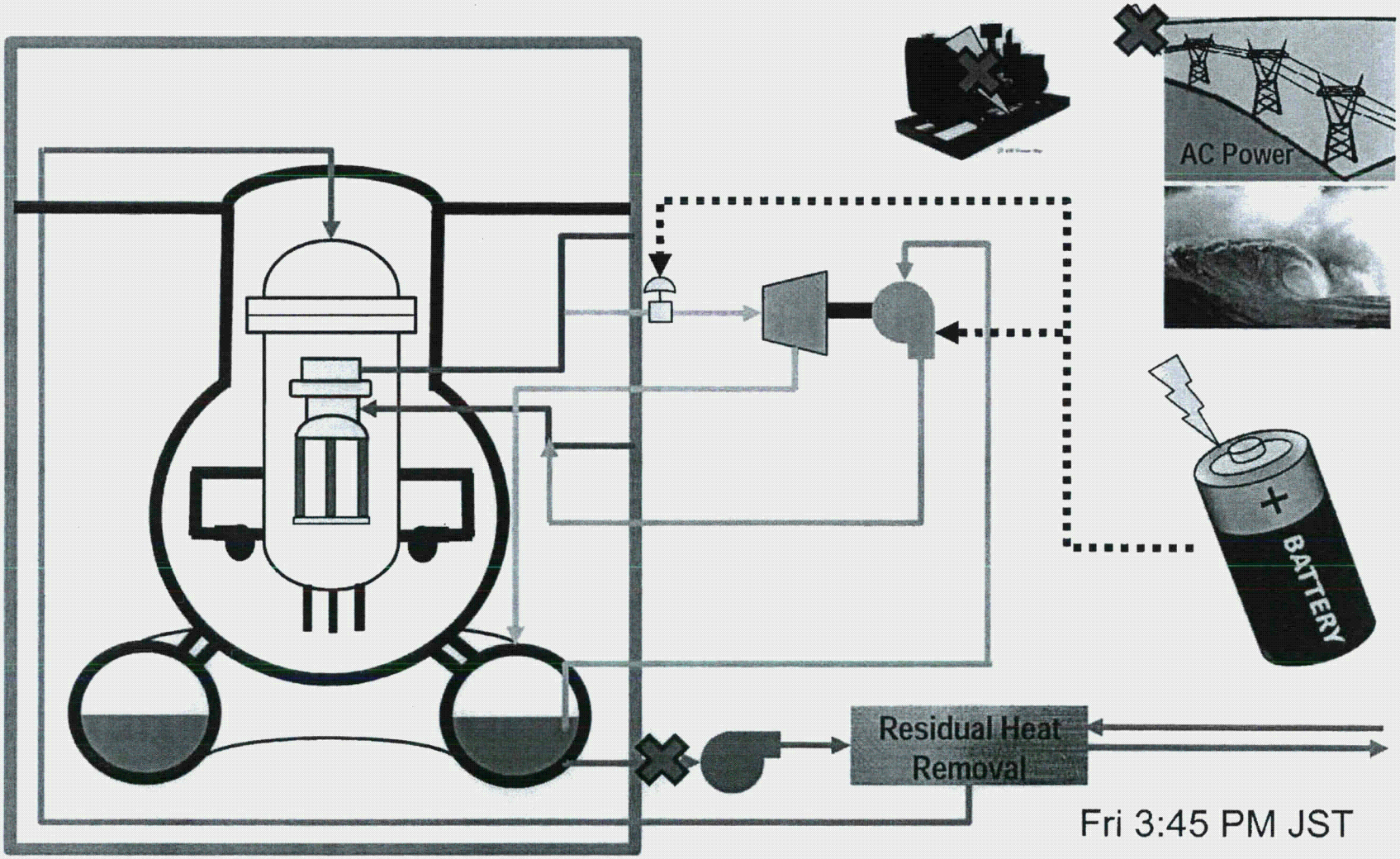


Fri 2:45 PM JST

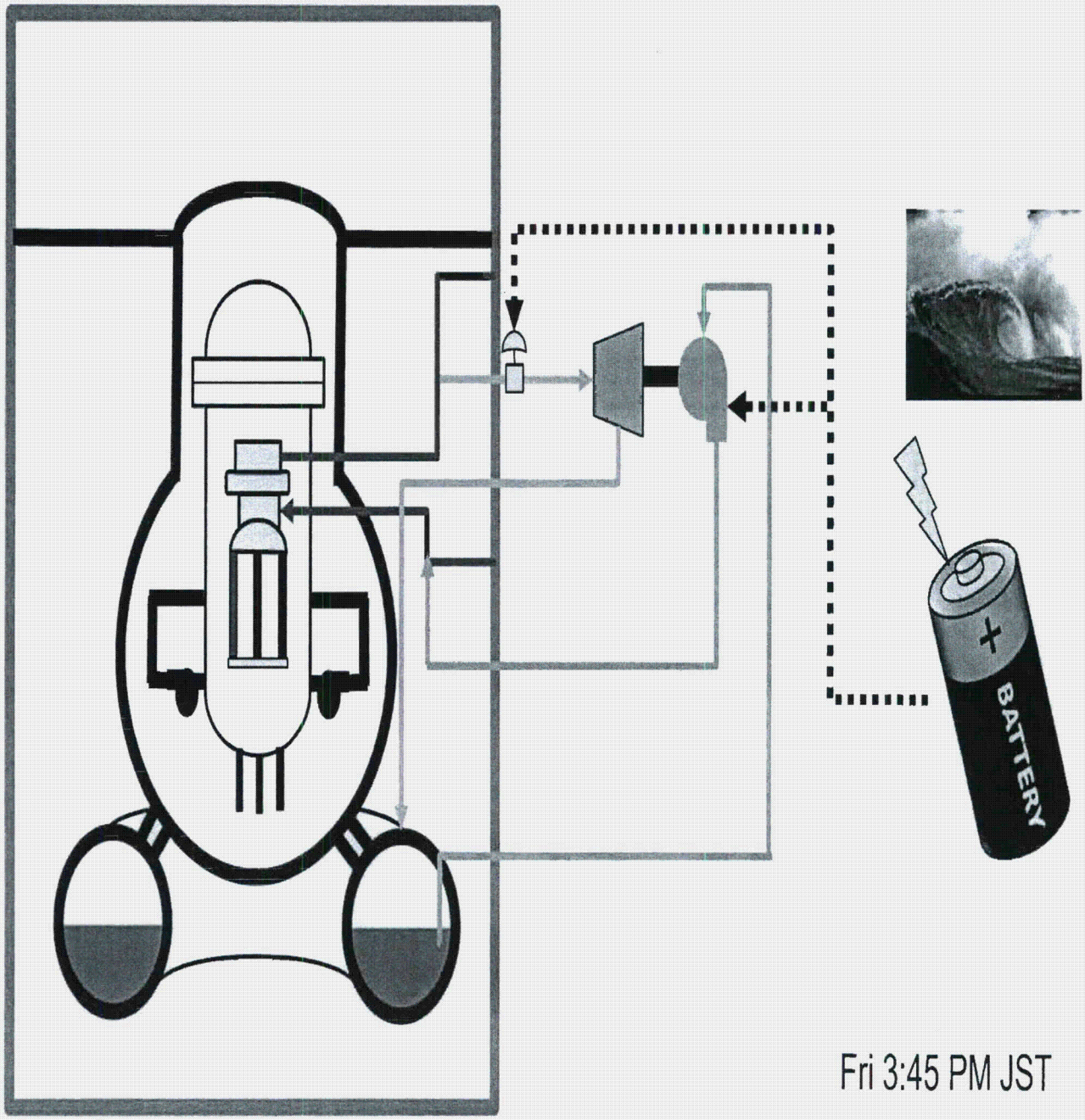
Earthquake Begins, Reactor Shuts Down Switch to Diesel Power



