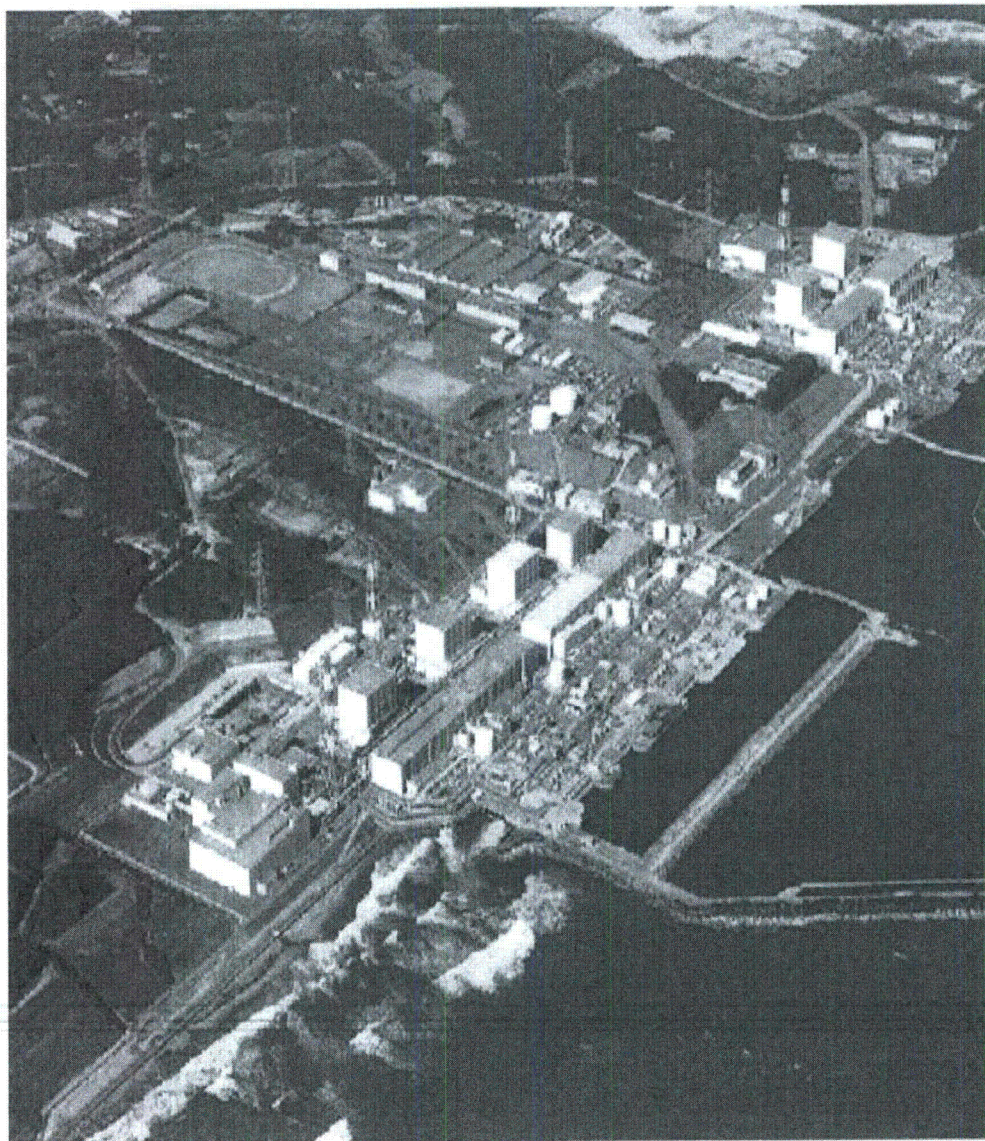




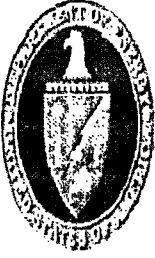
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Japan Earthquake Response

March 24, 2011 // 1800 EDT



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**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**

~~Official Use Only~~



~~Official Use Only~~

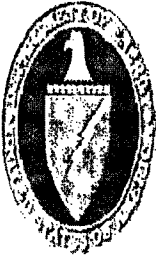
Current Status

No major changes in radiation levels at the Fukushima Daiichi Nuclear Power Plant

- Unit 1: Reactor water level stable, core damage est. 70%. Seawater injection is being converted to freshwater. Electrical power line connected (through Unit 2). At 1130 on March 24, lighting to unit 1 control room.
- Unit 2: Reactor water level stable, core damage est. 33%. Spent fuel pool has been filled. Power restored and electric water pump systems being tested.
- Unit 3: Seawater injection is being converted to freshwater in reactor; trucks pumping water into spent fuel pools. Water level stable and pressure stabilized. Power restored.
- Unit 4: Spraying continues periodically for the spent fuel pond. Power restored. Trucks pumping water into spent fuel pools.
- Units 5 & 6: External power supplying power to cooling system. Reactors appear stable. RHR seawater tripped at 1720 on March 23. Plans in place to start a standby pump on March 24.

Japanese media reports levels of radioiodine reported in tap water in Tokyo decreased to levels considered safe for consumption by infants.

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DOE/NNSA Response

Command, Control, Coordination:

- **Nuclear Incident Team (NIT):** Coordinating overall emergency response
- **Policy Working Group (PWG):** Coordinating overall policy
- **Senior Energy Official:** Primary Manager of deployed field teams
- **Liaisons:** DART, USPACOM, USAID, NRC

Modeling

- **National Atmospheric Release Advisory Center (NARAC):** conducting predictive radioactive atmospheric dispersion modeling

Monitoring and Sampling

- **Consequence Management Response Team (CMRT):** Conducting ground monitoring, air sampling and initial results analysis
- **Aerial Monitoring System (AMS):** Conducts aerial detection for mapping radiological ground material deposits

Assessment

- **Consequence Management Home Team (CMHT):** Scientific assessment of data updated daily from ground measurements and AMS flights

Medical Consultation

- **Radiation Emergency Assistance Center/Training Site (REAC/TS):** Providing medical advice about radiological exposure

Deployed (45)

Yokota AB

- (1) FTL
- (28) CMRT
- (7) AMS

US Embassy Tokyo

- (1) SEO
- (1) SEO Staff
- (2) Foreign Service Nationals
- (2) Permanent Staff
- (1) DART LNO
- (1) Nuclear Energy Representative

USPACOM HQ

- (1) LNO

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Significant Events: Past 24 Hrs.

◦ International Engagement:

- Received formal request from MOD Japan Joint Staff including FRMAC support for airborne radiation monitoring

◦ Nuclear Incident Team

- Submitted input to NSS Contingency Working Group established by DC on 23 Mar

Operations

◦ Modeling

- NARAC: Completed predictive plume models based on a plausible release scenario and weather data from 14 -26 March.

◦ Field Monitoring and Assessment

- AMS: Helicopter flight north through the Yohuku Valley; C-12 flight north of Fukushima Daiichi along the coast.
- CMRT: Two field teams conducted monitoring along the Yohuku and Jobhan Highways; continued monitoring at the US Embassy (Tokyo).
- Finished products

Medical Consult

- REAC/TS provided information regarding population monitoring considerations and screening strategies to DOE personnel in Tokyo.

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External Data Providers

Japan

- Ministry of Foreign Affairs (MOFA)
- Ministry of Education, Culture, Sports, Science, and Technology (MEXT)
- Tokyo Electric Power Company (TEPCO)
- Nuclear Safety Technology Center (NUSTEC)

United States

- Japan Emergency Command Center, US Embassy, Tokyo
- USAF, BSC Commander
- Futenma Marine Corps Air Station
- Nuclear Regulatory Commission
- Naval Reactors

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Guide to Interpretation

Derived Response Levels (DRL)

Early Phase DRL

- If a person is in danger of receiving an external radiation dose of 1 Rem over 4 days, the EPA recommends evacuation until radiation levels decrease. This area is indicated in red.

First Year DRL

If a person is in danger of receiving an external radiation dose greater than 2 Rem during the first year, the EPA recommends relocation until radiation levels decrease. This is not an urgent action because the dose is received over a full year. This area is indicated in orange.

Fifty Year DRL

- If a person is in danger of receiving an external radiation dose greater than 5 Rem over 50 years, the EPA recommends relocation until radiation levels decrease. This is not an urgent action because the dose is received over fifty years. This area is indicated in yellow.

Second Year DRL

- If a person is in danger of receiving an external radiation dose of greater than 0.5 Rem in a the second year (or any subsequent year), the EPA recommends relocation until radiation levels decrease. This area is indicated in green.

These calculations account for multiple variables. For instance, radiation is most intense in the first days following its release therefore dose reduction may be met by evacuating early in the response.

Protective actions are frequently expressed in dose rates. The dose rate is an indicator that residents would accumulate the threshold dose if they stayed in the area the entire time expressed (e.g. 1 year, 2 years, 50 years)

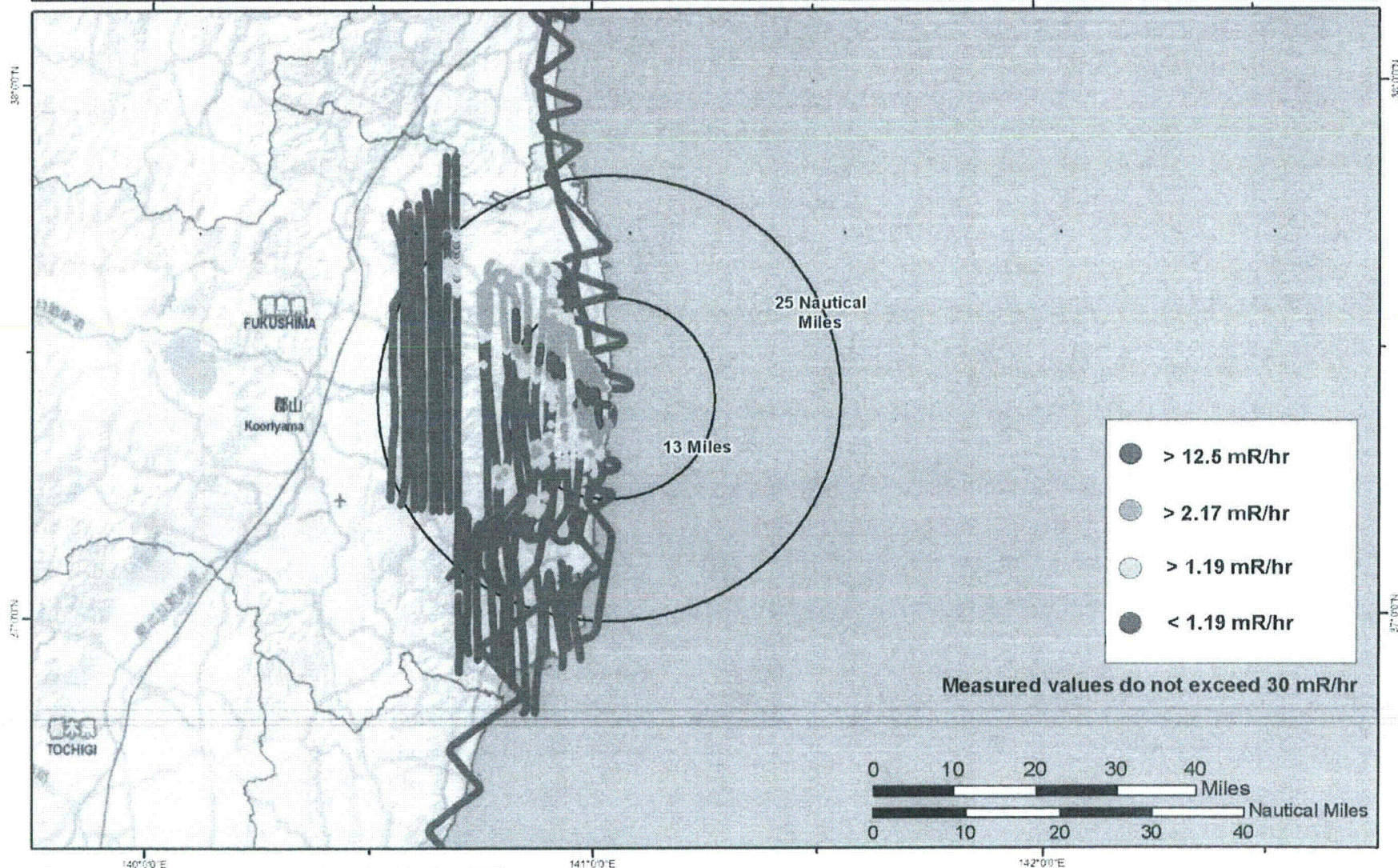
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Aerial Monitoring Results - C-12

Survey Date - 17, 18, 19 March 2011

FUKUSHIMA DAIICHI
JAPAN



Map created on 03232011 0210 JST

Name: NIT_C-12 23Mar2011 v4

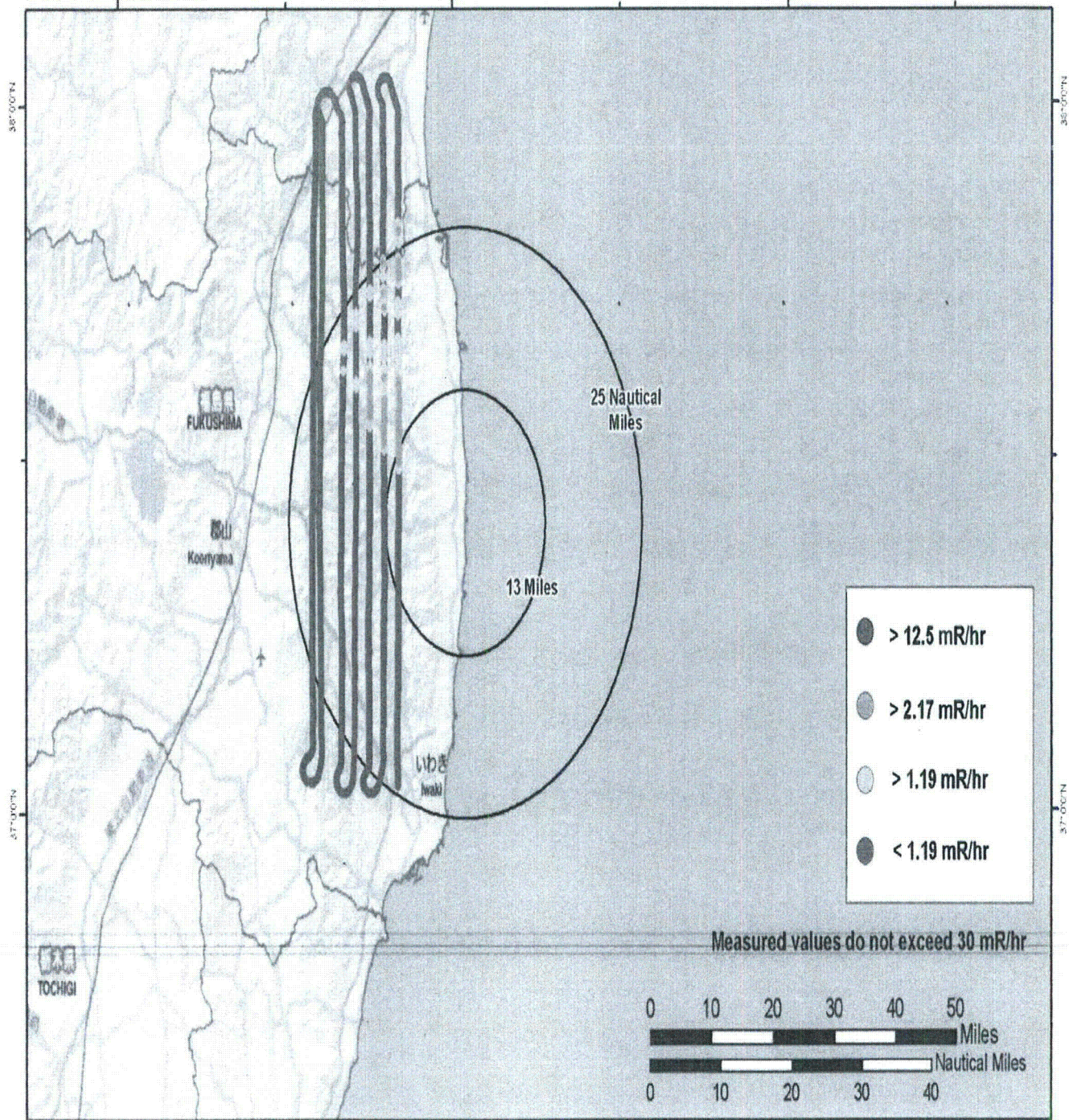
Nuclear Incident Team DOE NIT
Contact (202) 586 - 8100



Aerial Monitoring Results C-12

March 24, 2011

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JAPAN



Map created on 03252011 0330 JST
Name: NIT C-12 Results 24Mar2011 v3

UNCLASSIFIED

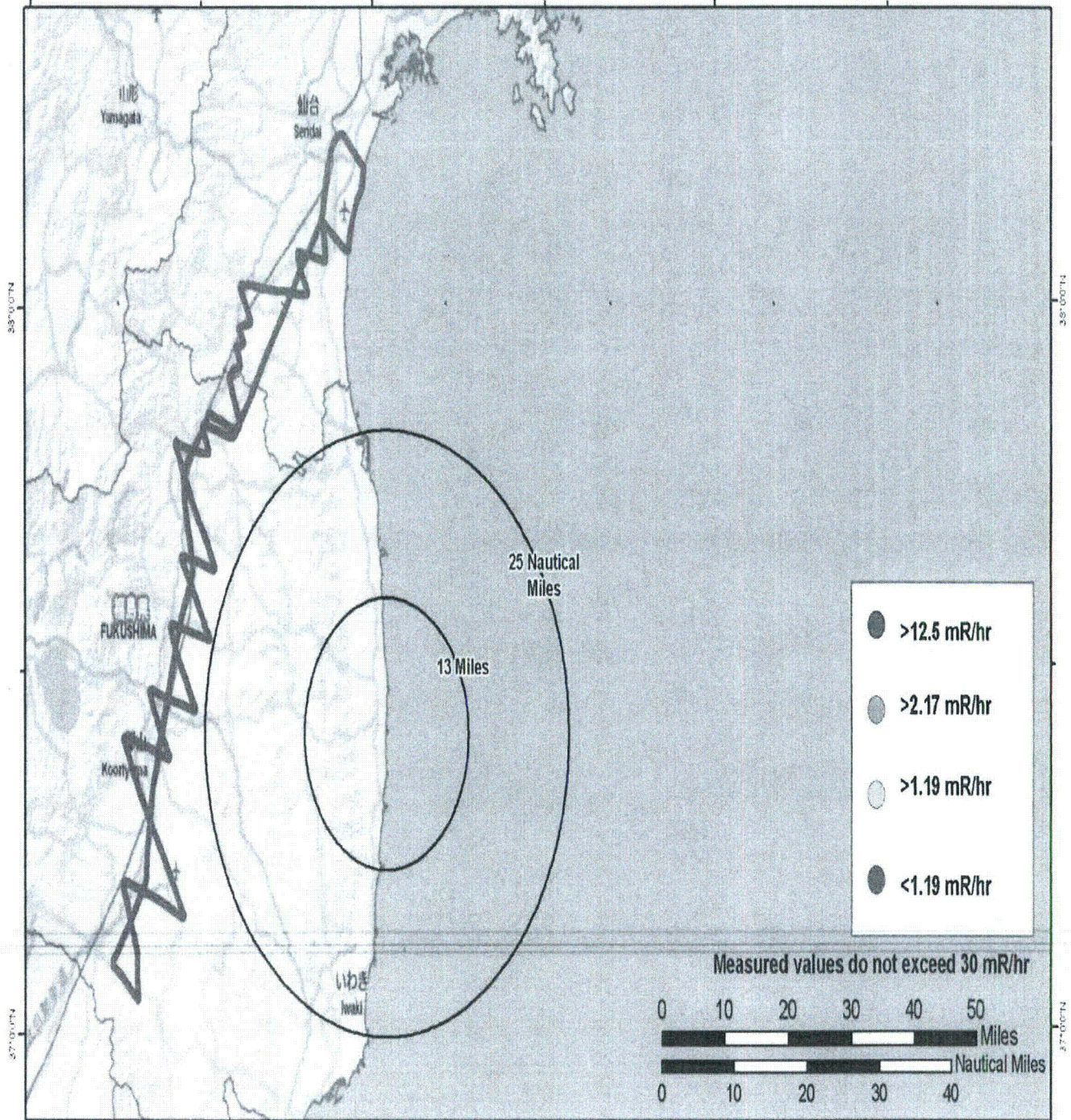
Nuclear Incident Team DOE NIT
Contact (202) 586 - 8100



Aerial Monitoring Results - UH1

March 24, 2011

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JAPAN



Map created on 03252011 0310 JST
Name: NIT UH1 24Mar2011 v1

UNCLASSIFIED

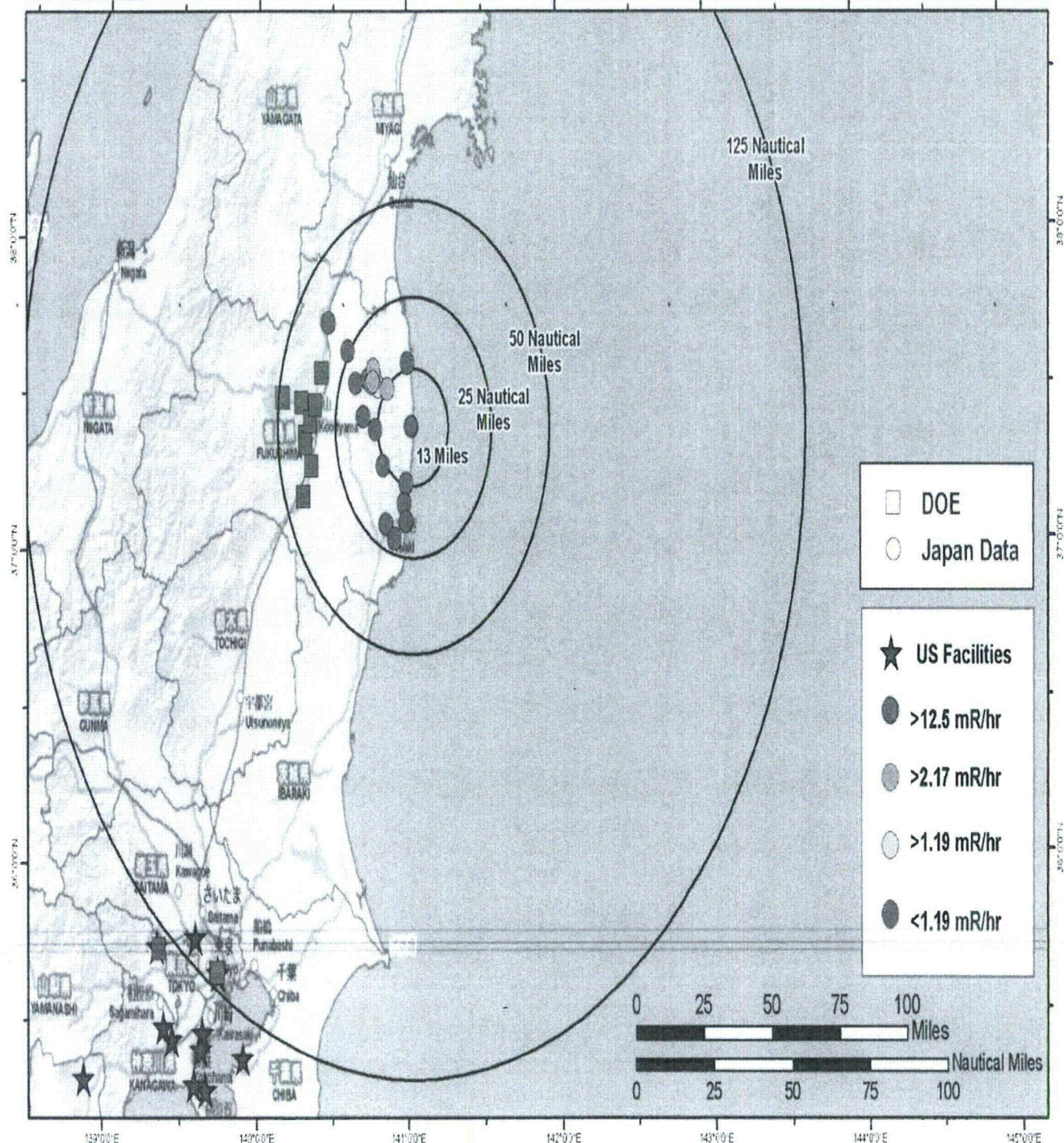
Nuclear Incident Team DOE NIT
Contact (202) 586 - 8100



Field Monitoring Results

March 24 05:00 to March 25 05:00 JST

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Map created on 03252011 0330 JST

Name: NIT 24hrsMonitoringResults 24Mar2011 v2

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Assessment

By comparing measurements gathered 24 March to previous measurements, the data indicate:

- Peak exposure rates are lower in comparable areas; Note: reduction in exposure rate is expected as a result of radioactive decay;
- No new areas of deposition are apparent although winds since March 19th have crossed the area measured;
- Rain (March 20-21) drove airborne radiation to the ground improving the accuracy of measurements

Precipitation March 21-22 creates some uncertainty regarding our conclusion:

- Wet soil can mask radiation emissions resulting in lower readings

Conclusion:

In the area measured, radiological material has not deposited in significant quantities since March 19th

Path Forward:

Additional measurements will refine our knowledge of radiological conditions in the area surrounding Fukushima Dai-ichi.

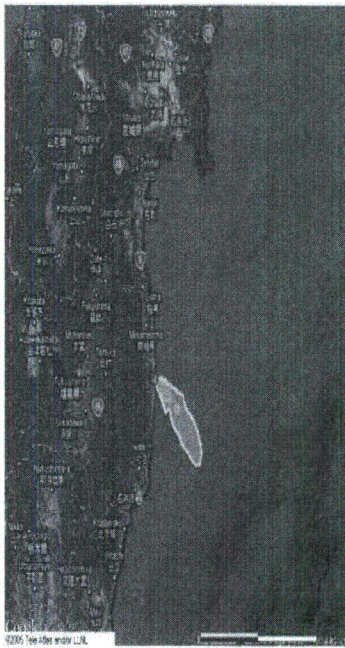
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Forecasted Weather March 24-25

03/25/2011 07:00 JST



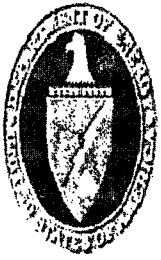
03/25/2011 14:00 JST



03/26/2011 01:00 JST



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Planned Operations: Next 24 Hrs

Field Monitoring

- AMS flight activities

- Flying C12 to West of where they flew yesterday, continuing to remap

- UH1 flying over Sendai area where Marines are stationed

- 1 ground team going to the embassy

- 1 ground team going north between Yokota and the plant

- Preparation for 3rd aerial capability

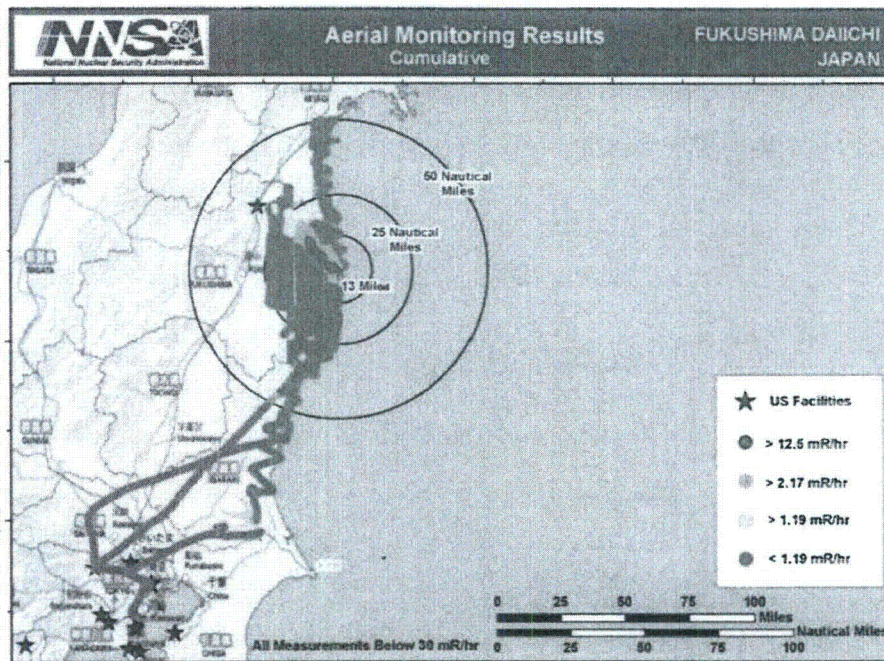
- GPU received

- Working on receipt of 3rd aircraft

- Flight crew in country for 3rd aircraft

DOE participating in Joint Monitoring and Assessment planning with DoD (US AFRAT)

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Map created on 03222011 0245 JST

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

5

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5 / 7

view on
slideshare



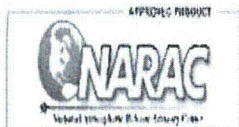
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(b)(5)

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

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Super Core



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U3U4aU4b Tokyo SuperCore- Draft
Refined Calc.

Early Phase Dose (0-96 Hrs)
(Total Effective Dose Including Plume Passage)

U3U4aU4b Rev 1 - Potential Release



Actions and Long-Term Effects

Description	(rem) Extent Area	Population
Exceeds 5 rem total effective dose.	>5 74.9km 756 km2	403,000
Exceeds 1 rem total effective dose.	>1 219km 5,967 km2	5.96E6

Areas and counts in the table are cumulative. Population Source = LandScan2005.

Effects or contamination from March 14, 2011 02:00 UTC to March 18, 2011 02:00 UTC at or near ground level.

Release Location: 37.421389 N, 141.032500 E

Material: BA-140 + LA-140 + CS-137 + I-131 + I-132 + TE-132 + XE-131M + KR-85 + XE-133 + XE-133M

Generated On: March 20, 2011 19:39 UTC

Model: ADAPT/LODI

Comments: Doses shown are total accumulated from the beginning of release.

U3 U4a U4b

Map Size: 295 km by 295 km Id: Production3.rcE12815.rc1

NARAC Operations: (onDuty Assessor); narac@llnl.gov; 925-424-6465

Requested by: (none none; DOE NIT; 202-586-8100)

Approved by: (NARAC Operations; NARAC)

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EZ 714 of 810



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Super Case

U.S. Arrival Times & Doses

Location	Surface Arrival (Days After Release)*	Cs-137 Estimated Deposition (pCi/m ²) **	I-131 Estimated Deposition (pCi/m ²) **	96-hr Projected Groundshine Dose (rem) **	1-Year old Child Projected Thyroid Dose (rem) **
Northeastward Case					
Alaska	3	5.3E+3 to 5E+5	890 to 5.9E+4	8E-04 to 8E-02	0.5 to 35
Hawaii	6	1.4E+4 to 2.1E+4	2.3E+3 to 3.1E+3	2 E-03 to 3E-03	1.3 to 1.8
Midway	7	1.1E+4	910	2E-03	0.5
Wake Island	8	2.0E+3	88	3E-04	0.1
West Coast (CA, OR, WA)	5	3.4E+2 to 5.3E+3	18 to 620	5E-05 to 8E-04	0.01 to 0.4
Eastward Case					
Alaska	4	2.6E+4 to 5.8E+4	3.8E+3 to 1.1E+4	4E-03 to 9E-03	2.3 to 6.4
Hawaii	5	1.5E+3 to 5.6E+3	9.2E+1 to 3.8E+2	2E-04 to 8E-04	0.1 to 0.2
Midway	4	7.4E+4	8.4E+3	1E-02	4.9
Wake Island	4	9.1E+3	3.8E+2	1E-03	0.2
West Coast (CA, OR, WA)	7	5.3E+1 to 5.9E+3	1.9 to 7.4E+2	8E-06 to 9E-04	0.001 to 0.4

*Arrival time is the number of days after the release start time.

** Variability due to geography

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EZ 715 of 810



Simulation Notes

Source term assumptions:

- 25% core melt in Unit 2 — 33% for Super Loss
- Spent fuel pool releases
 - unit 3 = 50%
 - unit 4 = 100%

Weather

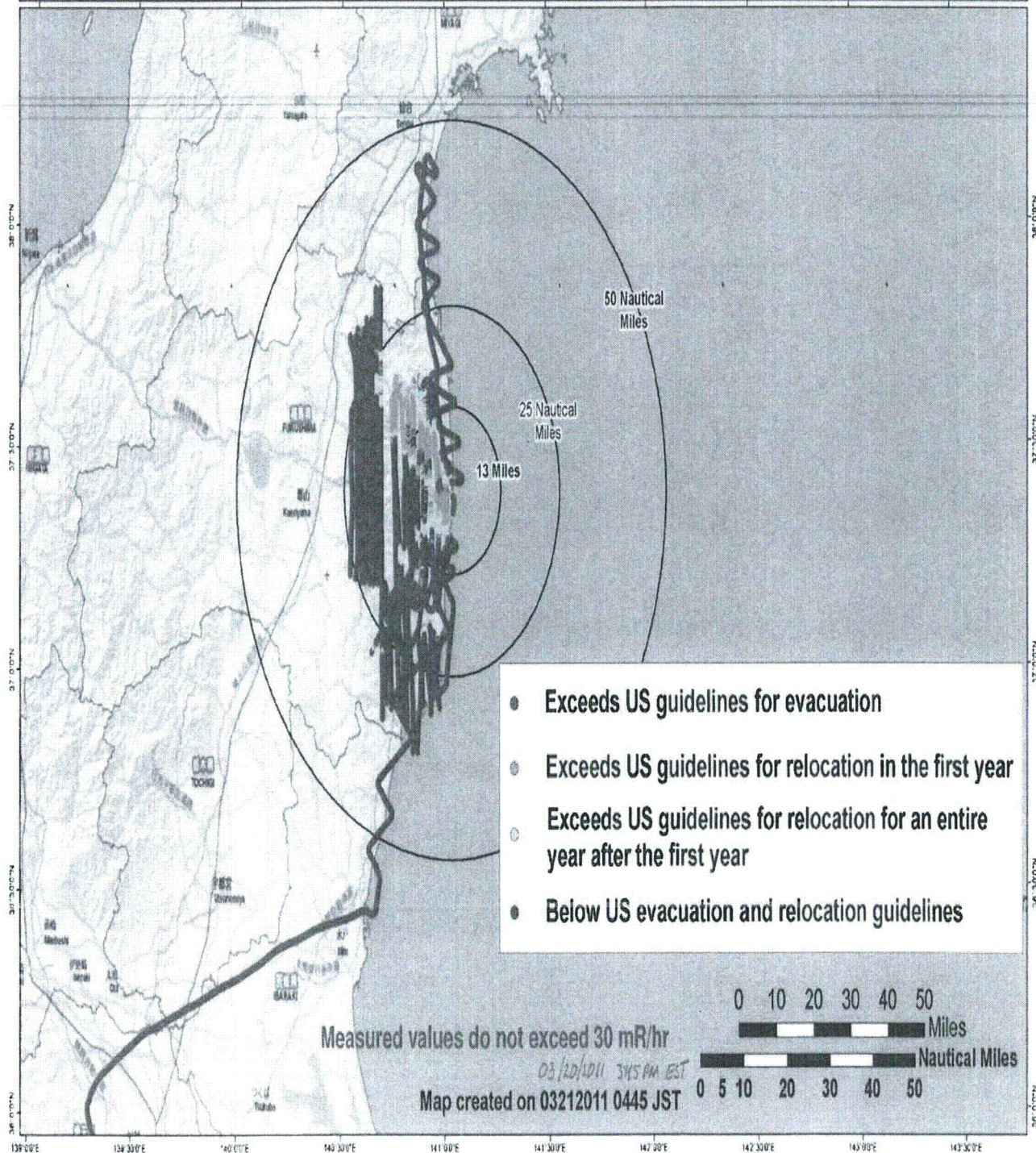
- Chosen to target Alaska and Hawaii



Aerial Monitoring Results - C12

3 Days of Flights

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JAPAN



Check for revision in 12 hours

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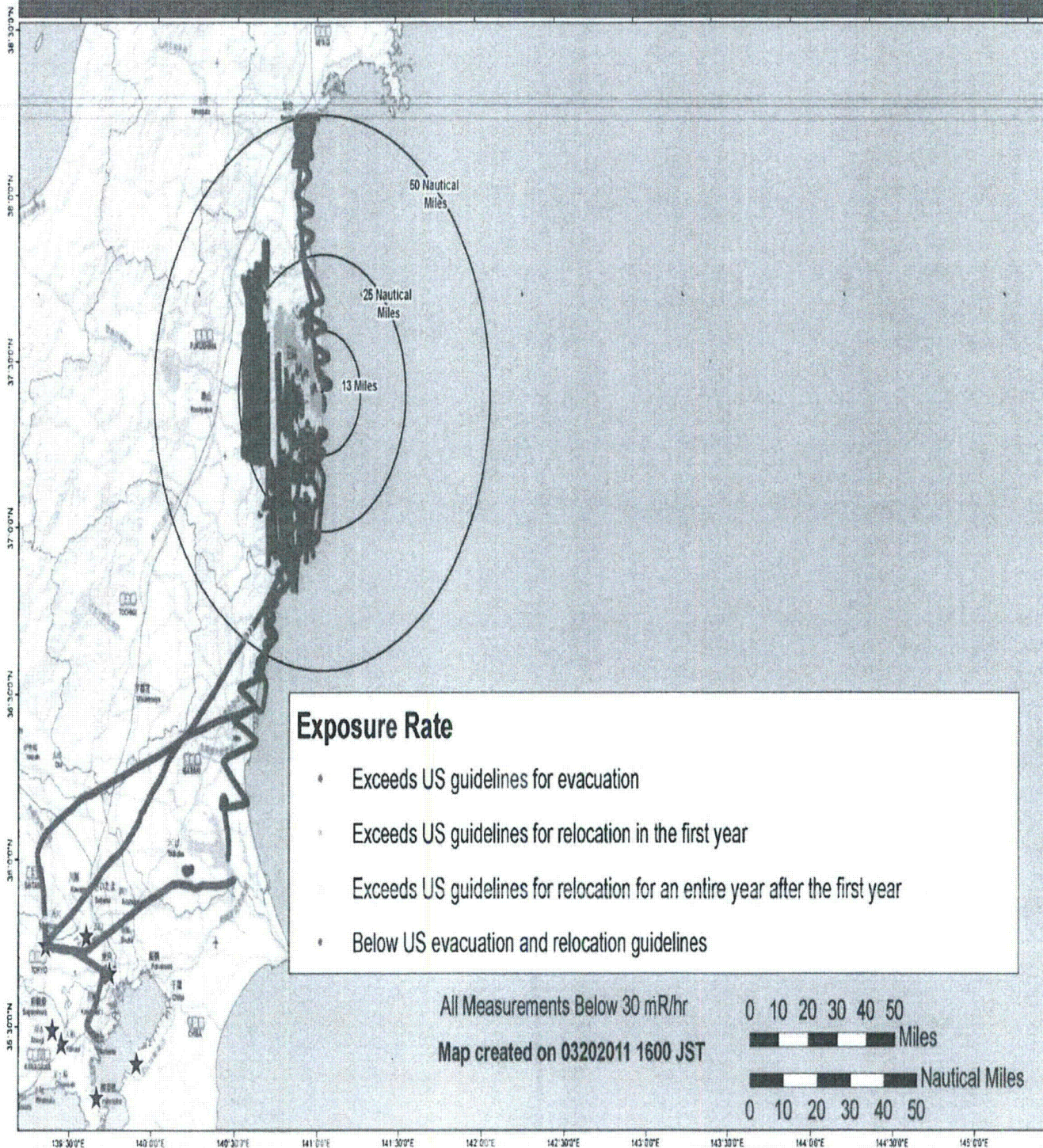
Nuclear Incident Team DOE NIT
Contact (202) 586 - 8100

11



Aerial Monitoring Results Cumulative

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Check for revision in 12 hours

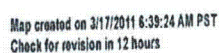
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(b)(4)



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NNSA Consequence Management Home Team
Contact (702) 794-1665

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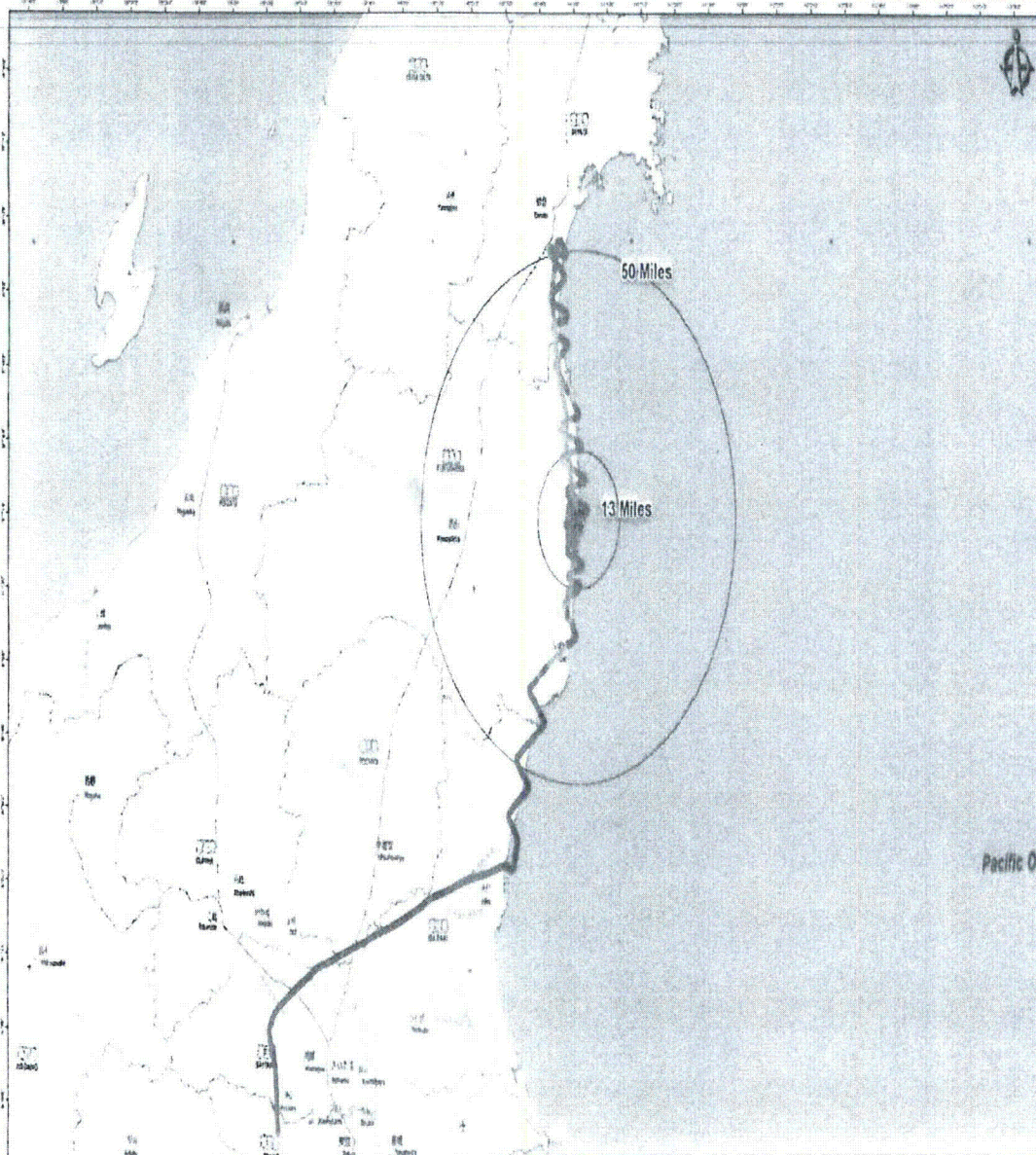
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EZ 720 of 810

Aerial Monitoring Results

Exposure Rate

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JAPAN



★ FUKUSHIMA DAICHI

C-12 Aerial Data

Exposure Rate (mR/hr)

- 0.01
- 0.02 - 0.10
- 0.11 - 1.00
- 1.01 - 10.00
- 10.01 - 20.00
- 20.01 - 32.48

Technical Considerations and Notes:

- This product is a representative estimate based upon the information provided.
- Exposure rate is based on the ground.
- Based upon current environmental conditions.
- This product aligns with previously established 13 mile protective action zone.
- Caution should be used when applying aerial measurements to ground-based measurements and activities at specific locations.

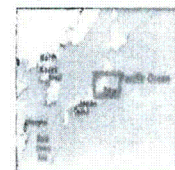
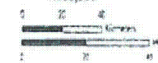
Not For Public Distribution

C-12 Mission: Altitude of 1000 ft Above Ground Level
Flight Information:
Estimated Area Flown 1800 Sq. Mi.

This map was produced by the Geographic Information Systems department of NSA's Remote Sensing Laboratory (RSL) at NSA's AFB, Las Vegas, Nevada. RSL uses 2007 ESRI World Street Map, and CHMT databases were used for map generation.

RSL map identifier number is: 03172011_Coverage.mxd

1:800,000



Map created on 3/17/2011 5:29:13 AM PST
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Contact (702) 794 - 1665

Official Use Only

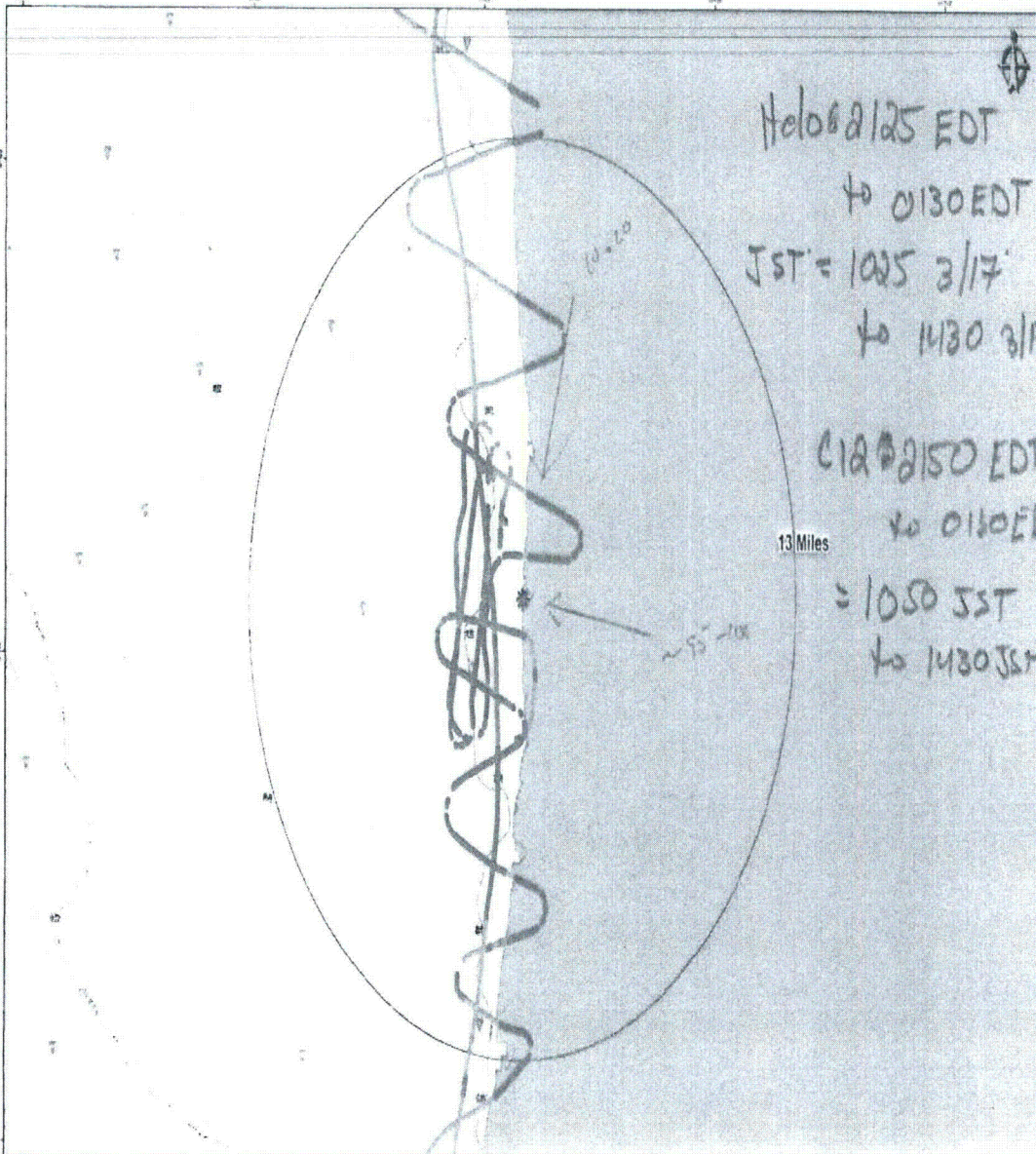
08:29 EPT

(b)(6)

Aerial Monitoring Results

Exposure Rate

FUKUSHIMA DAICHI
JAPAN



* FUKUSHIMA DAICHI

C-12 Aerial Data

Exposure Rate (mR/hr)

- * 0.01
- * 0.02 - 0.10
- * 0.11 - 1.00
- * 1.01 - 10.00
- * 10.01 - 20.00
- * 20.01 - 32.48

Technical Considerations and Notes

- * This product is a conservative estimate based upon the assumption that all material is deposited along the ground.
- * Based upon current environmental conditions.
- * This product aligns with previously established 13 mile protective action zone.
- * Caution should be used when comparing with measurements to ground based measurements and activities of specific loading.

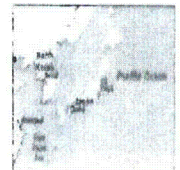
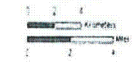
Not For Public Distribution

C-12 Monitor Altitude at 1000 ft Above Ground Level
Flight Information
Estimated Area flown 1800 Sq Mi

This map was produced by the Geographic Information Systems department of NNSA's Remote Sensing Laboratory (RSL) at the AFRL Las Vegas, Nevada. AFRL Las Vegas, NV 89115-5000. This map and data were used for map generation.