Tsunami Arrives, Diesels and Grid Disabled

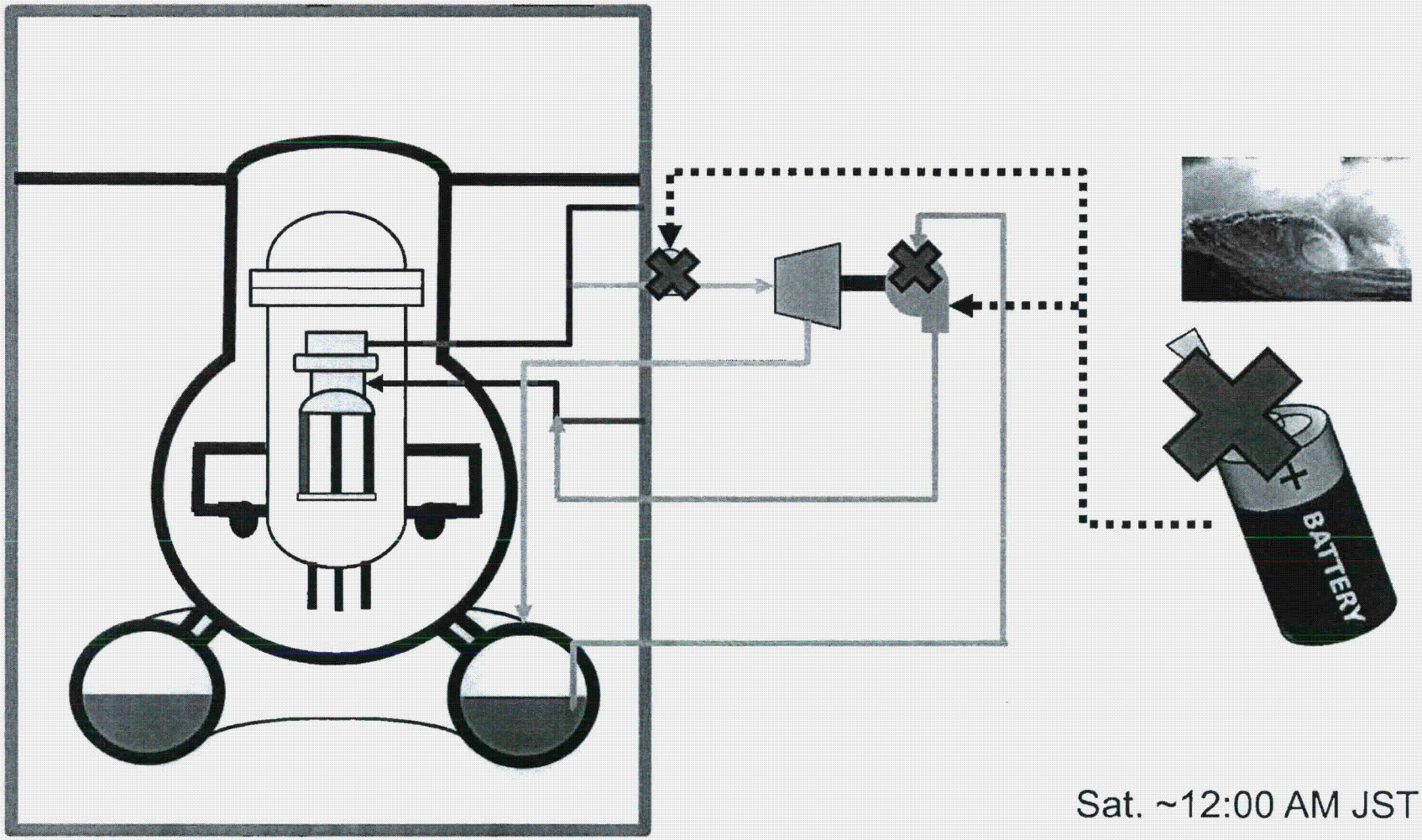


Battery Power Control of Steam-Driven RCIC



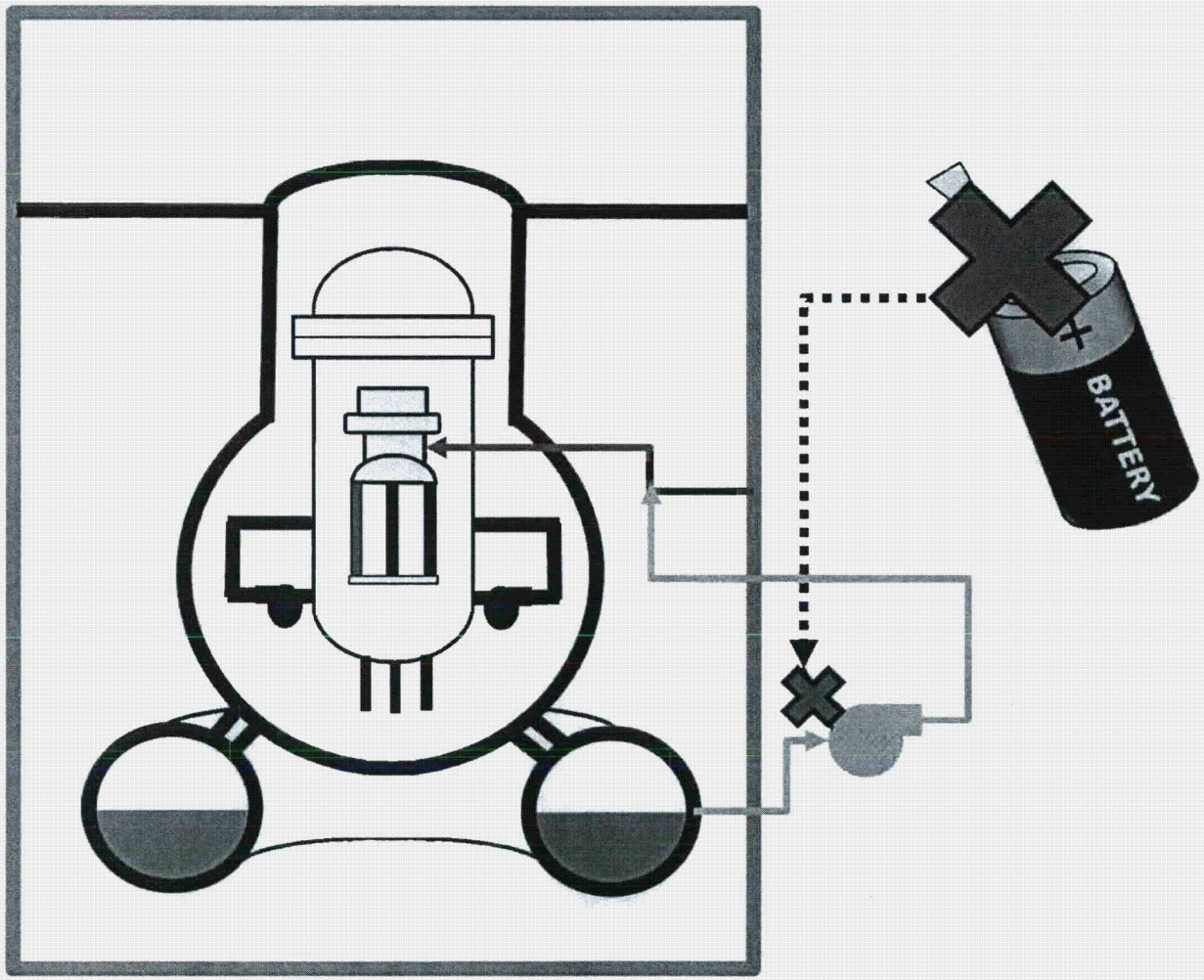
Fri 3:45 PM JST

Battery Power Exhausted



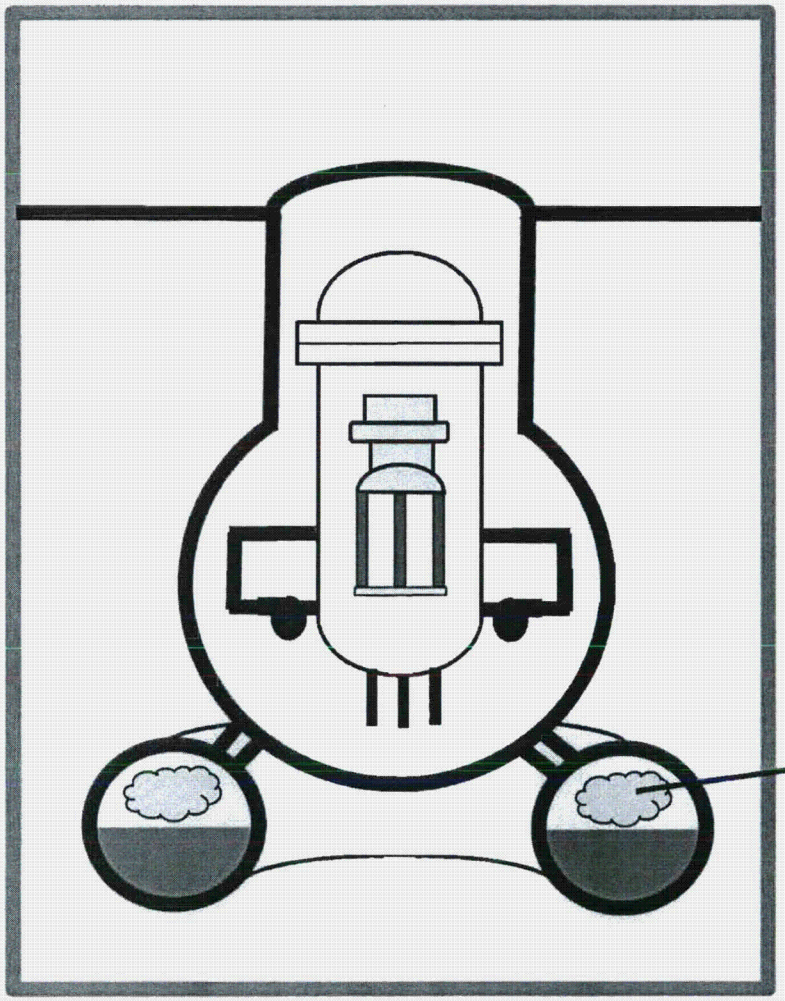
Sat. ~12:00 AM JST

Battery Power Exhausted



Sat ~12:00 AM JST

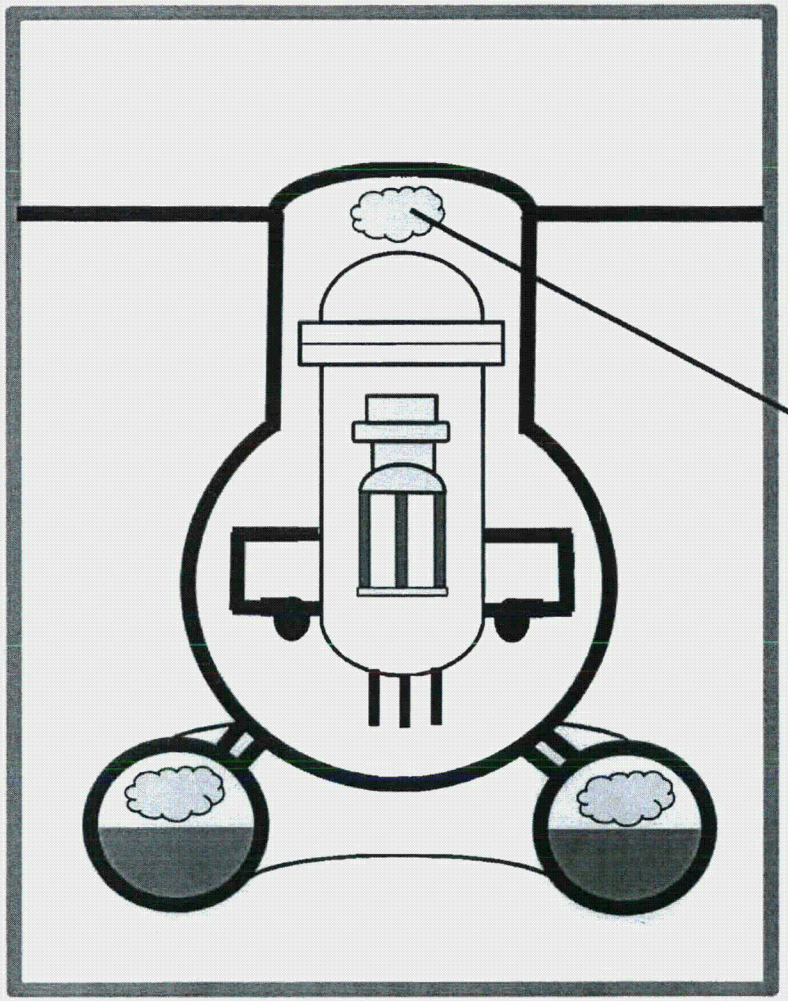
Battery Power Exhausted



Suppression pool (wet well) becomes saturated

Sat ~2:00 AM JST

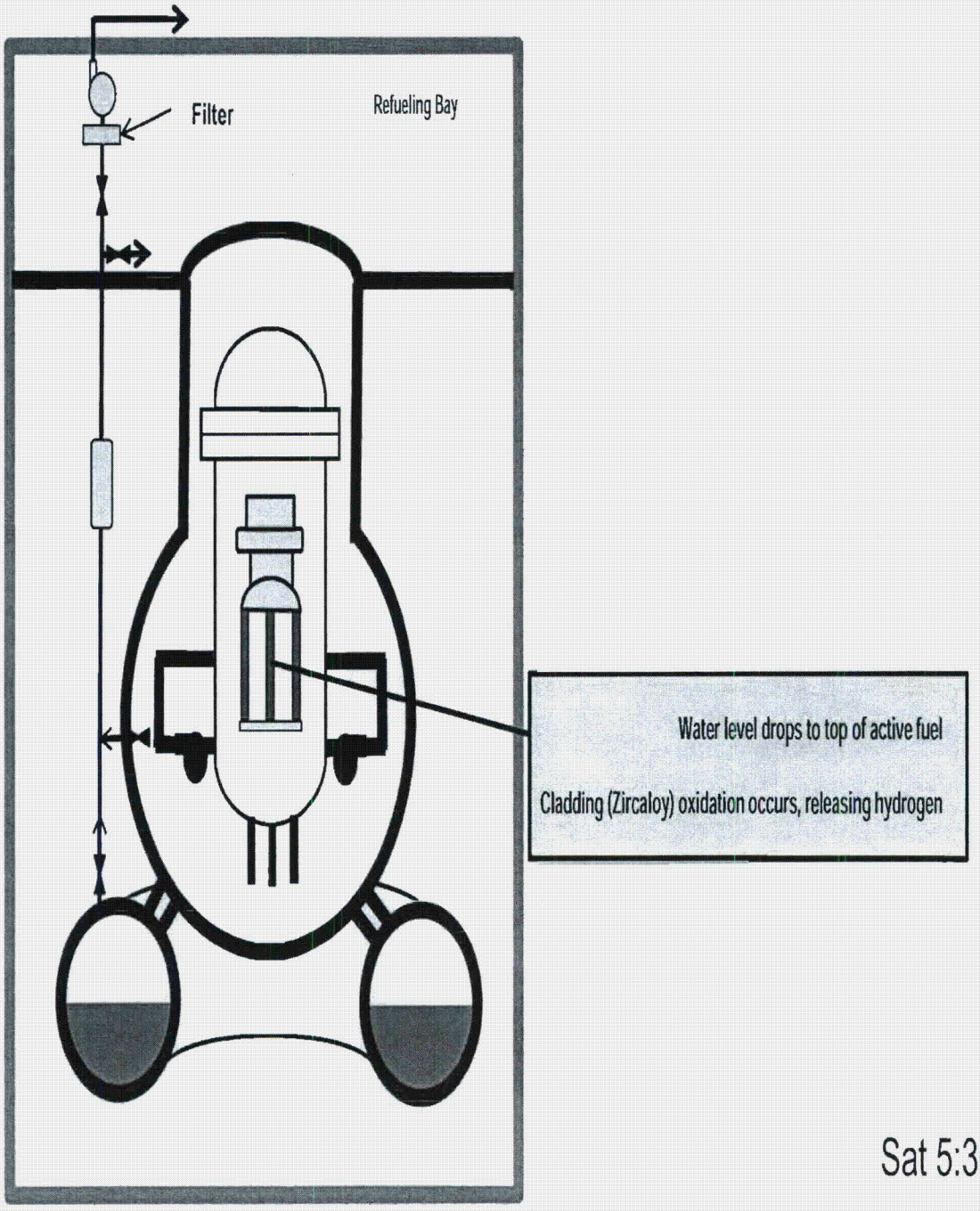
Containment Pressure Rises



Reported at 0.6 MPa
Normal is 0.4 MPa

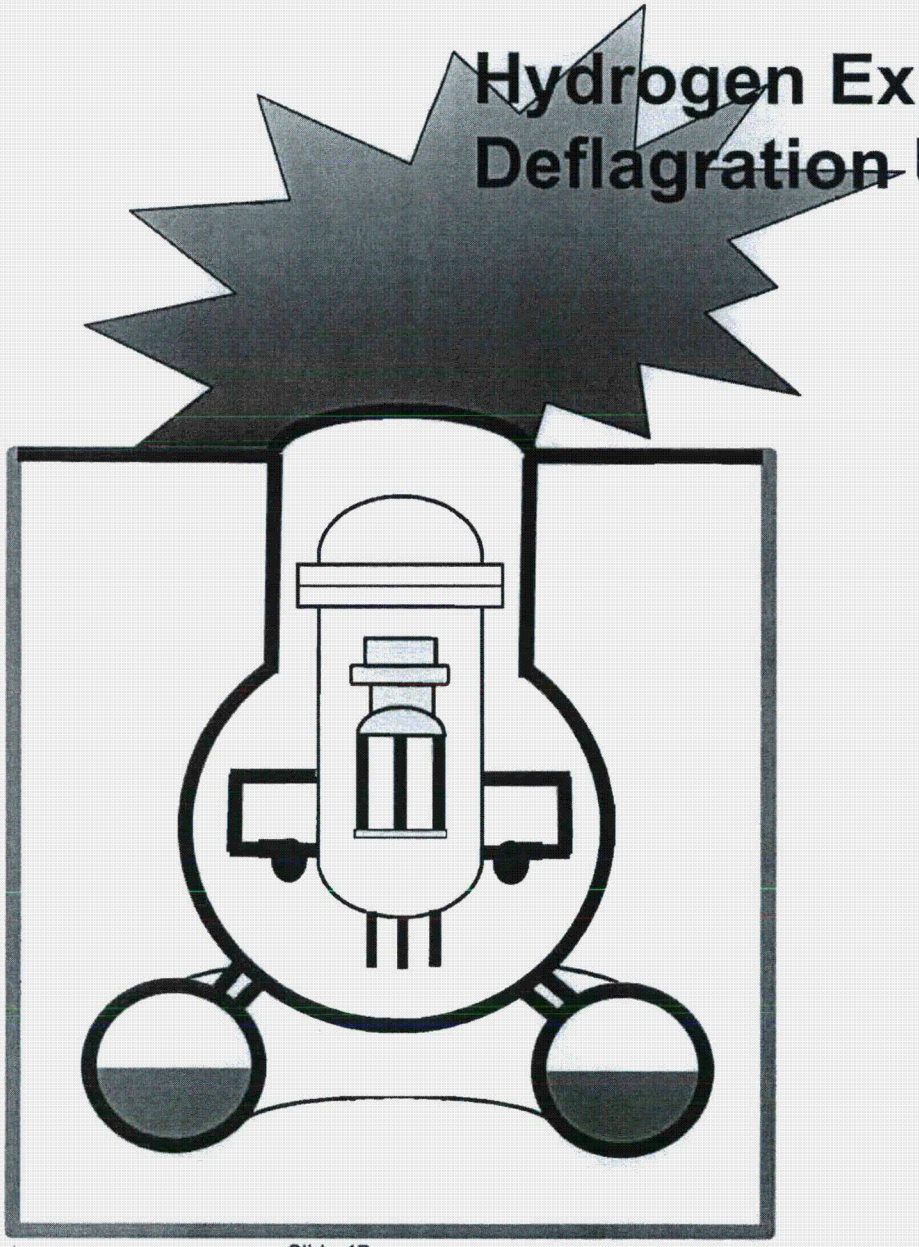
Sat ~2:00 AM JST

Venting from Containment to Refueling Bay



Sat 5:30 AM JST

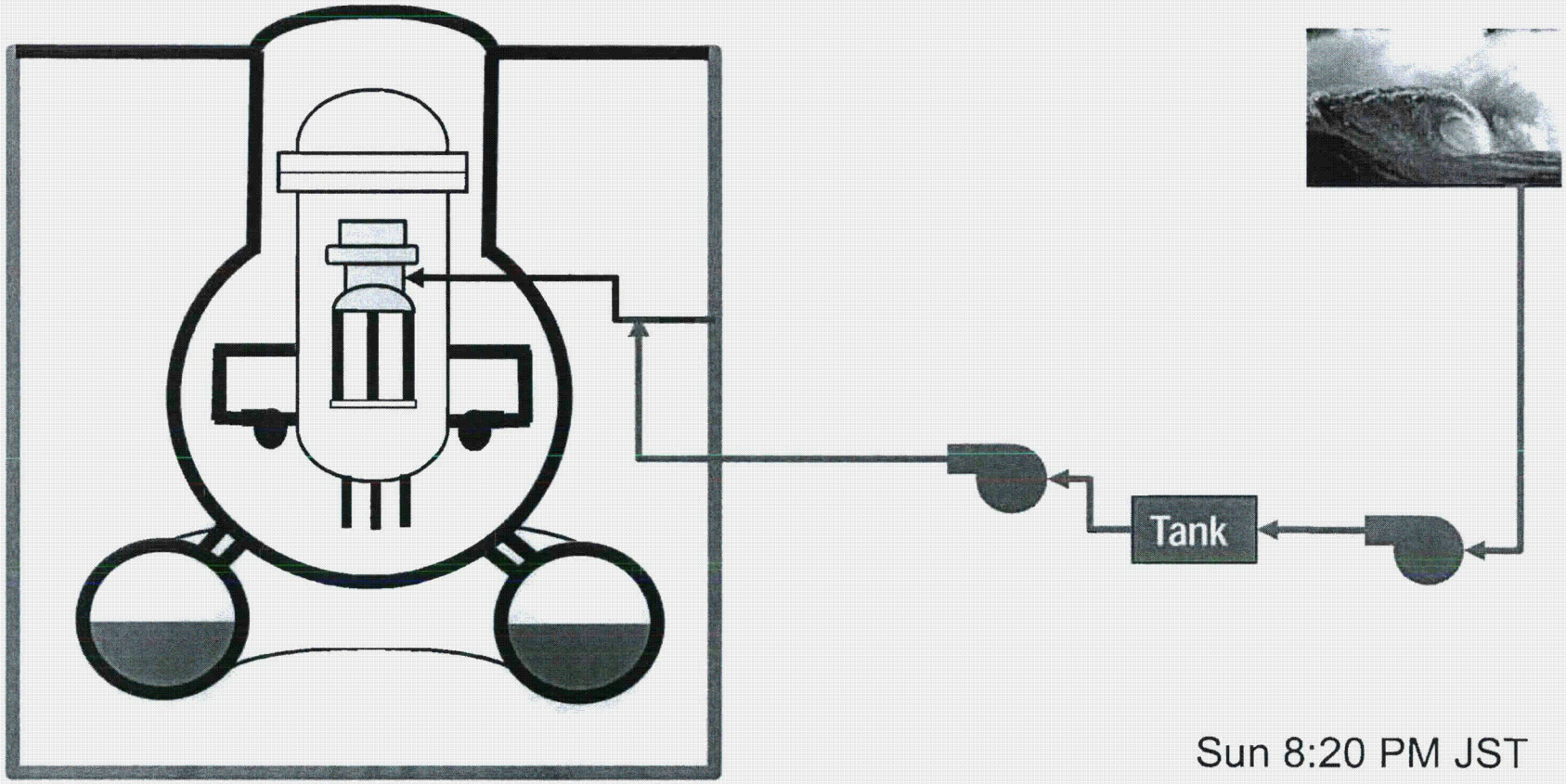
Hydrogen Explosion / Deflagration Unit 1



- Unit 1 Saturday 3:36 PM
- Unit 3 Monday 11:15 AM
- Unit 2 Tuesday 6:00 AM

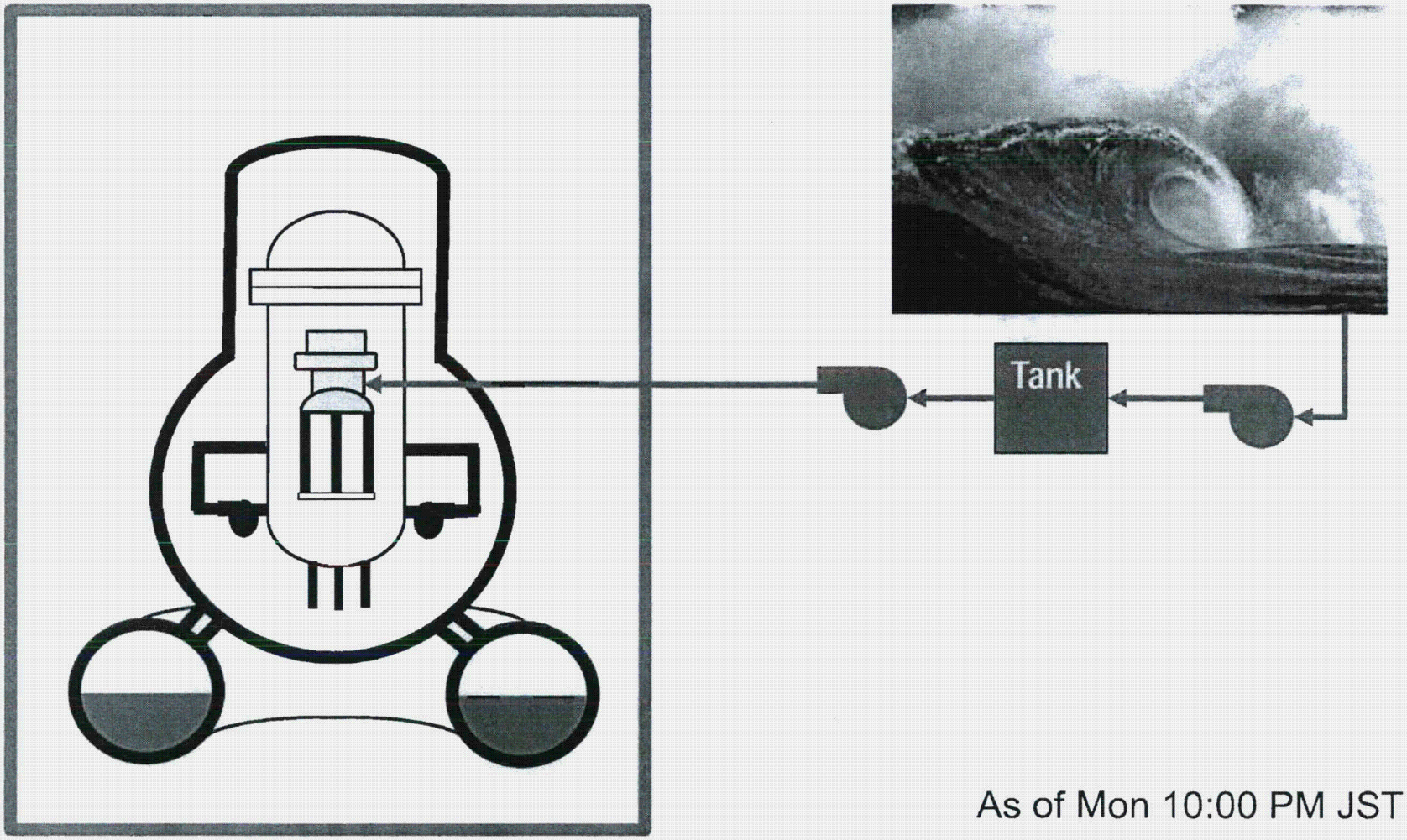
Sat 3:36 PM JST

Seawater Injection using Fire Pump



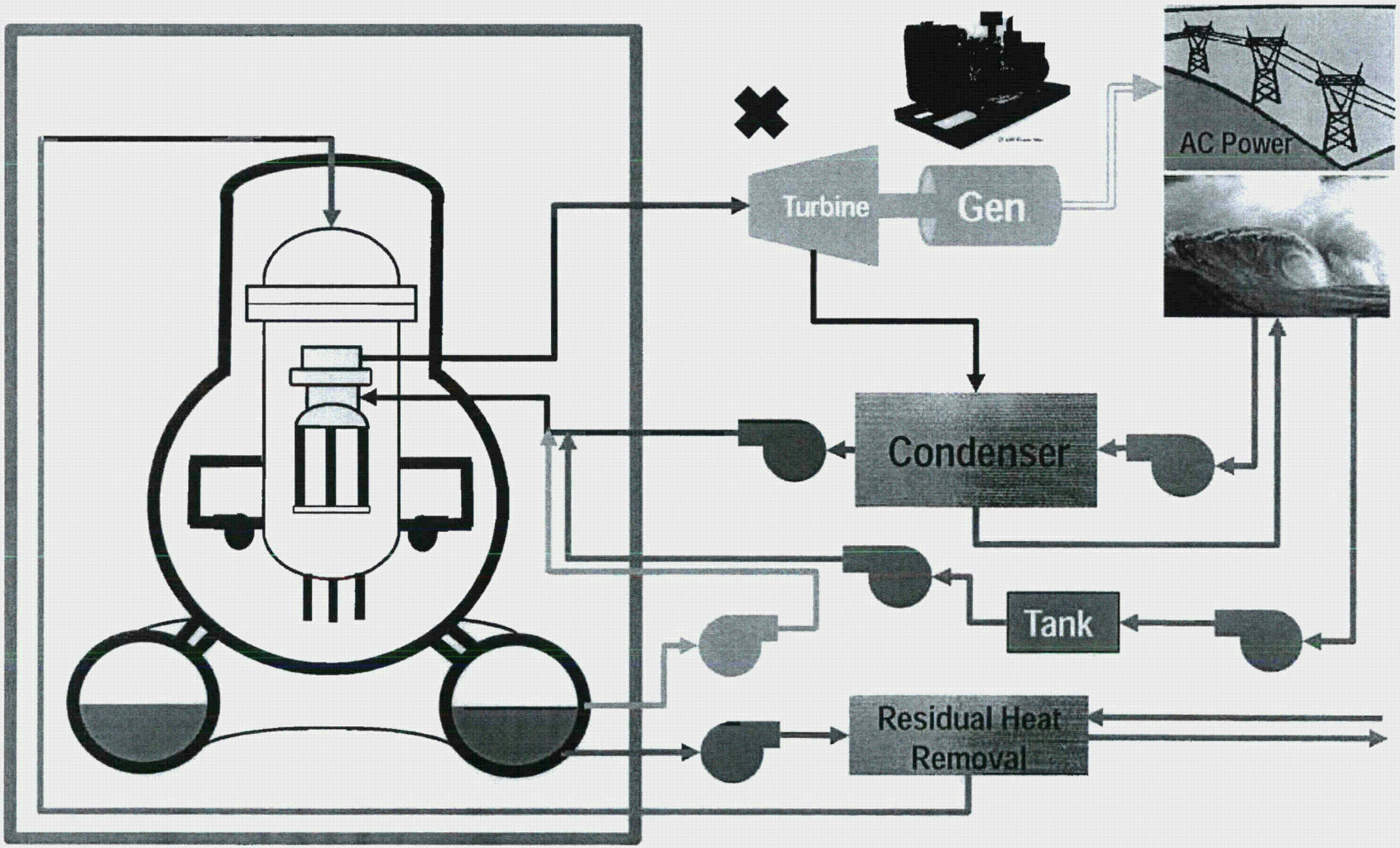
Sun 8:20 PM JST

Sea Water Injection



As of Mon 10:00 PM JST

Template



From: Phillip.Finck@inl.gov
To: Per F. Peterson; Pete Lyons; John Kelly
Cc: SCHU; Adams, Ian; Aoki, Steven; Bob Budnitz; Sheron, Brian; DAgostino, Thomas; Dick Garwin; Dick Garwin; John.Grossenbacher@inl.gov; Hurlbut, Brandon; John Holdren; Koonin, Steven; Harold.McFarlane@inl.gov; Owens, Missy; Poneman, Daniel; Ronaldo.Szilard@inl.gov; Steve Fetter
Subject: Re: Effects of salt deposition on cooling of BWR fuel assemblies
Date: Friday, March 18, 2011 12:26:58 PM

Per: we have started. Please call me.

----- Original Message -----
From: "Per F. Peterson" [peterson@nuc.berkeley.edu]
Sent: 03/18/2011 09:22 AM MST
To: "Lyons, Peter" <Peter.Lyons@Nuclear.Energy.gov>; "Kelly, John E (NE)" <JohnE.Kelly@Nuclear.Energy.gov>
Cc: SCHU <SCHU@hq.doe.gov>; "Adams, Ian" <Ian.Adams@hq.doe.gov>; "Aoki, Steven" <Steven.Aoki@nnsa.doe.gov>; Bob Budnitz <RJBudnitz@lbl.gov>; Brian Sheron <Brian.sheron@nrc.gov>; "DAgostino, Thomas" <Thomas.DAgostino@nnsa.doe.gov>; Dick Garwin <rlg2@us.ibm.com>; Dick Garwin <(b)(6) John Grossenbacher; "Hurlbut, Brandon" <Brandon.Hurlbut@hq.doe.gov>; John Holdren <(b)(6) "Koonin, Steven" <Steven.Koonin@science.doe.gov>; Harold McFarlane; "Owens, Missy" <Missy.Owens@hq.doe.gov>; Per Peterson <peterson@nuc.berkeley.edu>; Phillip Finck; "Poneman, Daniel" <Daniel.Poneman@hq.doe.gov>; Ronaldo Szilard; Steve Fetter <(b)(6)
Subject: Effects of salt deposition on cooling of BWR fuel assemblies

Pete and John,

It could be helpful to have someone at Sandia address the question of the impact of salt deposition on the coolability of BWR fuel assemblies by air and steam after they are uncovered by pool boil off or leakage, and get their response out to the group. A quick expert opinion from someone who has done these calculations and is familiar with the available experimental data could be helpful in reducing our uncertainty about the risks posed by salt in the Unit 3 pool.

My intuition is that the heat generation rates for fuel that is over one year past removal from the core are much lower than for freshly discharged fuel, which is the usual focus for analysis experiments. Because all of the fuel in the Unit 3 pool is old, it is possible that air cooling of the outside of the shrouds around the assemblies may be able to prevent heating of pins in the center of the assembly to the temperature needed to initiate zirconium oxidation.

If so, then salt is probably less of a problem because the flow area between the assembly and the rack, for low density racking, is pretty large, so it is more difficult to generate flow blockage with salt. Some expert judgement on whether this could be the case could be very helpful.

This said, I think that we can buy significant risk reduction if we can expedite the transition to use of fresh water for spray cooling of the pool in Unit 3, where there is significant evidence that the pool may have a leak. Bringing in ship-based desalination capability thus merits serious consideration.

-Per

CH/109

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Per F. Peterson
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http://www.nuc.berkeley.edu/People/Per_Peterson

From:	Virgilio, Rosetta
To:	Johnson, Michael; Leeds, Eric; Sheron, Brian; Haney, Catherine
Cc:	Dorman, Dan; Santiago, Patricia; Williams, Donna; Wertz, Trent; Piccone, Josephine; Jackson, Deborah; Turtil, Richard; Deegan, George; Miller, Charles; Moore, Scott
Subject:	ACTION: NGA Center in DC Requests NRC Expert Speaker for 3/22 or 3/23 and 4/4
Date:	Friday, March 18, 2011 12:38:24 PM
Importance:	High

All – Bob Nelson suggested I contact you directly, as you have been designated as NRC Communicators, relative to two requests below from the National Governors Association.

I told Greg Dierkers that NRC staff is pretty well stretched and might not be available to participate in next week's meeting, but I would put the request forward. I also offered that NRC is planning to hold a public Commission meeting Monday, 3/21, which will be Web streamed, and suggested this might satisfy their needs at this time. I told Greg I would send him the details when available. He understood we were pretty busy, indicating FEMA was unable to participate in the NGA meeting.

Please advise whether your schedule can support such a meeting – I would like to close the loop with Greg by COB this/Friday afternoon. Thanks much for your consideration.

Rosetta O. Virgilio
Senior Liaison Project Manager
Intergovernmental Liaison Branch
U.S. Nuclear Regulatory Commission
11545 Rockville Pike - T-8F42
Rockville, MD 20852-2738
301-415-2367
Rosetta.Virgilio@nrc.gov

From: Virgilio, Rosetta
To: 'gdierkers@NGA.ORG' <gdierkers@NGA.ORG>
Sent: Thu Mar 17 17:03:28 2011
Subject: Re: NGA Center NRC expert speaker requests

Thank you, Greg; I will followup and get back to you.

Sent from an NRC Blackberry
Rosetta O. Virgilio
(b)(6)

From: Dierkers, Gregory <gdierkers@NGA.ORG>
To: Virgilio, Rosetta
Cc: Gander, Sue <sgander@NGA.ORG>; MacLellan, Thomas <TMaclellan@NGA.ORG>; Ferro, Carmen <CFerro@NGA.ORG>
Sent: Thu Mar 17 16:36:04 2011
Subject: NGA Center NRC expert speaker requests

CH/110

Hi Rosetta,

Thanks for your time today. We appreciate you identifying someone from the NRC to support the NGA Center's outreach to states during this busy time.

As we discussed we would like to invite the NRC to join us for **two upcoming events -- a webinar next week and a conference in early April -- to brief governors' advisors on the Japanese situation and the implications for US plants**. The events are:

1) **A webinar with governors' security and energy advisors.** NGA Center staff is planning to host a conference call next week (Tuesday 3/21 or Wednesday 3/22) to provide senior state officials with an update on the Japan situation and to answer questions as to the operations of US plants, including regulations, plant security/safety, and the emergency preparedness efforts at the US nuclear fleet. We would ask that an NRC expert join the webinar remotely; the webinar would last for 1 hour.

2) **An in-person speaker at a governors' energy advisors meeting.** NGA Center's *Governors' Energy Advisors Policy Institute* on April 4th in Arlington, Virginia. The focus of the April 4th Institute is to provide a 'Technology 101' briefing for governors senior energy advisors. We would invite the NRC to attend in-person on April 4th from 1:45pm to 4:15pm. We would ask for a 10-15 minute presentation on the situation in Japan, the state of nuclear technology and regulations in the US, and the implications for states from the Japanese crisis. Attached is a draft agenda.

Thanks for considering both of these requests.

Sincerely,

Greg Dierkers
Program Director – Energy and Transportation
NGA Center for Best Practices
Environment, Energy and Transportation Division
202-624-7789
gdierkers@nga.org

From:	Virgilio, Rosetta
To:	Leeds, Eric; Johnson, Michael; Sheron, Brian; Haney, Catherine
Cc:	Dorman, Dan; Santiago, Patricia; Williams, Donna; Wertz, Trent; Piccone, Josephine; Jackson, Deborah; Turtil, Richard; Deegan, George; Miller, Charles; Moore, Scott; Camper, Larry
Subject:	RE: ACTION: NGA Center in DC Requests NRC Expert Speaker for 3/22 or 3/23 and 4/4
Date:	Friday, March 18, 2011 1:14:25 PM

Thank you, Eric – Which request are you addressing: the Webinar next week or April 4 conference?

From: Leeds, Eric
Sent: Friday, March 18, 2011 1:08 PM
To: Virgilio, Rosetta; Johnson, Michael; Sheron, Brian; Haney, Catherine
Cc: Dorman, Dan; Santiago, Patricia; Williams, Donna; Wertz, Trent; Piccone, Josephine; Jackson, Deborah; Turtil, Richard; Deegan, George; Miller, Charles; Moore, Scott
Subject: RE: ACTION: NGA Center in DC Requests NRC Expert Speaker for 3/22 or 3/23 and 4/4

I am willing and would use our briefing material from the Commission meeting for the presentation. The problem is that I won't know my availability until the day of. Maybe the day before.

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
301-415-1270

From: Virgilio, Rosetta
Sent: Friday, March 18, 2011 12:38 PM
To: Johnson, Michael; Leeds, Eric; Sheron, Brian; Haney, Catherine
Cc: Dorman, Dan; Santiago, Patricia; Williams, Donna; Wertz, Trent; Piccone, Josephine; Jackson, Deborah; Turtil, Richard; Deegan, George; Miller, Charles; Moore, Scott
Subject: ACTION: NGA Center in DC Requests NRC Expert Speaker for 3/22 or 3/23 and 4/4
Importance: High

All – Bob Nelson suggested I contact you directly, as you have been designated as NRC Communicators, relative to two requests below from the National Governors Association.

I told Greg Dierkers that NRC staff is pretty well stretched and might not be available to participate in next week's meeting, but I would put the request forward. I also offered that NRC is planning to hold a public Commission meeting Monday, 3/21, which will be Web streamed, and suggested this might satisfy their needs at this time. I told Greg I would send him the details when available. He understood we were pretty busy, indicating FEMA was unable to participate in the NGA meeting.

Please advise whether your schedule can support such a meeting – I would like to close the loop with Greg by COB this/Friday afternoon. Thanks much for your consideration.

Rosetta O. Virgilio
Senior Liaison Project Manager
Intergovernmental Liaison Branch

CH/111

U.S. Nuclear Regulatory Commission
11545 Rockville Pike - T-8F42
Rockville, MD 20852-2738
301-415-2367
Rosetta.Virgilio@nrc.gov

From: Virgilio, Rosetta
To: 'gdierkers@NGA.ORG' <gdierkers@NGA.ORG>
Sent: Thu Mar 17 17:03:28 2011
Subject: Re: NGA Center NRC expert speaker requests

Thank you, Greg; I will followup and get back to you.

Sent from an NRC Blackberry
Rosetta O. Virgilio
301-520-6611

From: Dierkers, Gregory <gdierkers@NGA.ORG>
To: Virgilio, Rosetta
Cc: Gander, Sue <sgander@NGA.ORG>; MacLellan, Thomas <TMaclellan@NGA.ORG>; Ferro, Carmen <CFerro@NGA.ORG>
Sent: Thu Mar 17 16:36:04 2011
Subject: NGA Center NRC expert speaker requests

Hi Rosetta,

Thanks for your time today. We appreciate you identifying someone from the NRC to support the NGA Center's outreach to states during this busy time.

As we discussed we would like to invite the NRC to join us for **two upcoming events -- a webinar next week and a conference in early April -- to brief governors' advisors on the Japanese situation and the implications for US plants**. The events are:

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Thanks for considering both of these requests.

Sincerely,

Greg Dierkers
Program Director – Energy and Transportation
NGA Center for Best Practices
Environment, Energy and Transportation Division
202-624-7789
gdierkers@nga.org

From:	Khanna, Meena
To:	Case, Michael
Cc:	Sheron, Brian; Chokshi, Nilesh; Kammerer, Annie; Ake, Jon; Munson, Clifford; Wilson, George
Subject:	RE: Fact Sheet on NRC Seismic Regulations
Date:	Friday, March 18, 2011 1:26:28 PM
Attachments:	Draft Fact Sheet on NRC Seismic Regulations_JPA_BT_GB_MK_CM.docx Draft Fact Sheet on NRC Seismic Regulations_JPA_BT_GB_MK_CM bullets.docx

Hi Mike,
Cliff asked me to send you the clean versions of the fact sheet...one has the information bulletized and the other is in narrative form...thanks!
meena

From: Munson, Clifford
Sent: Friday, March 18, 2011 12:51 PM
To: Case, Michael
Cc: Sheron, Brian; Chokshi, Nilesh; Khanna, Meena; Kammerer, Annie; Ake, Jon
Subject: Fact Sheet on NRC Seismic Regulations

Mike,

See attached. I worked on this with Jon Ake with input from NRR as well. Let me know if you need me to make changes.

Thanks,
Cliff
Clifford Munson, Ph.D.
Senior Level Advisor
U.S. NRC - Office of New Reactors
Division of Site and Environmental Reviews
301-415-6947
clifford.munson@nrc.gov

CH/112

Fact Sheet: Summarization of the NRC's Regulatory Framework for Seismic Safety

The seismic regulatory basis for licensing of the currently operating nuclear power reactors is contained in the following regulations: 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," including the "General Design Criteria for Nuclear Power Plants," and 10 CFR Part 100 ("Seismic and Geologic Siting Criteria For Nuclear Power Plants") and Appendix A to that Part, which describes the general criteria that guide the evaluation of the suitability of proposed sites for nuclear power plants.

General Design Criterion (GDC) 2, "Design Bases for Protection Against Natural Phenomena," in Appendix A requires that that the structures and components in nuclear power plants be designed to withstand the effects of natural phenomena, including earthquakes and tsunamis, without loss of capability to perform their intended safety functions. GDC 2 also requires that the design bases include sufficient margin to account for the limited accuracy, quantity, and period of time in which the historical data have been accumulated. The earthquake which could cause the maximum vibratory ground motion at the site is designated as the **Safe Shutdown Earthquake (SSE)**. Under SSE ground motions, nuclear power plant structures and components must remain functional and within applicable stress, strain, and deformation limits. Each plant must also have seismic instrumentation to determine if the **Operating Basis Earthquake (OBE)**, typically one-half or one-third the level of the SSE, has been exceeded. If the OBE is exceeded or significant plant damage has occurred, then the nuclear power plant must be shutdown.

Each plant is designed to a ground-shaking level (the SSE) that is appropriate for its location, given the possible earthquake sources that may affect the site and its tectonic environment. Ground shaking is a function of both the magnitude of the earthquake, the distance of the earthquake to the site, and the local geology. The magnitude alone cannot be used to predict ground motions. The existing plants were designed on a "deterministic" or "scenario earthquake" basis that accounted for the largest earthquake expected in the area around the plant. This required an assessment of earthquakes that had occurred in the region around each plant site.

Design basis loads for nuclear power plant structures include combined loads for seismic, wind, tornado, normal operating conditions (pressure and thermal), and accident conditions. Codes and standards, such as the American Society of Mechanical Engineers, the American Concrete Institute, and the American Institute of Steel Construction, are used in the design of nuclear power plant structures to ensure a conservative, safe design under design basis loads.