RSL map identification number is: 0173011-Planetary/Rescue.mxd

1:120,000



Map created on 3/17/2011 5:33:41 AM PST
Check for revision in 12 hours

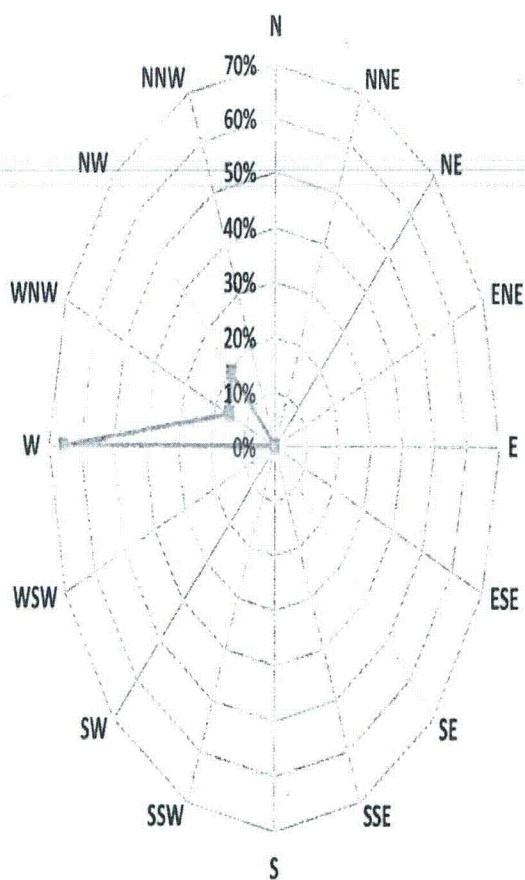
Official Use Only

NNSA Consequence Management Home Team
Contact (702) 794 - 1665

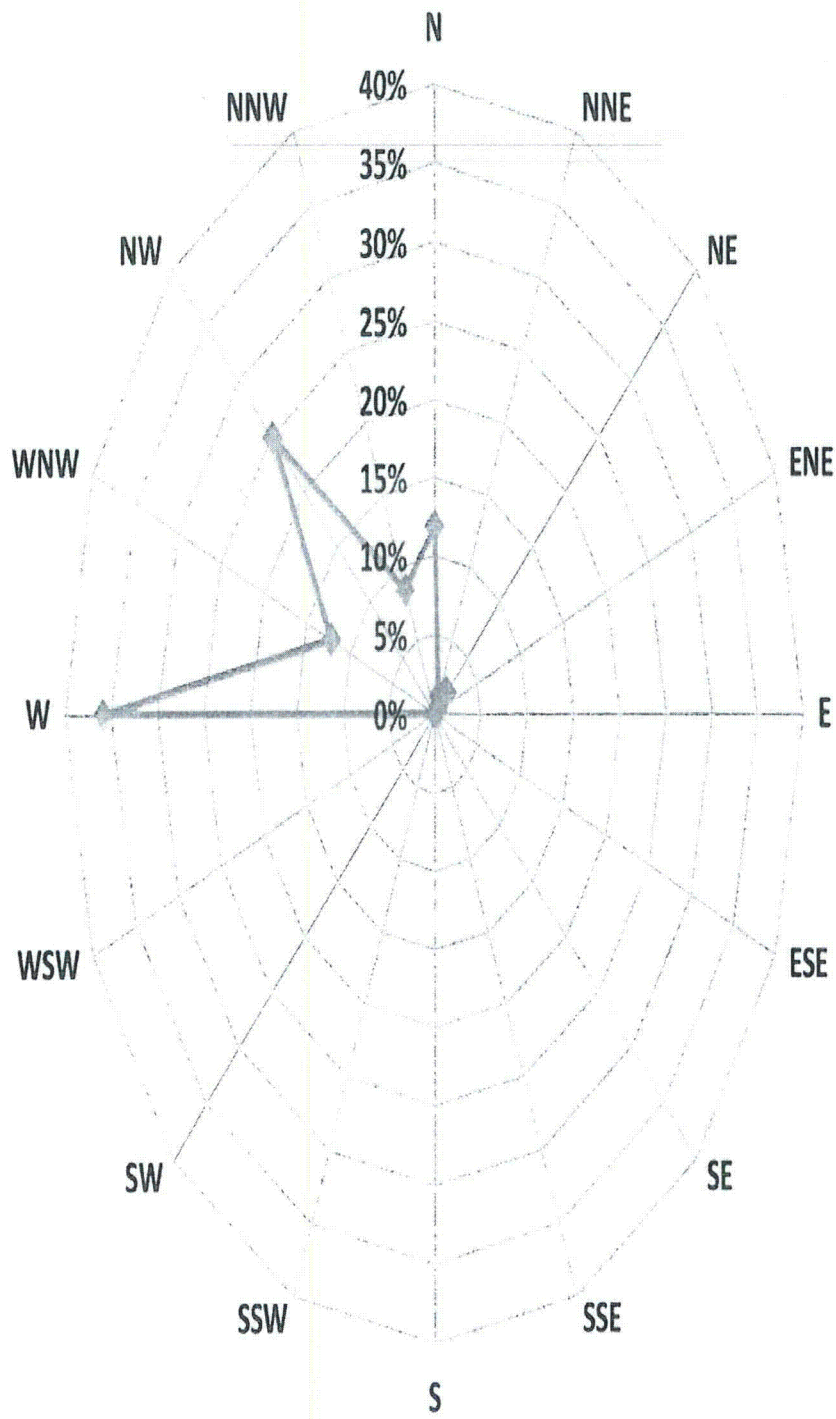
Official Use Only

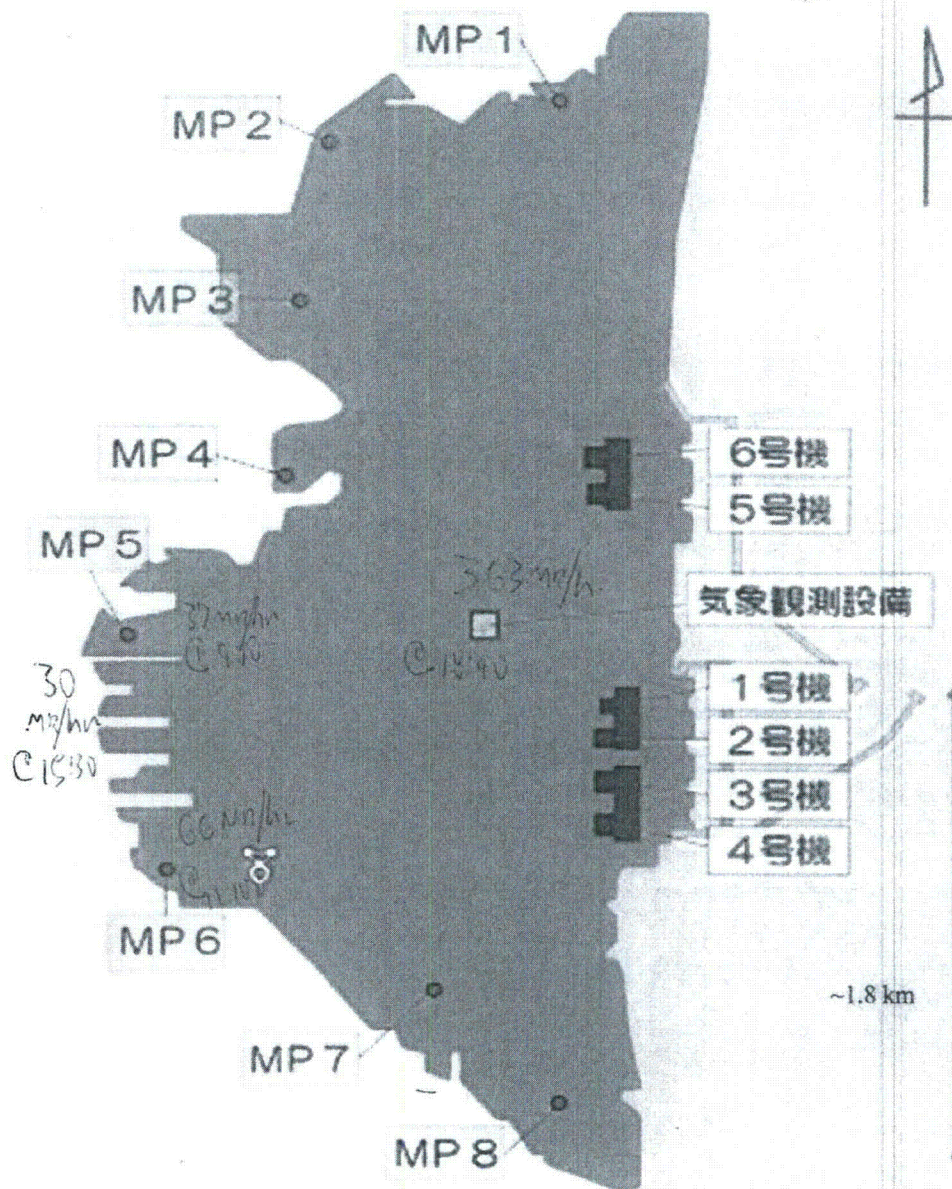
Date	Time (JST)	Wind Spd (m/s)	Wind Dir (degrees)
3/17/2011	1020	16.4	270
3/17/2011	1030	16.8	270
3/17/2011	1040	17.8	270
3/17/2011	1050	14.2	270
3/17/2011	1100	13.5	270
3/17/2011	1110	11.9	270
3/17/2011	1120	11.6	270
3/17/2011	1130	7.9	292.5
3/17/2011	1140	7.9	270
3/17/2011	1150	7.9	270
3/17/2011	1200	6	270
3/17/2011	1210	9.2	270
3/17/2011	1220	11.2	270
3/17/2011	1230	9.2	270
3/17/2011	1240	8.2	270
3/17/2011	1250	8.7	270
3/17/2011	1300	9.1	292.5
3/17/2011	1310	7.6	292.5
3/17/2011	1320	8.6	292.5
3/17/2011	1330	7.3	270
3/17/2011	1340	8.5	315
3/17/2011	1350	8.4	315
3/17/2011	1400	8.7	315
3/17/2011	1410	9.2	315
3/17/2011	1420	8.1	315
3/17/2011	1430	8	270

Wind Direction during Aerial Monitoring Flight
1025 through 1430 Japan time on 3/17/11



Wind Direction between 0430 on March 16 and 0600 March 28 Japan time





IAEA Incident and Emergency Centre
 Attachment 1: Location of fix Monitoring Points at Fukushima Daiichi
<http://www.tepco.co.jp/fukushima1-np/monitoring/monita2.html>

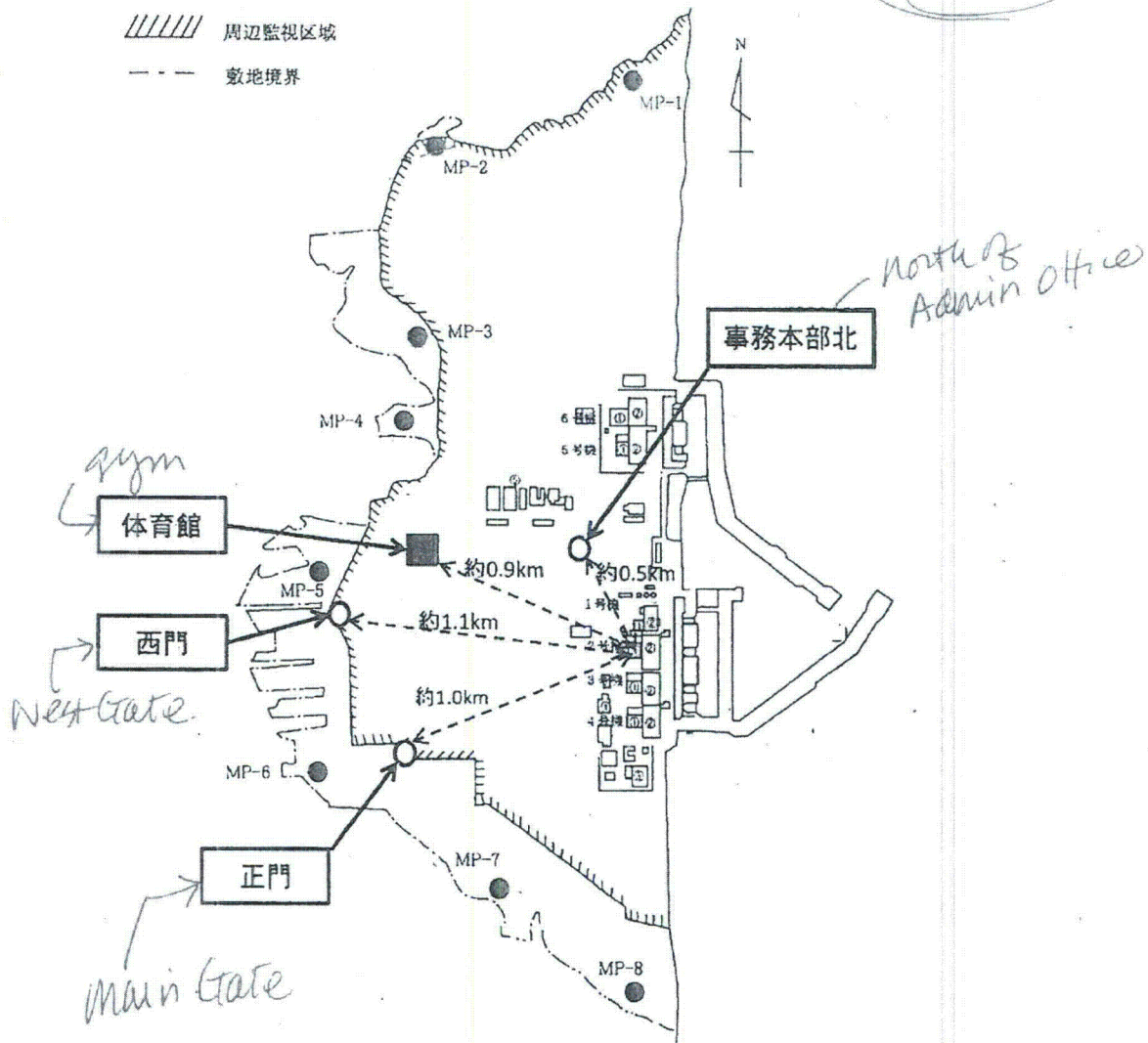
Respectfully

Guenther Winkler
 Emergency Response Manager
 13 March-2011 UTC time: 11:30

Fukushima Daiichi

福島第一原子力発電所

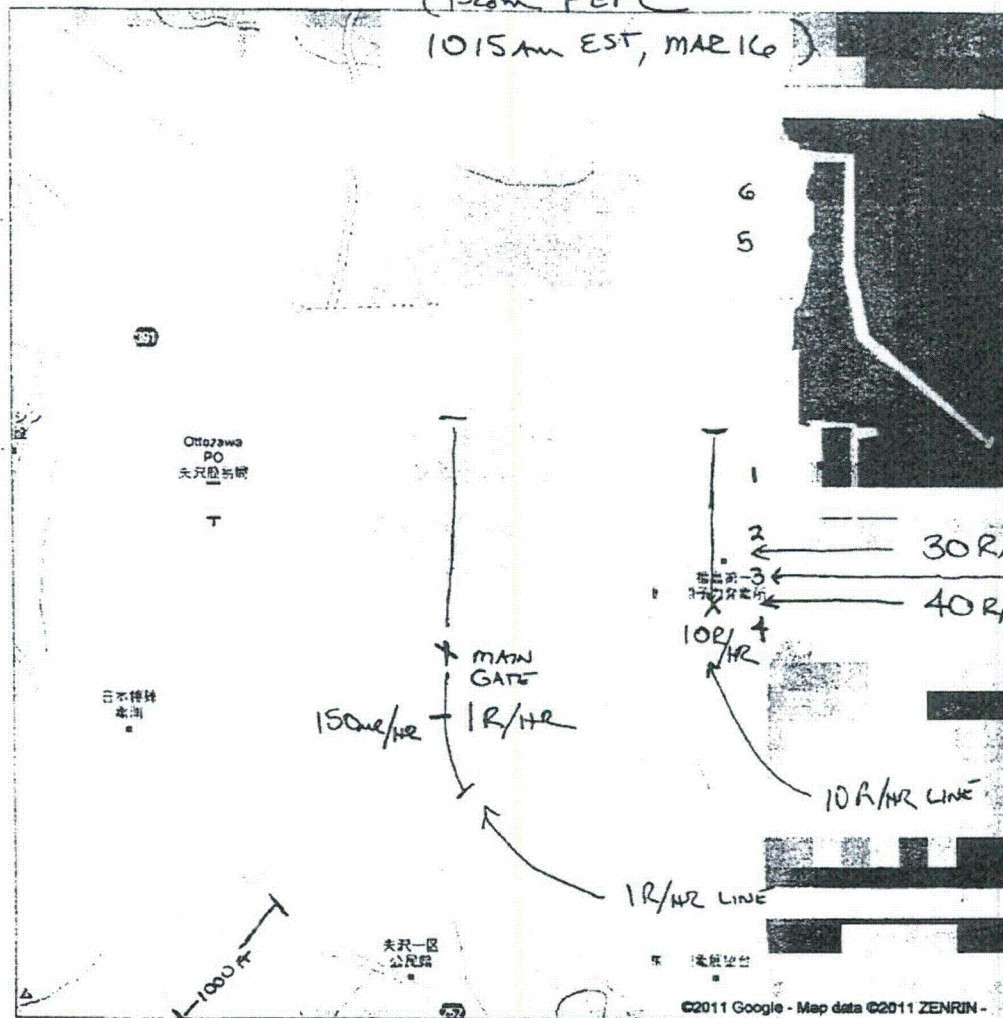
2011/3/17



Google maps

MAR 16
RAD LEVELS
(FROM FEPC
1015AM EST, MAR 16)

Get Google Maps on your phone
Text the word "GMAPS" to 466453



1sv = 100m

Fukushima Daiichi - Parameters related to the Plant

福島第一原子力発電所 プラント関連パラメータ

3月17日 4:00現在 As of 3/17 4am (= 3/16 3pm US EST)

号機	1u	2u	3u	4u	5u	6u
注水状況	消火系ラインを用いた海水注入中。	消火系ラインを用いた海水注入中。	消火系ラインを用いた海水注入中。 (3/15 2:30より開始)	停止中	停止中	停止中
原子炉水位	燃料域A: -1750mm 燃料域B: -1750mm (3:10現在)	燃料域A: -1400 mm (3:10現在)	燃料域A: -1950mm 燃料域B: -2300mm (3:20現在)	-	停止域 -1872mm (4:00現在)	停止域 -1773mm (4:00現在)
原子炉圧力	0.198MPaG (A) 0.155MPaG (B) (3:10現在)	-0.065MPaG (A) -0.079MPaG (B) (3:10現在)	0.023MPaG (A) 0.032MPaG (B) (3:20現在)	-	0.840MPaG (4:00現在)	0.649MPaG (4:00現在)
原子炉水温度	-			-	168.8℃ (4:00現在)	162.7℃ (4:00現在)
D/W・S/C圧力 S/C水温度	D/W 検出器不調 S/C 検出器不調	D/W 0.075MPaabs S/C D/S (3:10現在)	D/W 0.200 MPaabs S/C D/S (3:20現在)	-		
CAMS	D/W 3.09X10 ³ SV/h S/C 2.40X10 ³ SV/h (3:10現在) 24000/h	D/W 8.70X10 ³ SV/h S/C 2.65X10 ³ SV/h (3:10現在) 26500/h	D/W - S/C - (CAMS未使用)	-		
D/W 設計使用圧力	384kPaG	384kPaG	384kPaG	-		
D/W 設計使用圧力	427kPaG	427kPaG	427kPaG	-		
使用済燃料プール 水温度		-	-	84℃ (3/14 400)	64.5℃ (4:00現在)	61.0℃ (4:00現在)
電源	1Aトリップ 1Bトリップ	2Aトリップ 2Bトリップ	3Aトリップ 3Bトリップ	4AB使用不可	5ABトリップ	6B動作中 6A不可 HPCS不可
その他情報						

nturnent
na
wctawg
System
2

D/W = Drywell (Primary Cont.)

S/C = Secondary Containment

電力の入手
obtained from TEPCO
from Tamoko, Translators

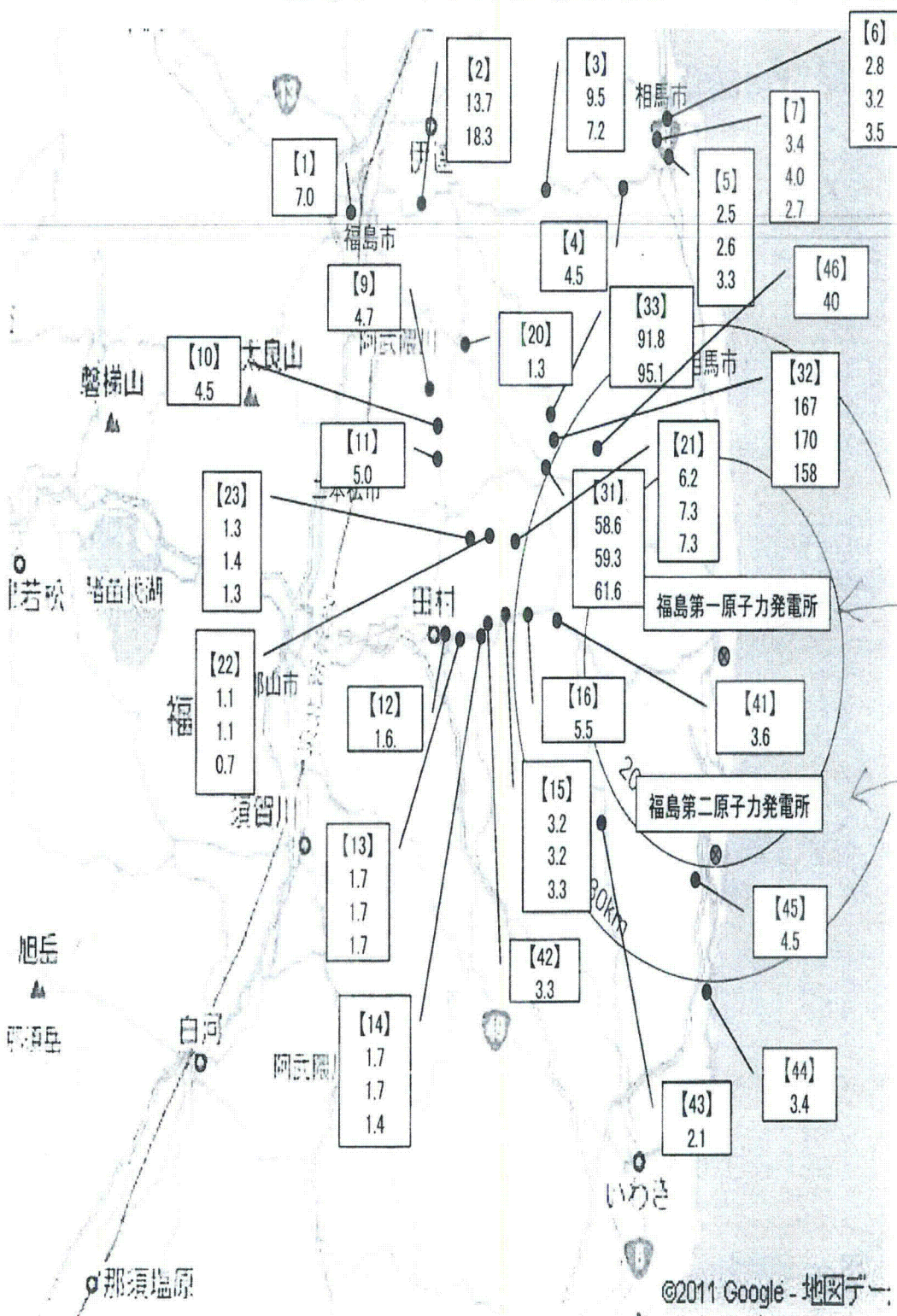
Fukushima Dai-ichi

福島第一原子力発電所周辺のモニタリング結果

測定日時 3/17/2011
3月17日 9:20-15:00
9時20分~15時00分

●測定箇所 = mp

Here 3/16 8:20pm ~ 3/17 2am



単位: マイクロシーベルト毎時

Unit: $\mu\text{Sv/hr}$
4 Sv/hr

729 of 810

Ministry of Education & Science

Monitoring beyond

12 miles from F. Daiichi

プレス発表資料

福島第一原子力発電所の20Km以遠のモニタリング結果について

平成23年3月17日16時00分現在
文 部 科 学 省

4pm
March 17

1. 文部科学省が実施した結果 注) 太下線データが今回追加分

- * 1 GM(ガイガー=ミューラー計測管)における値
- * 2 電離箱における値 *planar chamber*
- * 3 NaI(ヨウ化ナトリウム)シンチレータにおける値

March 17
3am
US EST

場所(福島第一発電所からの距離)	測定日時	数値(マイクロシーベルト/時) (記載のない限り屋外) <i>outdoor</i>	天候 <i>weather</i>	実施者
測定箇所 【32】 (約30Km北西)	3月17日15時00分	158.0 ^{*2} <i>in Sv/h</i>	降雨無し <i>no rain</i>	文部科学省
測定箇所 【2】 (約55Km北西)	3月17日14時50分	18.3 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所 【23】 (約35Km西北西)	3月17日14時50分	1.3 ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【31】 (約30Km西北西)	3月17日14時44分	61.6 ^{*2}	降雨無し	文部科学省
測定箇所 【15】 (約35Km西)	3月17日14時42分	3.3 ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【22】 (約35Km西北西)	3月17日14時35分	0.7 ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【14】 (約35Km西)	3月17日14時29分	1.4 ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【3】 (約45Km北西)	3月17日14時25分	7.2 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所 【21】 (約30Km西北西)	3月17日14時20分	7.3 ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【33】 (約30Km北西)	3月17日14時17分	95.1 ^{*2}	降雨無し	文部科学省
測定箇所 【13】 (約40Km西)	3月17日14時17分	1.7 ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【32】 (約30Km北西)	3月17日14時00分	170.0 ^{*2}	降雨無し	文部科学省
測定箇所 【23】 (約35Km西北西)	3月17日13時50分	1.4 ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【16】 (約30Km西)	3月17日13時47分	5.5 ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【31】 (約30Km西北西)	3月17日13時45分	59.3 ^{*2}	降雨無し	文部科学省

- *1 GM(ガイガー=ミューラー計測管)における値
 *2 電離箱における値
 *3 NaI(ヨウ化ナトリウム)シンチレータにおける値

場所(福島第1発電所からの距離)	測定日時	数値(マイクロシーベルト/時) (記載のない限り屋外)	天候	実施者
測定箇所【15】(約35Km西)	3月17日13時42分	3.2 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【22】(約35Km西北西)	3月17日13時35分	1.1 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【14】(約35Km西)	3月17日13時29分	1.7 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【7】(約45Km北)	3月17日13時25分	2.7 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【33】(約30Km北西)	3月17日13時23分	91.8 ^{*2}	降雨無し	文部科学省
測定箇所【21】(約30Km西北西)	3月17日13時20分	7.3 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【13】(約40Km西)	3月17日13時17分	1.7 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【6】(約45Km北)	3月17日13時10分	3.5 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【31】(約30Km西北西)	3月17日13時10分	58.6 ^{*2}	降雨無し	文部科学省
測定箇所【32】(約30Km北西)	3月17日13時10分	167.0 ^{*2}	降雨無し	文部科学省
測定箇所【46】(約20Km北西)	3月17日13時00分	3.4 ^{*2}	降雨無し	東京電力
測定箇所【5】(約45Km北)	3月17日12時55分	3.3 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【23】(約35Km西北西)	3月17日12時50分	1.3 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【15】(約35Km西)	3月17日12時42分	3.2 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【22】(約35Km西北西)	3月17日12時35分	1.1 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【14】(約35Km西)	3月17日12時29分	1.7 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【7】(約45Km北)	3月17日12時25分	4.0 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【21】(約30Km西北西)	3月17日12時20分	6.2 ^{*2}	降雨無し	原子力安全技術センター

- * 1 GM(ガイガーミューラー計測管)における値
 * 2 電離箱における値
 * 3 NaI(ヨウ化ナトリウム)シンチレータにおける値

場所(福島第1発電所からの距離)	測定日時	数値(マイクロシーベルト/時) (記載のない限り屋外)	天候	実施者
測定箇所【13】(約40Km西)	3月17日12時17分	1.7 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【45】(約20Km南)	3月17日12時12分	4.5 ^{*2}	降雨無し	東京電力
測定箇所【6】(約45Km北)	3月17日12時10分	3.2 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【44】(約30Km南)	3月17日12時10分	3.4 ^{*2}	降雨無し	東京電力
測定箇所【12】(約40Km西)	3月17日12時05分	1.6 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【43】(約20Km南西)	3月17日11時50分	2.1 ^{*2}	降雨無し	東京電力
測定箇所【20】(約45Km北西)	3月17日11時46分	1.3 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【42】(約30Km西)	3月17日11時00分	3.3 ^{*2}	降雨無し	東京電力
測定箇所【41】(約25Km西)	3月17日10時15分	3.6 ^{*2}	降雨無し	東京電力
測定箇所【5】(約45Km北)	3月17日11時55分	2.6 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【11】(約40Km北西)	3月17日11時27分	5.0 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【7】(約45Km北)	3月17日11時25分	3.4 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【10】(約40Km北西)	3月17日11時13分	4.5 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【6】(約45Km北)	3月17日11時10分	2.8 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【9】(約45Km北)	3月17日10時56分	4.7 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【5】(約45Km北)	3月17日10時55分	2.5 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【4】(約50Km北西)	3月17日10時33分	4.5 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【3】(約45Km北西)	3月17日10時20分	9.5 ^{*2}	降雨無し	日本原子力研究開発機構