In the mid to late 1990s, NRC staff reviewed the potential consequences of severe earthquakes (earthquakes beyond the safety margin included in each plant's design basis), as part of the Individual Plant Examination of External Events (or IPEEE) program. From this review, the staff determined that seismic designs of operating plants in the United States have adequate safety margins, for withstanding earthquakes, built into the designs. Currently, the NRC staff is reassessing the seismic designs of operating plants through our Generic Issues program. The initial results of this assessment found that: 1) seismic hazard estimates have increased at some operating plants in the central and eastern US; 2) there is no immediate safety concern, plants have significant safety margin and overall seismic risk estimates remain small; and 3) assessment of updated seismic hazards and plant performance should continue.

NRC's Regulatory Framework for Seismic Safety

NRC Regulations and Guidelines for Seismic Safety:

- The seismic regulatory basis for licensing of the currently operating nuclear power reactors is contained in the following regulations:
  - 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," including the "General Design Criteria for Nuclear Power Plants," and
  - 10 CFR Part 100 ("Seismic and Geologic Siting Criteria For Nuclear Power Plants") and Appendix A to that Part, which describes the general criteria that guide the evaluation of the suitability of proposed sites for nuclear power plants.
- In addition, General Design Criterion (GDC) 2, "Design Bases for Protection Against Natural Phenomena," in Appendix A requires that:
  - The structures and components in nuclear power plants be designed to withstand the effects of natural phenomena, including earthquakes and tsunamis, without loss of capability to perform their intended safety functions.
  - GDC 2 also requires that the design bases include sufficient margin to account for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.
    - The earthquake which could cause the maximum vibratory ground motion at the site is designated as the **Safe Shutdown Earthquake (SSE)**. Under SSE ground motions, nuclear power plant structures and components must remain functional and within applicable stress, strain, and deformation limits.
    - Each plant must also have seismic instrumentation to determine if the **Operating Basis Earthquake (OBE)**, typically one-half or one-third the level of the SSE, has been exceeded. If the OBE is exceeded or significant plant damage has occurred, then the nuclear power plant must be shutdown.

Plant Design /Design Basis (Seismic):

- Each plant is designed to a ground-shaking level (the SSE) that is appropriate for its location, given the possible earthquake sources that may affect the site and its tectonic environment. Ground shaking is a function of both the magnitude of the earthquake, the distance of the earthquake to the site, and the local geology. The magnitude alone cannot be used to predict ground motions. The existing plants were designed on a "deterministic" or "scenario earthquake" basis that accounted for the largest earthquake expected in the area around the plant. This required an assessment of earthquakes that had occurred in the region around each plant site.
- Design basis loads for nuclear power plant structures include combined loads for seismic, wind, tornado, normal operating conditions (pressure and thermal), and accident conditions. Codes and standards, such as the American Society of Mechanical Engineers, the American Concrete Institute, and the American Institute of Steel Construction, are used in the design of nuclear power plant structures to ensure a conservative, safe design under design basis loads.

NRC Current Reviews/Initiatives:

- In the mid to late 1990s, NRC staff reviewed the potential consequences of severe earthquakes (earthquakes beyond the safety margin included in each plant's design basis), as part of the Individual Plant Examination of External Events (or IPEEE) program. From this review, the staff determined that seismic designs of operating plants in the United States have adequate safety margins, for withstanding earthquakes, built into the designs. Currently, the NRC staff is reassessing the seismic designs of operating plants through our Generic Issues program. The initial results of this assessment found that: 1) seismic hazard estimates have increased at some operating plants in the central and eastern US; 2) there is no immediate safety concern, plants have significant safety margin and overall seismic risk estimates remain small; and 3) assessment of updated seismic hazards and plant performance should continue.

From:	Case, Michael
To:	peter.lyons@nuclear.energy.gov
Cc:	Sheron, Brian; Uhle, Jennifer; Munson, Clifford; Kammerer, Annie; Khanna, Meena; Chokshi, Nilesh; Wilson, George
Subject:	Fact Sheet on NRC Seismic Regulation
Date:	Friday, March 18, 2011 1:30:55 PM
Attachments:	Draft Fact Sheet on NRC Seismic Regulations_JPA_BT_GB_MK_CM.docx Draft Fact Sheet on NRC Seismic Regulations_JPA_BT_GB_MK_CM bullets.docx

Dr. Lyons:

Per your discussions with Brian, please find attached a one-page fact sheet on the NRC's Seismic Regulations (same information, one narrative, one bulletized).

CH/113

Fact Sheet: Summarization of the NRC's Regulatory Framework for Seismic Safety

The seismic regulatory basis for licensing of the currently operating nuclear power reactors is contained in the following regulations: 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," including the "General Design Criteria for Nuclear Power Plants," and 10 CFR Part 100 ("Seismic and Geologic Siting Criteria For Nuclear Power Plants") and Appendix A to that Part, which describes the general criteria that guide the evaluation of the suitability of proposed sites for nuclear power plants.

General Design Criterion (GDC) 2, "Design Bases for Protection Against Natural Phenomena," in Appendix A requires that that the structures and components in nuclear power plants be designed to withstand the effects of natural phenomena, including earthquakes and tsunamis, without loss of capability to perform their intended safety functions. GDC 2 also requires that the design bases include sufficient margin to account for the limited accuracy, quantity, and period of time in which the historical data have been accumulated. The earthquake which could cause the maximum vibratory ground motion at the site is designated as the **Safe Shutdown Earthquake (SSE)**. Under SSE ground motions, nuclear power plant structures and components must remain functional and within applicable stress, strain, and deformation limits. Each plant must also have seismic instrumentation to determine if the **Operating Basis Earthquake (OBE)**, typically one-half or one-third the level of the SSE, has been exceeded. If the OBE is exceeded or significant plant damage has occurred, then the nuclear power plant must be shutdown.

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Design basis loads for nuclear power plant structures include combined loads for seismic, wind, tornado, normal operating conditions (pressure and thermal), and accident conditions. Codes and standards, such as the American Society of Mechanical Engineers, the American Concrete Institute, and the American Institute of Steel Construction, are used in the design of nuclear power plant structures to ensure a conservative, safe design under design basis loads.

In the mid to late 1990s, NRC staff reviewed the potential consequences of severe earthquakes (earthquakes beyond the safety margin included in each plant's design basis), as part of the Individual Plant Examination of External Events (or IPEEE) program. From this review, the staff determined that seismic designs of operating plants in the United States have adequate safety margins, for withstanding earthquakes, built into the designs. Currently, the NRC staff is reassessing the seismic designs of operating plants through our Generic Issues program. The initial results of this assessment found that: 1) seismic hazard estimates have increased at some operating plants in the central and eastern US; 2) there is no immediate safety concern, plants have significant safety margin and overall seismic risk estimates remain small; and 3) assessment of updated seismic hazards and plant performance should continue.

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  - 10 CFR Part 100 ("Seismic and Geologic Siting Criteria For Nuclear Power Plants") and Appendix A to that Part, which describes the general criteria that guide the evaluation of the suitability of proposed sites for nuclear power plants.
- In addition, General Design Criterion (GDC) 2, "Design Bases for Protection Against Natural Phenomena," in Appendix A requires that:
  - The structures and components in nuclear power plants be designed to withstand the effects of natural phenomena, including earthquakes and tsunamis, without loss of capability to perform their intended safety functions.
  - GDC 2 also requires that the design bases include sufficient margin to account for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.
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From: Gibson, Kathy
To: Sheron, Brian
Cc: Wagner, Katie; Salay, Michael; Lee, Richard
Subject: Re: Effect of Salt
Date: Friday, March 18, 2011 1:41:25 PM

Brian,
More on salt and fission products below. We will send this to the Ops Center so they have this information if and when they need it.

Is there anyone else we should send it to?

Thanks,

Kathy

From: Lee, Richard
To: Gibson, Kathy
Cc: Wagner, Katie; Salay, Michael
Sent: Fri Mar 18 13:35:11 2011
Subject: RE: Effect of Salt

Kathy:

Below is a better response. It addressed not only the affects of sea water on fission products chemistry in the reactor coolant system and the spent fuel pool, but also address potential of plugging.

There do not appear to be serious downsides to the use of seawater. The Paul Scherer Institute (Switzerland) experiments have investigated effects of salt on aqueous iodine chemistry and had not seen much effect.

We see CII (Cholrine iodide) rather than I2 partitioning from salt solutions but iodine partitioning is about the same. There will be some organic iodide formation because of the organic in seawater. Seawater pH will typically be less than 7, but boration will change the pH presumably to a higher value and this will suppress iodine partitioning from the water into the gas phase. Any silver will precipitate, but in BWRs there is only fission product silver and this does not have a high yield. We can presume the seawater is saturated in carbon dioxide. This may precipitate any barium or strontium in the water as a carbonate.

Again, we do not expect a big effect such as plugging etc. There will be enhanced corrosion of the cladding and the steel, but these are very long term effects and not of particular interest now.

I don't think we need to worry about iodine in the spent fuel pools. The fuel is old enough that we are well beyond 10 half lives for the most important iodine isotopes. The only significant iodine iodine isotope is I-129 which has a very long half life and consequently a minuscule radioactivity in comparison to other things such as noble gases and cesium.

Richard

CH/114

From: Gibson, Kathy
Sent: Thursday, March 17, 2011 7:32 PM
To: Lee, Richard; Salay, Michael
Cc: Wagner, Katie
Subject: FW: Effect of Salt
Importance: High

Richard, Mike,
Do you have any info to answer this question? Effect of salt on cesium release? I'd like to respond to Brian tomorrow.

Thanks,
Kathy

Kathy Halvey Gibson
Director
Division of Systems Analysis

Kathy.Gibson@nrc.gov
(301) 251-7409 Work
(b)(6) ell

From: Sheron, Brian
Sent: Thursday, March 17, 2011 6:56 PM
To: Gibson, Kathy; Scott, Michael
Cc: Uhle, Jennifer
Subject: Effect of Salt

During my meeting today with Secretary Chu, the issue of salt water injection came up. The Japanese are injection seawater into the reactors. The seawater is boiling off, leaving salt. While there are obvious questions about how salt might affect coolability of the core (clogging coolant channels, etc., a question was raised about how the salt might affect the Cesium release. Do we have any info on what the effect might be?

From: Sheron, Brian
To: Weber, Michael; Virgilio, Martin; Leeds, Eric
Subject: Fw: Fact Sheet on NRC Seismic Regulation
Date: Friday, March 18, 2011 2:10:13 PM
Attachments: Draft Fact Sheet on NRC Seismic Regulations_JPA_BT_GB_MK_CM.docx
Draft Fact Sheet on NRC Seismic Regulations_JPA_BT_GB_MK_CM bullets.docx

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FYI.

From: Case, Michael
To: peter.lyons@nuclear.energy.gov <peter.lyons@nuclear.energy.gov>
Cc: Sheron, Brian; Uhle, Jennifer; Munson, Clifford; Kammerer, Annie; Khanna, Meena; Chokshi, Nilesh; Wilson, George
Sent: Fri Mar 18 13:30:51 2011
Subject: Fact Sheet on NRC Seismic Regulation

Dr. Lyons:

Per your discussions with Brian, please find attached a one-page fact sheet on the NRC's Seismic Regulations (same information, one narrative, one bulletized).

CH/115

Fact Sheet: Summarization of the NRC's Regulatory Framework for Seismic Safety

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From: Sheron, Brian
To: Valentin, Andrea
Subject: FW: Need your help: FOIA Request
Date: Friday, March 18, 2011 3:23:00 PM

FYI.

From: Leeds, Eric
Sent: Friday, March 18, 2011 1:19 PM
To: Craver, Patti; Ruland, William; Grobe, Jack; Boger, Bruce; Rothschild, Trip
Cc: Boyce, Thomas (OIS); Johnson, Michael; Sheron, Brian; Haney, Catherine; Wiggins, Jim; Miller, Charles; Moore, Scott; Uhle, Jennifer; Holahan, Gary; Schaeffer, James
Subject: FW: Need your help: FOIA Request

Thanks for your help, Trip!

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
301-415-1270

From: Rothschild, Trip
Sent: Friday, March 18, 2011 12:53 PM
To: Leeds, Eric
Cc: Wiggins, Jim; Weber, Michael; Virgilio, Martin; Burns, Stephen; Nichols, Russell; Sealing, Donna
Subject: RE: Need your help: FOIA Request

I told both NRO and the FOIA office that the NRC would not be meeting regular schedules on this. The emergency response activities take precedence and we will get to the FOIA request as soon as we can. The requests are quite broad in scope and I hope the AP will narrow the scope. As of this morning, the FOIA office had a called AP to discuss the requests, but their call had not been returned.

From: Leeds, Eric
Sent: Friday, March 18, 2011 11:39 AM
To: Burns, Stephen; Rothschild, Trip
Cc: Wiggins, Jim; Weber, Michael; Virgilio, Martin
Subject: Need your help: FOIA Request

Steve/Trip –

We've received a rather intrusive and broad FOIA from the Associated Press. As you're aware, the agency is in full event response mode, as well as sending key staff to Japan to assist in the emergency response activities there. Is there some relief in terms of schedule or scope that OPC can help us with? See below for more details.

Thanks for your consideration!

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation

CH/116

U.S. Nuclear Regulatory Commission
301-415-1270

From: Holzle, Catherine
Sent: Thursday, March 17, 2011 4:40 PM
To: Leeds, Eric
Cc: Meighan, Sean; Craver, Patti; Grobe, Jack; Boger, Bruce; Sealing, Donna; Nichols, Russell; Williamson, Edward; Hirsch, Patricia
Subject: RE: FOIA Request

It's still very early in the process, so OGC is not involved in the review end of this yet. But earlier today, I spoke with the FOIA Section Chief, Donna Sealing, who mentioned that we had received three FOIA requests on Japan, and that these had asked for "expedited treatment" under our FOIA regulations. We rarely grant these requests for special processing, but in this case, it was considered necessary. This will certainly put a strain on everyone who needs to provide records, but we need to do our best to comply. Your FOIA Coordinator, Patti Craver, is a seasoned FOIA expert and she will have no trouble working with the FOIA Office on the response. Naturally, OGC stands ready to provide legal support, as needed, but there won't be much for us to do in that respect until information is gathered and provided to the FOIA Office. Please let me know if I may be of further assistance.

From: Williamson, Edward
Sent: Thursday, March 17, 2011 3:50 PM
To: Leeds, Eric
Cc: Meighan, Sean; Craver, Patti; Grobe, Jack; Boger, Bruce; Hirsch, Patricia; Holzle, Catherine
Subject: RE: FOIA Request

Hi Eric,

OGC's FOIA legal advice comes from Pat Hirsch (AGC for LC) and her OGC Division. I think in particular --- Cathy Holzle is the key OGC Senior Attorney that works on providing advice regarding FOIA. I have cc both of them in the hopes that they can directly give you and your staff some timely legal advice that takes into account the current NRR focus and extensive efforts in support of Operations Center and other assistance relating to Japan.

Ed

Edward L. Williamson
Assistant General Counsel for Operating Reactors
Office of the General Counsel
U.S. Nuclear Regulatory Commission

Phone 301 -415-1143

Official Use Only----Attorney-Client Privileged / Attorney Work Product Rule

---

From: Leeds, Eric
Sent: Thursday, March 17, 2011 3:30 PM
To: Williamson, Edward
Cc: Meighan, Sean; Craver, Patti; Grobe, Jack; Boger, Bruce

Subject: FOIA Request

Ed –

NRR has received a FOIA request from the AP requesting all emails and internal communications with regard to the Japanese event. This will take each staff members hours for response, at a time where we are already stretched thin to support the OP Center, Japan, etc, etc.

Any advice on how to proceed. Is there an OGC POC we can work with on this? Our POC is Sean Meighan.

As always, thanks for your help!

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
301-415-1270

From: Sheron, Brian
To: Gibson, Kathy; Scott, Michael; Tinkler, Charles
Cc: Uhle, Jennifer
Subject: FW: Effects of salt deposition on cooling of BWR fuel assemblies
Date: Friday, March 18, 2011 3:29:00 PM

-----Original Message-----
From: Phillip.Finck@inl.gov [mailto:Phillip.Finck@inl.gov]
Sent: Friday, March 18, 2011 12:27 PM
To: Per F. Peterson; Pete Lyons; John Kelly
Cc: SCHU; Adams, Ian; Aoki, Steven; Bob Budnitz; Sheron, Brian; DAgostino, Thomas; Dick Garwin; Dick Garwin; John.Grossenbacher@inl.gov; Hurlbut, Brandon; John Holdren; Koonin, Steven; Harold.McFarlane@inl.gov; Owens, Missy; Poneman, Daniel; Ronaldo.Szilard@inl.gov; Steve Fetter
Subject: Re: Effects of salt deposition on cooling of BWR fuel assemblies

Per: we have started. Please call me.

----- Original Message -----
From: "Per F. Peterson" [peterson@nuc.berkeley.edu]
Sent: 03/18/2011 09:22 AM MST
To: "Lyons, Peter" <Peter.Lyons@Nuclear.Energy.gov>; "Kelly, John E (NE)" <JohnE.Kelly@Nuclear.Energy.gov>
Cc: SCHU <SCHU@hq.doe.gov>; "Adams, Ian" <Ian.Adams@hq.doe.gov>; "Aoki, Steven" <Steven.Aoki@nnsa.doe.gov>; Bob Budnitz <RJBudnitz@lbl.gov>; Brian Sheron <Brian.sheron@nrc.gov>; "DAgostino, Thomas" <Thomas.DAgostino@nnsa.doe.gov>; Dick Garwin <rlg2@us.ibm.com>; Dick Garwin (b)(6) John Grossenbacher; "Hurlbut, Brandon" <Brandon.Hurlbut@hq.doe.gov>; John Holdren (b)(6) "Koonin, Steven" <Steven.Koonin@science.doe.gov>; Harold McFarlane; Owens, Missy <Missy.Owens@hq.doe.gov>; Per Peterson <peterson@nuc.berkeley.edu>; Phillip Finck; "Poneman, Daniel" <Daniel.Poneman@hq.doe.gov>; Ronaldo Szilard; Steve Fetter (b)(6)
Subject: Effects of salt deposition on cooling of BWR fuel assemblies

Pete and John,

It could be helpful to have someone at Sandia address the question of the impact of salt deposition on the coolability of BWR fuel assemblies by air and steam after they are uncovered by pool boil off or leakage, and get their response out to the group. A quick expert opinion from someone who has done these calculations and is familiar with the available experimental data could be helpful in reducing our uncertainty about the risks posed by salt in the Unit 3 pool.

My intuition is that the heat generation rates for fuel that is over one year past removal from the core are much lower than for freshly discharged fuel, which is the usual focus for analysis experiments. Because all of the fuel in the Unit 3 pool is old, it is possible that air cooling of the outside of the shrouds around the assemblies may be able to prevent heating of pins in the center of the assembly to the temperature needed to initiate zirconium oxidation.

If so, then salt is probably less of a problem because the flow area between the assembly and the rack, for low density racking, is pretty large, so it is more difficult to generate flow blockage with salt.

CH/117

Some expert judgement on whether this could be the case could be very helpful.

This said, I think that we can buy significant risk reduction if we can expedite the transition to use of fresh water for spray cooling of the pool in Unit 3, where there is significant evidence that the pool may have a leak. Bringing in ship-based desalination capability thus merits serious consideration.

-Per

--

Per F. Peterson
Professor and Chair
Department of Nuclear Engineering
University of California
4153 Etcheverry Hall
Berkeley, California 94720-1730
peterson@nuc.berkeley.edu
Office: (510) 643-7749 Fax: (510) 643-9685
http://www.nuc.berkeley.edu/People/Per_Peterson

From: Scott, Michael
To: Sheron, Brian
Cc: Gibson, Kathy
Subject: Fw: Effect of Salt
Date: Friday, March 18, 2011 3:43:23 PM

Richard's answer in case you have not seen it.

Sent from my NRC blackberry
Michael Scott
(b)(6)

From: Lee, Richard
To: Scott, Michael
Sent: Fri Mar 18 15:36:40 2011
Subject: FW: Effect of Salt

Mike:

Here's is the e-mail. The sharepoint site where DSA is keeping track of our stuff is:

http://portal.nrc.gov/edo/res/DSA/Shared%20Documents/JPN-Status-Request.aspx

Richard

From: Lee, Richard
Sent: Friday, March 18, 2011 1:35 PM
To: Gibson, Kathy
Cc: Wagner, Katie; Salay, Michael
Subject: RE: Effect of Salt

Kathy:

Below is a better response. It addressed not only the affects of sea water on fission products chemistry in the reactor coolant system and the spent fuel pool, but also address potential of plugging.

There do not appear to be serious downsides to the use of seawater. The Paul Scherer Institute (Switzerland) experiments have investigated effects of salt on aqueous iodine chemistry and had not seen much effect.

We see CII (Cholrine iodide) rather than I2 partitioning from salt solutions but iodine partitioning is about the same. There will be some organic iodide formation because of the organic in seawater. Seawater pH will typically be less than 7, but boration will change the pH presumably to a higher value and this will suppress iodine partitioning from the water into the gas phase. Any silver will precipitate, but in BWRs there is only fission product silver and this does not have a high yield. We can presume the seawater is saturated in carbon dioxide. This may precipitate any barium or strontium in the water as a carbonate.

CH/118

Again, we do not expect a big effect such as plugging etc. There will be enhanced corrosion of the cladding and the steel, but these are very long term effects and not of particular interest now.

I don't think we need to worry about iodine in the spent fuel pools. The fuel is old enough that we are well beyond 10 half lives for the most important iodine isotopes. The only significant iodine iodine isotope is I-129 which has a very long half life and consequently a minuscule radioactivity in comparison to other things such as noble gases and cesium.

Richard

From: Gibson, Kathy
Sent: Thursday, March 17, 2011 7:32 PM
To: Lee, Richard; Salay, Michael
Cc: Wagner, Katie
Subject: FW: Effect of Salt
Importance: High

Richard, Mike,
Do you have any info to answer this question? Effect of salt on cesium release? I'd like to respond to Brian tomorrow.

Thanks,
Kathy

Kathy Halvey Gibson
Director
Division of Systems Analysis

Kathy.Gibson@nrc.gov
(301) 251-7499 Work
(b)(6) Cell

From: Sheron, Brian
Sent: Thursday, March 17, 2011 6:56 PM
To: Gibson, Kathy; Scott, Michael
Cc: Uhle, Jennifer
Subject: Effect of Salt

During my meeting today with Secretary Chu, the issue of salt water injection came up. The Japanese are injection seawater into the reactors. The seawater is boiling off, leaving salt. While there are obvious questions about how salt might affect coolability of the core (clogging coolant channels, etc., a question was raised about how the salt might affect the Cesium release. Do we have any info on what the effect might be?

From: Sheron, Brian
To: OST02 HOC; Virgilio, Martin; Weber, Michael; Ash, Darren; Dyer, Jim; Wiggins, Jim; Boger, Bruce; Grobe, Jack; Johnson, Michael; Zimmerman, Roy; Leeds, Eric; Cianci, Sandra; Garland, Stephanie
Cc: Evans, Michele
Subject: RE: ET Directors Schedule.docx
Date: Friday, March 18, 2011 3:50:00 PM

Looking at my calendar, it looks like I could take the 3pm to 11pm shifts on 3/2, 3/27, 3/31, and 4/3. I might be able to take some others, but let me just commit to these for now.

From: OST02 HOC
Sent: Friday, March 18, 2011 2:32 PM
To: Virgilio, Martin; Weber, Michael; Ash, Darren; Dyer, Jim; Wiggins, Jim; Boger, Bruce; Grobe, Jack; Johnson, Michael; Zimmerman, Roy; Sheron, Brian; Leeds, Eric; Cianci, Sandra; Garland, Stephanie
Cc: Evans, Michele
Subject: ET Directors Schedule.docx

Please focus on filling the vacancies for 3/23 through 3/27, as soon as possible. Please send your responses to OST02 HOC.

Thank you,

Michele Evans

CH/119

From: Sheron, Brian
To: Boger, Bruce; Wiggins, Jim; Weber, Michael
Subject: FW: Aerial Monitoring Results
Date: Friday, March 18, 2011 4:42:00 PM
Attachments: AMSData_18Mar2011 Report.ppt

See below. Is DOE providing us with this information through separate channels? If not, let me know and I'll call DOE (J. Kelly) and request they provide it to the NRC RC.

From: Adams, Ian [mailto:Ian.Adams@Hq.Doe.Gov]
Sent: Friday, March 18, 2011 4:14 PM
To: Aoki, Steven; RJBudnitz@lbl.gov; DAgostino, Thomas; (b)(6) Phillip.Finck@inl.gov; (b)(6) Grossenbacher, John (INL); (b)(6) Kelly, John E (NE); Koonin, Steven; Lyons, Peter; McFarlane, Harold; peterson@nuc.berkeley.edu; Sheron, Brian; ronaldo.szilard@inl.gov; SCHU; Adams, Ian; Owens, Missy; Hurlbut, Brandon; rlg2@us.ibm.com; Poneman, Daniel
Subject: Aerial Monitoring Results

Attached, please find the most recent measurements from last night's aerial monitoring flights.

Please do not forward this information or cc: anyone else as it is sensitive. However, please copy all the individuals on this email when responding to this group so that everyone has the same information.

Thanks,

Ian Adams
Office of the Secretary
Department of Energy
(202) 586-9585
ian.adams@hq.doe.gov

CH/120

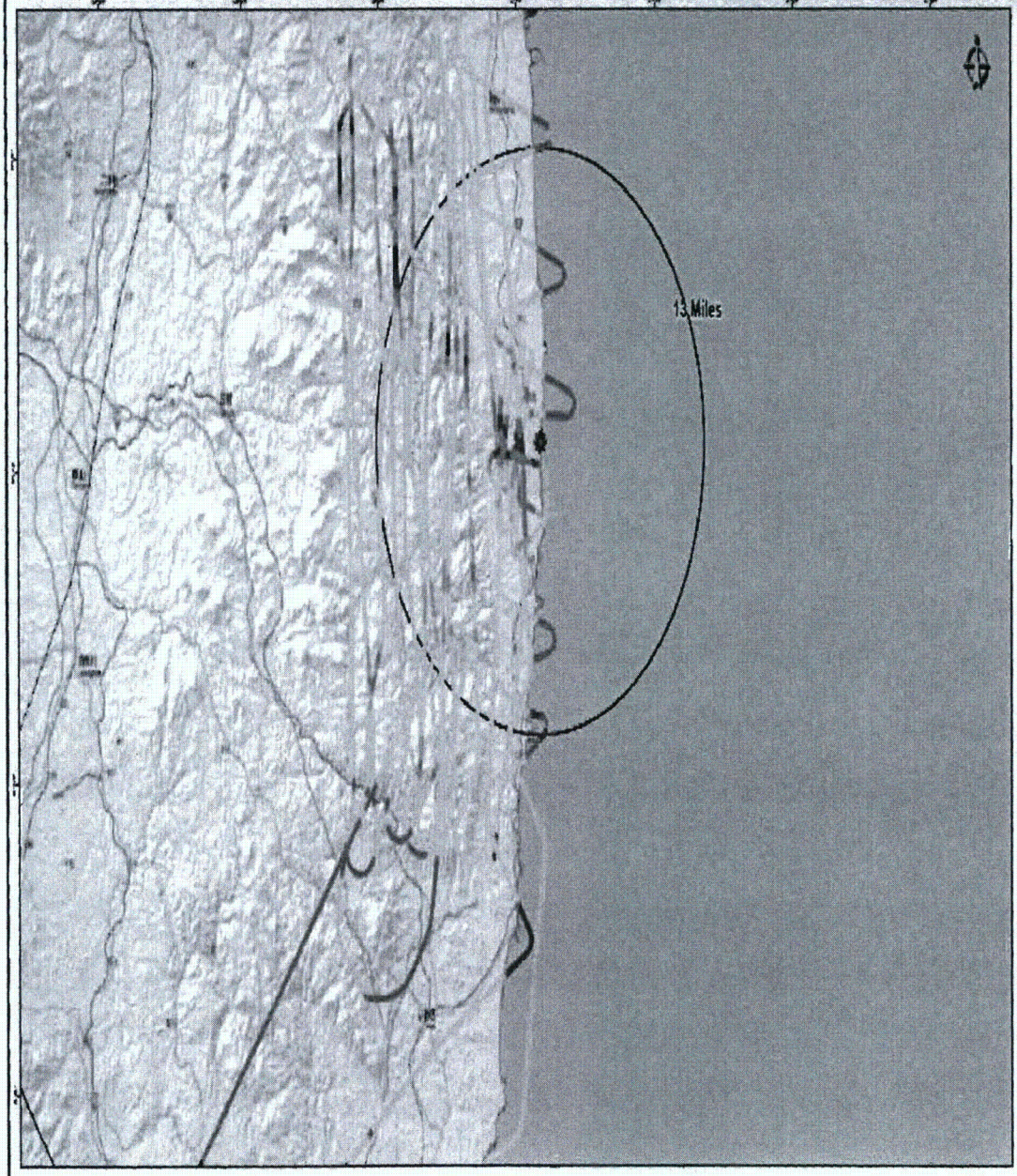
AMS Measurements

- DOE Team AMS Operations 17-18 March 2011
  - Two missions using military C-12 aircraft (fixed wing)
    - Serpentine and parallel patterns in the reactor vicinity at an altitude of 1000 ft.
  - UH-1 aircraft (helicopter)
    - Flights over U.S. facilities, including Embassy and military bases, at an altitude of 500 ft.
- Plot interpretation
  - Areas exceeding EPA Emergency Phase PAGs are shown in red and orange.
  - AMS data is presented as exposure rate 1 meter from the ground at the time the measurements occurred.
  - All measured exposure rates are assumed to be due to ground deposition. This is a conservative estimate because some of the measured dose is airborne. Measurements of ground truth under the flight path will be taken during the next 24 hours.

Aerial Monitoring Results

Exposure Rate

FUKUSHIMA DAICHI
JAPAN



FUKUSHIMA DAICHI

C-12 Aerial Data

Exposure Rate at 1 meter (mR/hr)

- < 0.02
- 0.02 - 0.10
- 0.10 - 1.00
- 1.00 - 5.00
- 5.00 - 10.00
- 10.00 - 20.00
- 20.00 - 39.42

Technical Determinations and Notes:

- This product is a cumulative radiation based upon the assumption that all radiation is originating from the ground.
- Low dose results are affected when averaging zero measurements together with low dose measurements and actual radiation locations.
- No correction has been made for deviations in flight altitude from nominal value.
- With respect to overlapping regions, these are inconsistent with no significant changes between days.

Not For Public Distribution

Flight Information:

Completed 03-12 (see from 3rd and time all)

This map was produced by the Geographic Information Systems department of NNSA's Remote Sensing Laboratory (RSL) at North AFB, Las Vegas, Nevada. NRP Grid 2010, ESRI World Street Map and CNMT database were used for map generation.

RSL Map Identification number is: 012_OverallCoverageCumMaxed131TimesR131.mxd

1:190,000

Map created on 3/18/2011 4:08:03 AM PST
Check for revision in 12 hours

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Nuclear Incident Team DOE NIT
Contact (202) 586 - 8100

~~Official Use Only~~

Conclusions from Aerial Measurements

- The greatest concentration of contaminated material is located to the northwest of the accident site
- There is a narrow band to the northwest beyond 13 miles from the site where the integrated 4-day doses approach or exceed 1 Rem
- As of 18 March the aerial measurements have not covered a large enough geographical location to completely map out the extent of the contamination

From: Flory, Shirley
To: OST02 HOC
Cc: Sheron, Brian
Subject: RE: ET Schedule for Operations Center - Japan Event
Date: Friday, March 18, 2011 5:05:52 PM

Pls. see below PLUS:

For Brian W. Sheron

Thursday, March 31, 3:00 PM-11:00 PM

Sunday, April 3, 3:00 PM-11: PM.

Thanks – Shirley Flory 301-251-7400

From: OST02 HOC
Sent: Friday, March 18, 2011 3:35 PM
To: Hudson, Sharon; Schwarz, Sherry; Sprogeris, Patricia; Flory, Shirley; Ross, Robin
Subject: ET Schedule for Operations Center - Japan Event
Importance: High

Hello...

Please focus on filling the vacancies for 3/23 through 3/27, as soon as possible. Please send your responses to OST02 HOC.

Executive Team			
ET Director			
Fri-Sat	3/18-3/19	11pm-7am	Roy Zimmerman
Sat	19-Mar	7am - 3pm	Jim Wiggins
Sat	19-Mar	3pm-11pm	Brian Sheron
Sat-Sun	3/19-3/20	11pm - 7am	Mike Johnson
Sun	20-Mar	7am - 3pm	Jim Wiggins
Sun	20-Mar	3pm-11pm	Brian Sheron
Sun-Mon	3/20-3/21	11pm - 7am	Mike Johnson
Mon	21-Mar	7am - 3pm	Mike Weber
Mon	21-Mar	3pm-11pm	Jim Wiggins
Mon-Tues	3/21-3/22	11pm - 7am	Mike Johnson
Tues	22-Mar	7am - 3pm	Mike Weber
Tues	22-Mar	3pm-11pm	Jim Wiggins
Tues-Wed	3/22-3/23	11pm - 7am	
Wed	23-Mar	7am - 3pm	Mike Weber
Wed	23-Mar	3pm-11pm	
Wed-Thur	3/23-3/24	11pm - 7am	
Thur	24-Mar	7am - 3pm	
Thur	24-Mar	3pm-11pm	
Thur-Fri	3/24-3/25	11pm - 7am	
Fri	25-Mar	7am - 3pm	
Fri	25-Mar	3pm-11pm	BRIAN W. SHERON
Fri-Sat	3/25-3/26	11pm-7am	
Sat	26-Mar	7am - 3pm	

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Sat	26-Mar	3pm-11pm	
Sat-Sun	3/26-3/27	11pm - 7am	
Sun	27-Mar	7am - 3pm	
Sun	27-Mar	3pm-11pm	BRIAN W. SHERON
Sun-Mon	3/27-3/28	11pm - 7am	

Thank you,
Michele Evans

From:	Scott, Michael
To:	Howe, Allen; Gratton, Christopher; Leeds, Eric
Cc:	Sheron, Brian; Gibson, Kathy; Uhle, Jennifer
Subject:	BRIAN SHERON"S COMMENTS ON JAPAN COMM BRIEF PRESENTATION
Date:	Friday, March 18, 2011 5:52:38 PM

Brian has been downtown and just now saw the slides. He had a couple of comments.

1. Slide 4 talking points discuss our collaboration with other Federal agencies, but bullets do not refer to those stakeholders in particular. This was similar to a comment made during today's dry run. Please ensure that collaboration and the role of other agencies are highlighted in the presentation.

2. Please consider the following in case the question arises: NRC has issued an IN for reactors regarding the Japan events. Begs the question: What about nonreactor facilities – lessons learned or impacts there?

Thanks

CH/122

From: Sheron, Brian
To: Evans, Michele; Case, Michael; Gibson, Kathy
Cc: Wiggins, Jim; Sangimino, Donna-Marie
Subject: RE: Staff for Potential Support in Japan
Date: Friday, March 18, 2011 5:44:00 PM

Mike, ask Donna to call NEA and cancel the meeting, or at least tell them that Syed can't attend.

From: Evans, Michele
Sent: Friday, March 18, 2011 5:42 PM
To: Case, Michael; Gibson, Kathy
Cc: Sheron, Brian; Wiggins, Jim
Subject: RE: Staff for Potential Support in Japan

Mike,

(b)(5),(b)(6)

Thanks

Michele

From: Case, Michael
Sent: Friday, March 18, 2011 3:42 PM
To: Gibson, Kathy; Evans, Michele
Subject: RE: Staff for Potential Support in Japan

(b)(5),(b)(6)

From: Gibson, Kathy
Sent: Friday, March 18, 2011 2:06 PM
To: Evans, Michele
Cc: Case, Michael
Subject: Re: Staff for Potential Support in Japan

(b)(5)

From: Evans, Michele
To: Gibson, Kathy

CH/123

Sent: Fri Mar 18 14:04:02 2011
Subject: RE: Staff for Potential Support in Japan

(b)(5)

From: Gibson, Kathy
Sent: Friday, March 18, 2011 1:39 PM
To: Evans, Michele
Cc: Uhle, Jennifer; Coyne, Kevin; Huffert, Anthony; Rubin, Stuart; Yarsky, Peter; Salley, MarkHenry; Elkins, Scott; Case, Michael; Bush-Goddard, Stephanie; Scott, Michael
Subject: Staff for Potential Support in Japan
Importance: High

Michele,

(b)(5)

Please let me know if you need anything else.

Kathy

Kathy Halvey Gibson
Director
Division of Systems Analysis

Kathy.Gibson@nrc.gov
(301) 251-7499 Work
(b)(6)

From:	Sheron, Brian
To:	Case, Michael; Richards, Stuart
Cc:	Uhle, Jennifer
Subject:	FW: 50.55a ASME Code Final Rulemaking - concurrence
Date:	Saturday, March 19, 2011 5:44:00 PM
Attachments:	Dir of NRR Memo.docx FRN for Final Rule RIN 3150-AI35.docx Notice of Final Rule.doc Regulatory Analysis 2005 Addenda.docx Approval for Publication.doc EDO Daily and Weekly Notes.doc Congressional Letters.doc

Mike, let me know if I should concur

From: Padovan, Mark
Sent: Saturday, March 19, 2011 2:08 PM
To: Nichols, Russell; Zimmerman, Roy; Sheron, Brian
Cc: Benney, Kristen; Case, Michael; Norris, Wallace; Helton, Shana; Quay, Theodore
Subject: 50.55a ASME Code Final Rulemaking - concurrence

Messrs. Nichols, Zimmerman, and Sheron,

Please concur on the attached final rule to incorporate by reference the 2005 Addenda thru 2008 Addenda of ASME Boiler and Pressure Vessel Code, and the 2005 Addenda and 2006 Addenda of the Operation and Maintenance Code, into 10 CFR 50.55a by Friday, March 25, 2011. You can send me your concurrence via email.

The following are attached for your review:

- Dir of NRR Memo
- Federal Register Notice
- Notice of Final Rule:
- Regulatory and Backfit Analysis
- Approval for Publication
- EDO Daily / Weekly notes
- Congressional Letters

In addition, we prepared an Analysis of Public Comments document that is available in ADAMS (ML110280240).

Wally - On the bottom of page 88 of the FRN, please add the date of Regulatory Guide 1.84, "Design, Fabrication, and Materials Code Case Acceptability, ASME Section III, Proposed Revision 34." Thanks.

Mark

CH/124

From: Scott, Michael
To: Mahoney, Michael; Gratton, Christopher; Howe, Allen
Cc: Gibson, Kathy; Sheron, Brian; Uhle, Jennifer; Dion, Jeanne; Santiago, Patricia; Tinkler, Charles; Zigh, Ghani
Subject: FW: CAN SOMEONE SEND ME AN E-COPY OF THE Q"S AND A"S FROM THE GO-BOOK?
Date: Friday, March 18, 2011 5:55:41 PM
Attachments: REScompiled QA.docx

I am providing you an early version of our Qs and As. More will be coming tomorrow. We owe some on zirc fires, but the involved staff are loaded up and need a little more time. Also, I will look these over one more time between now and tomorrow noon. Hope that's okay.

Mike

From: Dion, Jeanne
Sent: Friday, March 18, 2011 3:10 PM
To: Scott, Michael
Subject: RE: CAN SOMEONE SEND ME AN E-COPY OF THE Q'S AND A'S FROM THE GO-BOOK?

Mike- for consistency I'm leaving out the seismic/tsunami Q&A- assuming Annie will have to most to date information.
Still waiting on zirc fire Q&A.

From: Howe, Allen
Sent: Friday, March 18, 2011 3:02 PM
To: Scott, Michael; Gratton, Christopher; Boska, John
Cc: Dion, Jeanne
Subject: RE: CAN SOMEONE SEND ME AN E-COPY OF THE Q'S AND A'S FROM THE GO-BOOK?

Not something that we have.

Annie Kammerer was doing Q&As from the ops center for the seismic tsunami perspective

Thanks - Allen

From: Scott, Michael
Sent: Friday, March 18, 2011 11:00 AM
To: Howe, Allen; Gratton, Christopher; Boska, John
Cc: Dion, Jeanne
Subject: CAN SOMEONE SEND ME AN E-COPY OF THE Q'S AND A'S FROM THE GO-BOOK?

If I have it in my inbox, I can't find it. We don't want to reinvent the wheel in developing Qs and As for the Comm brief.

Thanks

CH/125

(b)(5)

(b)(5)

(b)(5)

(b)(5)

(b)(5)

(b)(5)

(b)(5)

From: Grobe, Jack
To: Sheron, Brian; Uhle, Jennifer; Wiggins, Jim; Evans, Michele; Miller, Charles; Haney, Catherine; Dorman, Dan; Moore, Scott; Johnson, Michael; Holahan, Gary; Leeds, Eric; Grobe, Jack; Boger, Bruce; Brenner, Eliot; Hayden, Elizabeth; Schmidt, Rebecca; Doane, Margaret; Mamish, Nader; Dyer, Jim; Brown, Milton; Hackett, Edwin; Piccone, Josephine; Wilson, George; Harrison, Donnie; Kammerer, Annie; Collins, Timothy; Milligan, Patricia; Salley, MarkHenry; Bowman, Eric
Cc: Borchardt, Bill; Weber, Michael; Virgilio, Martin; Ash, Darren; Burns, Stephen; Vietti-Cook, Annette; Andersen, James; Giitter, Joseph; Howe, Allen; Nelson, Robert; McGinty, Tim; Blount, Tom; Holian, Brian; Gallagher, Johanna; Brown, Milton; Cheok, Michael; Lee, Samson; Hiland, Patrick; Skeen, David; Ruland, William; Sheron, Brian; Lubinski, John
Subject: Support and Logistics for the Japan Commission Meeting
Date: Friday, March 18, 2011 6:06:09 PM

Ladies and Gents,

We want to ask your support for several aspects of the Commission meeting on Monday morning regarding the situation in Japan.

First, the only staff at the Commission table will be Bill Borchardt.

In the well, we anticipate having the two available DEDOs (I understand that Mike Weber will be on shift) and one representative from the front office of each of the following offices (either the office director or deputy)

NRR, NRO, NSIR, RES, NMSS, FSME, OPA, OCA, OIP, CFO, ACRS

Annette Vietti-Cook has indicated that she will reserve the "quadrant" of seats nearest the microphone (on the left side of the room as the Commissioners would see it) for NRC staff. As I understand it, the right side will be for reporters and the central area will be open for general public.

In the area for NRC staff, there will be 39 seats.

From a staff perspective, we would like the highest priority available for the following individuals whom Bill will call upon to answer (on camera) any more detailed questions on the indicated subjects. Bill will have the list and ask for this person to respond to any question where he wants more detailed support. Some of these folks will likely already be in the well. The microphone has been moved to allow television camera access to any individual answering questions.

Protection Against Natural Disasters – Gary Holahan
Station Blackout – George Wilson
Severe Accident and Spent Fuel Pool Accident Progression – Jennifer Uhle
Radiological Consequence Analysis – Cathy Haney
Hydrogen Fires and Explosions – MarkHenry Salley
Public Stakeholder Outreach – Eliot Brenner
State Outreach – Josie Piccone
International Interactions – Margie Doane
10CFR50.54(hh)(2)/B.5.b – Eric Bowman
Seismic Issues, Tsunami Issues, GI-199 – Annie Kammerer
Mark I containment issues – Tim Collins
Emergency Preparedness – Trish Milligan
Emergency Operating procedures/SAMGs – Donnie Harrison

CH/126

We understand that these people are available for the meeting. If not, please coordinate with Allen Howe to provide an equivalently capable individual.

That leaves 26 seats in the staff section for TAs and other Division Directors and above who should attend the meeting.

SECY is arranging for an e-mail to be sent out to the staff to indicate where televisions are available for other interested staff to observe the Commission meeting.

Thanks for your support.

Jack Grobe, Deputy Director
for Engineering and Corporate Support
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission

From: Gibson, Kathy
To: Sheron, Brian; Uhle, Jennifer
Subject: Fw: SFP: PRG/MB-3 Meeting June 15
Date: Friday, March 18, 2011 9:50:10 PM

Please approve the propsed travel below. Of course this will be adjusted accordingly re: Japan response etc.

From: Santiago, Patricia
To: Gibson, Kathy; Scott, Michael
Sent: Fri Mar 18 20:13:02 2011
Subject: FW: SFP: PRG/MB-3 Meeting June 15

Kathy and Mike
I did not find any office procedure for domestic travel but am aware of one for international. That said, there are 5 RES staff proposed to travel to SNL for the OECD/PRG meeting in June. I may not travel depending on ACRS and other commitments at that time.
I recommend these staff attend for the reasons identified below.

I can forward to Brett to coordinate with Jennifer/Brian if you prefer.
Thanks
Pat

From: Navarro, Carlos
Sent: Friday, March 18, 2011 8:41 AM
To: Santiago, Patricia
Cc: Zigh, Ghani; Velazquez-Lozada, Alexander; Madni, Imtiaz
Subject: SFP: PRG/MB-3 Meeting June 15

Dear Pat,

Our 3rd Program Review Group and Management Board Meeting (PRG/MB-3) is schedule to be in June 2011.

We are requesting approval for five (5) NRC staff's, i.e. various background expertise, to participate in the meetings (i.e. Ghani Zigh; Senior Technical Monitor, Alexander Velazquez; CFD modeling work, Imtiaz Mandi; MELCOR modeling and oversight, SPB/Chief (i.e. you) for Management Board meeting support, and myself (project manager).

Here is some background information for this meeting.

Date: June 15-16, 2011
Place: Albuquerque, NM (Sandia)

Purpose:

1. PRG meeting:
    a. Final Phase 1 Report
    b. MELCOR and CFD modeling for:

CH/127

i. design phase (blind),
ii. comparison with pre-ignition tests,
iii. modeling improvements (e.g. increased axial and radial model discretization), and
iv. post test modeling comparison

c. Rod Ballooning design

2. MB meeting:
   a. Program of Work for Phase 2
   b. Milestones and schedules
   c. Financial Report and Status

Let me know if you have any questions,

Thanks,

Carlos N.

From: Sheron, Brian
To: Coe, Doug (Doug.Coe@nrc.gov); Coyne, Kevin; Case, Michael; Richards, Stuart (Stuart.Richards@nrc.gov)
Cc: Uhle, Jennifer
Subject: FW: Meeting Request Follow Up
Date: Friday, March 18, 2011 10:15:30 PM

See e-mail string below. Who do we have that can support NRR on this? I can't open the link to the report because I'm on web mail. It sound like it is GI-199 related.

From: Dean, Bill
Sent: Friday, March 18, 2011 7:33 PM
To: Wittick, Brian; Leeds, Eric; Andersen, James
Cc: Muessle, Mary; Lew, David; Grobe, Jack; Boger, Bruce; Sheron, Brian; Uhle, Jennifer
Subject: Re: Meeting Request Follow Up

I believe RES assistance may be appropriate for this given the GI-199 subject matter.
Bill Dean
Regional Administrator
Region I, USNRC
Sent from NRC BlackBerry

From: Wittick, Brian
To: Leeds, Eric; Andersen, James
Cc: Muessle, Mary; Lew, David; Dean, Bill; Grobe, Jack; Boger, Bruce
Sent: Fri Mar 18 18:21:58 2011
Subject: RE: Meeting Request Follow Up

Eric,

I just spoke to Hipschman. Apparently the core of their interest is the following report.

http://adamswebsearch2.nrc.gov/idmws/DocContent.dll?library=PU_ADAMS^pbntad01&LogonID=76b41771c7675f39f80edfad53e3cf59&id=102500110
Let me call the state POC and get back to you.

VR
Brian

From: Leeds, Eric
Sent: Friday, March 18, 2011 6:21 PM
To: Andersen, James
Cc: Wittick, Brian; Muessle, Mary; Lew, David; Dean, Bill; Grobe, Jack; Boger, Bruce
Subject: RE: Meeting Request Follow Up

Jim –

Happy to help. Is this a telecom, or a meeting here, or a meeting there? Who am I briefing and on what?

Since its NY, do we want to bring RI along with us?

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
301-415-1270

From: Andersen, James

CH/128

Sent: Friday, March 18, 2011 5:50 PM
To: Leeds, Eric
Cc: Wittick, Brian; Muessle, Mary; Lew, David; Dean, Bill; Grobe, Jack; Boger, Bruce
Subject: RE: Meeting Request Follow Up

Eric, are you or another senior manager in NRR available next week to meet with the individuals from New York?

Jim A.

From: Hipschman, Thomas
Sent: Friday, March 18, 2011 4:29 PM
To: Andersen, James; Leeds, Eric
Cc: Wittick, Brian
Subject: FW: Meeting Request Follow Up

FYI – Haven't heard from Brian and didn't want to wait to pass this along to you.

Thomas Hipschman
Policy Advisor for Reactors
Office of Chairman Gregory B. Jaczko
301-415-1832

From: Thomas Hipschman
Sent: Friday, March 18, 2011 3:04 PM
To: Brian Wittick
Subject: FW: Meeting Request Follow Up

FYI – the Chairman has agreed that a senior manager from NRR should meet with them.

Thomas Hipschman
Policy Advisor for Reactors
Office of Chairman Gregory B. Jaczko
301-415-1832

From: Pace, Patti
Sent: Friday, March 18, 2011 1:48 PM
To: Hipschman, Thomas
Cc: Bradford, Anna; Batkin, Joshua; Coggins, Angela
Subject: FW: Meeting Request Follow Up

Hi Tom,

Anna asked me to forward this to you. Can you please work with NRR to make this happen? The folks from NY are eager to confirm something ASAP.

Thanks,

Patti Pace
Assistant to Chairman Gregory B. Jaczko
U.S. Nuclear Regulatory Commission
301-415-1820 (office)
301-415-3504 (fax)

From: Hilary Jochmans [mailto:Hilary.Jochmans@exec.ny.gov]
Sent: Friday, March 18, 2011 1:42 PM
To: Pace, Patti
Cc: Thomas Congdon; Bradford, Anna; Warren, Roberta
Subject: RE: Meeting Request Follow Up

Thank you, Patti. I greatly appreciate your assistance. I certainly understand the constraints on the Chairman's time. We would appreciate a meeting with the Senior Staff you suggest on Tuesday in person. Please let me know what other information you need from me, and then who the staffer will be and when where.
Thanks again,
Hilary

From: Pace, Patti [mailto:Patti.Pace@nrc.gov]
Sent: Friday, March 18, 2011 1:37 PM
To: Hilary Jochmans
Cc: Thomas Congdon; Bradford, Anna; Warren, Roberta
Subject: Meeting Request Follow Up

Dear Hilary,

Chairman Jaczko will not be available for a face to face meeting next week due to his role in the ongoing NRC response to the situation in Japan. He values the very good relationship between the NRC and State of New York. He has offered to make himself available for a phone call next week if that would be acceptable to Lt. Governor Duffy. If the Lt. Governor would prefer to meet with a senior NRC staff person we could work on that as an alternative.

Please let me know how you would like to proceed.

Many thanks,

Patti Pace
Assistant to Chairman Gregory B. Jaczko
U.S. Nuclear Regulatory Commission
301-415-1820 (office)
301-415-3504 (fax)

From: Hilary Jochmans [mailto:Hilary.Jochmans@exec.ny.gov]
Sent: Thursday, March 17, 2011 3:22 PM
To: Pace, Patti
Cc: Thomas Congdon
Subject: Follow up to Conversation

Hi Patti – It was great to chat with you. Glad to hear you are doing well. Thanks so much for your offer to help with this meeting request.

On Tuesday, the NYS Lt. Governor, Robert Duffy, NYS Director of Operations, Howard Glaser and NYS Deputy Secretary for Energy, Tom Congdon, would like to come to Washington to meet with the Chairman. Specifically, they would like to be briefed on the September 2010 NRC report including the status of the follow up review. If the Chairman is not available, they would like to meet with an appropriate Commissioner or senior staffer.

I greatly appreciate your assistance with this request. Please let me know if you need any additional information.

Thanks,
Hilary

Hilary F. Jochmans, Director
New York State Washington Office of the Governor
202-434-7100

From: Sheron, Brian
To: Uhle, Jennifer
Subject: Fw: Summary of NRC Seismic Regulations
Date: Friday, March 18, 2011 7:08:21 AM

I asked Annie to e-mail Pete with status/schedule.

From: Kammerer, Annie
To: peter.lyons@nuclear.energy.gov <peter.lyons@nuclear.energy.gov>
Cc: Sheron, Brian
Sent: Fri Mar 18 03:32:01 2011
Subject: Summary of NRC Seismic Regulations

Dear Mr. Lyons,

I wanted to give you an update on the status of the Summary of NRC's Seismic Regulations that we are developing for Mr. Chu's use.

Currently, we have developed a 2 page draft document and have forwarded to appropriate staff for review. We expect to have this to you by the afternoon at the latest.

Regards,
Annie

Dr. Annie Kammerer, PE
Senior Seismologist and Earthquake Engineer
US Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington DC 20555
1 (b)(6) mobile
1 BB

CH/129

From: Jaczko, Gregory
To: (b)(6) "SCHU@hq.doe.gov"; "Peter.Lyons@Nuclear.Energy.gov"; "JohnE.Kelly@Nuclear.Energy.Gov"; Sheron, Brian
Cc: Virgilio, Martin
Subject: Re: contingency PRA analysis, note from Bob Budnitz
Date: Friday, March 18, 2011 7:21:11 AM

We are in communication with doe(narac)/ge/inpo/naval reactors to develop strategies. I will make sure this recommendation gets tothat team. If there are other people from doe you would like participating please have them contac our ops center

---

From: Holdren, John P. (b)(6)
To: SCHU <SCHU@hq.doe.gov>; Lyons, Peter <Peter.Lyons@Nuclear.Energy.gov>; Kelly, John E (NE) <JohnE.Kelly@Nuclear.Energy.Gov>; Sheron, Brian
Cc: Jaczko, Gregory
Sent: Fri Mar 18 07:12:09 2011
Subject: FW: contingency PRA analysis, note from Bob Budnitz

(b)(5)

Best, John

PS for Pete Lyons: I haven't yet seen a list of those at yesterday's meeting with their e-mail addresses.