- *1 GM(ガイガー=ミューラー計測管)における値
- *2 電離箱における値
- *3 NaI(ヨウ化ナトリウム)シンチレータにおける値

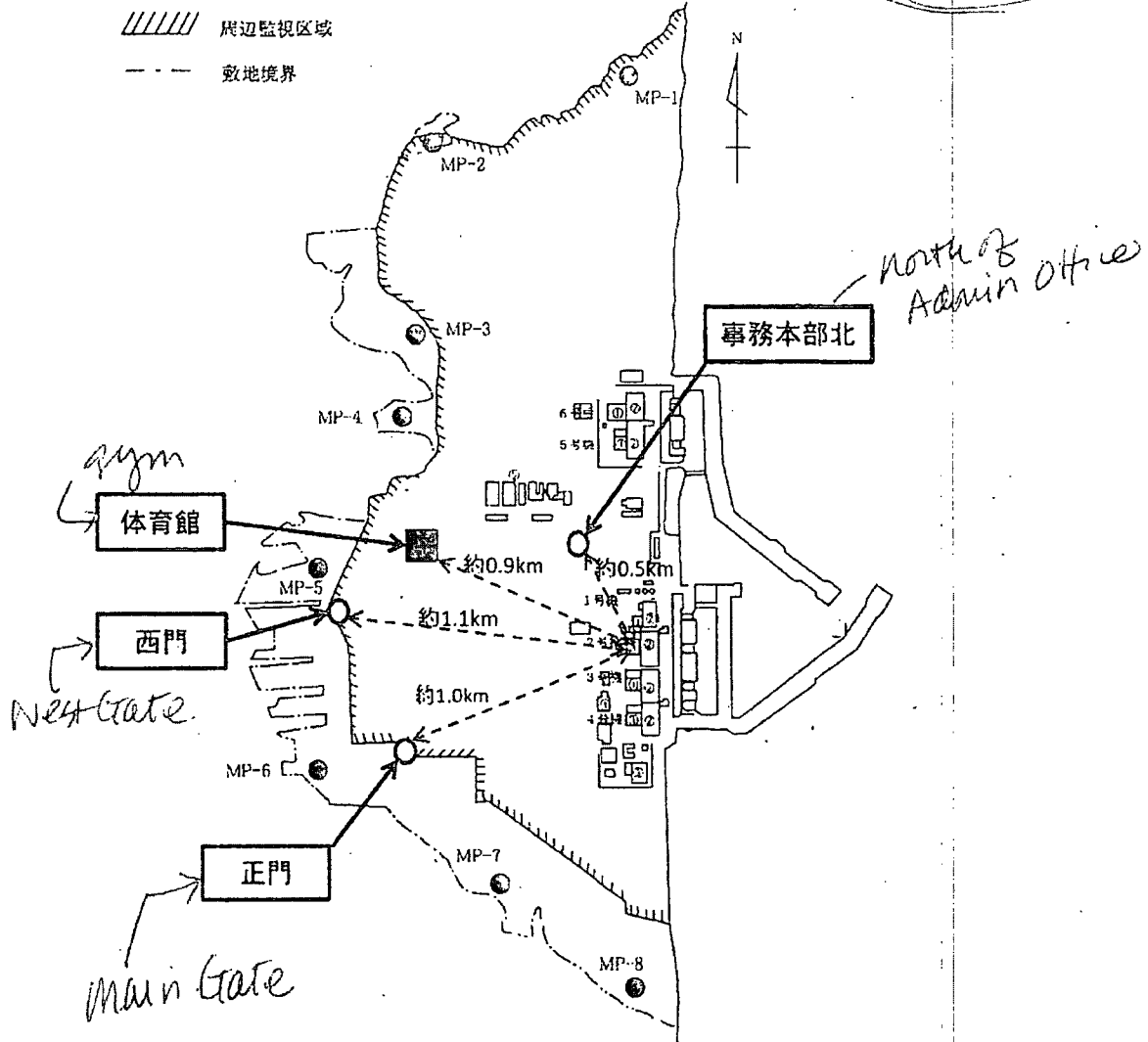
場所(福島第1発電所からの距離)	測定日時	数値(マイクロシーベルト/時) (記載のない限り屋外)	天候	実施者
測定箇所 【2】 (約55Km北西)	3月17日9時50分	13.7 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所 【1】 (約60Km北西)	3月17日9時20分	7.0 ^{*2}	降雨無し	日本原子力研究開発機構

2. 東京電力・警察庁の測定については準備中

Fukushima Daiichi

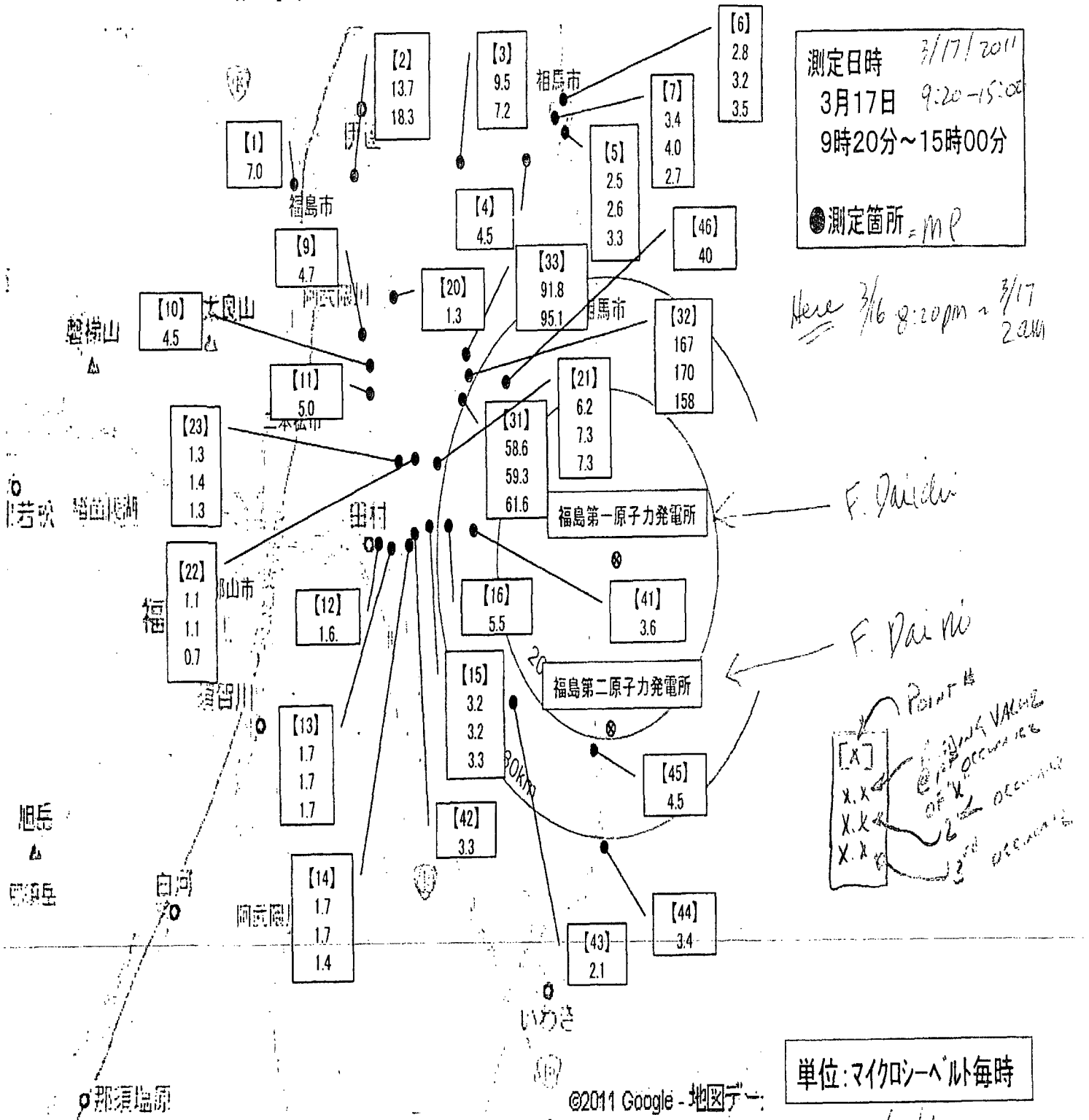
福島第一原子力発電所

2011/3/17



Fukushima Dai-ichi

福島第一原子力発電所周辺のモニタリング結果



Monitoring beyond
12 miles from F. Daiichi

プレス発表資料

福島第一原子力発電所の20Km以遠のモニタリング結果について

平成23年3月17日16時00分現在
文 部 科 学 省

4pm
March 17

1. 文部科学省が実施した結果 注) 太下線データが今回追加分

- * 1 GM(ガイガー=ミューラー計測管)における値
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March 17
3am
US EST

場所(福島第1発電所からの距離)	測定日時	数値(マイクロシーベルト/時) (記載のない限り屋外)	天候 Weather	実施者
測定箇所 【32】 (約30Km北西)	3月17日15時00分	<u>158.0</u> ^{*2} <i>4 Sv/h</i>	降雨無し <i>no rain</i>	文部科学省
測定箇所 【2】 (約55Km北西)	3月17日14時50分	<u>18.3</u> ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所 【23】 (約35Km西北西)	3月17日14時50分	<u>1.3</u> ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【31】 (約30Km西北西)	3月17日14時44分	<u>61.6</u> ^{*2}	降雨無し	文部科学省
測定箇所 【15】 (約35Km西)	3月17日14時42分	<u>3.3</u> ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【22】 (約35Km西北西)	3月17日14時35分	<u>0.7</u> ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【14】 (約35Km西)	3月17日14時29分	<u>1.4</u> ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【3】 (約45Km北西)	3月17日14時25分	<u>7.2</u> ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所 【21】 (約30Km西北西)	3月17日14時20分	<u>7.3</u> ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【33】 (約30Km北西)	3月17日14時17分	<u>95.1</u> ^{*2}	降雨無し	文部科学省
測定箇所 【13】 (約40Km西)	3月17日14時17分	<u>1.7</u> ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【32】 (約30Km北西)	3月17日14時00分	<u>170.0</u> ^{*2}	降雨無し	文部科学省
測定箇所 【23】 (約35Km西北西)	3月17日13時50分	<u>1.4</u> ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【16】 (約30Km西)	3月17日13時47分	<u>5.5</u> ^{*2}	降雨無し	原子力安全技術センター
測定箇所 【31】 (約30Km西北西)	3月17日13時45分	<u>59.3</u> ^{*2}	降雨無し	文部科学省

- * 1 GM(ガイガー=ミューラー計測管)における値
 * 2 電離箱における値
 * 3 NaI(ヨウ化ナトリウム)シンチレータにおける値

場所(福島第1発電所からの距離)	測定日時	数値(マイクロシーベルト/時) (記載のない限り屋外)	天候	実施者
測定箇所【15】(約35Km西)	3月17日13時42分	3.2 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【22】(約35Km西北西)	3月17日13時35分	1.1 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【14】(約35Km西)	3月17日13時29分	1.7 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【7】(約45Km北)	3月17日13時25分	2.7 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【33】(約30Km北西)	3月17日13時23分	91.8 ^{*2}	降雨無し	文部科学省
測定箇所【21】(約30Km西北西)	3月17日13時20分	7.3 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【13】(約40Km西)	3月17日13時17分	1.7 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【6】(約45Km北)	3月17日13時10分	3.5 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【31】(約30Km西北西)	3月17日13時10分	58.6 ^{*2}	降雨無し	文部科学省
測定箇所【32】(約30Km北西)	3月17日13時10分	167.0 ^{*2}	降雨無し	文部科学省
測定箇所【46】(約20Km北西)	3月17日13時00分	3.4 ^{*2}	降雨無し	東京電力
測定箇所【5】(約45Km北)	3月17日12時55分	3.3 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【23】(約35Km西北西)	3月17日12時50分	1.3 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【15】(約35Km西)	3月17日12時42分	3.2 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【22】(約35Km西北西)	3月17日12時35分	1.1 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【14】(約35Km西)	3月17日12時29分	1.7 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【7】(約45Km北)	3月17日12時25分	4.0 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【21】(約30Km西北西)	3月17日12時20分	6.2 ^{*2}	降雨無し	原子力安全技術センター

- *1 GM(ガイガー=ミューラー計測管)における値
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 *3 NaI(ヨウ化ナトリウム)シンチレータにおける値

場所(福島第1発電所からの距離)	測定日時	数値(マイクロシーベルト/時) (記載のない限り屋外)	天候	実施者
測定箇所【13】(約40Km西)	3月17日12時17分	1.7 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【45】(約26Km南)	3月17日12時12分	4.5 ^{*2}	降雨無し	東京電力
測定箇所【6】(約45Km北)	3月17日12時10分	3.2 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【44】(約30Km南)	3月17日12時10分	3.4 ^{*2}	降雨無し	東京電力
測定箇所【12】(約40Km西)	3月17日12時05分	1.6 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【43】(約20Km南西)	3月17日11時50分	2.1 ^{*2}	降雨無し	東京電力
測定箇所【20】(約45Km北西)	3月17日11時46分	1.3 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【42】(約30Km西)	3月17日11時00分	3.3 ^{*2}	降雨無し	東京電力
測定箇所【41】(約25Km西)	3月17日10時15分	3.6 ^{*2}	降雨無し	東京電力
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測定箇所【11】(約40Km北西)	3月17日11時27分	5.0 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【7】(約45Km北)	3月17日11時25分	3.4 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【10】(約40Km北西)	3月17日11時13分	4.5 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【6】(約45Km北)	3月17日11時10分	2.8 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【9】(約45Km北)	3月17日10時56分	4.7 ^{*2}	降雨無し	原子力安全技術センター
測定箇所【5】(約45Km北)	3月17日10時55分	2.5 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【4】(約50Km北西)	3月17日10時33分	4.5 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【3】(約45Km北西)	3月17日10時20分	9.5 ^{*2}	降雨無し	日本原子力研究開発機構

- * 1 GM(ガイガー=ミューラー計測管)における値
- * 2 電離箱における値
- * 3 NaI(ヨウ化ナトリウム)シンチレータにおける値

場所(福島第1発電所からの距離)	測定日時	数値(マイクロシーベルト/時) (記載のない限り屋外)	天候	実施者
測定箇所【2】(約55Km北西)	3月17日9時50分	13.7 ^{*2}	降雨無し	日本原子力研究開発機構
測定箇所【1】(約60Km北西)	3月17日9時20分	7.0 ^{*2}	降雨無し	日本原子力研究開発機構

2. 東京電力・警察庁の測定については準備中

Fukushima Daiichi
Near the Front Gate (near MP-6) (WSW of #2 unit)
Main

2011/3/17 8:49

福島第一(1F) 西門付近(MP-5付近)(2号機西南西の位置)

Monitoring
Car
Measure
Value
Weather
Wind
Direction
Velocity

3月16日 9/16	5:00	5:30	6:00	6:30	6:40	6:50	7:00	7:10	7:20	7:30	7:40	7:50	8:00	8:10	8:20	8:30	8:40	8:50	9:00	9:10	9:20	9:30
モニタリングカー																						
測定値($\mu\text{Sv/h}$)	918.2	868.0	894.0	848.0	837.0	815.0	808.8	670.3	661.8	651.1	644.0	636.8	627.5	620.8	613.9	606.6	600.4	593.4	587.6	582.2	582.4	582.3
中性子	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
風向	北西	北北西	北西	西	西北西	西北西	北西	北西	北西	北西	西	西	北北西	西北西	北北西	北北西	北	北北西	北西	北	北西	北西
風速(m/s)	2.9	2.6	2.0	1.4	1.4	1.4	1.4	1.4	1.2	1.3	1.2	1.2	1.2	1.3	1.4	1.4	1.7	2.2	1.7	2.3	1.8	1.9
	NW	NW	NW	W	WNW	WNW	NW	NW	NW	NW	W	W	NW	WNW	WNW	WNW	N	WNW	NW	N	NW	NW

3月16日	9:40	9:50	10:00	10:10	10:20	10:30	10:45	10:54	10:55	11:00	11:10	11:20	11:30	11:40	11:50	12:00	12:10	12:20	12:30	12:40	12:50	13:00
モニタリングカー																						
測定値($\mu\text{Sv/h}$)	641.8	700.6	810.3	908.5	2399.0	1351.0	6400.0	2300.0	2900.0	3391.0	2720.0	1900.0	5350.0	2633.0	2578.0	4418.0	3138.0	3261.0	10850.0	8234.0	2851.0	2672.0
中性子	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
風向	西	北北西	東北東	北東	東北東	東	東北東	北東	-	北東	北北東	東北東	北東	東	北	東南東	東	北	東北東	西	北西	西南西
風速(m/s)	1.6	1.5	1.8	1.5	1.4	2.2	4.9	-	-	2.0	1.9	2.3	1.6	1.8	1.8	1.6	0.9	3.8	1.4	1.4	4.1	3.0
	W	NW	ENE	NE	ENE	E	ENE	NE		NE	NNE	ENE	NE	E	N	ESE	E	N	ENE	W	NW	WSW

3月16日	13:10	13:20	13:30	13:40	13:50	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	15:40	15:50	16:00	16:10	16:20	-	-
モニタリングカー																						
測定値($\mu\text{Sv/h}$)	2536.0	2430.0	2331.0	2257.0	2182.0	2122.0	2059.0	2022.0	1937.0	1888.0	1835.0	1788.0	1752.0	1697.0	1664.0	1629.0	1591.0	1556.0	1530.0	1472.0	-	-
中性子	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
風向	西南西	西南西	北	北西	北西	東北東	西南西	西南西	西	西北西	西南西	北西	北西	北北西	北	北北西	西	西	南西	北西	-	-
風速(m/s)	1.0	1.2	2.4	2.7	2.1	1.7	1.9	2.3	2.1	2.1	3.1	2.3	3.4	3.0	2.7	2.6	2.6	1.9	2.4	2.1	-	-
	WSW	WSW	W	NW	NW	ENE	SSW	SSW	W	WNW	WSW	NW	NW	NW	N	NW	W	W	SW	NW		

福島第一(1F) 体育館付近(MP-5東側)(2号機西北西の位置) ※消防活動の支障に与えるため移動

3月16日	17:03	17:10	17:20	17:30	17:40	17:50	18:00	18:10	18:20	18:30
モニタリングカー										
測定値($\mu\text{Sv/h}$)	752.0	749.3	745.6	741.3	738.2	735.0	731.0	728.0	725.9	723.3
中性子	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
風向	-	北	北西	西北西	北北西	北北西	西北西	北西	西	北西
風速(m/s)	-	3.6	3.5	3.5	4.0	4.0	4.3	3.9	3.5	3.6
		N	NW	WNW	NW	WNW	WNW	NW	W	NW

East of
Near the Gymnasium (MP-5)
(WNW of #2 unit) moved for
the better fire distinguishing activities

(moved for the
better fire distinguishing
activities)

福島第一(1F) 西門付近(MP-5付近)(2号機西の位置) ※MP-6の放射線によるリスクが高いことから西門付近で測定

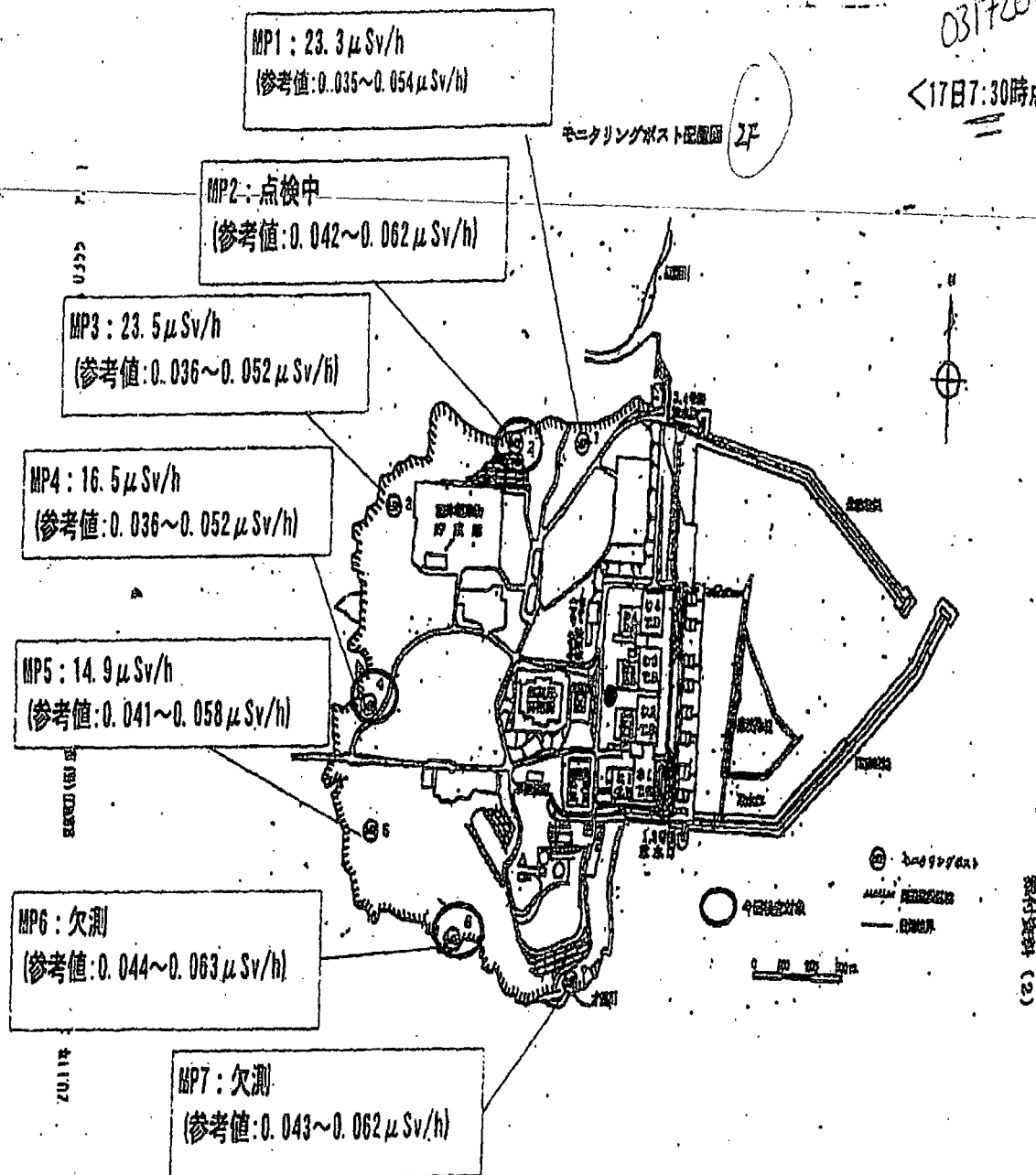
3月16日	19:00	19:30	20:00	20:30	21:00	21:30	22:00	22:30	23:00	23:30
モニタリングカー										
測定値($\mu\text{Sv/h}$)	385.4	380.7	375.5	373.6	370.2	366.5	363.7	361.2	358.8	355.7
中性子	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
風向	北西	北西	北北西	北北西	北北西	北北西	北西	東南東	北北東	北北東
風速(m/s)	2.1	2.0	2.1	1.9	1.2	1.0	1.2	0.4	0.5	0.8
	NW	NW	WNW	WNW	NW	NW	NW	ESE	NNE	NNE

Near the West Gate (near the MP-5)
(West of #2 unit)
* measuring done due to high risk of
radiation of MP-6

3月17日	0:30	0:50	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30
モニタリングカー															
測定値($\mu\text{Sv/h}$)	351.4	350.1	348.2	345.9	344.8	344.6	341.7	340.8	339.4	338.3	335.1	334.7	333.8	314.5	313.5
中性子	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
風向	北東	南南西	東	西	北西	北	西	西	北西	西	西	西	西	西	西
風速(m/s)	1.1	0.4	0.9	0.5	1.5	1.5	1.8	1.8	1.0	1.3	2.3	3.1	3.6	3.7	3.8
	NE	SSW	E	W	NW	N	W	W	NW	W	W	W	W	W	W

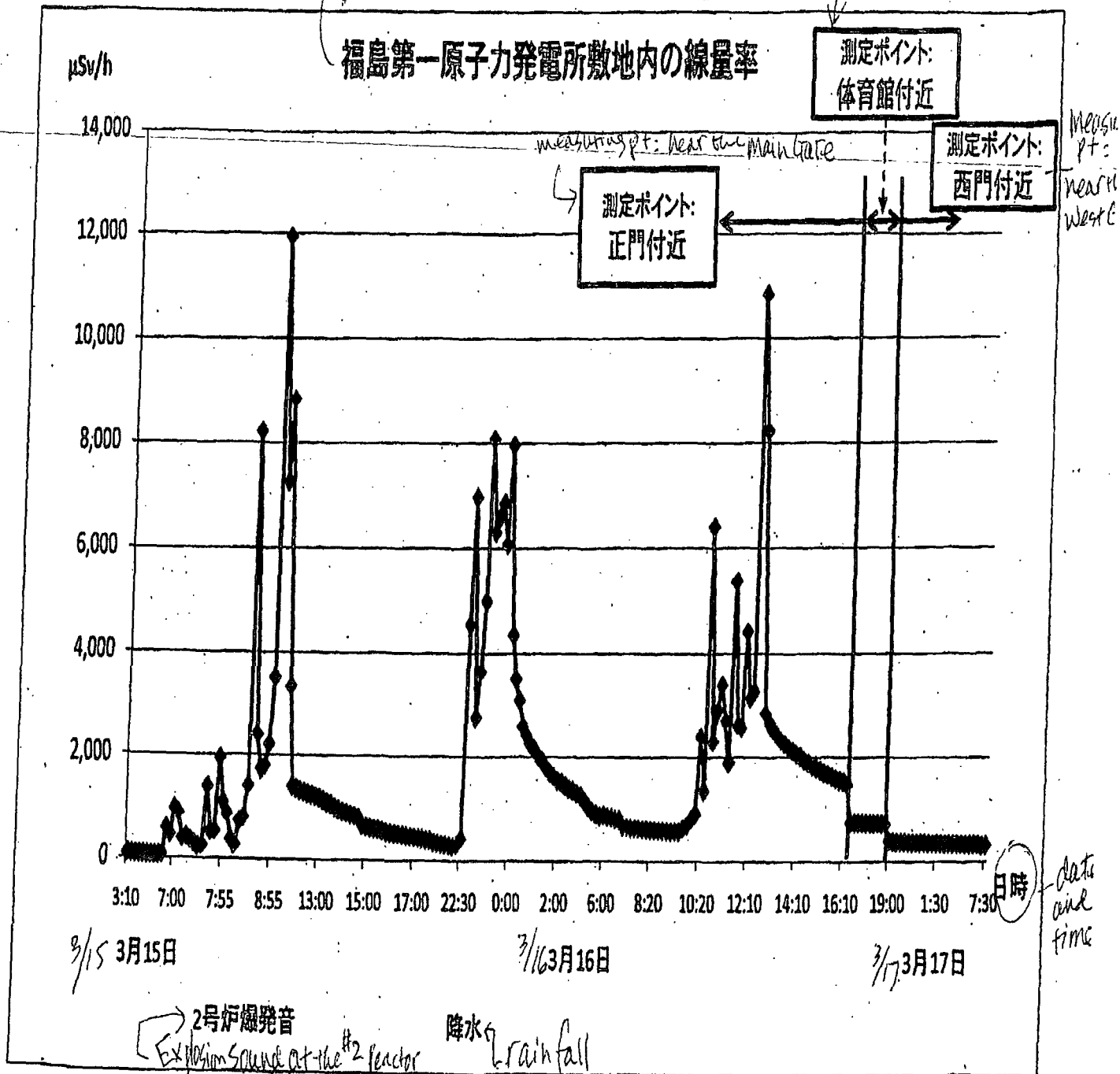
03172011

＜17日7:30時点＞



[Radiation at the Fukushima Daiichi Plant site]