JOHN P. HOLDREN
Assistant to the President for Science and Technology
and Director, Office of Science and Technology Policy
Executive Office of the President of the United States
email (b)(6)
direct phone (b)(6)
assistant Karrie Pitzer (b)(6)

From: Bob Budnitz [mailto:rjbudnitz@lbl.gov]
Sent: Friday, March 18, 2011 6:41 AM
To: Holdren, John P.
Subject: Fwd: contingency PRA analysis, note from Bob Budnitz

TO: Steve Chu & John Holdren

FROM: Bob Budnitz, LBNL

[I have put John Kelly DOE-NE and Brian Sheron NRC on distribution here. They should be getting all this stuff.]

(b)(5)

CH/130

(b)(5)

Bob Budnitz
****

Robert J. Budnitz
Lawrence Berkeley National Laboratory
University of California
Earth Sciences Division, Mail Stop 90R-1116
Berkeley CA 94720
(Phone) 510-486-7829
(Fax) 510-486-5686
Email: RJBudnitz@lbl.gov

Home in (b)(6)
Robert J. Budnitz,
(b)(6)

From: Sheron, Brian
To: Zigh, Ghani; Santiago, Patricia
Cc: Uhle, Jennifer; Gibson, Kathy; Scott, Michael
Subject: RE: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)
Date: Saturday, March 19, 2011 7:58:54 AM

IT sounds like this is what the Commissioner wants. Please forward either hard copies or the ML numbers to Rebecca.

From: Zigh, Ghani
Sent: Saturday, March 19, 2011 7:09 AM
To: Sheron, Brian; Santiago, Patricia
Cc: Uhle, Jennifer; Gibson, Kathy; Scott, Michael
Subject: RE: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)

Yes, SNL did perform other studies about 5 years ago.
These studies are in ADAMS under ML062550218, ML082261433, and ML0816800640.
These reports discuss the coolability limits (i.e. age of the assembly) for PWR and BWR assemblies for different configurations (i.e. management).
Five configuration were analyzed (Uniform, Checkerboard, 1X4, Checkerboard with empties, and 1x4 with empties)

for the BWR, the following results were found:

for Uniform configuration, the coolabity limit is 310 days old fuel.
for Checkerboard configuration, the coolability limit is 117 days old fuel.
for 1x4 configuration, the coolability limits is 20 days old fuel.
for Checkerboard with empties configuration, the coolabilaty limit is 25 days oldfuel
for 1x4 with empties configuration , the coolability limit is 20 days old fuel.

The age of the fuel assembly as function of power is as follows for the BWR assembly:
310 days old is 2.7 kWatt
117 days is 5 kWatt
25 days is 10 kWatt
20 days is 10.3 kWatt

From: Sheron, Brian
Sent: Friday, March 18, 2011 10:32 PM
To: Santiago, Patricia
Cc: Uhle, Jennifer; Gibson, Kathy; Scott, Michael; Zigh, Ghani
Subject: RE: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)

If this is the BWR fuel bundle ignition test, I do not think this is what they are looking for. Did SNL do a SFP study some time ago? Like 5-10+ years ago?

From: Santiago, Patricia
Sent: Friday, March 18, 2011 6:36 PM
To: Tadesse, Rebecca
Cc: Bubar, Patrice; Sheron, Brian; Rini, Brett; Uhle, Jennifer; Gibson, Kathy; Scott, Michael; Bowman, Gregory; Zigh, Ghani; Navarro, Carlos
Subject: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)

Rebecca,

I believe the attached report is what you are requesting ---- Final BWR Sandia Fuel Project (SFP) Sandia Report.

CH/13

We also have a time lapse video (OUO as well) that we can make a copy and provide Monday.

If you have additional questions, Ghani Zigh is the best person to assist.

Thanks
Pat

From: Sheron, Brian
To: Evans, Michele
Subject: RE: ACTION NEEDED: Proposed replacement staff for team in Japan
Date: Saturday, March 19, 2011 11:00:29 AM

If you could call them, that would be great. I'm at home and don't have their phone numbers. In the past when I've called the NRC on weekends, I get no answer. Also, I was coming to the OP center early)1pm) today ro start the turnover, and prepare for the 2 pm meeting, so I was going to leave soon. I have an errand I need to run on my way in. If you can't, I'll call them once I get to the Op center.

From: Evans, Michele
Sent: Saturday, March 19, 2011 8:41 AM
To: Sheron, Brian
Subject: RE: ACTION NEEDED: Proposed replacement staff for team in Japan

Brian,

The team has been approved, so we need to inform Mike and Syed. The Liaison Team will have their names by noon. So you or I need to call them by then, so the word comes from us, not Ops Center first.

Can you make the calls and then confirm with me? If not, let me know and I will call them.

Thanks

Michele

-----Original Message-----
From: Sheron, Brian
Sent: Saturday, March 19, 2011 8:08 AM
To: Evans, Michele; Uhle, Jennifer; Pederson, Cynthia; McCree, Victor; Mamish, Nader; Lew, David; Leeds, Eric
Cc: Satorius, Mark; Wert, Leonard; Doane, Margaret; Grobe, Jack; Johnson, Michael
Subject: RE: ACTION NEEDED: Proposed replacement staff for team in Japan

OK, thanks for the clarification.

From: Evans, Michele
Sent: Saturday, March 19, 2011 8:02 AM
To: Sheron, Brian; Uhle, Jennifer; Pederson, Cynthia; McCree, Victor; Mamish, Nader; Lew, David; Leeds, Eric
Cc: Satorius, Mark; Wert, Leonard; Doane, Margaret; Grobe, Jack; Johnson, Michael
Subject: RE: ACTION NEEDED: Proposed replacement staff for team in Japan

Thanks Brian for the email. Just got off the phone with HR. The concern involves availability of medicines, proper diet, and services in Tokyo, Japan. If you haven't contacted your employee at this point, then no need to. Instead, we are making arrangements for Dr. Cadoux to have a discussion with all the members of this team on Monday to provide the appropriate medical screening. If based on that discussion, a member decides it is not appropriate for them to travel to Japan at this time, we'll take them off the team and identify a replacement.

Michele

-----Original Message-----

04/132

From: Sheron, Brian
Sent: Friday, March 18, 2011 10:21 PM
To: Evans, Michele; Uhle, Jennifer; Pederson, Cynthia; McCree, Victor; Mamish, Nader; Lew, David; Leeds, Eric
Cc: Satorius, Mark; Wert, Leonard; Doane, Margaret; Grobe, Jack; Johnson, Michael
Subject: RE: ACTION NEEDED: Proposed replacement staff for team in Japan

(b)(5)

From: Evans, Michele
Sent: Friday, March 18, 2011 7:07 PM
To: Uhle, Jennifer; Pederson, Cynthia; McCree, Victor; Mamish, Nader; Lew, David; Leeds, Eric
Cc: Sheron, Brian; Satorius, Mark; Wert, Leonard; Doane, Margaret; Grobe, Jack; Johnson, Michael
Subject: ACTION NEEDED: Proposed replacement staff for team in Japan

(b)(5)

(b)(5)

Thanks for everyone's support.

Michele

From: Evans, Michele
Sent: Friday, March 18, 2011 6:47 PM
To: Casto, Chuck; Monninger, John; Dorman, Dan
Cc: Weber, Michael; Borchardt, Bill; Virgilio, Martin; Boger, Bruce; Zimmerman, Roy; Wiggins, Jim
Subject: Proposed replacement staff for team in Japan

Chuck,

Based on the input you provided this morning regarding expertise for the next wave of staff going to Japan, we're proposing the attached team.

(b)(5)

(b)(5)

Thanks

Michele

(202) 586-9585

ian.adams@hq.doe.gov

<<Nuclear group>>

From: Sheron, Brian
To: Borchardt, Bill; Weber, Michael; Virgilio, Martin
Subject: FW: coordination
Date: Sunday, March 20, 2011 11:16:27 AM

FYI. See the last sentence.

From: SCHU [SCHU@hq.doe.gov]
Sent: Sunday, March 20, 2011 11:06 AM
To: Adams, Ian; Aoki, Steven; Binkley, Steve; Bob Budnitz; Sheron, Brian; Brinkman, Bill; DAgostino, Thomas; Dick Garwin; Dick Garwin; Finck, Phillip; Grossenbacher, John (INL); Hurlbut, Brandon; John Holdren; Kelly, John E (NE); Koonin, Steven; Lyons, Peter; McFarlane, Harold; Owens, Missy; Per Peterson; Poneman, Daniel; Rolando Szilard; Steve Fetter; Poneman, Daniel
Subject: coordination

To all on the nuclear science group,

I have been reading with great interest the email exchanges.

We are also setting up a additional means of coordination of all the activities. Steve Aoki will the primary POC for the NNSA and NITOPS work (e.g. estimates of radioactive levels at the sources and their movement for each of the reactors and the spent fuel pools), Steve Binkley will be the POC for the nuclear science group and will be on the daily calls with NRC and other stakeholders. John Kelly will be the POC and coordinators with industry (e.g. INPO, GE, and others), efforts at Idaho, and NE at the DOE.

The plan is have Aoki, Kelly and Binkley will be working side by side for at least part of each day in a to-be-determined-location in Forrestal to enhance the communication.

As we work to understand and monitor the unfolding situation and assist the TEPCO and the Japanese government in their containment and mitigation efforts, it is not too early to think about how to deal with the longer term contamination and restoration issues in Japan and how we can assist in upgrading safety of US reactors.

Thank you for all of your efforts.

Steven Chu
Department of Energy

CH/133

From: Golder, Jennifer
To: Valentin, Andrea; Uhle, Jennifer; Sheron, Brian
Cc: Grancorvitz, Teresa; Spencer, Ruth; Stout, Kathleen
Subject: RE: Res Costs
Date: Friday, March 18, 2011 12:24:36 PM

Andrea,

(b)(5)

Jennifer Golder

Budget Director
Office of the Chief Financial Officer
United States Nuclear Regulatory Commission

From: Valentin, Andrea
Sent: Friday, March 18, 2011 9:53 AM
To: Golder, Jennifer; Uhle, Jennifer; Sheron, Brian
Cc: Grancorvitz, Teresa; Spencer, Ruth; Stout, Kathleen
Subject: RE: Res Costs

Jennifer (G),

(b)(5)

Thanks,

Andrea Valentin, Acting Director
Program Management, Policy Development and Analysis Staff
Office of Nuclear Regulatory Research
301-251-7497

From: Golder, Jennifer
Sent: Thursday, March 17, 2011 4:30 PM
To: Uhle, Jennifer; Grancorvitz, Teresa
Cc: Valentin, Andrea
Subject: Res Costs

Hi Jennifer,

ct/134

(b)(5)

I will need to know by tomorrow morning.

Thanks much

Jennifer Golder

Budget Director
Office of the Chief Financial Officer
United States Nuclear Regulatory Commission

From:	Padovan, Mark
To:	Nichols, Russell; Zimmerman, Roy; Sheron, Brian
Cc:	Benney, Kristen; Case, Michael; Norris, Wallace; Helton, Shana; Quay, Theodore
Subject:	50.55a ASME Code Final Rulemaking - concurrence
Date:	Saturday, March 19, 2011 2:08:27 PM
Attachments:	Dir of NRR Memo.docx FRN for Final Rule RIN 3150-AI35.docx Notice of Final Rule.doc Regulatory Analysis 2005 Addenda.docx Approval for Publication.doc EDO Daily and Weekly Notes.doc Congressional Letters.doc

Messrs. Nichols, Zimmerman, and Sheron,

Please concur on the attached final rule to incorporate by reference the 2005 Addenda thru 2008 Addenda of ASME Boiler and Pressure Vessel Code, and the 2005 Addenda and 2006 Addenda of the Operation and Maintenance Code, into 10 CFR 50.55a by Friday, March 25, 2011. You can send me your concurrence via email.

The following are attached for your review:

- Dir of NRR Memo
- Federal Register Notice
- Notice of Final Rule:
- Regulatory and Backfit Analysis
- Approval for Publication
- EDO Daily / Weekly notes
- Congressional Letters

In addition, we prepared an Analysis of Public Comments document that is available in ADAMS (ML110280240).

Wally - On the bottom of page 88 of the FRN, please add the date of Regulatory Guide 1.84, "Design, Fabrication, and Materials Code Case Acceptability, ASME Section III, Proposed Revision 34." Thanks.

Mark

CH/135

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From: Gibson, Kathy
To: Sheron, Brian; Uhle, Jennifer
Subject: Fw: SFP Recommendations -- Update
Date: Friday, March 18, 2011 3:58:24 PM

FYI :-(

From: Tinkler, Charles
To: Gibson, Kathy
Sent: Fri Mar 18 15:26:52 2011
Subject: RE: SFP Recommendations -- Update

We don't and we said so repeatedly.

From: Gibson, Kathy
Sent: Friday, March 18, 2011 2:39 PM
To: Tinkler, Charles
Subject: Fw: SFP Recommendations -- Update

I thought we didn't think sand was a good idea????

From: Lee, Richard
To: Wagner, Katie
Cc: Gibson, Kathy; Scott, Michael
Sent: Fri Mar 18 14:33:59 2011
Subject: FW: SFP Recommendations -- Update

Please enter this (if you have not) to our share point site. This documented the option paper that Op Center will forward to the NRC teams at the U.S. Embassy in Tokyo to provide U.S. advice to the Japanese team on managing the Fukushima crisis.

From: RST01 Hoc
Sent: Friday, March 18, 2011 1:13 PM
To: Modeen, David
Cc: Tinkler, Charles; Lee, Richard; Gordon, Matthew; RST07 Hoc
Subject: RE: SFP Recommendations -- Update

Please send to members of the phone group

From: Modeen, David [mailto:dmodeen@epri.com]
Sent: Friday, March 18, 2011 10:45 AM
To: RST01 Hoc; Edsinger, Kurt
Subject: RE: SFP Recommendations -- relative to criticality concerns

Joe, working on it. When we have some insights, we'll pass along.
Dave

Director, External Affairs
EPRI Nuclear Power Sector
704-595-2670 (work)
(b)(6) **cell)**

CH/136

dmodeen@epri.com

From: RST01 Hoc [mailto:RST01.Hoc@nrc.gov]
Sent: Friday, March 18, 2011 10:23 AM
To: Modeen, David
Subject: RE: SFP Recommendations -- relative to criticality concerns

Dave,

We are trying to get up to speed on that issue, so any thoughts you have will be appreciated.

Joe Williams
RST Coordinator

From: Modeen, David [mailto:dmodeen@epri.com]
Sent: Friday, March 18, 2011 10:05 AM
To: RST01 Hoc
Subject: RE: SFP Recommendations

I will distribute, Joe. Thanks.

I didn't want to complicate the call, but would like to know if NRC staff has an assessment (not a calculation of the actual SFPs at 1F) as to the potential risk of a criticality configuration resulting from any of those strategies. Seems very unlikely but that is just a judgment. Any work done on your end on that?

Dave

Director, External Affairs
EPRI Nuclear Power Sector
704-595-2670 (work)
(b)(6) **(cell)**
dmodeen@epri.com

From: RST01 Hoc [mailto:RST01.Hoc@nrc.gov]
Sent: Friday, March 18, 2011 10:00 AM
To: Modeen, David
Cc: Wall, James; Edsinger, Kurt; RST07 Hoc
Subject: RE: SFP Recommendations

Dave,

Here is NRC recommendation summary. Please ensure all phone call participants receive a copy.

Joe Williams
RST Coordinator

From: Modeen, David [mailto:dmodeen@epri.com]
Sent: Friday, March 18, 2011 8:55 AM
To: RST01 Hoc

Cc: Wall, James; Edsinger, Kurt
Subject: SFP Recommendations

Following up from the morning telcon, EPRI Contacts are:

David Modeen – dmodeen@epri.com
Kurt Edsinger – kedsinge@epri.com
James (Joe) Wall – jwall@epri.com

FYI, I am coordinating EPRI's response. Any requests for information or discussion on any other technical topic, the NRC Operations Center duty officer should feel free to contact me any time.

Dave

Director, External Affairs
EPRI Nuclear Power Sector
704-595-2670 (work)
(b)(6) (cell)
dmodeen@epri.com

From: Adams, Ian
To: Adams, Ian; Aoki, Steven; Binkley, Steve; Brinkman, Bill; RJBudnitz@lbl.gov; SCHU; DAgostino, Thomas; (b)(6) Finck, Phillip; (b)(6) Grossenbacher, John (INL); (b)(6) Hurlbut, Brandon; Kelly, John E (NE); Koonin, Steven; Lyons, Peter; McFarlane, Harold; Owens, Missy; peterson@nuc.berkeley.edu; Poneman, Daniel; Sheron, Brian; ronaldo.szilard@inl.gov
Subject: Contact list
Date: Saturday, March 19, 2011 4:22:37 PM
Attachments: Nuclear group contact info 0319.xlsx

Attached, please find the most up to date contact list for the nuclear group with phone numbers included. This will be further updated as more information is available.

Thanks
Ian

Ian Adams
Office of the Secretary
Department of Energy
(202) 586-9585
ian.adams@hq.doe.gov

CH/137

First	Last	Affiliation	Email 1	Email 2	Cell	Office
Ian	Adams	DOE	ian.adams@hq.doe.gov		(b)(6)	(202) 586-9585
Steve	Aoki	NNSA	Steven.Aoki@nnsa.doe.gov			
Steve	Binkley	DOE	Steve.Binkley@science.doe.gov			(202) 586-8441
Bill	Brinkman	DOE	Bill.Brinkman@science.doe.gov			(202) 586-8435
Bob	Budnitz	LBL	RJBudnitz@lbl.gov			(510) 486-7829
Steven	Chu	DOE	schu@hq.doe.gov			(202) 586-7160
Tom	D'Agostino	NNSA	Thomas.DAgostino@nnsa.doe.gov			(202) 586-5555
Steve	Fetter	WH	(b)(6)			
Phil	Finck	INL	Phillip.Finck@inl.gov			(208) 526-9447
Dick	Garwin	WH	(b)(6)	rlg2@us.ibm.com		
John	Grossenbacher	INL	john.grossenbacher@inl.gov			(208) 526-9021
John	Holdren	WH	(b)(6)			(202) 456-6030
Brandon	Hurlbut	DOE	brandon.hurlbut@hq.doe.gov			(202) 586-8957
John	Kelly	NE	JohnE.Kelly@Nuclear.Energy.Gov			(202) 586-5458
Steve	Koonin	DOE	Steven.Koonin@science.doe.gov			(202) 586-0505
Pete	Lyons	DOE	Peter.Lyons@Nuclear.Energy.gov			(202) 586-2565
Harold	McFarlane	INL	harold.mcfarlane@inl.gov			(202) 586-9175
Missy	Owens	DOE	missy.owens@hq.doe.gov			(202) 586-4251
Per	Peterson	Berkeley	peterson@nuc.berkeley.edu			(510) 501-4905
Dan	Poneman	DOE	Daniel.Poneman@hq.doe.gov			(202) 586-5500
Brian	Sheron	NRC	Brian.sheron@nrc.gov			(301) 251-7400
Ronaldo	Szilard	INL	ronaldo.szilard@inl.gov			

Home

(b)(6)

From: Kammerer, Annie
To: Kammerer, Annie; Hiland, Patrick; Skeen, David; Case, Michael; RST01 Hoc
Cc: Howe, Allen; Nelson, Robert; Stutzke, Martin; Giitter, Joseph; Rihm, Roger; McDermott, Brian; Hasselberg, Rick; Chokshi, Nilesh; Munson, Clifford; Cook, Christopher; Flanders, Scott; Ross-Lee, MaryJane; Brown, Frederick; Ruland, William; Dudes, Laura; Karas, Rebecca; Ake, Jon; Hogan, Rosemary; Uhle, Jennifer; Marshall, Michael; Uselding, Lara; Randall, John; Allen, Don; Burnell, Scott; Hayden, Elizabeth; Pires, Jose; Graves, Herman; Candra, Hernando; Murphy, Andrew; Sheron, Brian; Dricks, Victor; Warnick, Greg; Reynoso, John; Lantz, Ryan; Markley, Michael; Orders, William; Santiago, Patricia; Snodderly, Michael; Baggett, Steven; Sosa, Belkys; Davis, Roger; Franovich, Mike; Castleman, Patrick; Sharkey, Jeffry; Boska, John; Ma, John; Tegeler, Bret; Patel, Pravin; Shams, Mohamed; Morris, Scott; Brenner, Eliot; Harrington, Holly; Seber, Dogan; Ledford, Joey; Johnson, Michael; Virgilio, Martin; Holahan, Vincent; Bergman, Thomas; Webb, Michael; Manoly, Kamal; Khanna, Meena; Screnci, Diane; Thomas, Eric; Nguyen, Quynh; Meighan, Sean; "FOIAResource.hoc@nrc.gov"
Subject: FAQ questions posted
Date: Saturday, March 19, 2011 5:24:51 PM

All,

For your reading enjoyment, and in anticipation of the end of cycle meetings in the regions next week, the NRC has issued a press release announcing a publically available set of FAQs on the earthquake and tsunami.

I hope people find it helpful!

Cheers,
Annie

PS special thanks to Jennifer Uhle who stayed after her overnight shift in the Ops Center to review and provide outstanding comments that really improved the document.

From: Kammerer, Annie
Sent: Saturday, March 19, 2011 9:00 AM
To: Kammerer, Annie; Hiland, Patrick; Skeen, David; Case, Michael; RST01 Hoc
Cc: Howe, Allen; Nelson, Robert; Stutzke, Martin; Giitter, Joseph; Rihm, Roger; McDermott, Brian; Hasselberg, Rick; Chokshi, Nilesh; Munson, Clifford; Cook, Christopher; Flanders, Scott; Ross-Lee, MaryJane; Brown, Frederick; Ruland, William; Dudes, Laura; Karas, Rebecca; Ake, Jon; Hogan, Rosemary; Uhle, Jennifer; Marshall, Michael; Uselding, Lara; Randall, John; Allen, Don; Burnell, Scott; Hayden, Elizabeth; Pires, Jose; Graves, Herman; Candra, Hernando; Murphy, Andrew; Sheron, Brian; Dricks, Victor; Warnick, Greg; Reynoso, John; Lantz, Ryan; Markley, Michael; Orders, William; Santiago, Patricia; Snodderly, Michael; Baggett, Steven; Sosa, Belkys; Davis, Roger; Franovich, Mike; Castleman, Patrick; Sharkey, Jeffry; Boska, John; Ma, John; Tegeler, Bret; Patel, Pravin; Shams, Mohamed; Morris, Scott; Brenner, Eliot; Harrington, Holly; Seber, Dogan; Ledford, Joey; Johnson, Michael; Virgilio, Martin; Holahan, Vincent; Bergman, Thomas; Webb, Michael; Manoly, Kamal; Khanna, Meena; Screnci, Diane; Thomas, Eric; Nguyen, Quynh; Meighan, Sean; FOIAResource.hoc@nrc.gov
Subject: Seismic Q&As March 19th 8am update

All,

Here is today's updated version. Lot of new fact sheets have been prepared for various briefings and for Monday's public meeting!

However, the big news of the day is that we just sent off a 6 page, 22 question, much better edited version for a public Q&A set. It's all in OPA's capable hands now. I think it's pretty good...but then I'm biased.

Cheers,
Annie

From: Kammerer, Annie
Sent: Friday, March 18, 2011 6:51 AM
To: Kammerer, Annie; Hiland, Patrick; Skeen, David; Case, Michael; RST01 Hoc
Cc: Howe, Allen; Nelson, Robert; Stutzke, Martin; Giitter, Joseph; Rihm, Roger; McDermott, Brian; Hasselberg, Rick; Chokshi, Nilesh; Munson, Clifford; Cook, Christopher; Flanders, Scott; Ross-Lee, MaryJane; Brown, Frederick; Ruland, William; Dudes, Laura; Karas, Rebecca; Ake, Jon; Hogan, Rosemary; Uhle, Jennifer; Marshall, Michael; Uselding, Lara; Randall, John; Allen, Don; Burnell, Scott; Hayden, Elizabeth; Pires, Jose; Graves, Herman; Candra, Hernando; Murphy, Andrew; Sheron, Brian; Dricks, Victor; Warnick, Greg; Reynoso, John; Lantz, Ryan; Markley, Michael; Orders, William; Santiago, Patricia; Snodderly, Michael; Baggett, Steven; Sosa, Belkys; Davis, Roger; Franovich, Mike; Castleman, Patrick; Sharkey, Jeffry; Boska, John; Ma, John; Tegeler, Bret; Patel, Pravin; Shams, Mohamed; Morris, Scott; Brenner, Eliot; Harrington, Holly; Seber, Dogan; Ledford, Joey; Johnson, Michael; Virgilio, Martin; Holahan, Vincent; Bergman, Thomas; Webb, Michael; Manoly, Kamal; Khanna, Meena; Screnci, Diane; Thomas, Eric; Nguyen, Quynh; Meighan, Sean
Subject: RE: Seismic Q&As March 18th 5am update

All,

Please see the updated version of the Seismic Q&As.

Among today's highlights:
*We added a Terms and Definitions section at the end of the document. (We know that an acronyms list would be helpful too, but it will have to wait a little)
*The "additional information" section has been split into tables, plots, and fact sheets
*A high-level draft fact sheet on NRC's seismic regulations has been added
*We added a section to track outstanding questions that have come in from congress. This will support those who get the tickets in the short terms (most likely NRR). The questions will be moved to the appropriate sections long term (as long as they are not duplicates.)

I'm sure we all agree this has been a crazy week!. We're hoping that the weekend workload is lighter (if only because we won't get as many email from in house) and we can clean up this document and fill in some of the missing answers in preparation for the news story changing. We're trying hard to get out in front of the next wave.

CH/138

Cheers,
Annie

From: Kammerer, Annie
Sent: Thursday, March 17, 2011 2:36 AM
To: Kammerer, Annie; Hiland, Patrick; Skeen, David; Case, Michael; RST01 Hoc
Cc: Howe, Allen; Nelson, Robert; Stutzke, Martin; Giitter, Joseph; Rihm, Roger; McDermott, Brian; Hasselberg, Rick; Chokshi, Nilesh; Munson, Clifford; Cook, Christopher; Flanders, Scott; Ross-Lee, MaryJane; Brown, Frederick; Giitter, Joseph; Howe, Allen; Ruland, William; Dudes, Laura; Karas, Rebecca; Ake, Jon; Munson, Clifford; Hogan, Rosemary; Uhle, Jennifer; Marshall, Michael; Uselding, Lara; Randall, John; Allen, Don; Burnell, Scott; Hayden, Elizabeth; Pires, Jose; Graves, Herman; Candra, Hernando; Murphy, Andrew; Murphy, Andrew; Pires, Jose; Hogan, Rosemary; Sheron, Brian; Dricks, Victor; Warnick, Greg; Reynoso, John; Lantz, Ryan; Markley, Michael; Orders, William; Santiago, Patricia; Snodderly, Michael; Baggett, Steven; Sosa, Belkys; Davis, Roger; Franovich, Mike; Castleman, Patrick; Sharkey, Jeffry; Boska, John; Ma, John; Tegeler, Bret; Patel, Pravin; Shams, Mohamed; Morris, Scott; Brenner, Eliot; Harrington, Holly; Seber, Dogan; Ledford, Joey; Johnson, Michael; Virgilio, Martin; Holahan, Vincent; Bergman, Thomas
Subject: Seismic Q&As March 17th 2am update

All,

As promised, a sharepoint site has been set up where our friends in NRR will be posting the latest version of the Seismic Q&A document on an ongoing basis. If someone would prefer to use the sharepoint site, instead of being on this distribution list, please let me know...
http://portal.nrc.gov/edo/nrr/NRR%20TA/FAQ%20Related%20to%20Events%20Occuring%20in%20Japan/Forms/AllItems.aspx

This latest update has a number of new questions (not many with answers today, but we are working hard). A high priority question we are working on is "how many plants are near a mapped active fault". We're focusing on anything within 50 miles. We're also pulling relevant questions from the congressional inquiries we just received; and will also give these high priority to support any needs by NRR.