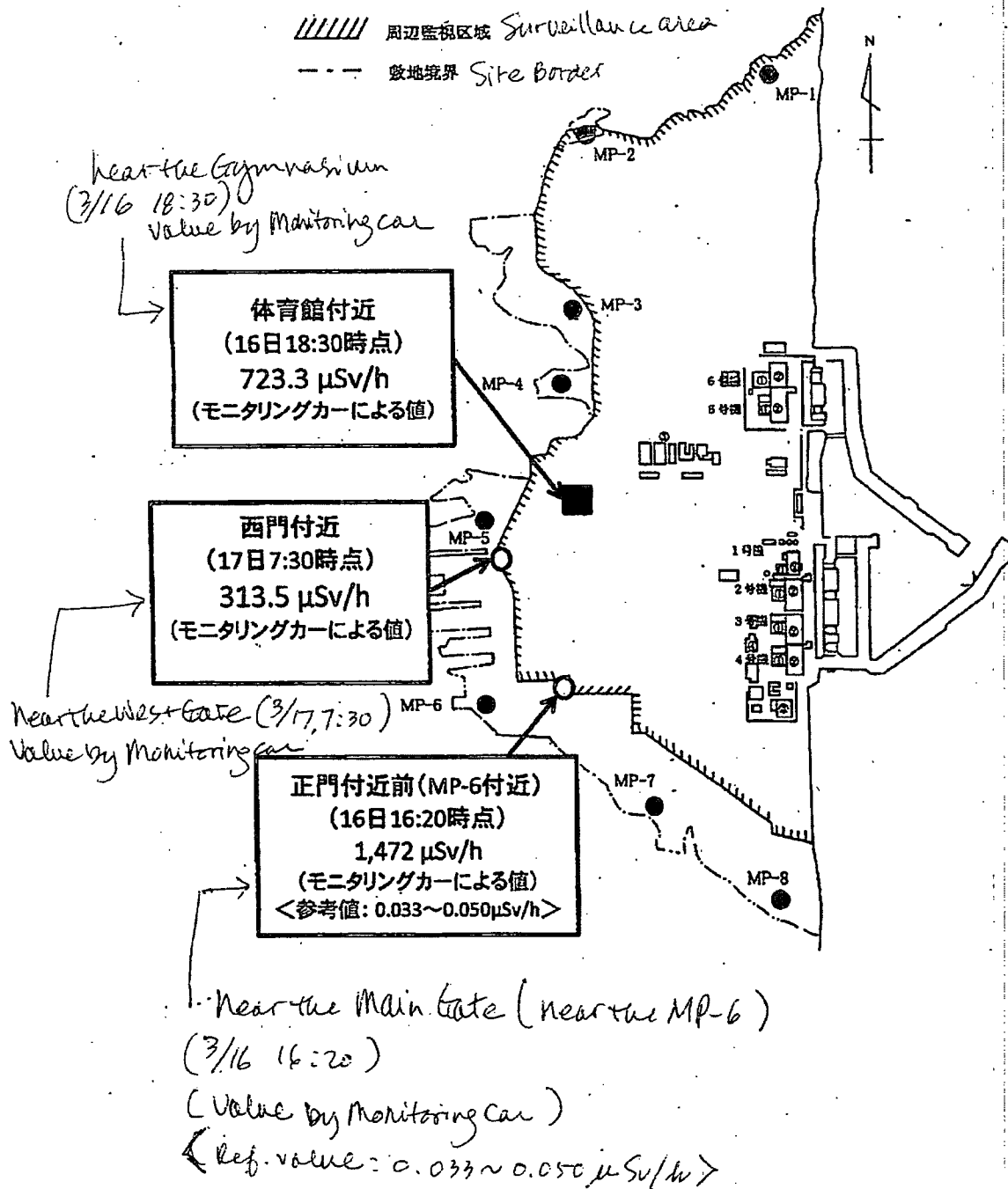
Measuring pt: Near the Gymnasium



Fukushima Daiichi Plant
福島第一原子力発電所

2011/3/17
07:30現在

////// 周辺監視区域 Surveillance area
--- 敷地境界 Site border



Various Power Plant Monitoring data (obtained as of 3/16 21:00)

各発電所等の環境モニタリング結果(3/16 21:00に入手したデータ結果)

単位: $\mu\text{Sv/h}$

会社名	発電所名	3月16日											
		0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00
北海道電力	泊原発所										0.024	0.024	0.024
東北電力	女川原子力発電所	4.80	4.70	4.70	4.50	4.30	4.20	4.20	4.20	4.20	4.10	4.10	4.00
	東通原子力発電所	0.02	0.02	0.03	0.03	0.02	0.02	0.020	0.020	0.020	0.020	0.018	0.018
東京電力	福島第一原子力発電所	4351	2159	1552	1267	1047	918.2	884	808.8	627.5	587.6	810.3	3391
	福島第二原子力発電所	15.6	43.6	44.9	45.5	38.6	34.9	32.1	30.4	28.7	27.6	76.8	44.7
	柏崎刈羽原子力発電所	0.077	0.075	0.073	0.074	0.081	0.083	0.072	0.066	0.064	0.064	0.069	0.069
日本原子力発電	東海第二発電所	0.8469	0.8336	0.8346	0.8212	0.817	1.346	1.944	1.542	1.42	1.283	1.174	1.096
	敦賀発電所	0.086	0.077	0.074	0.076	0.075	0.073	0.073	0.074	0.076	0.086	0.088	0.083
中部電力	浜岡原子力発電所	0.068	0.069	0.069	0.068	0.069	0.069	0.069	0.069	0.068	0.068	0.068	0.068
北陸電力	志賀原子力発電所	0.037	0.037	0.035	0.034	0.033	0.033	0.033	0.034	0.034	0.04	0.04	0.039
中国電力	島根原子力発電所	0.03	0.03	0.03	0.031	0.03	0.03	0.031	0.035	0.035	0.04	0.033	0.031
関西電力	美浜発電所	0.081	0.075	0.074	0.079	0.077	0.074	0.075	0.073	0.078	0.082	0.089	0.082
	高浜発電所	0.044	0.043	0.042	0.053	0.058	0.05	0.050	0.051	0.046	0.045	0.049	0.048
	大飯発電所	0.038	0.037	0.036	0.049	0.062	0.049	0.043	0.040	0.037	0.035	0.035	0.038
四国電力	伊方発電所	0.014	0.014	0.014	0.013	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013
九州電力	玄海原子力発電所	0.026	0.027	0.028	0.026	0.026	0.026	0.026	0.027	0.026	0.026	0.026	0.025
	川内原子力発電所	0.039	0.038	0.037	0.038	0.039	0.037	0.039	0.039	0.037	0.038	0.039	0.037

会社名	発電所名	3月16日									
		12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
北海道電力	泊原発所	0.023	0.024	0.024	0.024	0.023	0.024	0.026	0.026	0.024	0.023
東北電力	女川原子力発電所	3.90	3.90	3.80	3.70	3.70	3.70	3.60	3.60	3.60	3.50
	東通原子力発電所	0.018	0.018	0.017	0.017	0.016	0.018	0.018	0.025	0.025	0.022
東京電力	福島第一原子力発電所	4418	2627	2122	1788	1556	752	731	385.4	375.5	370.2
	福島第二原子力発電所	38.6	34.9	32.4	30.6	29.1	28.4	27.7	27.1	26.6	25.9
	柏崎刈羽原子力発電所	0.066	0.066	0.065	0.064	0.064	0.066	0.066	0.068	0.069	0.065
日本原子力発電	東海第二発電所	1.078	0.99	0.96	0.93	0.91	0.89	0.88	0.87	0.87	0.87
	敦賀発電所	0.079	0.089	0.081	0.076	0.075	0.075	0.078	0.079	0.08	0.074
中部電力	浜岡原子力発電所	0.068	0.068	0.068	0.068	0.069	0.069	0.069	0.069	0.069	0.069
北陸電力	志賀原子力発電所	0.036	0.033	0.032	0.032	0.032	0.04	0.037	0.033	0.033	
中国電力	島根原子力発電所	0.032	0.03	0.031	0.03	0.03	0.032	0.03	0.029	0.029	0.031
関西電力	美浜発電所	0.076	0.081	0.076	0.076	0.075	0.08	0.078	0.08	0.08	
	高浜発電所	0.058	0.051	0.052	0.053	0.053	0.061	0.068	0.069	0.058	
	大飯発電所	0.047	0.046	0.039	0.049	0.041	0.042	0.052	0.05	0.045	
四国電力	伊方発電所	0.014	0.014	0.013	0.013	0.014	0.013	0.013	0.014	0.013	
九州電力	玄海原子力発電所	0.026	0.025	0.026	0.026	0.026	0.025	0.024	0.024	0.025	0.025
	川内原子力発電所	0.037	0.038	0.039	0.038	0.04	0.038	0.038	0.038	0.038	0.039

*福島第一原子力発電所: 17:00及び18:00は体育館付近(MP-5東側)の測定値(消防活動の支援になるため正門付近(MP-6)から移動)

19:00以降は西門付近(MP-5付近)の測定値(正門付近(MP-6)の放射線によるリスクが高いことから体育館付近(MP-5東側)から移動)

* Fukushima Daiichi: at 17:00 and 18:00 values measured near the gym (East of MP-5). Location moved from Main Gate area (MP-6) due to the interference with the fire distinguish activities.
After 19:00 values measured near the West Gate (near MP-5). (Location moved from the gymnasium area (MP-5) due to high risk of radiation around the Main Gate (MP-6)) (East of)

hoo1

From: DTRA Operations Center (b)(6)
Sent: Wednesday, March 16, 2011 9:21 AM
To: (b)(6) hoo1
Subject: FW: RAD Survey data (S)



naracc 27.pdf (356 KB)

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

From: (b)(6)
[mailto:(b)(6)]
Sent: Wednesday, March 16, 2011 5:18 AM
To: (b)(6)

(b)(6)

Subject: RAD Survey data (S)

Classification: UNCLASSIFIED

Sir,

Please see attached additional attached data sheets for input to plume models (11-216; Updates for Fukushima 1 and 2 Nuclear Plants)

Please let me know if you have any questions or concerns.

V/r,

LCDR John Bleidorn, LCDR O'Neill

COMSUBGRU 7

Naval Area Commander Communications Center (NACCC)

(b)(6)

Near Tokyo - Shipyard

27

(b)(5)

Summary Report

(b)(5)

Summary Report

(b)(5)

Release Pathway

(b)(5)

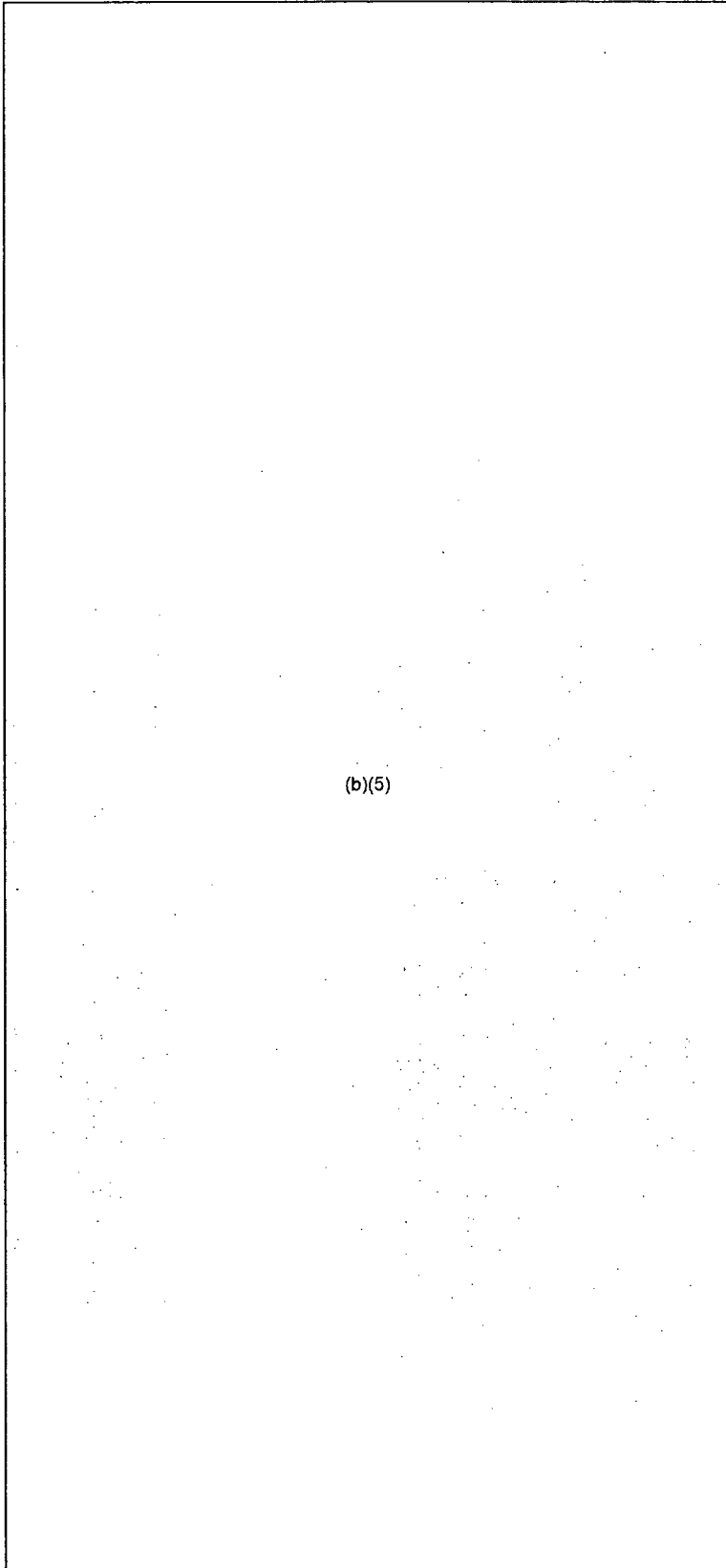
Meteorology

(b)(5)

Summary Report

(b)(5)

Summary Report



Summary Report

(b)(5)

(b)(5)

Calculations

(b)(5)

PMT02 Hoc

From: OST01 HOC
Sent: Saturday, March 19, 2011 2:12 AM
To: PMT02 Hoc; PMT11 Hoc; PMT01 Hoc; RST01 Hoc
Subject: FW: HA:
Attachments: spent_fuel.xps; Fukushima_1(unit 1)english.doc; Fukushima_1(unit 2)english.doc; Fukushima_1(unit 3)english.doc

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

From: H00 Hoc
Sent: Saturday, March 19, 2011 2:09 AM
To: OST01 HOC
Subject: FW: HA:

Rebecca,

Attachments!

Dong

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

From: Smith, Brooke
Sent: Saturday, March 19, 2011 2:05 AM
To: Devercelly, Richard; Monninger, John; H00 Hoc; LIA03 Hoc; LIA02 Hoc; Casto, Chuck; Cook, William
Subject: Fw: HA:

Sent from an NRC Blackberry.

Brooke G. Smith

(b)(6)

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

From: Strizhov V. F <vfs@ibrae.ac.ru>
To: Smith, Brooke
Cc: spluzhnik@tenex.co.jp <spluzhnik@tenex.co.jp>
Sent: Sat Mar 19 01:59:34 2011
Subject: HA:

(b)(4),(b)(5)

Valery Strizhov

От: Smith, Brooke [mailto:Brooke.Smith@nrc.gov]
Отправлено: Сб, 19.03.2011 6:16
Кому: Strizhov V. F
Копия: 'spluzhnik@tenex.co.jp'
Тема: Re:

Thank you very much for the information. I have forwarded your analysis to the rest of our NRC team. Your message indicated that there is an attachment and I wanted to confirm that all the information is in the body of the email. We will contact you if we have any questions.

Best regards,

Sent from an NRC Blackberry.
Brooke G. Smith

(b)(6)

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

From: Strizhov V. F <vfs@ibrae.ac.ru>
To: Smith, Brooke
Cc: spluzhnik@tenex.co.jp <spluzhnik@tenex.co.jp>
Sent: Fri Mar 18 19:28:39 2011
Subject:

Dear Mrs. Smith

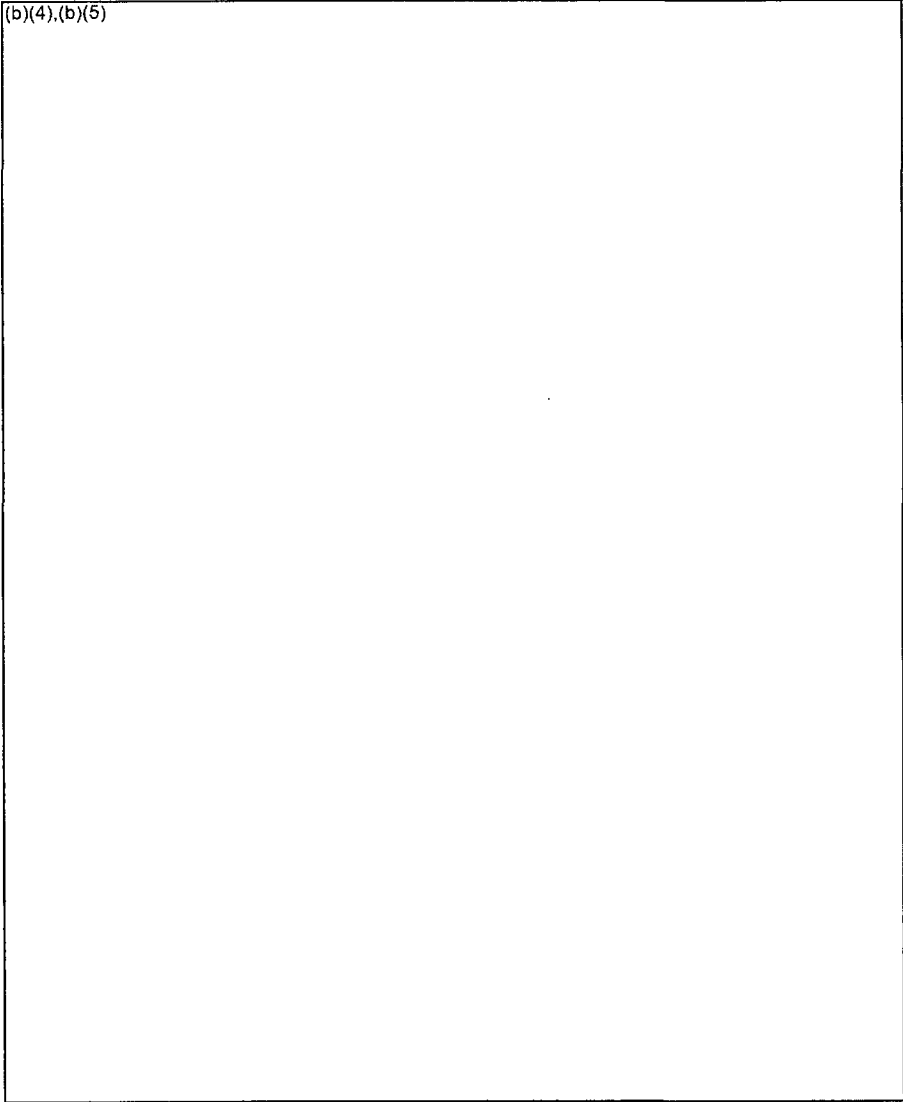
(b)(4),(b)(5)

(b)(4),(b)(5)

(b)(4),(b)(5)

Valery Strizhov

(b)(4),(b)(5)



MOX Versus LEU

R. O. Gauntt

Sandia National Laboratories

to Jason Schepers 3/18/2011
PMT 09 Station

Sandia has characterized fission product release from MOX fuels, and their differences from LEU fuels for the USNRC in the context of proposed revisions to the NREG-1465 regulatory source term. These characterizations are based on both historical fission product release rate experiments done at ORNL as well as more contemporary experimental studies performed in the VERCORS facility in France. Release rate models are incorporated in the MELCOR code that capture these differences. In short, release rate of volatile fission products (Cs, I and Te) are observed to be higher in MOX fuels relative to LEU when release is taking place at lower temperatures (~2000K), but becomes comparable to LEU rates when the temperatures exceed 2400K.

In reactor accidents with significant fuel damage, these differences in release rate at lower temperatures ultimately has no appreciable effect on total releases for reactor accidents because fuel temperatures rapidly escalate through the lower temperature range and volatiles are nearly completely released. This might not be the case for spent fuel pool accidents involving MOX as MELCOR analyses for pool accidents often produce heatup behavior that lingers extensively in the ~2000K temperature range. In these cases, we would expect to see elevated release rate for volatiles in MOX spent fuel relative to LEU spent fuel. The larger differences are for the volatile fission products such as Cs, I and Te. Release rates for Pu are low for both MOX and for LEU, and while there are isotopic differences in Pu content for LEU and for MOX, both fuels contain Pu on discharge.

We would recommend at some point a comparative study of fission product release behavior for MOX versus LEU in spent fuel pool accidents using the MELCOR specific models for MOX and LEU release, in order to evaluate this potential difference in volatile release behavior at SFP accident temperatures.

PMT02 Hoc

From: PMT02 Hoc
Sent: Saturday, March 19, 2011 6:00 AM
To: narac@llnl.gov
Cc: PMT11 Hoc; nitops@nnsa.doe.gov; cmht@nnsa.doe.gov; PMT02 Hoc
Subject: MELCOR Source Term - additional information
Attachments: MARCH 18-19 MELCOR release inventories (FOR NARAC FOLLOWUP EMAIL).doc

--- THIS IS A MONITORING OPERATION FOR THE FUKUSHIMA REACTOR IN JAPAN ---

NARAC,

As requested in our recent telephone conversation, this email provides additional information about the technical basis for the recent MELCOR-based source terms.

Please confirm receipt of this e-mail.

**PMT Dose Analyst (PMT02)
NRC Operation Center
301-816-5100, ext 5402**

This information should not be released at this time.

NO PARTICIPATION OR RESPONSE BY CMHT IS EXPECTED

From: PMT02 Hoc
Sent: Saturday, March 19, 2011 12:28 AM
To: 'narac@llnl.gov'
Cc: PMT11 Hoc; PMT02 Hoc; 'nitops@nnsa.doe.gov'; 'cmht@nnsa.doe.gov'
Subject: MELCOR Source Term

--- THIS IS A MONITORING OPERATION FOR THE FUKUSHIMA REACTOR IN JAPAN ---

NARAC,

Attached are the following MELCOR source terms:

- Unit 1 core,
- Unit 2 core,
- Unit 3 core
- Spent Fuel Pool Unit 1
- Spent Fuel Pool Unit 2
- Spent Fuel Pool Unit 3, and
- Spent Fuel Pool Unit 4

Each source term has a separate worksheet in the excel file. Note the spent fuel pool data includes plume energy (MW)). All worksheets have assigned release date/time and release duration. All source terms are in units of curies released.

Please confirm receipt of this e-mail.

**PMT Dose Analyst (PMT02)
NRC Operation Center
301-816-5100, ext 5402**

This information should not be released at this time.

MARCH 19, 2011
SOURCE TERM FOR A REALISTIC "WORSE-CASE" SCENARIO

For the past week, the source terms used for estimating radiological consequences from the Fukushima site were based on loss-of-coolant accident assumptions in NUREG-1465 (alternative siting source term). An updated "worst-case" scenario was developed assuming each Fukushima reactor and spent fuel pool currently in jeopardy experiences a significant release, but using best-estimate accident progression assumptions. This scenario used insights from a contemporary consequence study that assumed a long-term station blackout (LTSBO) event modeled after a domestic BWR/4 Mark I nuclear power plant. For each reactor, the radionuclide source terms were generated using MELCOR and the standard isotopic abundances (Ci/MWt) were obtained from the MACCS2 manual after scaling to the Fukushima power levels. The release duration is assumed to be relatively short (one-half hour) based on a containment failure shortly after RPV breach.

The spent fuel pool inventories were based on ORIGEN results provided by GE for Unit 4, assuming a mix of 100 day and 500 day offloaded fuel. Source terms for Units 1, 2 and 3 were based on 500 day offloaded fuel. Release fractions were based on MELCOR calculations. The 8-hour release duration for Unit 4 was based on a MELCOR calculation. This 8-hour release duration was then doubled for Units 1, 2 and 3 assumptions because they did not have recently offloaded fuel, causing a slower escalation. Plume energies were developed for each spent fuel pool.

The overall timing (sequence) of releases from each unit are as follows:

- Unit 1 reactor at 15:36 on 3/12/2011
- Unit 3 reactor at 11:15 on 3/14/2011
- Unit 2 reactor at 06:15 on 3/15/2011
- Unit 3 and 4 spent fuel pools at 6:15 on 3/16/2011 (assumed 24 hrs after previous reactor release)
- Unit 2 spent fuel pool at 6:15 on 3/17/2011 (assumed 24 hrs after previous spent fuel pool release)
- Unit 1 spent fuel pool at 6:15 on 3/18/2011 (assumed 24 hrs after previous spent fuel pool release).

PMT02 Hoc

From: PMT02 Hoc
Sent: Friday, March 18, 2011 3:57 AM
To: PMT02 Hoc; 'narak@llnl.gov'; 'nitops@nnsa.doe.gov'
Cc: 'cmht@nnsa.doe.gov'; Brandon, Lou
Subject: Clarification release fraction NRC RASCAL estimations

--- THIS IS A MONITORING OPERATION FOR THE FUKUSHIMA REACTOR IN JAPAN ---

This is a MONITORING OPERATION FOR THE JAPAN EARTHQUAKE TSUNAMI AFTERMATH.

The Unit 2 source term provided for a 33% core melt RASCAL run. This means that 25% core activity is actually released. It is assumed that 8% of the activity is plates out on the walls of containmant.

NRC Protective Measures Team
301-816-5419

Please reply to this email to acknowledge receipt.

This information should not be released at this time.

NO PARTICIPATION OR RESPONSE BY CMHT IS EXPECTED

--- THIS IS A MONITORING OPERATION FOR THE FUKUSHIMA REACTOR IN JAPAN

PMT09 Hoc

From: Gauntt, Randall O [rogaunt@sandia.gov]
Sent: Friday, March 18, 2011 6:41 PM
To: Hart, Michelle; Tinkler, Charles; Schaperow, Jason
Cc: PMT09 Hoc; PMT11 Hoc; Hoc, PMT12; Pickering, Susan Y; Orrell, Stanley A
Subject: Fukushima SFP Source Terms
Attachments: Randall O Gauntt Ph D .vcf; Fukushima SFP Source Terms.xlsx

I would recommend staggering these source terms out, perhaps 24 to 48 hrs apart, starting with Unit 4.

The inventory and released radioactivity is in CURIES.

I do not have a decay power for units 1, 2 or 3, but Unit 4 has a total decay power of ~3.5MW. You might use that for the plume energy for unit 4 pool.

I would very much like to see the results of the NARAC analysis.

Randall Gauntt

505 284 3989

(b)(6) Cell

(b)(5)



fuel assemblies

MELCOR analysis for PB (based on Unit 4 MELCOR analysis)

Pool Inventory - Curies

Released Inventory - Curies

Isotope

pu241
cm242
cm244
kr 85
sr 89
sr 90
y 90
y 91
zr 95
nb 95
ru103
rh103m
ru106
rh106
cs134
cs137
ba137m
ce141
ce144
pr144
pr144m
pm147
li31

(b)(4)

✓
✓

(b)(4),(b)(5)

(b)(4)

PMT09 Hoc

From: Gauntt, Randall O [rogaunt@sandia.gov]
Sent: Friday, March 18, 2011 9:07 PM
To: Gauntt, Randall O; Hart, Michelle; Tinkler, Charles; Schaperow, Jason
Cc: PMT09 Hoc; PMT11 Hoc; Hoc, PMT12; Pickering, Susan Y; Orrell, Stanley A
Subject: RE: Fukushima SFP Source Terms
Attachments: Fukushima SFP Source Terms.xlsx

From: Gauntt, Randall O
Sent: Friday, March 18, 2011 5:48 PM
To: Gauntt, Randall O; 'michelle.hart@nrc.gov'; 'Charles.Tinkler@nrc.gov'; 'Schaperow, Jason'
Cc: 'pmt09.hoc@nrc.gov'; 'pmt11.hoc@nrc.gov'; 'pmt12.hoc@nrc.gov'; Pickering, Susan Y; Orrell, Stanley A
Subject: RE: Fukushima SFP Source Terms

Attached is the latest Excel sheet. See the tab marked Peach Bottom.

(b)(4),(b)(5)

Randy

<< File: Fukushima SFP Source Terms.xlsx >>

From: Gauntt, Randall O
Sent: Friday, March 18, 2011 4:41 PM
To: 'michelle.hart@nrc.gov'; 'Charles.Tinkler@nrc.gov'; 'Schaperow, Jason'
Cc: 'pmt09.hoc@nrc.gov'; 'pmt11.hoc@nrc.gov'; 'pmt12.hoc@nrc.gov'; Pickering, Susan Y; Orrell, Stanley A
Subject: Fukushima SFP Source Terms

(b)(4),(b)(5)

Randall Gauntt
505 284 3989

(b)(6) Cell

<< File: Randall O Gauntt Ph D .vcf >>

<< File: Fukushima SFP Source Terms.xlsx >>

MOX Versus LEU

R. O. Gauntt

Sandia National Laboratories

Sandia has characterized fission product release from MOX fuels, and their differences from LEU fuels for the USNRC in the context of proposed revisions to the NRIEG-1465 regulatory source term. These characterizations are based on both historical fission product release rate experiments done at ORNL as well as more contemporary experimental studies performed in the VERCORS facility in France. Release rate models are incorporated in the MELCOR code that capture these differences. In short, release rate of volatile fission products (Cs, I and Te) are observed to be higher in MOX fuels relative to LEU when release is taking place at lower temperatures (~2000K), but becomes comparable to LEU rates when the temperatures exceed 2400K.

In reactor accidents with significant fuel damage, these differences in release rate at lower temperatures ultimately has no appreciable effect on total releases for reactor accidents because fuel temperatures rapidly escalate through the lower temperature range and volatiles are nearly completely released. This might not be the case for spent fuel pool accidents involving MOX as MELCOR analyses for pool accidents often produce heatup behavior that lingers extensively in the ~2000K temperature range. In these cases, we would expect to see elevated release rate for volatiles in MOX spent fuel relative to LEU spent fuel. The larger differences are for the volatile fission products such as Cs, I and Te. Release rates for Pu are low for both MOX and for LEU, and while there are isotopic differences in Pu content for LEU and for MOX, both fuels contain Pu on discharge.

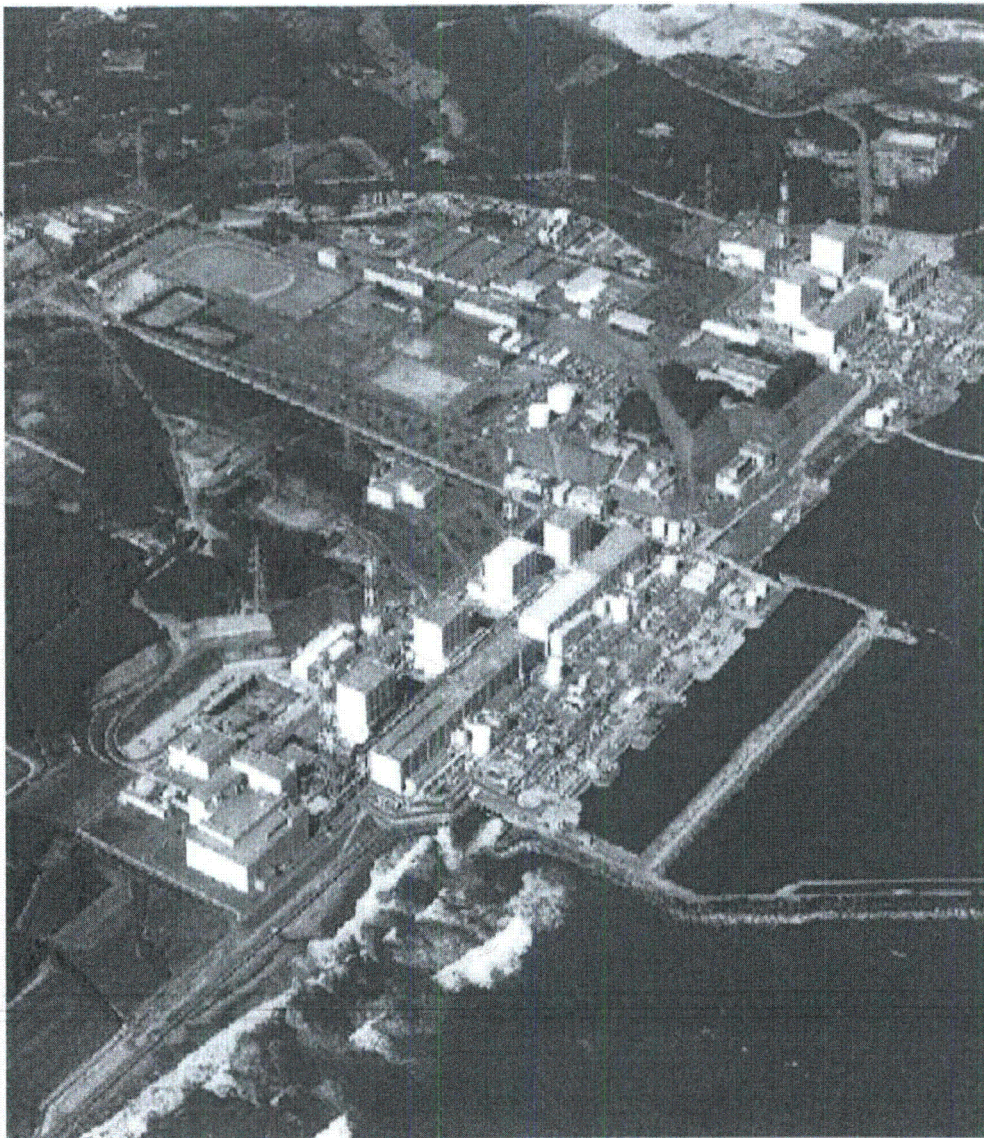
We would recommend at some point a comparative study of fission product release behavior for MOX versus LEU in spent fuel pool accidents using the MELCOR specific models for MOX and LEU release, in order to evaluate this potential difference in volatile release behavior at SFP accident temperatures.



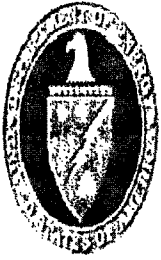
—Official Use Only—

Japan Earthquake Response

March 30, 2011 // 1800 EDT



—Official Use Only—



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**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**

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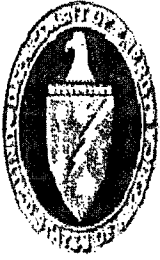


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Current Status

- ♦ **No major changes in radiation levels at the Fukushima Daiichi Nuclear Power Plant**
- ♦ **Additional power plant status in accompanying text SITREP**
 - Unit 1: The IAEA confirmed that the reactor temperature has decreased slightly. Reactor water level stable, core damage est. 70%. Freshwater injection continues. Electrical power line connected (through Unit 2). Condenser is full, so pumping turbine basement halted at 2230 UTC on 28 Mar.
 - Unit 2: Reactor water level stable, core damage est. 33%. Spent fuel pool has been filled. TEPCO reports having switched over to utilizing a temporary electrical pump to inject fresh water into Unit 2, in place of the fire pump that had previously been used.
 - Unit 3: Freshwater injection continues; trucks pumping water into spent fuel pools. reactor water level 1.9 m (A) 2.3 m (B) below the top of the fuel rods.
 - Unit 4: Spraying continues periodically for the spent fuel pond. Power restored. Trucks pumping water into spent fuel pools; seawater is also being injected via the Fuel Pool Cooling System (FPC).
- ♦ **TEPCO continues to address issues with water in the trenches outside the turbine buildings of Units 2 and 3**
 - The Nuclear Safety Commission of Japan suggests that higher activity in the water discovered in the Unit 2 turbine building is supposed to be caused by water, which has been in contact with molten fuel rods for a time and directly released into the turbine building via some, as yet unidentified, path
- ♦ **Voluntary evacuation zone extended to 30km from Fukushima Daiichi.**

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DOE/NNSA Response

♦ Command, Control, Coordination:

- **Nuclear Incident Team (NIT):** Coordinating overall emergency response
- **Policy Working Group (PWG):** Coordinating overall policy
- **Senior Energy Official:** Primary Manager of deployed field teams
- **Liaisons:** DART, USPACOM, USAID, NRC

♦ Modeling

- **National Atmospheric Release Advisory Center (NARAC):** conducting predictive radioactive atmospheric dispersion modeling

♦ Monitoring and Sampling

- **Consequence Management Response Team (CMRT):** Conducting ground monitoring, air sampling and initial results analysis
- **Aerial Monitoring System (AMS):** Conducts aerial detection for mapping radiological ground material deposits
- Currently 3 platforms: 1 Fixed, 2 Rotary

♦ Assessment

- **Consequence Management Home Team (CMHT):** Scientific assessment of data updated daily from ground measurements and AMS flights

♦ Medical Consultation

- **Radiation Emergency Assistance Center/Training Site (REAC/TS):** Providing medical advice about radiological exposure

Deployed (41)

Yokota AB

- (1) SEO
- (1) SEO Staff
- (23) CMRT
- (7) AMS

US Embassy Tokyo

- (2) Foreign Service Nationals
- (2) Permanent Staff
- (3) DART LNO
- (1) Nuclear Energy Representative

USPACOM HQ

- (1) LNO

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Significant Events: Past 24 Hrs.

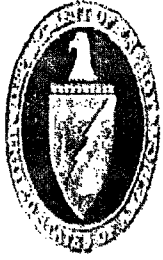
International Engagement:

- ♦ Participated in Health Working Group meetings on long term monitoring for health effects
- ♦ Discussed monitoring strategies and coordination with MEXT

Nuclear Incident Team:

- ♦ Released shape files for use by NGA and USGS
- ♦ Provided ground monitoring and aerial measuring data spreadsheets to CDC, FDA, HHS, USDA, EPA, NRC, DHS, NR, and WH
- ♦ Provided results of current NARAC modeling results to PACOM including intermediate phase relocation plots

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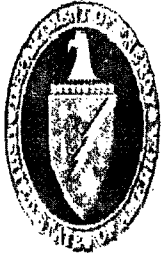
—Official Use Only—

Significant Events: Past 24 Hrs.

Operations:

- ♦ Modeling
 - NARAC: Developed Intermediate Phase PAGs for two hypothetical release scenarios; continued work on products normalizing NARAC models to measurements taken in the field.
- ♦ Field Monitoring and Assessment
 - AMS UH-1: Flew the Tohoku Expressway south of Koriyama to the hills north of Kuroiso.
 - AMS HH-60: Flew the Tohoku Expressway north of Koriyama to the north side of Fukushima.
 - AMS C-12: Flew the valley south of Kuroiso down to Utsunomiya.
 - Continued monitoring activities at the US Embassy Japan
 - Continued to coordinate with USFJ and GOJ to implement the Distance Early Warning Line
 - One ground team drove along the Tohoku with the Sparks in conjunction with the C-12, UH-1, and HH-60 flights
 - One ground team traveled to Yokosuka to collect the air sample
- ♦ Medical Consult
 - REAC/TS provided information regarding population monitoring considerations and screening strategies to share with GOJ if requested.
 - Tasked to participate in the Health Group meeting
 - REAC/TS provided advice on passenger screening on a CDC teleconference
 - Responded to RFI on bioassay for U.S. workers deployed to Japan
 - Requested by the Japanese Government to assist in dose reconstruction of impacted population

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Data Providers

♦ Japan

- Ministry of Foreign Affairs (MOFA)
- Nuclear Safety Technology Center (NUSTEC)
- Tokyo Electric Power Company (TEPCO)
- Ministry of Agriculture, Forestry and Fisheries (MAFF)
- Ministry of Education, Culture, Sports, Science, and Technology (MEXT)
- Ministry of Health, Welfare and Labor
- Nuclear and Industrial Safety Agency (NISA)
- Nuclear Safety Commission

♦ Consequence Management Response Team

- CMRT/CMOC
- AMS
- AFRAT

♦ External US

- Japan Emergency Command Center, US Embassy, Tokyo
- USAF, BSC Commander
- USAF, WC-135 Constant Phoenix
- Futenma Marine Corps Air Station
- Nuclear Regulatory Commission
- Naval Reactors

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Guide to Interpretation

US EPA Derived Response Levels (DRLs) for Evacuation and Relocation

■ Early Phase DRL

If a person is in danger of receiving an external radiation dose of 1 Rem over 4 days, the EPA recommends evacuation until radiation levels decrease. This area is indicated by red.

First Year DRL

If a person is in danger of receiving an external radiation dose greater than 2 Rem during the first year, the EPA recommends relocation until radiation levels decrease. This is not an urgent action because the dose is received over a full year. This area is indicated by orange.

Fifty Year DRL

If a person is in danger of receiving an external radiation dose greater than 5 Rem over 50 years, the EPA recommends relocation until radiation levels decrease. This is not an urgent action because the dose is received over fifty years. This area falls within the second year DRL.

Second Year DRL

If a person is in danger of receiving an external radiation dose of greater than 0.5 Rem in the second year (or any subsequent year), the EPA recommends relocation until radiation levels decrease. This area is indicated by yellow.

These calculations account for multiple variables. For instance, radiation is most intense in the first days following its release therefore dose reduction may be met by evacuating early in the response.

Protective actions are frequently expressed in dose rates. The dose rate is an indicator that residents would accumulate the threshold dose if they stayed in the area the entire time expressed (e.g. 1 year, 2 years, 50 years)

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Guide to Interpretation

Areas at Risk for Agricultural Contamination

Aerial measurements can indicate areas where agricultural monitoring and sampling should occur, although they cannot directly determine the amount of contamination of agricultural products grown in these areas.

AMS monitoring results in areas beyond 25 miles from the Fukushima Daiichi reactors show areas where dose rates are many times higher than historical background.

The measured external dose rates in these areas are not high enough to warrant evacuation or relocation of the population, however, lower levels of radioactive contamination in agricultural products provide more of a risk because the radioactive material can be ingested into the body. Agricultural monitoring in these areas may be warranted.

◆ Areas 10 to 100 times historical background are indicated by green.

◇ Areas 2 to 10 times historical background are indicated by light blue.

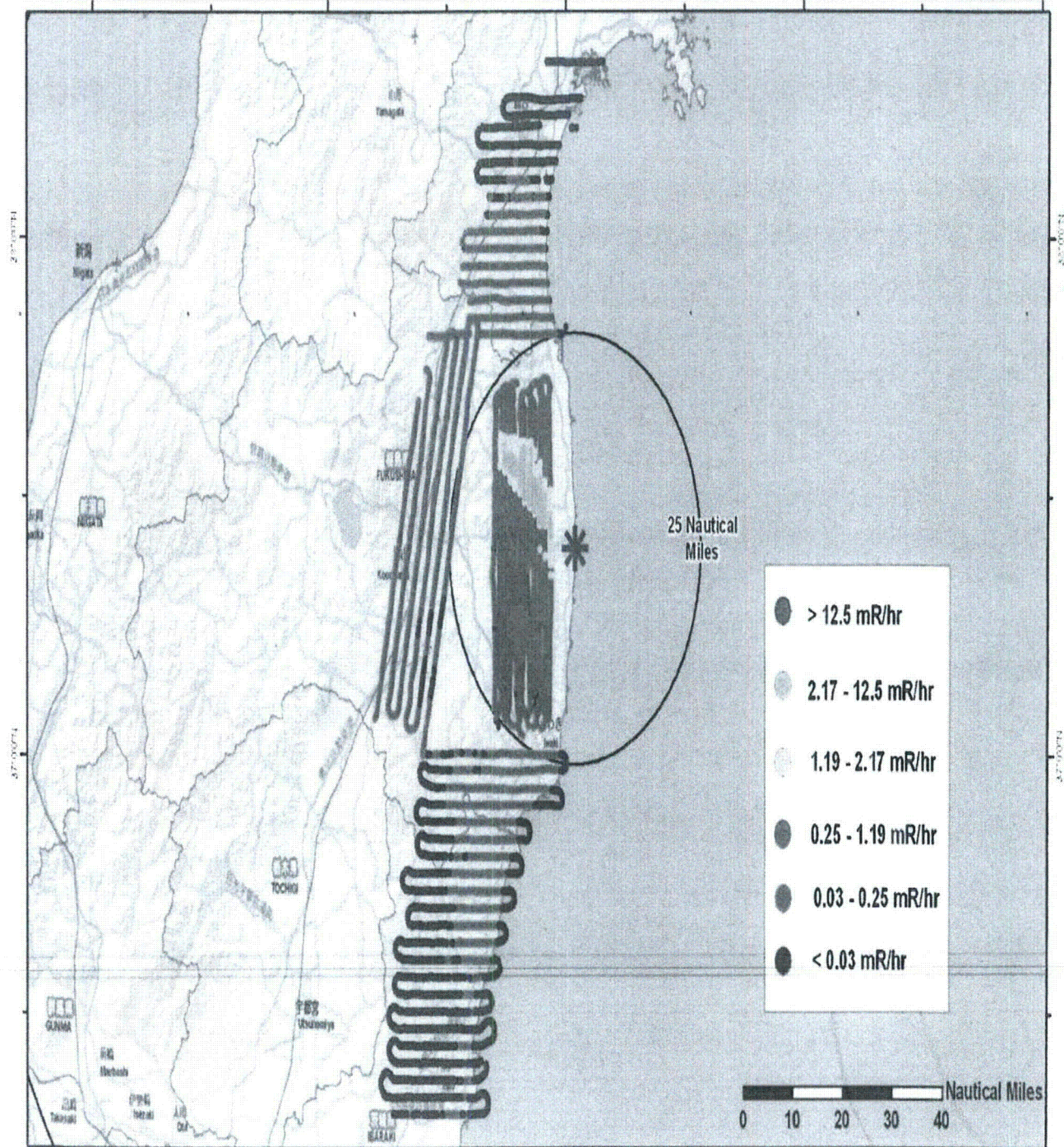
◆ Areas at or near historical background are indicated by dark blue.

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Aerial Results C-12 Flights (March 27, 28, 29, 2011)

FUKUSHIMA DAIICHI
JAPAN



Map created on 03302011 0315 JST
Name: NIT 29Mar2011 Combined Flights 0327_0329

UNCLASSIFIED

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

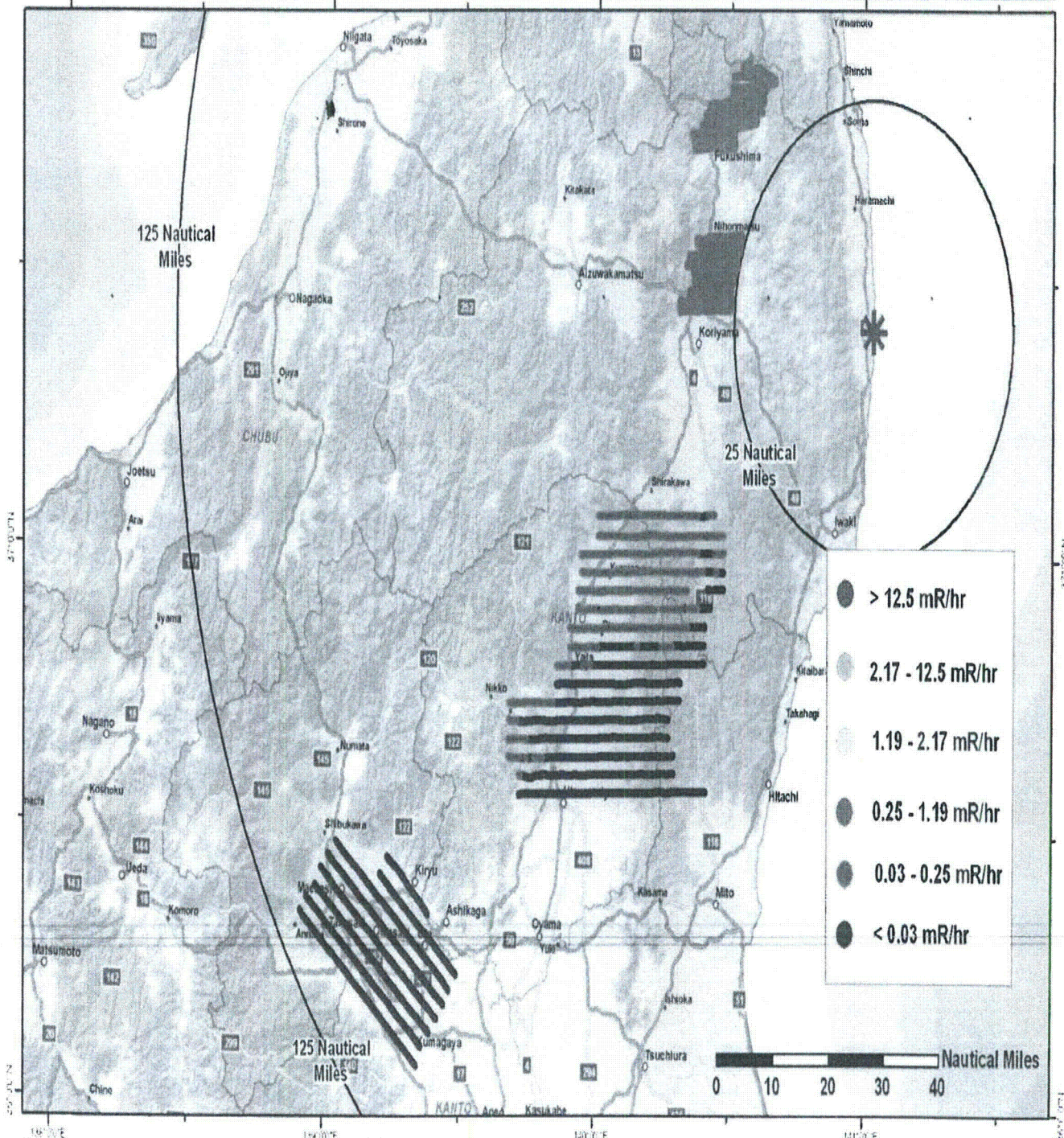
EZ 772 of 810



Aerial Monitoring Results

Combined C-12, UH-1, and UH-60 Flight (March 30, 2011)