Many new figures and some draft fact sheets have added to the "additional information" section. These include the NRO half of a tsunami fact sheet...a description of the tsunami research is still to come from RES.

Some good news: Yesterday's version seems to have been widely forwarded around the agency. So, we are also starting to get some excellent questions from staff looking forward. This is allowing us to feel that we are finally getting out in front of things to a small degree. Also, our team has grown and we now have someone acting as source of seismic expertise for the 11pm to 7 am shift. This means that we now have seismic experts available to the RST and OPA at the Op Center 24 hours, with 2 people during the day. That extra support is allowing us to get this out at least an hour earlier today ☺

We are continuing to compile the questions that come in and update the seismic Q&A document. If you have suggested changes, or want to provide missing answers, please forward them to me for compilation.

This is a living document and will be updated daily in the foreseeable future.

Happy St. Paddy's Day. May the world (especially our friends in Japan) have the luck of the Irish today.

Cheers,
Annie

Dr. Annie Kammerer, PE
Senior Seismologist and Earthquake Engineer
US Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington DC 20555
(b)(6) mobile
BB

From: Kammerer, Annie
Sent: Tuesday, March 15, 2011 3:41 AM
To: Hiland, Patrick; Skeen, David
Cc: Howe, Allen; Nelson, Robert; Stutzke, Martin; Giitter, Joseph; Rihm, Roger; McDermott, Brian; Hasselberg, Rick; Kammerer, Annie; Chokshi, Nilesh; Munson, Clifford; Cook, Christopher; Flanders, Scott; Ross-Lee, MaryJane; Brown, Frederick; Giitter, Joseph; Howe, Allen; Case, Michael; Ruland, William; Dudes, Laura; Karas, Rebecca; Ake, Jon; Munson, Clifford; Hogan, Rosemary; Uhle, Jennifer; Marshall, Michael; Uselding, Lara; Randall, John; Allen, Don; Burnell, Scott; Hayden, Elizabeth; Pires, Jose; Graves, Herman; Candra, Hernando; Murphy, Andrew; Murphy, Andrew; Pires, Jose; Hogan, Rosemary; Sheron, Brian; Dricks, Victor; Warnick, Greg; Reynoso, John; Lantz, Ryan; Markley, Michael
Subject: latest version of Q&As

All,

This is the first draft of the seismic-specific Q&As. It is pretty rough and there are many answers still missing, but people

have contributed a lot and we thought it may be useful for many people trying to answer questions coming in.

We are continuing to compile the questions that come in and update the seismic Q&A document. If you have suggested changes, or want to provide missing answers, please forward them to me for compilation.

This is a living document and will be updated daily in the foreseeable future.

Annie

Dr. Annie Kammerer, PE
Senior Seismologist and Earthquake Engineer
US Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
Washington DC 20555
(b)(6) mobile
3B

From: Sheron, Brian
To: Adams, Ian; Aoki, Steven; Binkley, Steve; "RJBudnitz@lbl.gov"; (b)(6) "rlg2@us.ibm.com"; Grossenbacher, John (INL); Kelly, John E (NE); Lyons, Peter; McFarlane, Harold; "peterson@nuc.berkeley.edu"; Finck, Phillip; "ronaldo.szilard@inl.gov"; (b)(6)
Subject: RE: Updated nuclear group distribution list
Date: Saturday, March 19, 2011 5:49:00 PM

Daytime: 301-251-7400
Evenings (b)(6)
Cell: (b)(6)

From: Adams, Ian [mailto:Ian.Adams@Hq.Doe.Gov]
Sent: Saturday, March 19, 2011 12:43 PM
To: Aoki, Steven; Binkley, Steve; 'RJBudnitz@lbl.gov'; Sheron, Brian; (b)(6) 'rlg2@us.ibm.com'; Grossenbacher, John (INL); Kelly, John E (NE); Lyons, Peter; McFarlane, Harold; 'peterson@nuc.berkeley.edu'; Finck, Phillip; 'ronaldo.szilard@inl.gov'; (b)(6)
Subject: Re: Updated nuclear group distribution list

Good afternoon,

When you have a chance, please reply back to this email with the best phone number to reach you at so that we have good contact information for everyone.

Thanks,
Ian

From: Adams, Ian
To: Adams, Ian; Aoki, Steven; Binkley, Steve; Bob Budnitz <RJBudnitz@lbl.gov>; Brian Sheron <Brian.sheron@nrc.gov>; Brinkman, Bill; DAgostino, Thomas; Dick Garwin (b)(6) Dick Garwin <rlg2@us.ibm.com>; Grossenbacher, John (INL); Hurlbut, Brandon; John Holdren (b)(6) Kelly, John E (NE); Koonin, Steven; Lyons, Peter; McFarlane, Harold; Owens, Missy; Per Peterson <peterson@nuc.berkeley.edu>; Phil Finck <Phillip.Finck@inl.gov>; Poneman, Daniel; Rolando Szilard <ronaldo.szilard@inl.gov>; SCHU; Steve Fetter (b)(6)
Sent: Fri Mar 18 19:02:01 2011
Subject: Updated nuclear group distribution list

Good evening,

Attached, please find an updated nuclear group distribution list, with Bill Brinkman and Steve Binkley added. Please use this list going forward.

Thanks,

Ian

Ian Adams

Office of the Secretary

Department of Energy

CH/139

From: Sheron, Brian
To: Case, Michael; Gibson, Kathy
Cc: Uhle, Jennifer
Subject: FW: Deployment to Japan
Date: Saturday, March 19, 2011 5:50:00 PM
Attachments: 2nd Staff Deployment to Japan.docx

From: Evans, Michele
Sent: Saturday, March 19, 2011 11:42 AM
To: Scott, Michael; Blamey, Alan; Giessner, John; Taylor, Robert; Jackson, Todd; Miller, Marie; Ali, Syed; Sheikh, Abdul; Way, Ralph; Ramsey, Jack
Cc: Cadoux, Claude; Dempsey, Jeanne; Linnerooth, Sarah; Buchholz, Jeri; Sheron, Brian; McCree, Victor; Pederson, Cynthia; Lubinski, John; Holian, Brian; Leeds, Eric; Lew, David; Lorson, Raymond; Mamish, Nader
Subject: Deployment to Japan

Thank you for volunteering for deployment to Japan. This work is of highest priority for the agency and your efforts are enormously appreciated.

The plan is for Mike Scott (RES) and Alan Blamey (RII) to leave the USA on Tuesday, March 22.
The remaining team members, Jack Giessner (RIII), Rob Taylor (NRR), Todd Jackson (RI), Marie Miller (RI), Syed Ali (RES), Abdul Sheikh (NRR), Ralph Way (NSIR), and Jack Ramsey (OIP) will depart on or about March 24. The intent is that your stay will be two weeks or less, depending on how the situation in Japan evolves.

The Operations Center Liaison Team (LT) will be contacting you later today to handle the logistic for your trip. This includes items such as flights, passports, country clearances, health immunizations, international blackberry service, dosimetry and KI tablets.

In addition, HR has requested that I provide you the information below:

-Please contact NRC Health Services on Monday morning on 301-415-8400 to schedule an appointment with Dr. Cadoux for health screening and counseling. If at all possible, it is important that you meet with Dr. Cadoux face-to-face. However, if you are located in the Region or if you are notified and deployed in a very short time frame so that medical screening is not possible, this screening will be conducted by phone. Please be aware that medical services available in Tokyo are limited at this time. Additionally, working conditions are such that controlling diet, sleep, exercise, and routine may be impossible. All of these factors can impact your health. Please review any medical conditions that you may have with Dr. Cadoux so that he can provide you with advice and counseling on managing you medical condition while deployed.

-Before you deploy we recommend that you speak briefly with the NRC Employee Assistance Program counselor, Sarah Linnerooth. Sarah can be reached on 301-415-7113. While you are deployed, EAP services are available to both you and your family, including extended family members such as Grandparents. The telephone number is for EAP service is 1-800-896-0276. More information is available on the EAP on the web at www.eapconsultants.com. To learn more about the EAP and the services provided click on the member services tab. The NRC passcode is (b)(6) Please be sure to share

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this information with your family.

At this point, I ask that you hold any questions that you may have until the LT contacts you directly. However, after that time, if you have any additional questions or concerns that have not been addressed, please call or email me.

Thank you.

Michele Evans
Acting Deputy OD, NSIR
Michele.evans@nrc.gov
BB: 240-688-6509

Deployment of Second NRC Team to Japan as of March 19, 2011

Skill Set	Name/Office/Projected Deployment date
Executive level	**Dan Dorman/NMSS/March 19**
General Technical Knowledge/interpersonal skills travelling March 22	**Mike Scott/RES/March 22** **Alan Blamey/Region II/ March 22**
General Technical Knowledge/interpersonal skills travelling March 24	Jack Giessner/Region III/March 24 Rob Taylor/NRR/March 24
Protective Measures/Dose Assessment	Todd Jackson/Region I/March 23 Marie Miller/Region I/March 24
Structural Engineering Expertise	Syed Ali/RES/March 24 Abdul Sheikh/NRR/March 24
Damage Assessment Expertise	Ralph Way/NSIR/March 24
Expertise in Infrared Images	No NRC staff identified with this expertise. We are pursuing NGA resources that could support in Japan.
International Programs Expertise	Jack Ramsey/OIP/March 24 TBD/TBD/March 24

From: ET02 Hoc
To: Sheron, Brian
Subject: Unit 3 explosion video
Date: Sunday, March 20, 2011 6:21:43 PM

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http://www.youtube.com/watch?v=y1NAYTABpRo

CH/141

From: Valentin, Andrea
To: Sheron, Brian; Uhle, Jennifer
Cc: Grancorvitz, Teresa; Spencer, Ruth; Stout, Kathleen
Subject: RE: Res Costs
Date: Friday, March 18, 2011 6:32:49 PM

(b)(5)

From: Sheron, Brian
Sent: Friday, March 18, 2011 4:52 PM
To: Valentin, Andrea; Golder, Jennifer; Uhle, Jennifer
Cc: Grancorvitz, Teresa; Spencer, Ruth; Stout, Kathleen
Subject: RE: Res Costs

Basis? What is the $ for?

From: Valentin, Andrea
Sent: Friday, March 18, 2011 9:53 AM
To: Golder, Jennifer; Uhle, Jennifer; Sheron, Brian
Cc: Grancorvitz, Teresa; Spencer, Ruth; Stout, Kathleen
Subject: RE: Res Costs

Jennifer (G),

(b)(5)

Thanks,

Andrea Valentin, Acting Director
Program Management, Policy Development and Analysis Staff
Office of Nuclear Regulatory Research
301-251-7497

From: Golder, Jennifer
Sent: Thursday, March 17, 2011 4:30 PM
To: Uhle, Jennifer; Grancorvitz, Teresa
Cc: Valentin, Andrea
Subject: Res Costs

Hi Jennifer,

CH/142

(b)(5)

I will need to know by tomorrow morning.

Thanks much

Jennifer Golder

Budget Director
Office of the Chief Financial Officer
United States Nuclear Regulatory Commission

From: Sheron, Brian
To: Speiser, Herald; Batkin, Joshua; HOO Hoc
Cc: Borchardt, Bill; Brenner, Eliot; Pace, Patti
Subject: RE: seismic question for today
Date: Saturday, March 19, 2011 7:00:00 PM

Herald, we are working on the question, and I will have the ET director on duty at 8am tomorrow call the Chairman. The HOO has the Chairman's cell phone #.

From: Speiser, Herald
Sent: Saturday, March 19, 2011 6:34 PM
To: Batkin, Joshua; Sheron, Brian; HOO Hoc
Cc: Borchardt, Bill; Brenner, Eliot; Pace, Patti
Subject: RE: seismic question for today

Mr. Sheron,

It is my understanding that the Chairman is aware of this call and that you will initiate the call to the Chairman. Do you have his cell phone number?

Thank you.

Herald

****
Herald M. Speiser - (301) 415-1830
Administrative Assistant
Office of the Chairman
Nuclear Regulatory Commission
11555 Rockville Pike
Mailstop: O-16G4
Rockville, MD 20852

From: Batkin, Joshua
Sent: Saturday, March 19, 2011 6:02 PM
To: Sheron, Brian; HOO Hoc
Cc: Borchardt, Bill; Brenner, Eliot; Speiser, Herald; Pace, Patti
Subject: Re: seismic question for today

Thanks Brian. Can you please schedule an 8am ET update call tomorrow with the Chairman?

Joshua C. Batkin
Chief of Staff
Chairman Gregory B. Jaczko
(301) 415-1820

CH/143

From: Sheron, Brian
To: Batkin, Joshua; HOO Hoc
Cc: Borchardt, Bill; Brenner, Eliot
Sent: Sat Mar 19 17:35:59 2011
Subject: RE: seismic question for today

Josh, we're working on it.

From: Batkin, Joshua
Sent: Saturday, March 19, 2011 4:35 PM
To: Sheron, Brian; HOO Hoc
Cc: Borchardt, Bill; Brenner, Eliot
Subject: seismic question for today

The Chairman keeps getting asked a question along the lines of 'how many of our plants are in/near seismically active areas.' Is there a specific numerical way to answer this i.e maybe like there are X number in high seismic areas or near faults etc.? Thank you Josh

From: Sheron, Brian
To: Batkin, Joshua; HOO Hoc
Cc: Borchardt, Bill; Brenner, Eliot; Speiser, Herald; Pace, Patti
Subject: RE: seismic question for today
Date: Saturday, March 19, 2011 6:55:00 PM

Will do.

From: Batkin, Joshua
Sent: Saturday, March 19, 2011 6:02 PM
To: Sheron, Brian; HOO Hoc
Cc: Borchardt, Bill; Brenner, Eliot; Speiser, Herald; Pace, Patti
Subject: Re: seismic question for today

Thanks Brian. Can you please schedule an 8am ET update call tomorrow with the Chairman?

Joshua C. Batkin
Chief of Staff
Chairman Gregory B. Jaczko
(301) 415-1820

From: Sheron, Brian
To: Batkin, Joshua; HOO Hoc
Cc: Borchardt, Bill; Brenner, Eliot
Sent: Sat Mar 19 17:35:59 2011
Subject: RE: seismic question for today

Josh, we're working on it.

From: Batkin, Joshua
Sent: Saturday, March 19, 2011 4:35 PM
To: Sheron, Brian; HOO Hoc
Cc: Borchardt, Bill; Brenner, Eliot
Subject: seismic question for today

The Chairman keeps getting asked a question along the lines of 'how many of our plants are in/near seismically active areas.' Is there a specific numerical way to answer this i.e maybe like there are X number in high seismic areas or near faults etc.? Thank you Josh

From: Sheron, Brian
To: Borchardt, Bill
Cc: Johnson, Michael
Subject: RE: Chairman Brief
Date: Sunday, March 20, 2011 7:13:00 PM

Thanks.

From: Borchardt, Bill
Sent: Sunday, March 20, 2011 7:01 PM
To: Sheron, Brian
Cc: Johnson, Michael
Subject: Re: Chairman Brief

Nothing additional. I met with the Chairman @ noon and discussed the 10am call and my follow on conversation with INPO.
Bill Borchardt
Via blackberry

From: Sheron, Brian
To: Borchardt, Bill
Cc: Johnson, Michael
Sent: Sun Mar 20 18:49:29 2011
Subject: Chairman Brief

Bill, during my brief of the Chairman at 3:15 pm today, he wanted a brief at the 11:15 briefing on the 10 am phone call you and Jim W. participated in at 10 am this morning with the industry. I have the Op center summary, which I will turn over to Mike Johnson, who takes over at 11 pm. Is there anything in particular we need to stress to him in the briefing?

CH/145

From:	Wiggins, Jim
To:	Sheron, Brian
Subject:	Fw: Report on Meeting between Chairman Jaczko and Japanese Ambassador to the U.S. Ichiro Fujisaki
Date:	Saturday, March 19, 2011 9:03:26 PM
Attachments:	Doc1.docx bechtel detailed diagram.pdf Japan Aid.xlsx Chairmans March 18 Doc.docx

See attach 3. This is the equipment list the Chairman took to his mtg with the Japanese ambassidor Fri pm. So we completed the action that was discussed at the 4:00pm NSS call.

From: LIA07 Hoc
Sent: Sat Mar 19 06:24:53 2011
Subject: Report on Meeting between Chairman Jaczko and Japanese Ambassador to the U.S. Ichiro Fujisaki

Dear Colleagues,

Attached is the report summarizing Chairman Jaczko's meeting with Japanese Ambassador to the U.S. Ichiro Fujisaki, held on March 18, 2011, at 1600 hours EST. We have also included other key documents which provide additional information pertinent to the recent events. Please note this information is "official use only" and is only being shared within the federal family. Please call the Headquarters Operations Office at 301-816-5100 with questions.

International Liaison Team
U.S. Nuclear Regulatory Commission

CH/146

From: Sheron, Brian
To: Virgilio, Martin
Subject: FW: Japanese Earthquake 19 March 2011 1800 EDT
Date: Saturday, March 19, 2011 9:17:00 PM
Attachments: Japan Earthquake Response 03192011 1800.pdf
SITREP MAR19 1800-final.docx

-----Original Message-----
From: Adams, Ian [mailto:Ian.Adams@Hq.Doe.Gov]
Sent: Saturday, March 19, 2011 8:36 PM
To: Adams, Ian; Aoki, Steven; Binkley, Steve; Brinkman, Bill; RJBudnitz@lbl.gov; DAgostino, Thomas; (b)(6) Finck, Phillip; (b)(6) Grossenbacher, John (INL); (b)(6) Hurlbut, Brandon; Kelly, John E (NE); Koonin, Steven; Lyons, Peter; McFarlane, Harold; Owens, Missy; peterson@nuc.berkeley.edu; Poneman, Daniel; Sheron, Brian; ronaldo.szilard@inl.gov
Subject: Japanese Earthquake 19 March 2011 1800 EDT

Attached is the most recent Sit Rep on Japan.

A reminder - this information is not to be distributed further or shared with anyone not copied here.

Thanks,
Ian

-----Original Message-----
From: NITOPS
Sent: Saturday, March 19, 2011 6:25 PM
Subject: Japanese Earthquake 19 March 2011 1800 EDT

Please find attached the latest DOE SITREP regarding the ongoing earthquake and tsunami response in Japan.

This information is provided for your internal use and should be shared only with those who have a need to know. Further distribution of this information outside of your agency.

The SITREP will be updated every 12 hours.

Nuclear Incident Team (NIT)
Office of Emergency Response (NA-42)
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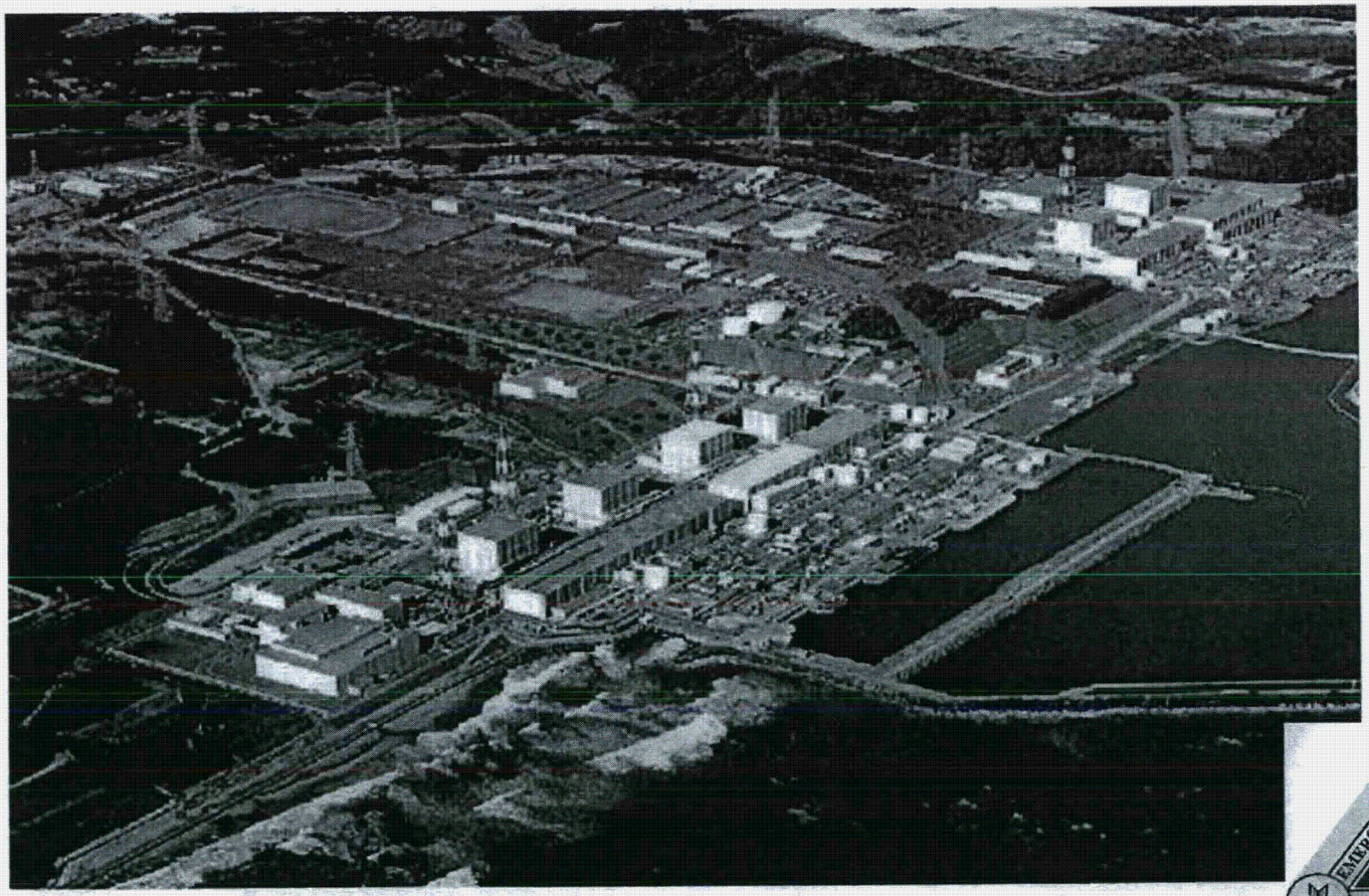
CH/147

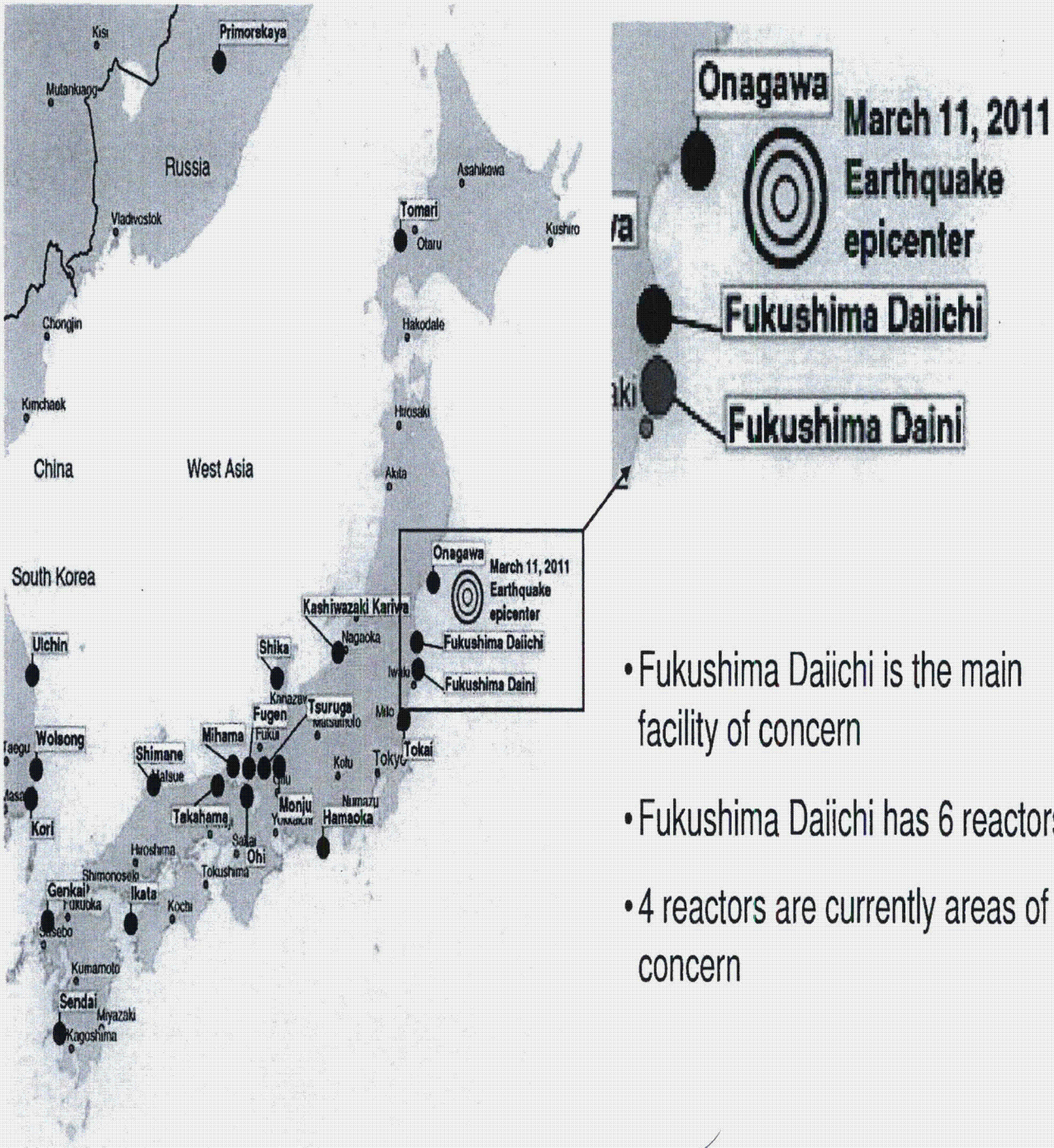
Japan Earthquake Response
March 19, 2011 // 1800 EDT



This information is for limited distribution to those with a NEED TO KNOW and should not be forwarded outside your agency or organization without prior clearance from U.S. DOE

Contact: DOE/NNSA Nuclear Incident Team: NITOPS@nnsa.doe.gov

Japan Nuclear Facilities



- Fukushima Daiichi is the main facility of concern
- Fukushima Daiichi has 6 reactors
- 4 reactors are currently areas of concern

Current Status Fukushima Daiichi

Reactors 1, 2 and 3 at the plant are being cooled with seawater. There is some level of uranium fuel damage at all three units, and containment structure damage is suspected at reactor 2.