FUKUSHIMA DAIICHI
JAPAN



Map created on 03302011 2350 JST
Name: NIT Combined Aerial Results 30Mar2011

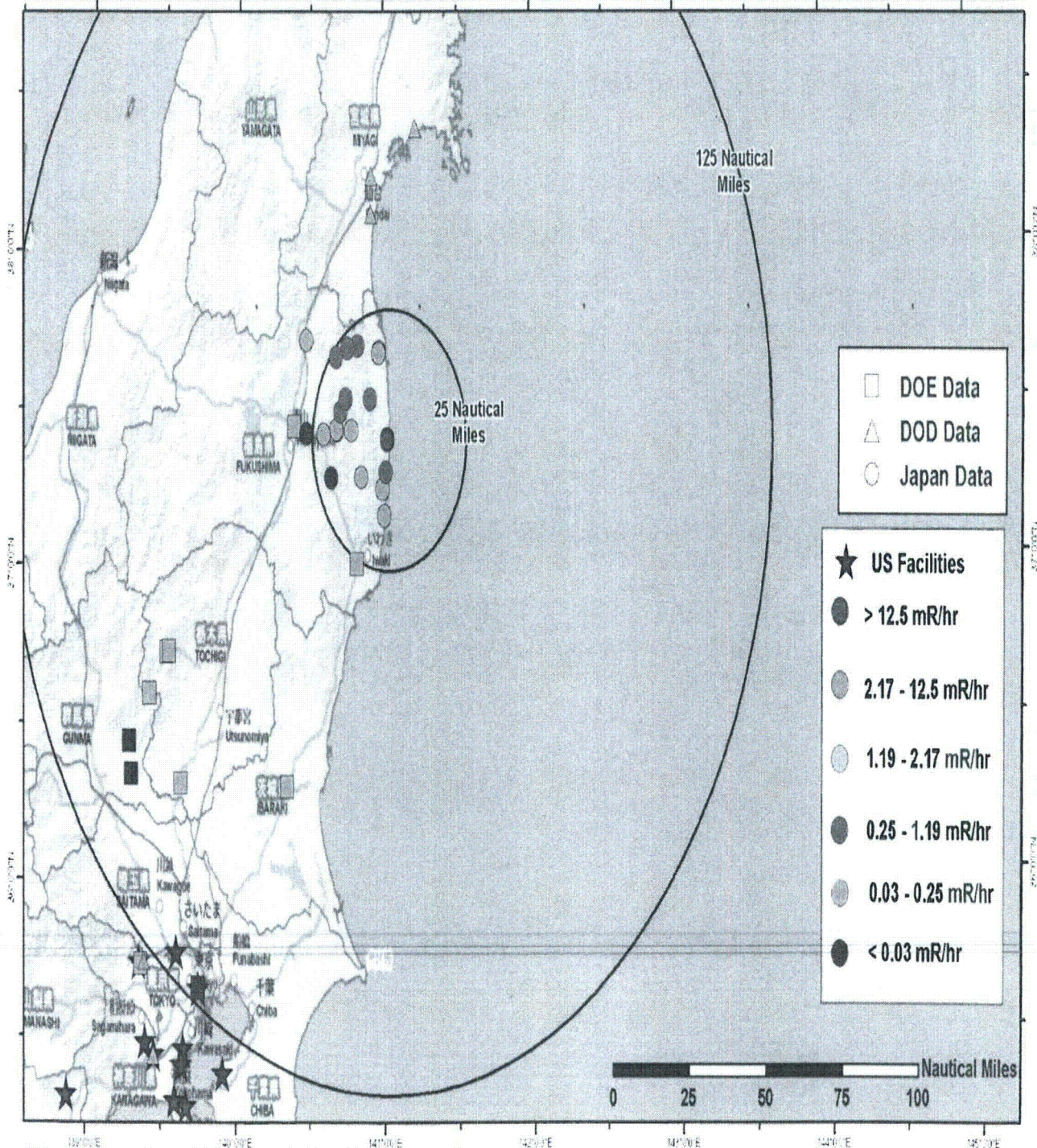
UNCLASSIFIED

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



Field Monitoring Results March 29 13:00 to March 30 13:00 JST

FUKUSHIMA DAIICHI
JAPAN



Map created on 03302011 1400 JST

Name: NIT 24hrsMonitoringResults 29Mar2011 Option 2 1300

UNCLASSIFIED

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

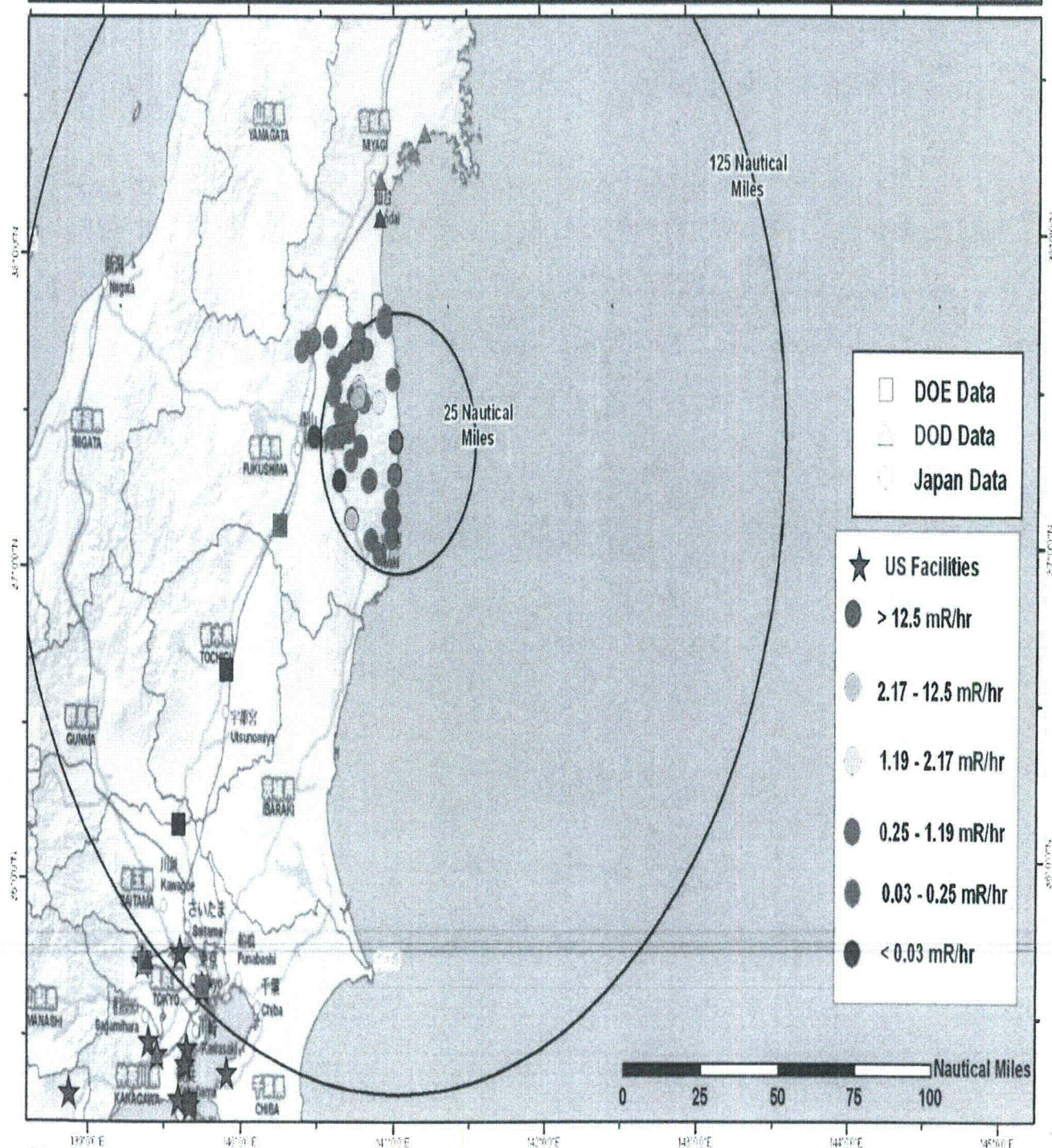
EZ 774 of 810



Field Monitoring Results

March 30 01:00 to March 31 01:00 JST

FUKUSHIMA DAIICHI
JAPAN



Map created on 03312011 0230 JST
Name: NIT 24hrMonitoringResults 30Mar2011 0100

UNCLASSIFIED

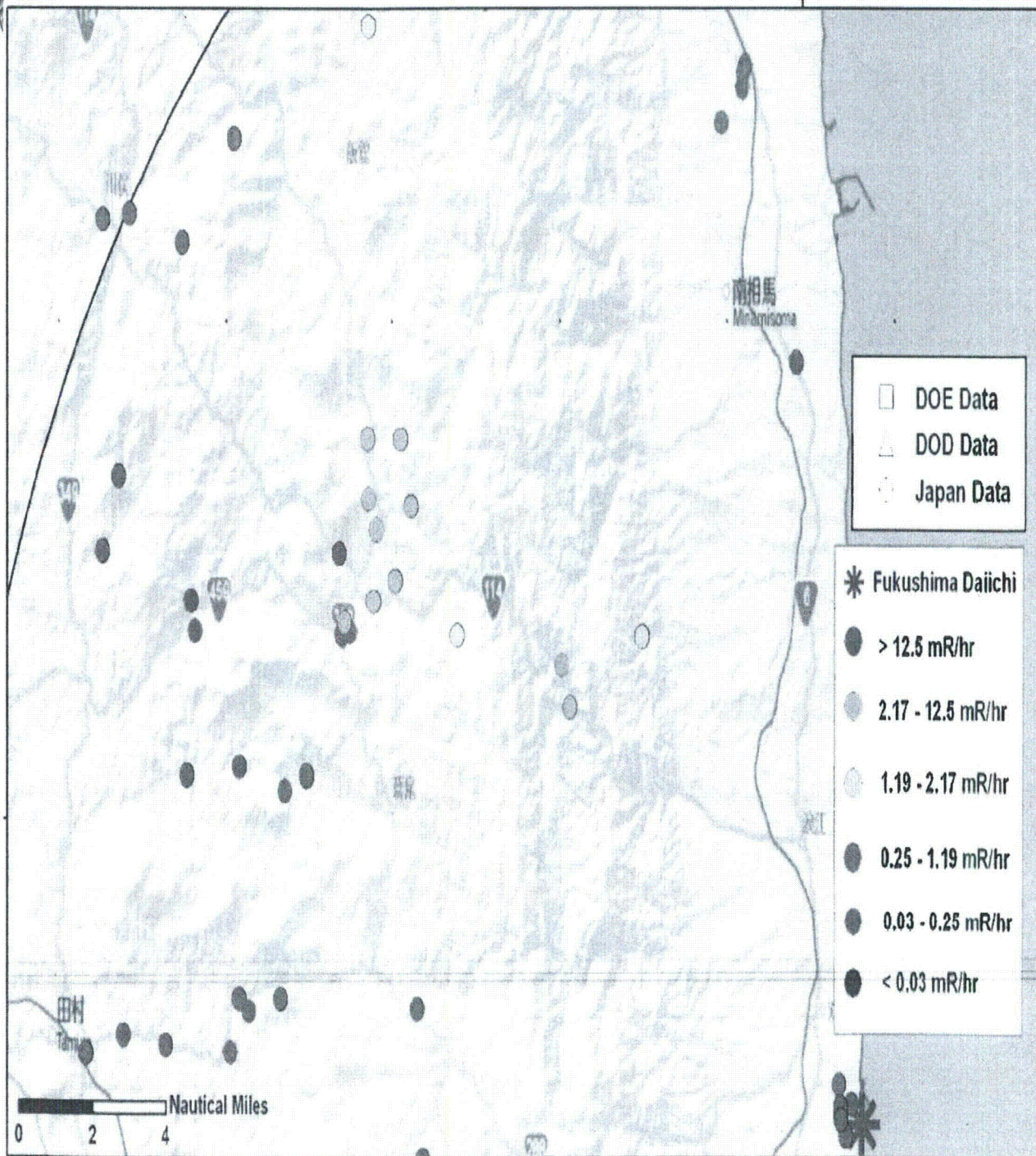
Nuclear Incident Team DOE NIT
Contact (202) 586 - 8100



Field Monitoring Results

March 23 01:00 to March 31 01:00 JST

FUKUSHIMA DAIICHI
JAPAN



Map created on 03312011 0230 JST

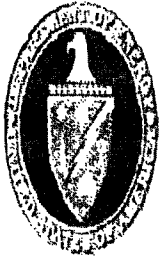
Name: CMHT 24hrMonitoringResults 22_30Mar2011 0100 Plant Region

UNCLASSIFIED

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

4

EZ 776 of 810



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Aerial and Ground Monitoring Data Assessment

Assessment:

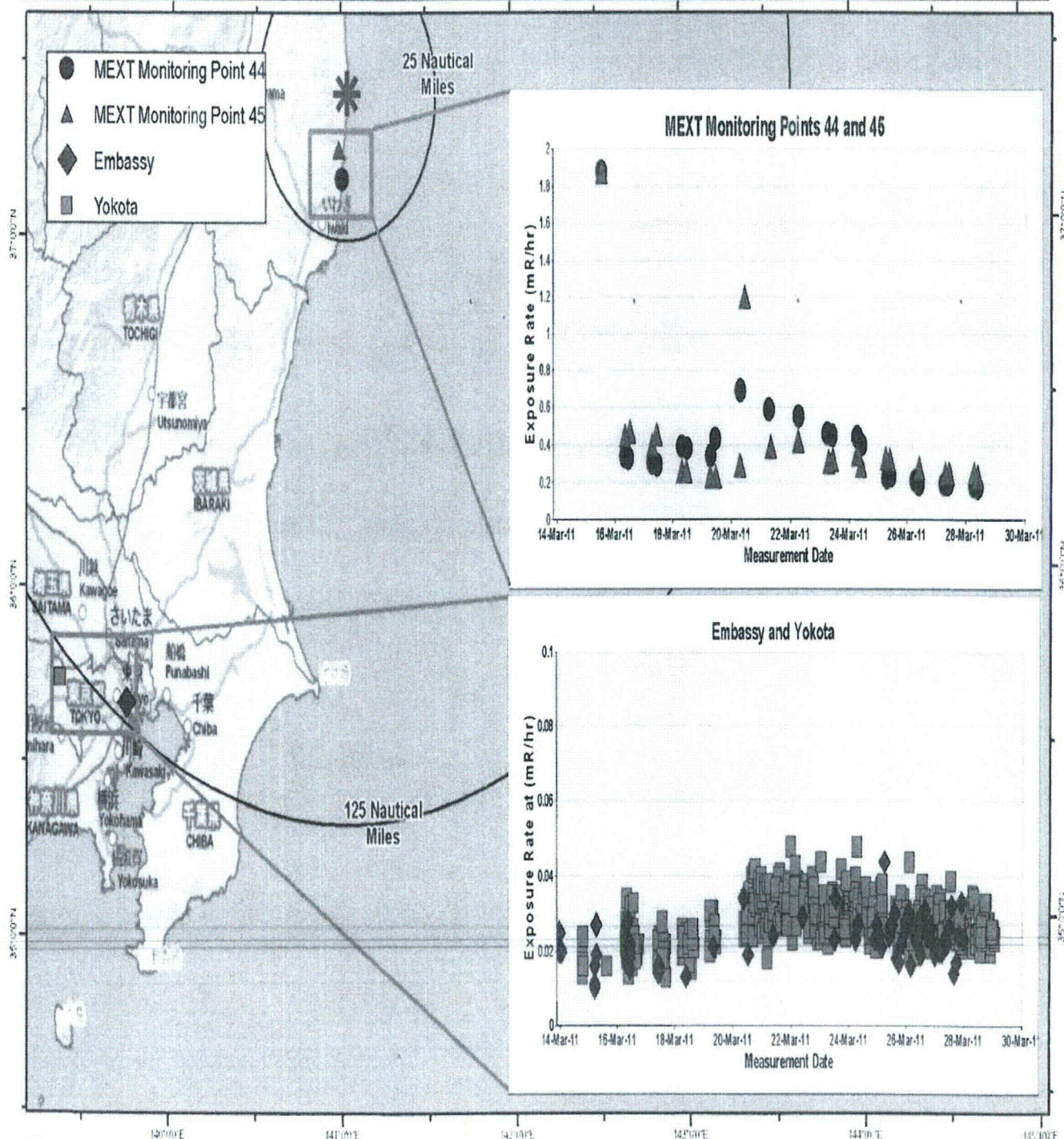
- ♦ An assessment of measurements gathered through 30 March show:
 - Radiation levels consistently below actionable levels for evacuation or relocation outside of 25 miles.
 - 30 March aerial monitoring results indicate that agricultural monitoring is warranted beyond the 25 miles radius to fully characterize areas of agricultural concern.
 - Radiological material has not deposited in significant quantities in the areas measured since 19 March

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Exposure Trend Plot Extending South to Yokota AB

FUKUSHIMA DAIICHI
JAPAN



Map created on 03302011 1800 JST
Name: CMHT MonTrend 30Mar2011 South

UNCLASSIFIED

Nuclear Incident Team DOE NIT **16**
Contact (202) 586 - 8100

EZ 778 of 810



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Exposure Rate Trend Assessment

Assessment:

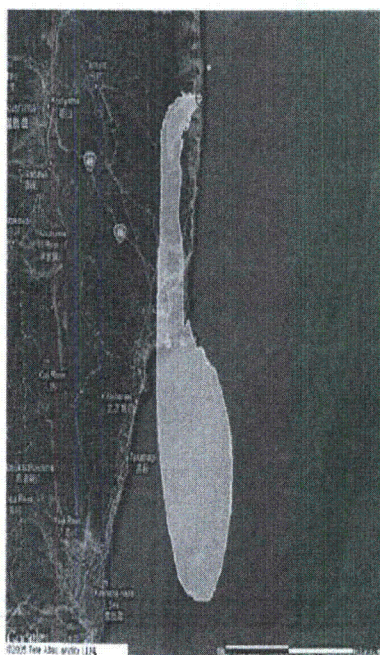
- ♦ Exposure rates measured by MEXT at two monitoring points south of the Fukushima Daiichi plant peaked at values between 1 and 2 mR per hour on 15 and 21 March. Recent measurements show a decrease to approximately 0.2 mR per hour.
- ♦ Exposure rates measured at Yokota Air Base and the U.S. Embassy, Tokyo have been in the range of 20 – 30 μ R per hr from 14 – 28 March.
- ♦ Historical background exposure rates across Japan are in the range of 5 – 20 μ R per hour.



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Forecasted Weather March 31 to April 1

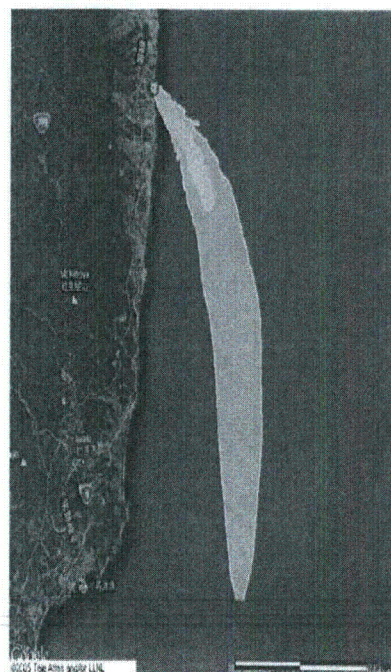
03/31/2011 07:00:00



03/31/2011 14:00:00



04/01/2011 03:00:00



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~~Official Use Only~~

Planned Operations: Next 24 Hrs

- ♦ Aerial Monitoring
 - AMS continues to map areas of potential agricultural contamination
 - AMS UH-1: : Fly the southern half of Tohoku Expressway south of Koriyama to the hills north of Kuroiso to complete planned mission from 3/30.
 - AMS HH-60: Fly the southern half Tohoku Expressway north of Koriyama to the north side of Fukushima to complete planned mission from 3/30.
 - AMS C-12: Fly the metro area of north Tokyo across the valley at the request of GOJ.
- ♦ Ground Monitoring
 - Two ground teams will drive in the Mito area the valley northwest of Tokyo in the Takasaki/Maebashi region at the request of GOJ and conduct beta/gamma surveys, HPGe in-situ gamma spectrum and low-volume air sample for particulate/iodine.
 - Continuing work to implement the Distance Early Warning Line using DOE radiation detectors.
- ♦ Continue joint Monitoring and Assessment planning with DoD (US AFRAT).

Hoc, PMT12

From: Jackson, Todd
Sent: Wednesday, March 30, 2011 11:04 PM
To: Hoc, PMT12
Subject: FW: Updated Agriculture Product
Attachments: C12AgriculturalImpactandPathPlot_3302011.pdf

PMT,

Are you on distribution for these? I had requested they add you at this email address to their distribution list so there is continuity whenever Marie and I depart or turnover.

If you are getting them please forward on to me and Marie,

(b)(5)

(b)(5)

Todd

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

From: DARTDOELiaison1 [mailto:(b)(6)]
Sent: Wednesday, March 30, 2011 7:17 PM
To: Jackson, Todd; Miller, Marie
Subject: Updated Agriculture Product

Todd, Marie,

Here is the update Ag Impact product. I also have updated flight paths from yesterday available but they're too large to email.

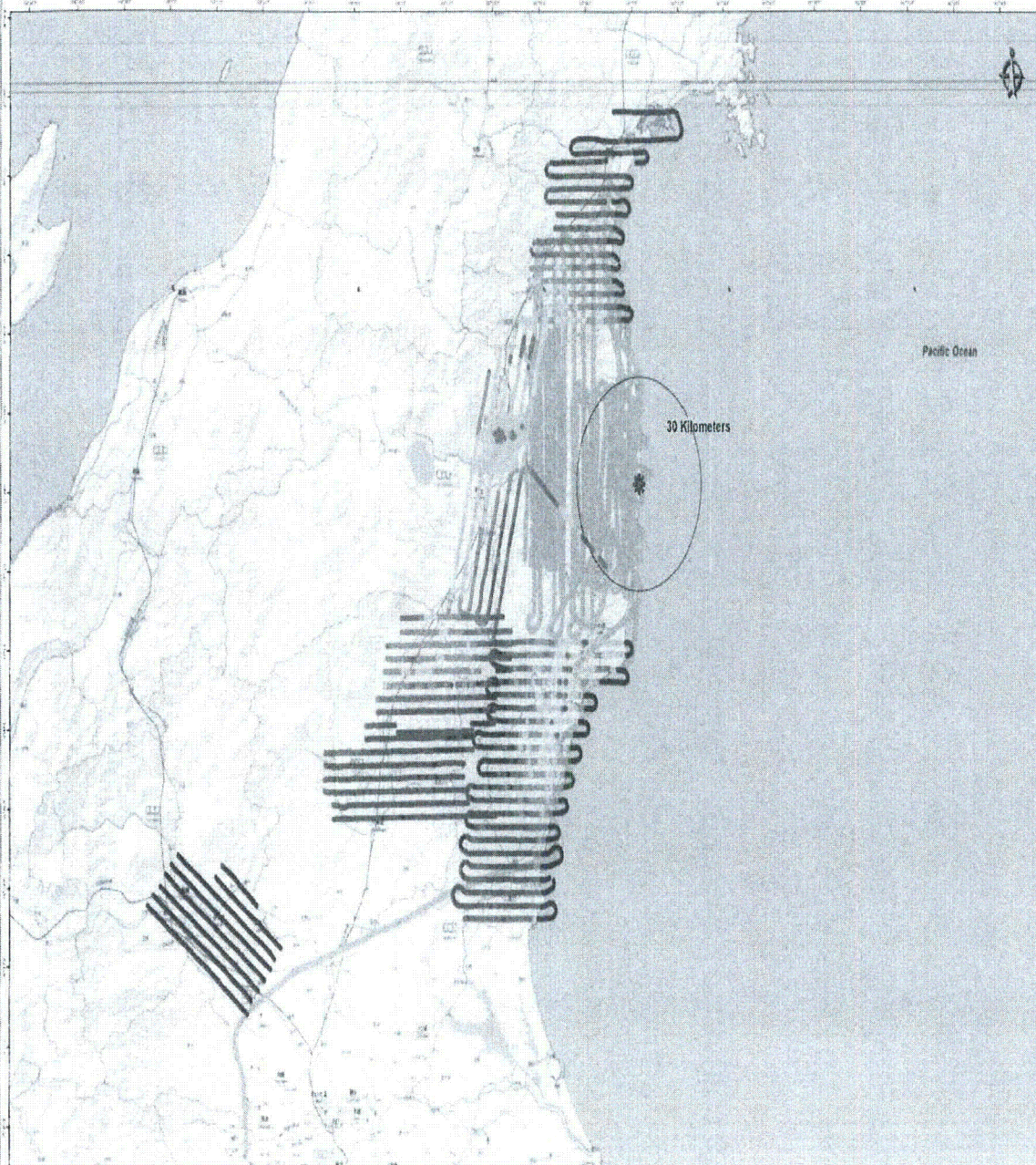
Thanks,
Mark



Aerial Monitoring Results

C-12 & UH-1 Survey Dates: 28-30 March 2011

FUKUSHIMA DAIICHI
JAPAN



* Fukushima Daiichi

Aerial Data- 6 Flights

Exposure Rate at 1 meter ($\mu\text{R/hr}$)

- < 582
- < 500
- < 300
- < 200
- < 150
- < 100
- < 60
- < 30
- < 10

- The colors represent a significantly lower exposure rate than on previous maps.
- The range of exposure rates are based on limitations of aircraft system sensitivity not based on specific regulatory limits.

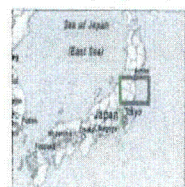
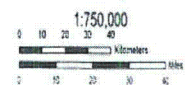
Technical Considerations and Notes:

- This product is a conservative estimate based upon the assumption that all material is deposited along the ground. This assumption may overestimate the ground level exposure rate by an order of magnitude.
- An attempt has been made to remove the effect of radiation sources not of terrestrial nature. However, significant material remains suspended in the air and continues to be vented from the NPP. This product does not correct for this effect in a spatially dependent manner.
- Caution should be used when correlating aerial measurements to ground based measurements and activities at specific locations.
- A correction has been added for deviations in height above ground level based on altitude and the local topography.

Not For Public Distribution

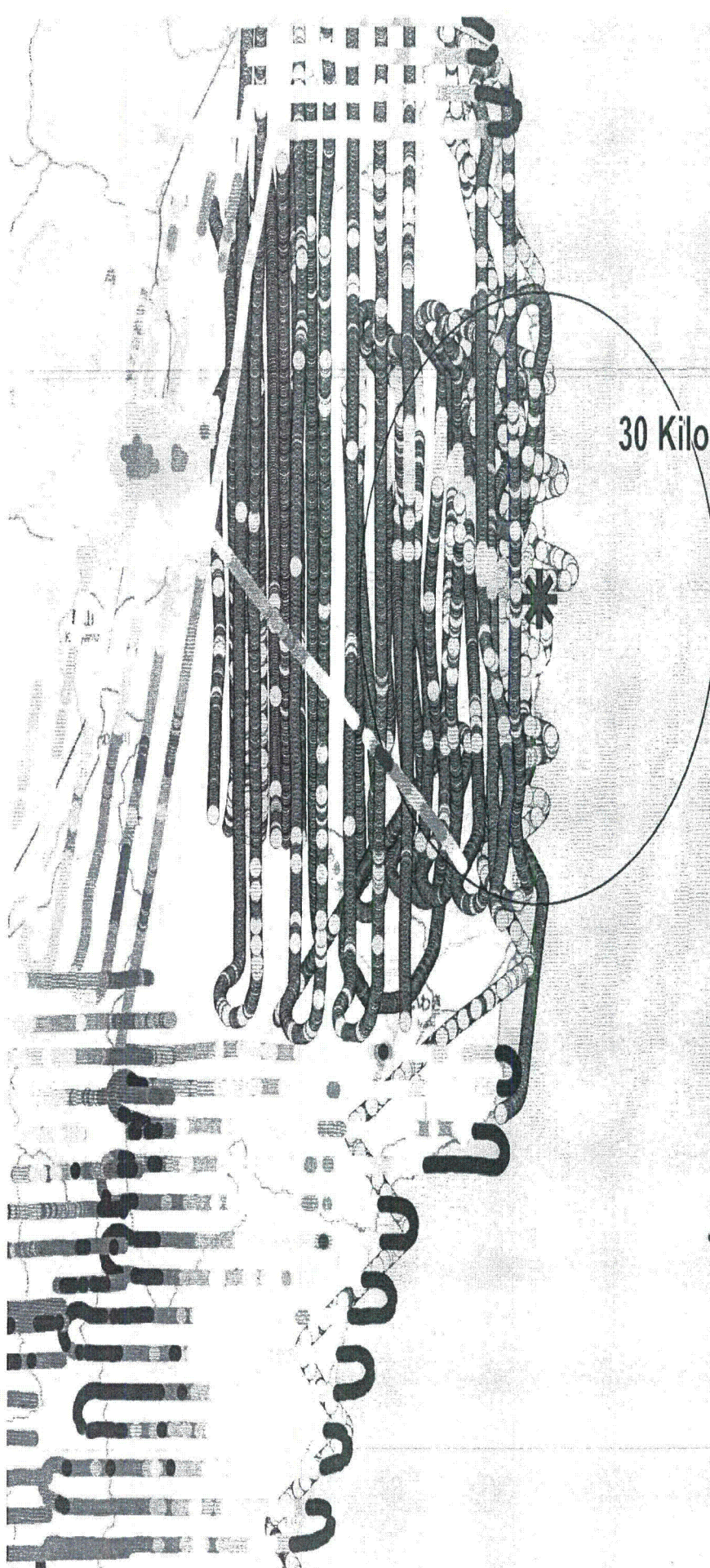
Flight Information:
C-12 Nominal Altitude of 2000 ft Above Ground Level, Speed 140 knots
UH-1 Nominal Altitude of 500 ft Above Ground Level, Speed 70 knots
This map was produced by the Geographic Information Systems Department of NNSA's Remote Sensing Laboratory (RSL) at Nellis AFB, Las Vegas, Nevada. WSP Gold 2010, ESRI World Street Map, and CNMT databases were used for map generation.

RSL map identification number is:
C13AgriculturalImpactsPathPlot_23022011.mxd

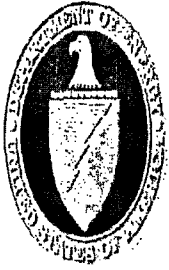


Map created on 3/30/2011 08:35:50 PM JST
Check for revision in 12 hours

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



30 Kilometers



~~Official Use Only~~

AMS Measurements

♦ Ops Summary

- DOE Team flew two concurrent missions using military C-12 and UH-1 aircraft.
 - C-12 aircraft flew serpentine pattern north and south of the reactors at an altitude of 1000 ft.
 - UH-1 helo flew a serpentine pattern 50 miles to the north and northwest of Toyko at an altitude of 500 feet.

♦ Plot interpretation

- Areas exceeding EPA Emergency Phase PAGs are shown in red and orange.
- C-12 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.

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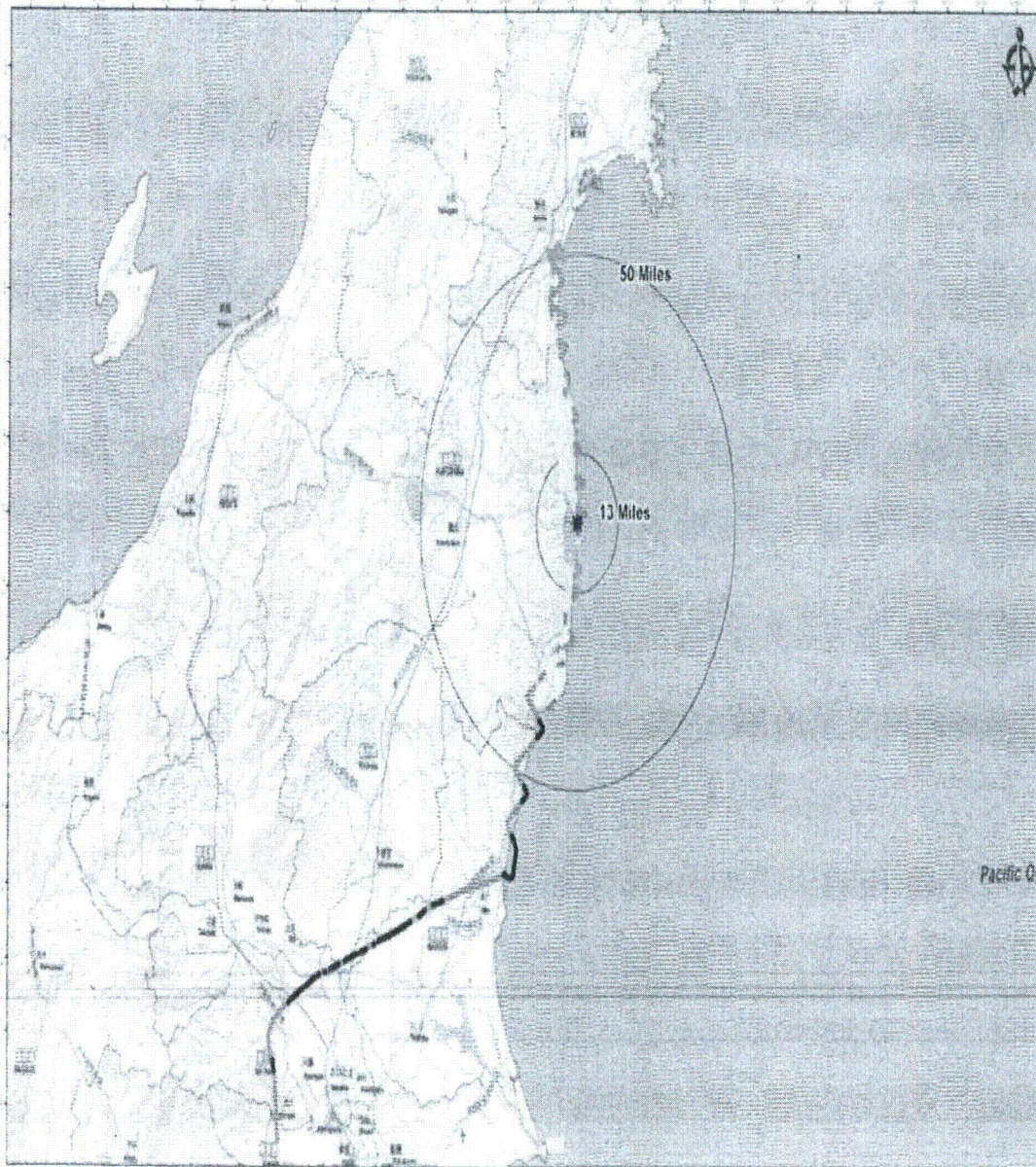


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Aerial Monitoring Results

Exposure Rate

FUKUSHIMA DAICHI
JAPAN



* FUKUSHIMA DAICHI

C-12 Aerial Data

Exposure Rate (mR/hr)

- 0.01
- 0.02 - 0.10
- 0.11 - 1.00
- 1.01 - 10.00
- 10.01 - 20.00
- 20.01 - 32.48

Technical Considerations and Notes
• This product is a preliminary estimate based upon the measurement of radiation levels during the flight.
• Based upon current atmospheric conditions.
• This product is not for use in making decisions.
• This product is not for use in making decisions.
• Caution: This product is not for use in making decisions.
• Caution: This product is not for use in making decisions.