6 Reactors:

Unit 1:

- Per the NRC (quoting various sources), as of 0600 EDT March 19: Core damage to undetermined extent; Reactor Containment System (RCS) depressurized, seawater injected to cool core; Primary containment is functional; Secondary containment lost; Spent fuel (292 bundles) water level unknown
- Per NISA, 0150 EDT March 19: Reactor parameters appear stable (pressure - 0..27 MPa (40 psi, depressurized), water level - 1.75 meters below the top of the fuel rods; Previous estimate of fuel rod damage was at 70%.

Unit 2:

- Per NRC (quoting various sources), 0600 EDT March 19: Core damaged to undetermined extent; RCS pressures unknown, seawater injected to cool core; Primary containment has possible Torus damage; Secondary containment has hole cut in side of fuel floor metal to reduce hydrogen buildup, steam is coming from hole; Spent fuel (587 bundles) No further information. TEPCO has outside power to Auxilliary Transformer.
- Per NISA, 0150 EDT March 19: Reactor parameters appear stable (pressure - 0.085 MPa (12 psi, depressurized), water level - 1.4 meters below the top of the fuel rods, Previous estimate of fuel rod damage was at 33%.

Current Status Fukushima Daiichi

6 Reactors (continued):

Unit 3:

- Per the NRC (quoting various sources), as of 0600 EDT March 19: Core damaged to undetermined extent; RCS pressures unknown, radiation has been released, seawater is still being injected to cool the core. At this time, per the NRC, the primary containment status is unknown, the secondary containment has been lost, and visible "white smoke" has been interpreted by NRC as steam. With respect to the spent fuel pond (514 bundles), helicopters flybys to drop water as well as water cannon trucks spraying water continued on March 17. As of 1400 UTC on 19 March, the IAEA reports that it still lack reliable validated data on water levels and temperatures at the spent fuel pools at Units 3 and 4.
- Per NISA, as of 0150 EDT March 19: The reactor parameters appear stable (pressure - 0.078 MPa (11 psi, depressurized), and the water level is 2.1 meters below the top of the fuel.
- Also of note, the only MOX fuel at the site are the 32 MOX assemblies in the Unit 3 reactor core which consists of less than 6% of the total assemblies in the core The presence of MOX in this ratio will not change the nature of the radiological emissions from the plant. There is plutonium already in the uranium fuel that is irradiated. The impact of MOX is undetectable. The radiological consequences will be dominated by the incidences in Unit 3 and 4 used fuel pools of which there is no MOX.
- No new information has been obtained that would confirm the status of the reactor vessel. Concerns have been raised due to the previous hydrogen explosion on March 14th.

Current Status Fukushima Daiichi

6 Reactors (continued):

Unit 4:

- Per NRC (quoting various sources), as of 0600 EDT March 19: Core offloaded; RCS – Not applicable; Primary containment – Not applicable; Secondary containment - lost, visible "white smoke" interpreted by NRC as steam; Spent fuel (1201 bundles), pool may be dry, damage to fuel rods suspected, water was dumped on site with water cannons. As of 1100 EDT March 19, JAIF reports that preparations are being made to inject water into the fuel pool.
- An earlier report suggested that an explosion had damaged the Unit 4 reactor building, exposing used fuel. The spent fuel pond may have been damaged during the explosion, and the ability of the pond to retain water for a significant period is in doubt. We have conflicting information on this from the GOJ and TEPCO. A helicopter flyby was performed on 16 March. Video images of the SFP#4 were inconclusive as to the water level although senior METI and NISA officials in Tokyo indicate that the images confirm that water covers the spent fuel. As of 1330 JST on 19 March, NISA was reporting that the temperature in the spent fuel pond was 84 degrees Celsius.

Current Status Fukushima Daiichi

6 Reactors (continued):

Unit 5:

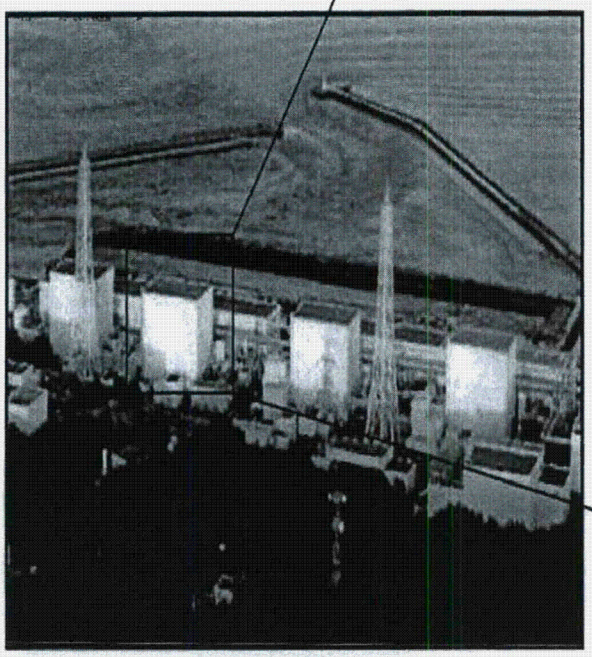
- Per NRC quoting various sources), 0600 EDT March 19: Shutdown since January 3, 2011. Core in RPV; Spent fuel (950 bundles), temperature 66C, Unit 6 emergency diesel generator is available; fire truck spray has been staged.
- Per NISA, 0150 EDT March 19: Reactor parameters appear stable (pressure – 1.359 MPa (197 psi, depressurized), water level – 1.98 meters above the top of the fuel,
- The Residual Heat Removal (RHR) system was restarted to providing cooling water to the reactor. Power is being provided using an operational diesel generator. Holes have been made in the roof to provide a vent path to reduce the potential for a hydrogen explosion.
- Unit 5 was in a refueling outage at the time of the earthquake. With the restart of the RHR system, reactor temperatures will decrease. No reactor temperature updates have been provided. No updates on spent fuel pool level have been provided, noting that previous reports had indicated level decreases.

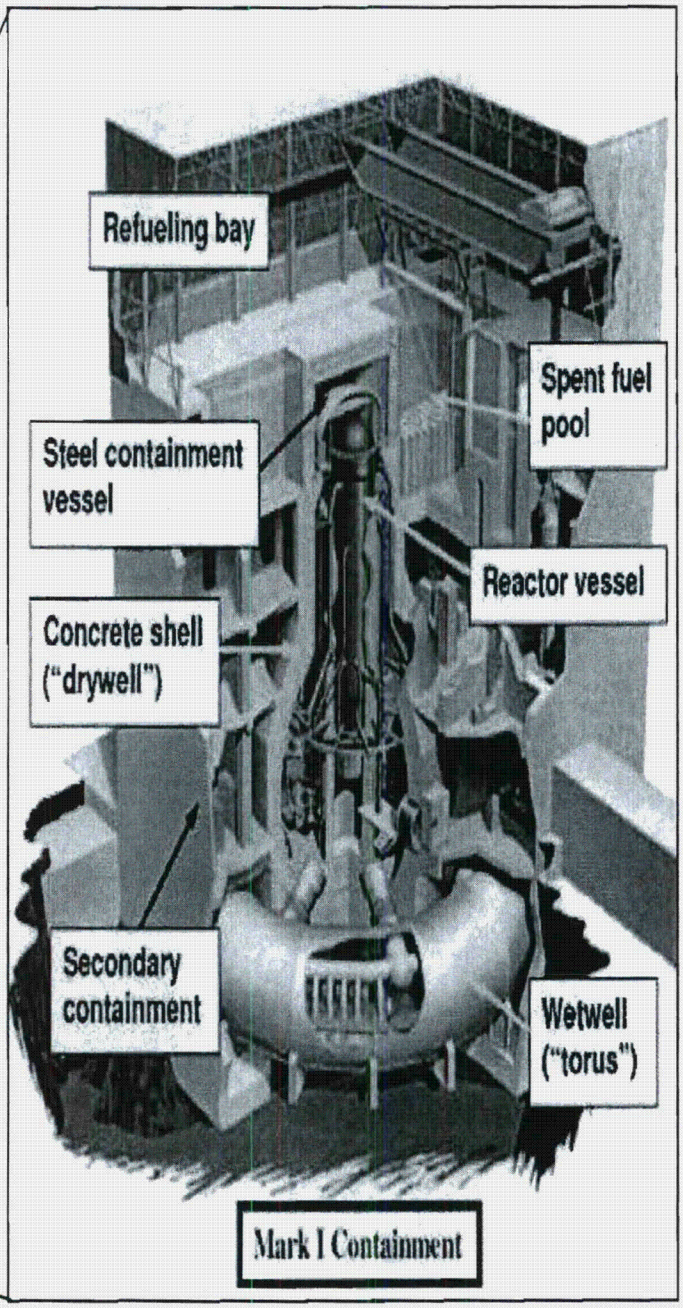
Unit 6:

- Per NRC quoting various sources), 0600 EDT March 19: Shutdown since August 14, 2011. Core in RPV; Spent fuel (876 bundles), temperature 66C, Unit's emergency diesel generator is available.
- Per NISA, 0150 EDT March 19: Reactor parameters appear stable (pressure – 1.359 MPa (197 psi, depressurized), water level – 1.98 meters above the top of the fuel,
- Holes have been made in the roof to provide a vent path to reduce the potential for a hydrogen explosion.
- Unit 6 was in a refueling outage at the time of the earthquake. The reactor is stable with reactor temperature of 157.1℃. Spent fuel pool temperatures are stable at 65.0℃

- As of 1400 UTC 19 March, the IAEA reports that temperatures at the spent fuel pools in Units 5 and 6 have risen in the past few days but this does not give rise to immediate concern. Water continues to be circulated within the reactor pressure vessels and the spent fuel ponds at both units.

Boiling Water Reactor





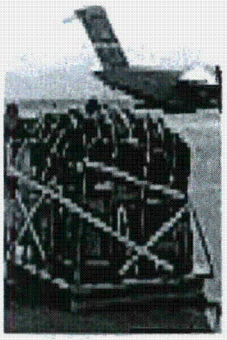
Current Status
Fukushima Daini and Onagawa

- Fukushima Daini:
  - 4 reactor units were operational and automatically shutdown
  - Cooling capability was lost on 13 and 14 March
  - Elevated radiation readings were reported on 13 and 14 March but have decreased
  - TEPCO confirmed cold shutdown and continued cooling of reactor cores.
- Onagawa:
  - Elevated readings were reported on 13 March
    - Readings peaked at 10 μSv/hr at the site boundary on 13 March
  - Readings have decreased
  - Elevated readings have been attributed to the Daiichi plant
  - Onagawa is located approximately 75 km north of the Daiichi plant
  - All reactors are stable

DOE Response

- Deployed:

  - 6 representatives at U.S. Embassy Tokyo
    - 2 permanent staff (NNSA & Nuclear Energy)
    - 2 Foreign Service Nationals
    - 1 Nuclear Energy representative deployed
    - 1 NNSA representative deployed as part of USAID Disaster Assistance Response Team (DART)
  - Consequence Management Assets
    - 34 personnel
    - Tailored Consequence Management Response Team (CMRT) based at Yokota Air Force Base outside Tokyo
      - Scientific data assessment staff
      - Radiation monitoring personnel
      - Air sampling capability
      - Management, coordination, and liaison staff
      - Health Physics equipment (for contamination surveys)



    - *Aerial Measuring System (AMS)*
      - Aerial detection systems for mapping radiological ground material deposits
    - *5 x 2-man field monitoring teams*

  - *DOE remains capable of performing its domestic responsibility*

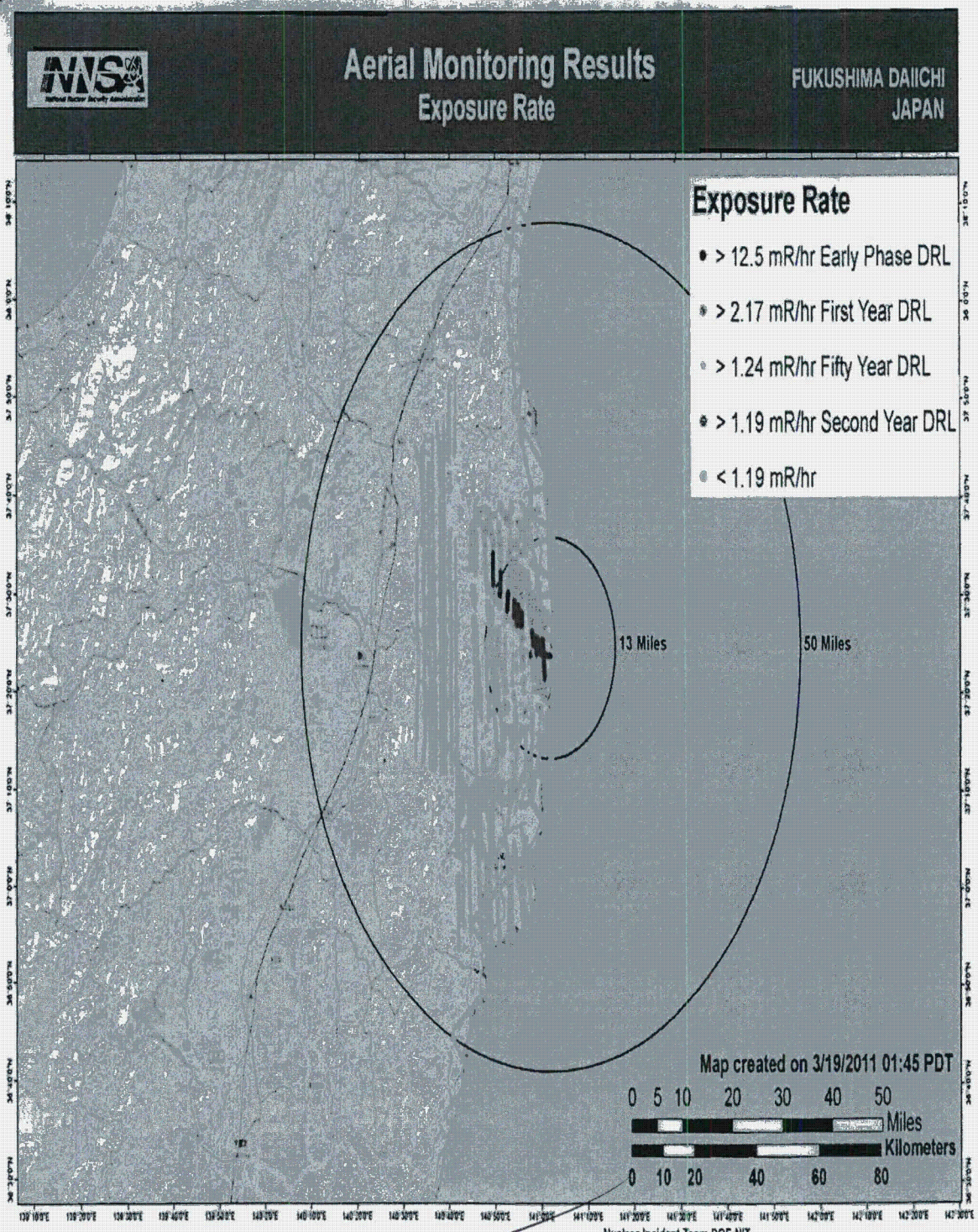
DOE Response

- Activated:
  - Nuclear Incident Team (NIT) at DOE Headquarters
    - Coordinating DOE response
      - Policy
      - Scientific
      - Emergency Response
  - National Atmospheric Release Advisory Center (NARAC) at Lawrence Livermore National Lab
    - Predictive plume modeling of atmospheric radiation release
  - Consequence Management Home Team
    - Scientific assessment of data based on requests from Federal, State, and local officials
  - Medical expertise through the Radiation Emergency Assistance Center / Training Site (REAC/TS) in Oak Ridge, TN
    - Fielding numerous requests for advice on protection of responders from radiation exposures
    - Vastly increased traffic on the REAC/TS website for radiation dose effect information
    - Coordinating response options in case deployed personnel receive exposure
- ***Mobilizing:***
  - ***Liaison to PACOM (expected on location Monday)***

AMS Measurements

- DOE Team AMS Operations 19 March 2011
  - One mission using military C-12 aircraft (fixed wing)
    - Concentrated within 50 mile zone but outside a 13 mile zone flying a pattern intended to bound the NW edge of the deposition.
  - One mission using UH-1 aircraft (helicopter)
    - Flights North of the reactors in the vicinity of Sendai. Covered approximately 10 miles South of Sendai.
  - One mission using H60 aircraft (helicopter)
    - Platform used to transport a ground measuring team along flight paths of previous AMS flight paths (ground truth data).

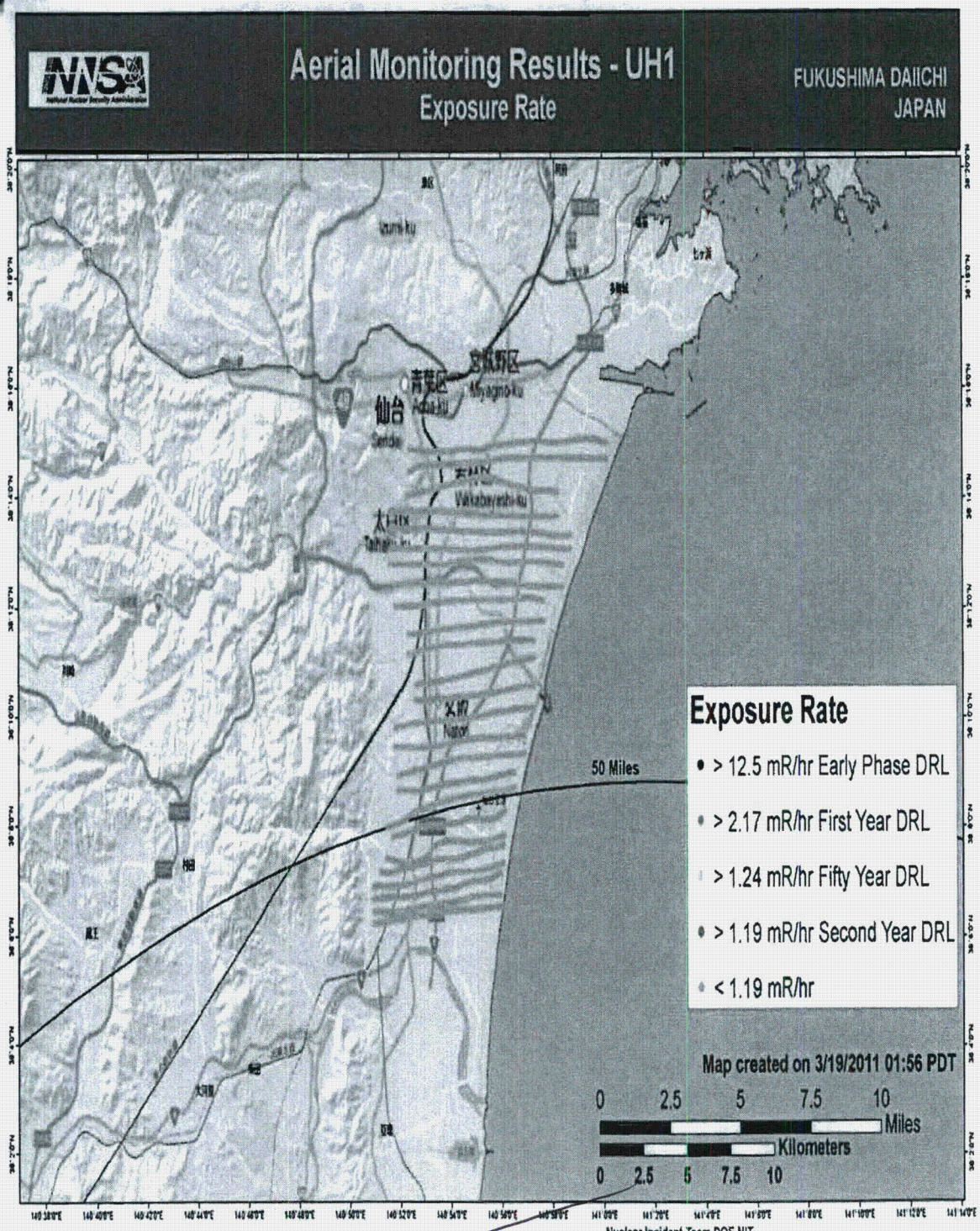
Aerial Measurements



Check for revision in 12 hours

Nuclear Incident Team DOE NIT
Contact (202) 586 - 8100

Aerial Measurements



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Conclusions from Aerial Measurements

- The greatest concentration of contaminated material is likely located to the northwest of the accident site.
- There is a narrow band extending from Fukushima to the northwest. Integrated 4-day doses exceed the EPA Early Phase Protective Action Guidelines beyond the 13 mile evacuation area to the northwest.
- AMS results appear to have bounded the deposition on the NW edge.

Planned AMS Operations for March 20

- Conduct AMS measurements between Tokyo north to the NPP not exceeding their turn back levels (300 mR/hr exposure rate or 300mR integrated exposure)
  - UH-1 aircraft: Concentrate on the Fukushima area, if operations permit
  - C-12 aircraft: Concentrate on the areas west of the 50 mile zone radius flying a parallel line pattern

Triage Analysis

- Five spectra were taken at distance from the reactor site
  - Indicate radionuclides expected in reactor coolant release
    - I-131, I-132, I-133, Te-132, Cs-134, Cs-136, Cs-137
  - No indication of refractory nuclides that indicate core melting
    - Mo-99, Zr-95, Nd-147
    - More data will be collected closer to the plant for indication of core melting

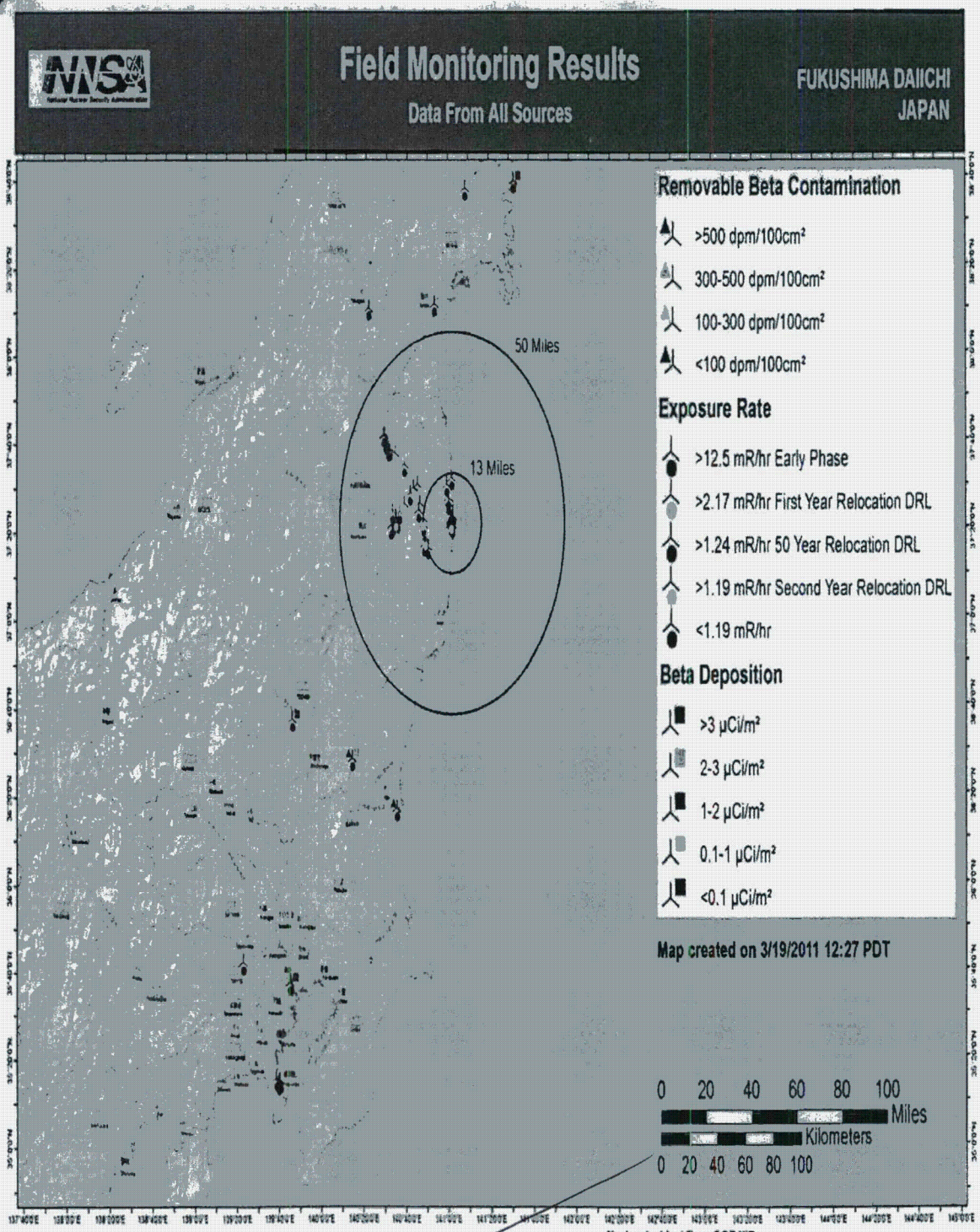
Ground Monitoring Results

- Ground measurements of exposure rate from Japanese sources are consistent with latest AMS data
- AMS results suggest areas where next ground measurements could be prioritized
  - Area NW of plant out to and beyond 13 mi evacuation radius
  - Area SW of plant outside 13 mi evacuation radius to confirm levels below EPA Early Phase Protective Action Guidelines

Organizations Providing Data

- **Japan**
  - Nuclear Safety Technology Center (NUSTEC)
  - Ministry of Foreign Affairs (MOFA)
- **United States**
  - Japan Emergency Command Center, US Embassy, Tokyo
  - USAF, BSC Commander
  - Marines
  - Nuclear Regulatory Commission
  - Richland (PNNL)
  - Office of International Relations

Ground Monitoring: All Sources



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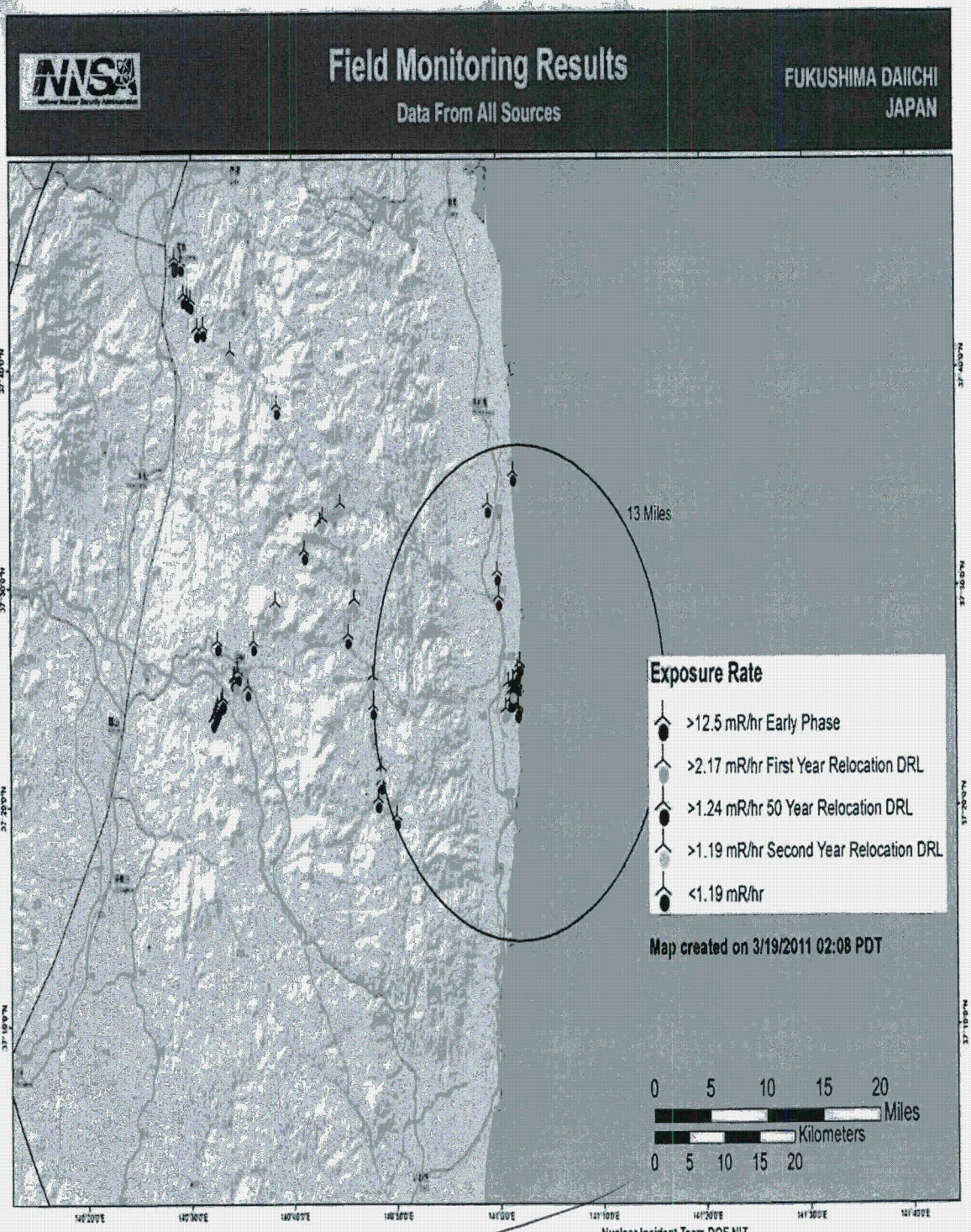
Ground Monitoring: Near Plant



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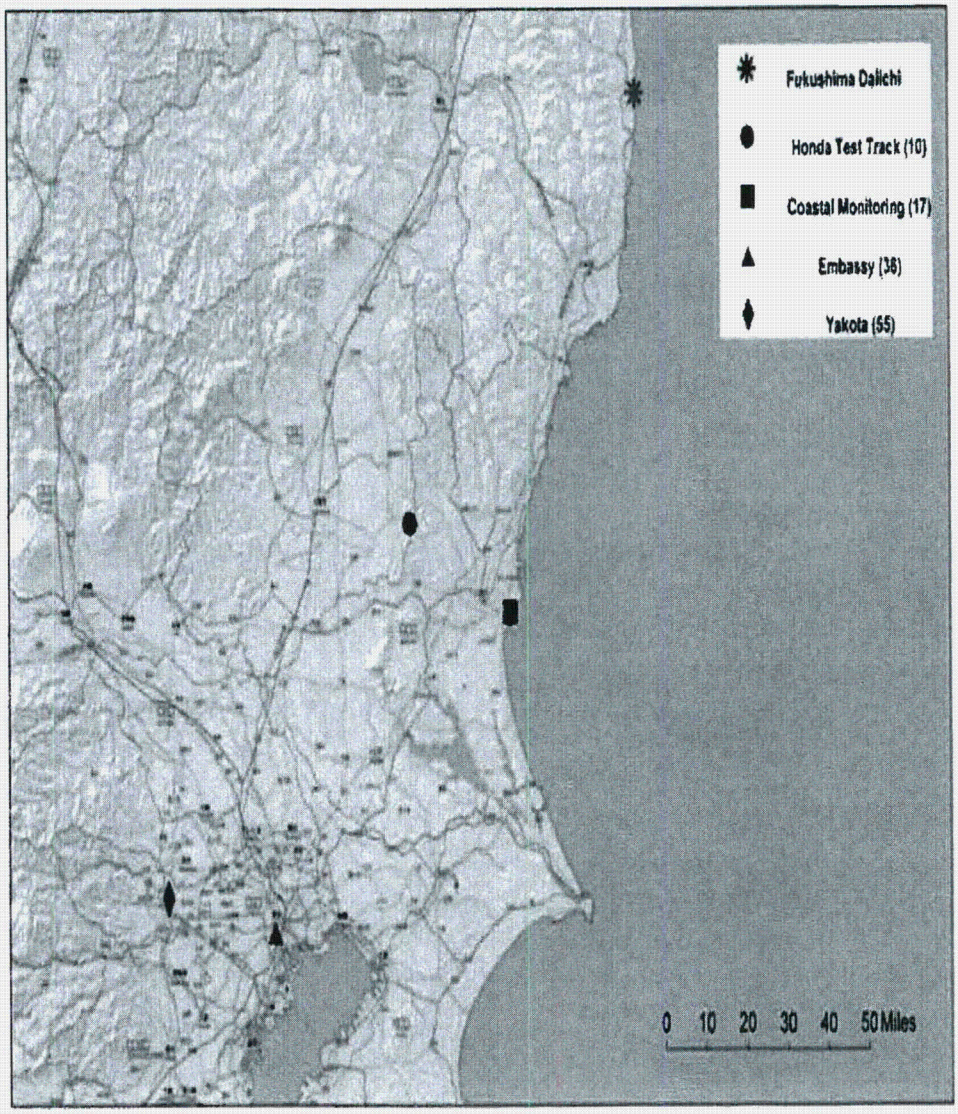
Contact (202) 586 - 8100

DOE Monitoring Locations

- **Honda Test Track**
  - < 3 x historical background
- **Coastal Monitoring**
  - < 3 x historical background
- **Embassy**
  - < 2 x historical background
- **Yokota**
  - < 2 x historical background

CMRT Monitoring Locations



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Weather Forecast

- Wind is predicted to shift on-shore starting 0300 UTC. This wind will carry radioactive releases across land west of Fukushima plant.
- Wind is predicted to shift to the south starting at 1500 UTC.

Planned Ground Monitoring Operations

- Resources will continue to conduct alpha, beta, gamma contamination surveys, and gamma exposure rate surveys.
- Teams will characterize deposition/exposure foot print when access is permitted.
- Focus on evacuated areas and adjacent non-controlled areas.
- Identify contaminant re-suspension and air concentration levels in the vicinity of the accident site.
- Collect gamma ray spectra at ground measurement locations.
- Long term air sample locations may be established.

Planned Ground Monitoring Operations for March 20

- Continue air monitoring US Embassy and housing towers
- Continue air monitoring at CMOC TOC
- Road survey following the Jobon Expressway from the north side of Tokyo to within the 50 mile zone
- Road survey following the Tohoku Expressway from the north side of Tokyo to within the 50 mile zone to the north side

DEPARTMENT OF ENERGY SITUATION REPORT
Earthquake & Tsunami in Japan
March 19, 2011
UPDATE 1800 EDT

POWER PLANT UPDATE AND OTHER NUCLEAR ISSUES

Summary: Summary of information received as of 1800 on 19 March from the NRC, Embassy-Tokyo, IAEA Incident and Emergency Center, TEPCO, METI, NISA, Japan Atomic Industrial Forum, and Nuclear Energy Institute.

NISA Updates on Temporary Ratings on the International Nuclear and Radiological Event Scale (INES): As of 19 March, NISA released new temporary INES ratings on the events as Fukushima Dai-ichi and Daini. INES is rated by 3 criteria (Criterion 1: People and the Environment, Criterion 2: Radiological Barriers and Controls at facilities, Criterion 3: Defense in Depth). The highest level among the three becomes the rating of the event. The scale ranges from level 0 (No safety significance) to level 7 (Major accident). NISA's revised temporary ratings are as follows:

At Fukushima Units 1, 2, 3: Criterion 1: TBD; Criterion 2: 5; Criterion 3: 3; Rating: 5.

At Fukushima Dai-ichi Unit 4: Criterion 1: TBD; Criterion 2: TBD; Criterion 3: 3; Rating: 3.

At Fukushima Daini Units 1, 2 and 4: Criterion 1: - ; Criterion 2: -; Criterion 3: 3; Rating: 3.

Status of Efforts to Restore Power: As of 0030 EDT March 19, the IAEA reported the emergency power source transformer was receiving power from the external transmission line; NRC reports restoration from switchyard to Unit 2 480V is in progress. As of 1400 UTC, the IAEA reports that power will be restored to Unit 2 on 19 March, which will then act as a hub for restoring power to Unit 1. The IAEA has no information as to whether the water pumps have been damaged and if they will work when power is restored. Power restoration efforts will focus on the installation of a temporary power panel at Unit#2 first followed by Units #1, #5 and #6. Once power is restored, priority will be restoring water injection systems. Preparations are under way to start spraying water on #4. After power becomes available, it will take 4 to 5 days to switch from the use of fire trucks to pump water into the reactors to an electrically-driven pump.

Cooling Efforts: As of 1400 UTC 19 March, the IAEA reports that seawater is still being injected into the reactor pressure vessels of Units 1 and 2, and additional fire trucks have arrived to reinforce water spraying efforts for the Unit 3 reactor building. Even though decay heat will diminish over time, they will need to maintain cooling for a long period of time.

Radiation Levels: As of 0400 EDT March 19, the AIST reported fission products in fallout had been collected at its Tsukuba Center Headquarters (approx 20 miles NE of Tokyo). Radiation readings were 0.04 μSv/h (0.004 mrem/h). The AIST is a public research organization funded by the GOJ. The next AISTupdate will be at 2100 EDT March 19.

As of 1400 UTC 19 March, the IAEA radiation monitoring team took measurements at seven different locations in Tokyo and in the Kanagawa and Chiba Prefectures. Dose rates were well below those which are dangerous to human health. The IAEA monitoring team is now en route to Aizu Wakamatsu City, 97 km west of the Fukushima nuclear power plant. Measurements made by Japan in a number of locations have shown the presence of radionuclides – i.e., isotopes such as Iodine-131 and Cesium-137 - on the ground. The IAEA and the UN Food and Agriculture Organization (FAO) are consulting with the Japanese authorities on measures being taken in these areas related to food and agriculture.

The Japanese Ministry of Health, Labour and Welfare informed the IAEA that radiation levels exceeding legal limits had been detected in milk produced in the Fukushima area and in certain vegetables in Ibaraki. The Ministry has requested an investigation into the possible stop of sales of food products from the Fukushima Prefecture.

The IAEA continues to monitor data from Comprehensive Test Ban Treaty Organization (CTBTO) radionuclide monitoring stations. As far as the Fukushima Daini nuclear power plant is concerned, there is no record of any incidents or radiation releases at the site. Present elevated radiation levels at the Daini site are attributed by Japan to events at the Daiichi nuclear power plant.

Fukushima Daiichi Unit 1 reactor (NRC priority 4): Per the NRC (quoting various sources), as of 0600 EDT March 19: Core damaged to undetermined extent; Reactor Containment System (RCS) depressurized, seawater injected to cool core; Primary containment is functional; Secondary containment lost; Spent fuel (292 bundles) water level unknown.

Per NISA, 0150 EDT March 19: Reactor parameters appear stable (pressure - 0..27 MPa (40 psi, depressurized), water level - 1.75 meters below the top of the fuel rods, Previous estimate of fuel rod damage was at 70%.

Fukushima Daiichi Unit 2 reactor (NRC priority 3): Per NRC (quoting various sources), 0600 EDT March 19: Core damaged to undetermined extent; RCS pressures unknown, seawater injected to cool core; Primary containment has possible Torus damage; Secondary containment has hole cut in side of fuel floor metal to reduce hydrogen buildup, steam is coming from hole; Spent fuel (587 bundles) No further information. TEPCO has outside power to Auxilliary Transformer.

Per NISA, 0150 EDT March 19: Reactor parameters appear stable (pressure - 0.085 MPa (12 psi, depressurized), water level - 1.4 meters below the top of the fuel rods, Previous estimate of fuel rod damage was at 33%.

Fukushima Daiichi Unit 3 reactor (NRC priority 1): Per the NRC (quoting various sources), as of 0600 EDT March 19: Core damaged to undetermined extent; RCS pressures unknown, radiation has been released, seawater is still being injected to cool the core. At this time, per the NRC, the primary containment status is unknown, the secondary containment has been lost, and visible "white smoke" has been interpreted by NRC as steam. With respect to the spent fuel pond (514 bundles), helicopters flybys to drop water as well as water cannon trucks spraying water continued on March 17. As of 1400 UTC on 19 March, the IAEA reports that it still lack reliable validated data on water levels and temperatures at the spent fuel pools at Units 3 and 4.

Per NISA, as of 0150 EDT March 19: The reactor parameters appear stable (pressure - 0.078 MPa (11 psi, depressurized), and the water level is 2.1 meters below the top of the fuel.

Also of note, the only MOX fuel at the site are the 32 MOX assemblies in the Unit 3 reactor core which consists of less than 6% of the total assemblies in the core The presence of MOX in this ratio will not change the nature of the radiological emissions from the plant. There is plutonium already in the uranium fuel that is irradiated. The impact of MOX is undetectable. The radiological consequences will be dominated by the incidences in Unit 3 and 4 used fuel pools of which there is no MOX.

Fukushima Daiichi Unit 4 reactor (NRC priority 5): Per NRC (quoting various sources), as of 0600 EDT March 19: Core offloaded; RCS – Not applicable; Primary containment – Not applicable; Secondary containment - lost,

visible "white smoke" interpreted by NRC as steam; Spent fuel (1201 bundles), pool may be dry, damage to fuel rods suspected, water was dumped on site with water cannons. As of 1100 EDT March 19, JAIF reports that preparations are being made to inject water into the fuel pool.

Reactor parameters: Not applicable.

An earlier report suggested that an explosion had damaged the Unit 4 reactor building, exposing used fuel. The spent fuel pond may have been damaged during the explosion, and the ability of the pond to retain water for a significant period is in doubt. We have conflicting information on this from the GOJ and TEPCO. A helicopter flyby was performed on 16 March. Video images of the SFP#4 were inconclusive as to the water level although senior METI and NISA officials in Tokyo indicate that the images confirm that water covers the spent fuel.

Fukushima Daiichi Unit 5 reactor (NRC priority 5): Per NRC quoting various sources), 0600 EDT March 19: Shutdown since January 3, 2011. Core in RPV; Spent fuel (950 bundles), temperature 66C, Unit 6 emergency diesel generator is available; fire truck spray has been staged.

Per NISA, 0150 EDT March 19: Reactor parameters appear stable (pressure – 1.359 MPa (197 psi, depressurized), water level – 1.98 meters above the top of the fuel.

As of 1400 UTC 19 March, the IAEA reports that temperatures at the spent fuel pools in Units 5 and 6 have risen in the past few days but this does not give rise to immediate concern. Water continues to be circulated within the reactor pressure vessels and the spent fuel ponds at both units.

The Residual Heat Removal (RHR) system was restarted to provide cooling water to the reactor. Power is being provided using an operational diesel generator. Holes have been made in the roof to provide a vent path to reduce the potential for a hydrogen explosion.

Unit 5 was in a refueling outage at the time of the earthquake. With the restart of the RHR system, reactor temperatures will decrease. No reactor temperature updates have been provided. No updates on spent fuel pool level have been provided, noting that previous reports had indicated level decreases.

Fukushima Daiichi Unit 6 reactor (NRC priority 6): Per NRC quoting various sources), 0600 EDT March 19: Shutdown since August 14, 2011. Core in RPV; Spent fuel (876 bundles), temperature 66C, Unit's emergency diesel generator is available.

Per NISA, 0150 EDT March 19: Reactor parameters appear stable (pressure – 1.359 MPa (197 psi, depressurized), water level – 1.98 meters above the top of the fuel.

As of 1400 UTC 19 March, the IAEA reports that temperatures at the spent fuel pools in Units 5 and 6 have risen in the past few days but this does not give rise to immediate concern. Water continues to be circulated within the reactor pressure vessels and the spent fuel ponds at both units.

Holes have been made in the roof to provide a vent path to reduce the potential for a hydrogen explosion.

Unit 6 was in a refueling outage at the time of the earthquake. The reactor is stable with reactor temperature of 157.1°C. Spent fuel pool temperatures are stable at 65.0°C.

Fukushima Daini Units 1-4: TEPCO confirmed cold shutdown and continued cooling of reactor cores.

IAEA WebSite:

Japan Earthquake Update (19 March 2011, 1400 UTC)

As of 1400 UTC on 19 March, the IAEA reported that the situation at the Fukushima Daiichi nuclear power plants is similar to that described yesterday. Efforts to restore electrical power to the site continue. It is hoped that power will be restored to Unit 2 today, which will then act as a hub for restoring power to Unit 1. However, we do not know if the water pumps have been damaged and if they will work when power is restored. Seawater is still being injected into the reactor pressure vessels of Units 1 and 2 and additional fire trucks have arrived, reinforcing the operation to spray water into the Unit 3 reactor building. The IAEA still lacks lack reliable validated data on water levels and temperatures at the spent fuel pools at Units 3 and 4. Temperatures at the spent fuel pools in Units 5 and 6 have risen in the past few days but this does not give rise to immediate concern. Water continues to be circulated within the reactor pressure vessels and the spent fuel ponds at both units. A second diesel generator is providing power for cooling at Units 5 and 6. The IAEA has been informed that

holes have been made in the roof of the reactor building at Units 5 and 6 to avoid the risk of a hydrogen explosion.

IAEA Director General (DG) Amano left Tokyo for Vienna on 19 March, after meetings with senior government leaders and officials from the plant operator TEPCO. The DG will brief a special session of the Board of Governors on Monday, 21 March on his trip.

Tokyo Electric Power Company (TEPCO) Update: While other sites and data are inconsistent with TEPCO's latest update, as of 0000 JST 19 March, TEPCO reported the following information for Daichi units 1-4: Reactors cold shutdown, stable water levels, offsite power is available. No cooling water has leaked to the reactor containment vessels. Maintaining average water temperature at 100°C in the pressure restraints.

Aerial Measurements Update:

- DOE Team AMS Operations 18-19 March 2011
  - One mission using military C-12 aircraft (fixed wing)
    - Concentrated within 50 mile zone but outside a 3m zone flying a pattern that incorporates flights over water. Endstate was to determine extent of contamination NW of plant and to close previous collected data countours
  - One mission using UH-1 aircraft (helicopter)
    - Flights North of the reactors vicinity of Sendai. Endstate was to survey areas occupied by USMC north of 50 mile zone
  - One mission using H60 aircraft (helicopter)
    Platform used to transport a ground measuring team along flight paths of previous AMS flight paths (ground truth data).

Upcoming Actions:

- Conduct AMS measurements between Tokyo north to the NPP not exceeding their turn back levels (0.5 R/hr):
  - Helo: Priority on the Fukushima area if conditions permit. Endstate is the survey of populated areas in the 50 mile zone
  - C-12: Priority to the areas SW of the 50 mile radius. Endsate is to determine extent of contamination SW of the plant and to close previously collected data contours
- Ground Monitoring to support AMS
  - Survey the Joban and Tohoku expressways from N of Toyko to within 50m zone
  - Highway between Yokata and Tokyo

News Reports

The Japanese Ministry of Health, Labour and Welfare has confirmed the presence of radioactive iodine contamination in food products measured in the Fukushima Prefecture, the area around the Fukushima Daiichi nuclear power plant. According to the latest data, the food products were measured from 16-18 March and indicated the presence of radioactive iodine. To date, no other radioactive isotopes have been shown to increase in the analysis of food products around Fukushima. (0800 EDT 3/19/11).

The AP reported that water in Tokyo tested positive for radioactive iodine, although GOJ confirmed the trace amounts do not affect human health if ingested (Reported in DOS sitrep.)

Reuters reports that three hundred technicians have been working to salvage the six-reactor Fukushima plant, with the effort advancing, quoting NISA's Deputy General Hidehiko Nishiyama saying "We are making progress ... (but) we shouldn't be too optimistic." It cited the economic toll at $200 billion, noting it will be in Japan's biggest reconstruction push since post-World War II. Other advances noted: improving situation Unit3 due to water dousing efforts, progress in bringing power back to water pumps used to cool overheating nuclear fuel, the attachment of a power cable to the No.1 and No. 2 reactors, with hopes to restore electricity later in the day and to reach No. 3 and 4 soon to test turning the pumps on. (0945 AM EDT 19 March 2011)

Kyodo News also reported positive events, quoting Chief Cabinet Secretary Yukio Edano as saying that conditions at the plant's highly dangerous No. 3 reactor unit have become relatively stable on day three of the unprecedented mission to douse water from outside the damaged building to fill an overheating spent fuel pool. Defense Minister Toshimi Kitazawa was quoted as saying that the surface temperatures at the No. 1 to No. 4 reactors were found by a Self-Defense Forces helicopter in the morning to be 100 C or lower, adding they were lower than feared. Prime Minister Naoto Kan instructed the Defense Ministry to continue monitoring around the plant, Kitazawa said. (19 March 2011)

OTHER NUCLEAR ISSUES

According to the NRC's March 18th 1800 Status Update, the NRC Protective Measures Team is working with DOE/NARAC to refine source term models in an effort to develop dose projections beyond 50 miles. NRC has the lead to develop source terms and dose projections within Japan, up to 50 miles from the reactor site while DOE has the lead for dose projections beyond 50 miles and for the United States and territories.

(March 18, 1613 EST) NRC provided revised source term description.

DOE ASSESSMENT

[Factored into reactor summaries]

REQUESTS FOR US ASSISTANCE

DOE: 34 total

The team had two primary components:

- Consequence Management (CM) – is DOE's emergency response team to protect the public's health and safety from a radiological dispersal that results in contamination to the environment. It includes: scientific data assessment and radiation monitoring; management, coordination, and liaison function; data management with GIS product development; health physics kit supporting contamination surveys; and low volume air sampling.
- Aerial Measuring System (AMS) - is DOE's aerial emergency response capability for mapping radiological material deposited on the ground. It includes: aerial radiation detection systems with capabilities for sensitive radiation mapping and high-radiation field surveys; equipment can be mounted on up to two aircraft simultaneously; and deploys with a self-contained analytic capability.

Tailored CM (CMRT/AMS) arrived at Yokota AB 1230EDT

- Fixed wing and helicopter aerial measuring flights conducted
- Helo from Tokyo and then north for 50 miles
- Fixed wing north past Fukushima (upwind), to Sendai
    - Standard serpentine pattern
    - Turnback limit set at 0.5 r/hour (not observed)
- Concern: Screening mail sent from Japan at U.S. post offices
- Countries are issuing various evacuation guidance
- Assessment of AMS results estimated 1300 EDT
- AMS fixed wing sortie will continue serpentine pattern northward as a continuation of the previous day's pattern
- AMS helicopter will over fly DoD facilities
- Japan Earthquake Medical Issues Working Group identifies FRMAC to provide support once data is available

One team installed air samplers on roof of US Tokyo Embassy (As of 0600 17 March, No elevated levels reported)

Primary mission for DoD is environmental characterization for USF in AOR

The Department of Energy has been designated the lead agency for communicating information to the States regarding monitoring of radiation heading toward or over the United States. The DOE's Lawrence Livermore National Laboratory (National Atmospheric Release Assessment Center) is monitoring weather patterns over the Pacific Ocean. The Environmental Protection Agency maintains air monitoring stations throughout the country and has reinforced its monitoring effort.

Also note that offers from industry to help in Japan are being coordinated through the Institute of Nuclear Power Operations (INPO) via NE.

ENERGY INFRASTRUCTURE:

ELECTRICITY: As of March 18th 7:00 AM JST, Japan's Nuclear and Industry Safety Agency reports that of the households that can receive power, 343,000 households remain without electricity in Japan. (Down from 473,000 as of 3/17). Due to the higher demand caused by colder temperatures, companies and individual customers are being urged to conserve electricity especially during the evening and overnight. Rolling blackouts are still scheduled for select areas in the Tokyo and Tohoku Electric Power Companies' service areas.

PETROLEUM: According to a report yesterday (March 17) from Japan's Ministry of Economic, Trade, and Industry, six oil refineries have suspended operations. Those refineries are the JX Sendai (145,000 b/d), JX Kashima (189,000 b/d), Cosmo Chiba (220,000 b/d), Kyokutou (175,000 b/d), TonenGeneral Kawasaki (335,000 b/d), and JX Negishi (270,000 b/d). The Ministry stated that three of the six refineries were expected to recover steadily in the next week.

LNG: According to a report from Japan's Ministry of Economic, Trade, and Industry (March 16), seven of Japan's forty LNG import terminals are unable to receive shipments. According to EIA, in 2010 Japan imported approximately 9.6 Bcf/d of LNG (over 40 percent of world supply).

CONTACTS WITH JAPANESE OFFICIALS

On March 17, Administrator D'Agostino spoke with Japanese Ambassador Fujisaki

Deputy Secretary Poneman and Deputy Secretary Steinberg spoke with Vice Foreign Minister Sasae at 1530 on 16 March to offer support, discuss the updated US guidance to AMCITs, and request additional information.

Deputy Secretary Poneman and Deputy Secretary Steinberg spoke with State Secretary Edano and NISA Director General Nobuaki Terasaka with a similar message.

Various meetings in Tokyo between US Embassy staff and counterparts from Ministry of Economy, Trade and Industry and Japanese Ministry of Defense

Phone call with Ministry of Economy, Trade and Industry and Nuclear and Industrial Safety Agency officials in Tokyo;

Meeting with Ambassador Fujisaki

QUESTIONS BEING WORKED:

The following request came in on 19 March 2011:

Request by David Brown of Berkeley Nucleonics for DOE to help facilitate the transfer of personnel radiation dosimeters currently held by the state of Illinois to agencies in Japan.

The following request came in from DOS asking for assistance. We are working a response.

The Permanent Mission of Japan, through the IAEA Incident and Emergency Centre, is seeking information about the following capabilities in your countries:

1. Unmanned remotely controlled aerial vehicle for the aerial radiological survey
2. Robots for the work in the high dose rate areas
3. Unmanned remotely controlled ground vehicles for carrying equipment in the high dose rate areas
4. We would appreciate if you could provide the following information is required for three above mentioned categories:
    - Technical details of the above mentioned equipment (including specifications)
    - What is the possible availability of this equipment, and
    - When it would be possible to dispatch this equipment, if requested

CONTACT INFORMATION:

Nuclear Incident Team in the Emergency Operations Center (NITOPS@NNSA.DOE.GOV) - 202-586-8100

Office of the Deputy Secretary 202-586-5500

Watch Schedule:

George Allen/Heather Looney	1600/19 Mar – 0000/20 Mar
Phill Niedzielski-Eichner/Karyn Durbin	0000/20 Mar – 0800/20 Mar