Not For Public Distribution

C-12 National Aerial Data at 1000 ft Above Ground Level
Flight Information:
Estimated Area From 1000 ft to 1000 ft

This map was produced by the Geographic Information Systems
Department of NSA's Remote Sensing Laboratory (RSL) at Air Force
AFB, Los Angeles, California. It is based on data collected by the
C-12 National Aerial Data at 1000 ft Above Ground Level.

RSL Map Identification Number: 0317201_GravelCoverage.mxd

1:800,000



Map created on 3/17/2011 5:29:13 AM PST
Check for revision in 12 hours

Official Use Only

NNSA Consequence Management Home Team
Contact (702) 794-1665

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EZ 786 of 810

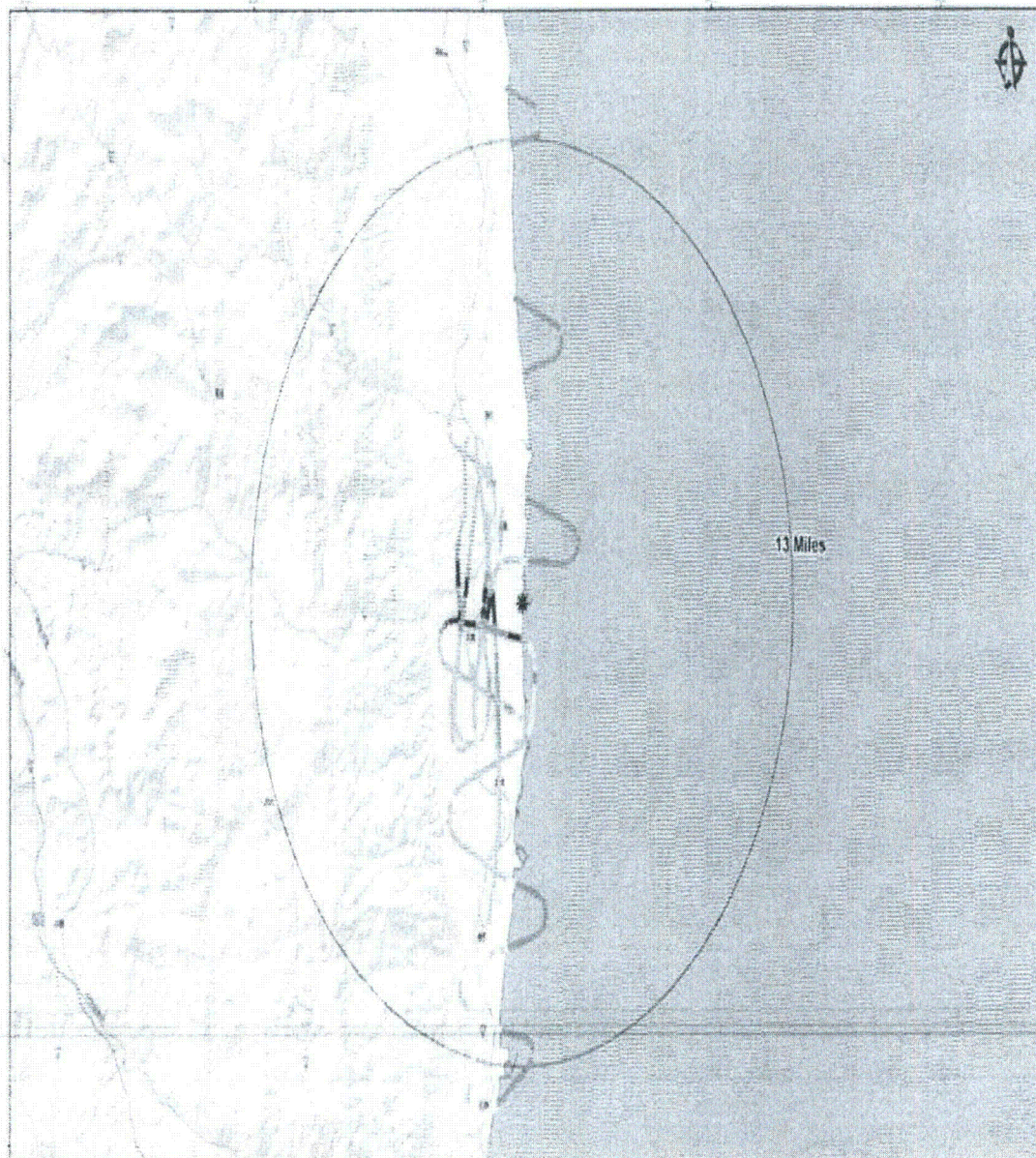


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Aerial Monitoring Results

Exposure Rate

FUKUSHIMA DAICHI
JAPAN



* FUKUSHIMA DAICHI

C-12 Aerial Data

Exposure Rate (mR/hr)

- 0.01
- 0.02 - 0.10
- 0.11 - 1.00
- 1.01 - 10.00
- 10.01 - 20.00
- 20.01 - 32.48

Technical Considerations and Notes

- This product is a derivative of data from the aerial survey.
- Data is collected along the flight path.
- Data is collected at a rate of 1000 mR/hr.
- Data is collected at a rate of 1000 mR/hr.
- Data is collected at a rate of 1000 mR/hr.

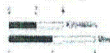
Not For Public Distribution

C-12 Aerial Data at 1000 mR/hr and
Flight Information
Estimated Area (km²) by 10

This map was produced by the Geographic Information Systems
Department of the U.S. Department of Energy (DOE) at the
AFS, Las Vegas, Nevada. The map was created using the
and other data sources available for map generation.

AFS map identifier: Japan
1000 mR/hr, 1000 mR/hr, 1000 mR/hr

1:120,000



Map created on 3/17/2011 5:33:41 AM PST
Check for revision in 12 hours

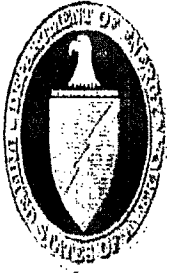
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Contact (702) 784 - 1665

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EZ 787 of 810

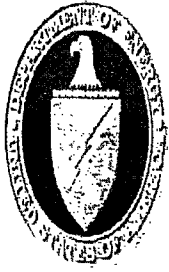


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Conclusions

- ♦ A conservative assessment of these measurements indicates that as of 17 March 2011:
 - Emergency Phase PAGs are not exceeded beyond 5 miles to the north and south of the accident site
 - Evacuation and shelter areas established by the Government of Japan are adequate for current conditions
 - US evacuation guidance is sufficient and conservative

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Next steps

- ♦ Analysis of the helicopter data is on-going. Preliminary analysis indicates that the radiological deposition extending 50 miles north from Tokyo is near background.
- ♦ DOE (CM Home Team) is in the process of converting these measurements to a 4-day dose
- ♦ Additional flights are planned this evening to characterize areas further west of the accident site

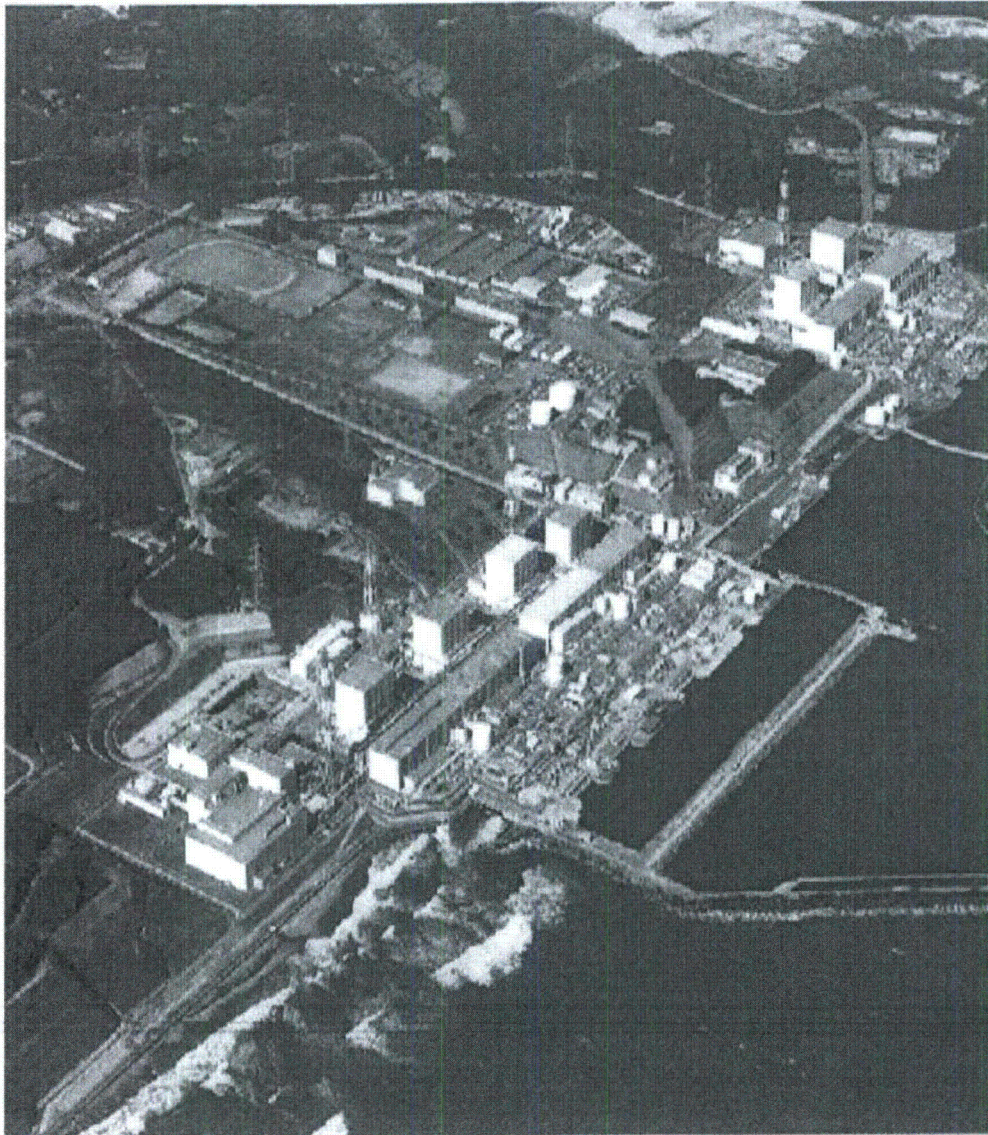
~~Official Use Only~~



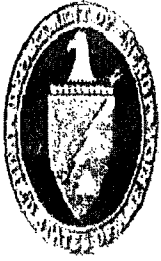
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Japan Earthquake Response

March 23, 2011 // 1800 EDT



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**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**

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Current Status

No major changes in radiation levels at the Fukushima Daiichi Nuclear Power Plant

- Unit 1: Reactor water level stable, core damage est. 70%. Seawater injection is being converted to freshwater. Electrical power line connected (through Unit 2). Radiation level reported by TEPCO at front gate at 0700 JLT
- Unit 2: Reactor water level stable, core damage est. 33%. Spent fuel pool has been filled. Power restored and electric water pump systems being tested.
- Unit 3: Seawater injection is being converted to freshwater in reactor; trucks pumping water into spent fuel pools. Water level stable and pressure stabilized. Power restored.
- Unit 4: Spraying continues periodically for the spent fuel pond. Power restored. Trucks pumping water into spent fuel pools.
- Units 5 & 6: Diesel generators supplying power to cooling system. Reactors appear stable.

Elevated levels of radioiodine are being reported in tap water in Tokyo.

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DOE/NNSA Response

Command, Control, Coordination:

- **Nuclear Incident Team (NIT):** Coordinating overall emergency response
- **Policy Working Group (PWG):** Coordinating overall policy
- **Senior Energy Official:** Primary Manager of deployed field teams
- **Liaisons:** DART, USPACOM, USAID, NRC

Modeling

- **National Atmospheric Release Advisory Center (NARAC):** conducting predictive radioactive atmospheric dispersion modeling

Monitoring and Sampling

- **Consequence Management Response Team (CMRT):** Conducting ground monitoring, air sampling and initial results analysis
- **Aerial Monitoring System (AMS):** Conducts aerial detection for mapping radiological ground material deposits

Assessment

- **Consequence Management Home Team (CMHT):** Scientific assessment of data updated daily from ground measurements and AMS flights

Medical Consultation

- **Radiation Emergency Assistance Center/Training Site (REAC/TS):** Providing medical advice about radiological exposure

Deployed (41)

Yokota AB

- (1) SEO
- (28) CMRT
- (6) AMS

US Embassy Tokyo

- (2) Foreign Service Nationals
- (2) Permanent Staff
- (1) DART LNO
- (1) Nuclear Energy Representative

USPACOM HQ

- (1) LNO

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4

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Operations Over Past 24 Hrs.

Modeling

- NARAC: Developing transpacific runs with new source term (Melcore source term). Produced predictive plume models for next 24 hours including two bounding cases for Tokyo and completion of west coast impacts table

Field Monitoring

- AMS: Ongoing surveys – rotary aircraft mission in Ibaraki Prefecture focused on agriculture area near coast; fixed-wing mission north and west of Daiichi to provide plume deposition on land.
- CMRT: Field Teams conducted monitoring missions south of incident site along Joban Expressway and at US Embassy (Tokyo).

Assessment

- CMRT and CMHT compiled DOE, Interagency, and Japan inputs to produce field measurement summary for last 24 hours

Medical Consult

- Responded to 7 medical consult RFIs in past 48 hours

Nuclear Incident Team

- Supported DOS and NSS Trip Wire Meeting
- Ongoing evaluation of DOE NR dose model
- Published two radiological Triage reports

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External Data Providers

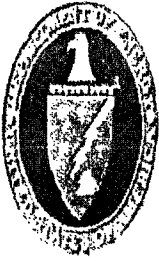
Japan

- Ministry of Foreign Affairs (MOFA)
- Ministry of Education, Culture, Sports, Science, and Technology (MEXT)
- Tokyo Electric Power Company (TEPCO)
- Nuclear Safety Technology Center (NUSTEC)

United States

- Japan Emergency Command Center, US Embassy, Tokyo
- USAF, BSC Commander
- Futenma Marine Corps Air Station
- Nuclear Regulatory Commission
- Naval Reactors

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Guide to Interpretation

Derived Response Levels (DRL)

• Early Phase DRL

- If a person is in danger of receiving an external radiation dose of 1 Rem over 4 days, the EPA recommends evacuation until radiation levels decrease. This area is indicated in red.

• First Year DRL

If a person is in danger of receiving an external radiation dose greater than 2 Rem during the first year, the EPA recommends relocation until radiation levels decrease. This is not an urgent action because the dose is received over a full year. This area is indicated in orange.

• Fifty Year DRL

- If a person is in danger of receiving an external radiation dose greater than 5 Rem over 50 years, the EPA recommends relocation until radiation levels decrease. This is not an urgent action because the dose is received over fifty years. This area is indicated in yellow.

• Second Year DRL

- If a person is in danger of receiving an external radiation dose of greater than 0.5 Rem in a the second year (or any subsequent year), the EPA recommends relocation until radiation levels decrease. This area is indicated in green.

These calculations account for multiple variables. For instance, radiation is most intense in the first days following its release therefore dose reduction may be met by evacuating early in the response.

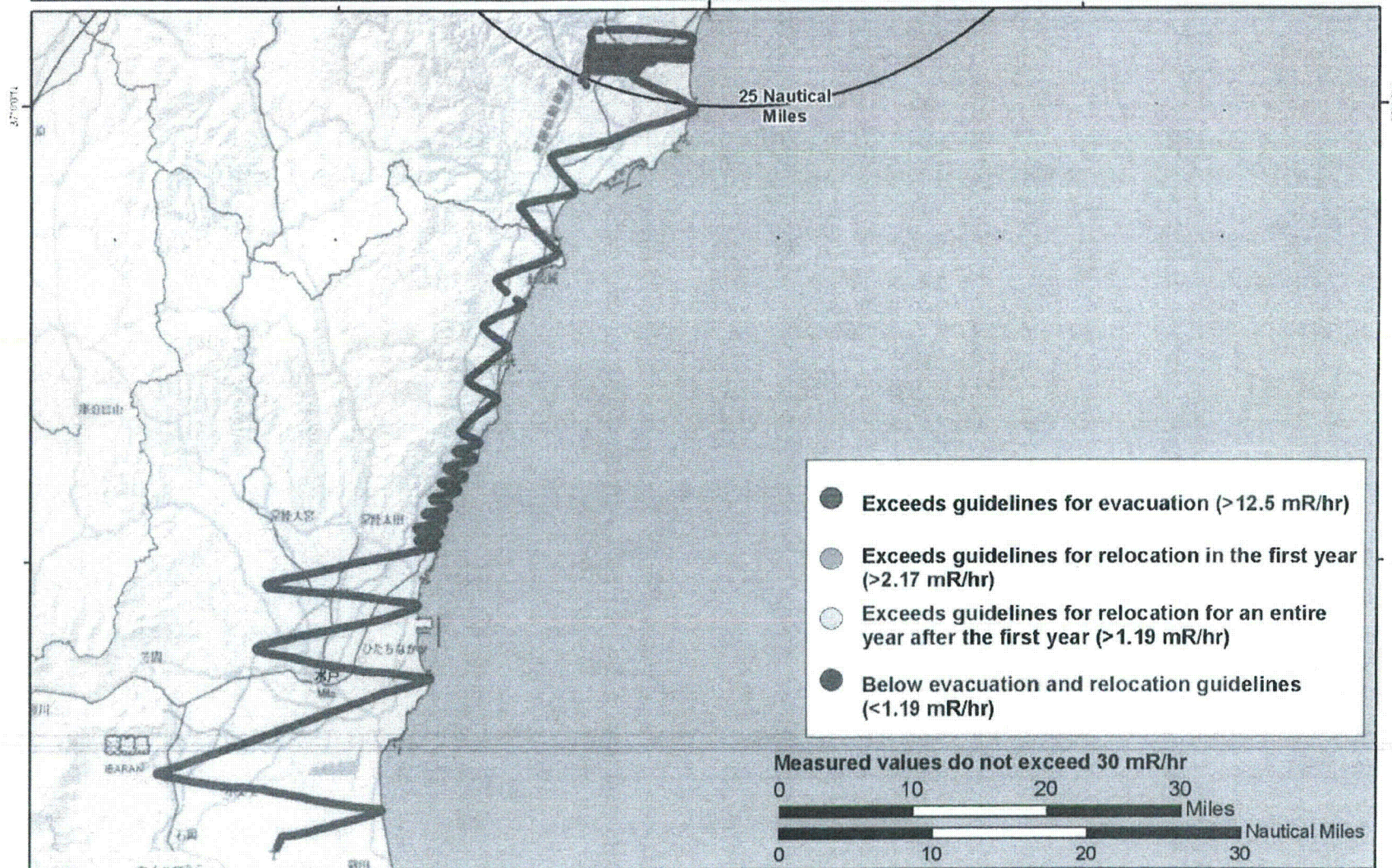
Protective actions are frequently expressed in dose rates. The dose rate is an indicator that residents would accumulate the threshold dose if they stayed in the area the entire time expressed (e.g. 1 year, 2 years, 50 years)

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Aerial Monitoring Results - Helicopter FUKUSHIMA DAIICHI JAPAN

March 23, 2011



Map created on 03242011 0515 JST

Name: NIT-D Helo 23Mar2011 v3

Nuclear Incident Team DOE NIT
Contact (202) 686 - 8100

EZ 797 of 810

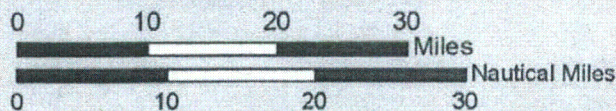
**Preliminary data
requiring final
altitude corrections**

25 Nautical
Miles

13 Miles

- Exceeds guidelines for evacuation (>12.5 mR/hr)
- Exceeds guidelines for relocation in the first year (>2.17 mR/hr)
- Exceeds guidelines for relocation for an entire year after the first year (>1.19 mR/hr)
- Below evacuation and relocation guidelines (<1.19 mR/hr)

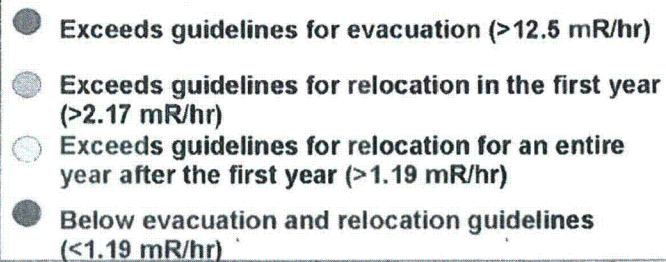
Measured values do not exceed 30 mR/hr



Map created on 03242011 0515 JST
Name: NI-D C-12 23Mar2011 v3

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

EZ 798 of 810



- △ DOD Data
- DOE Data
- Japan Data

Map created on 03242011 0530 JST
Name: NIT-D MonitoringResults 21Mar 2145 to 22Mar 2145 v4

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

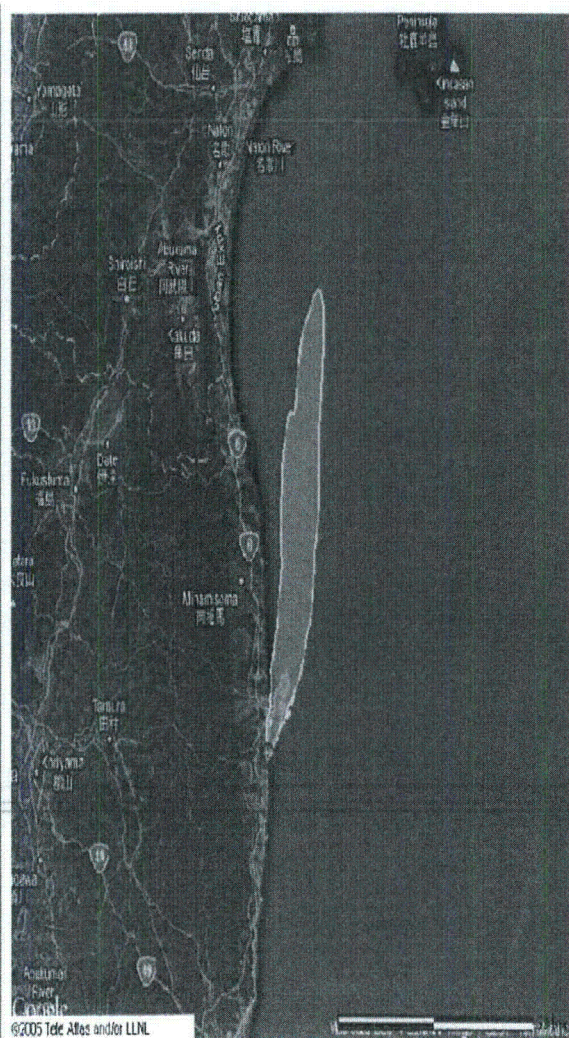
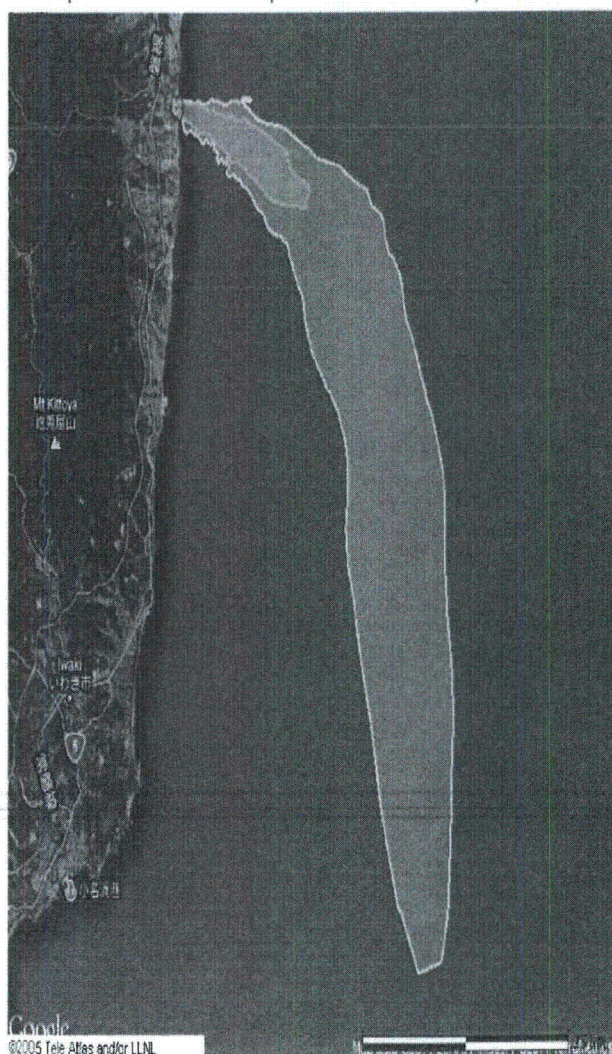


Official Use Only

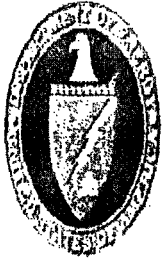
Forecasted Weather March 23-24

◆ 03/24/2011 07:00:00 JST

03/24/2011 14:00 JST



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Planned Operations: Next 24 Hrs

- Collocation of AFRAT with CMRT; setting up within 24 hours, lab operational in 36 hours
- Field Monitoring
 - AMS and field monitoring operations will be determined by results of 23 March activities and any changes in priorities.
 - Planned operations for 24 March will be included in 1800 SitRep.

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12

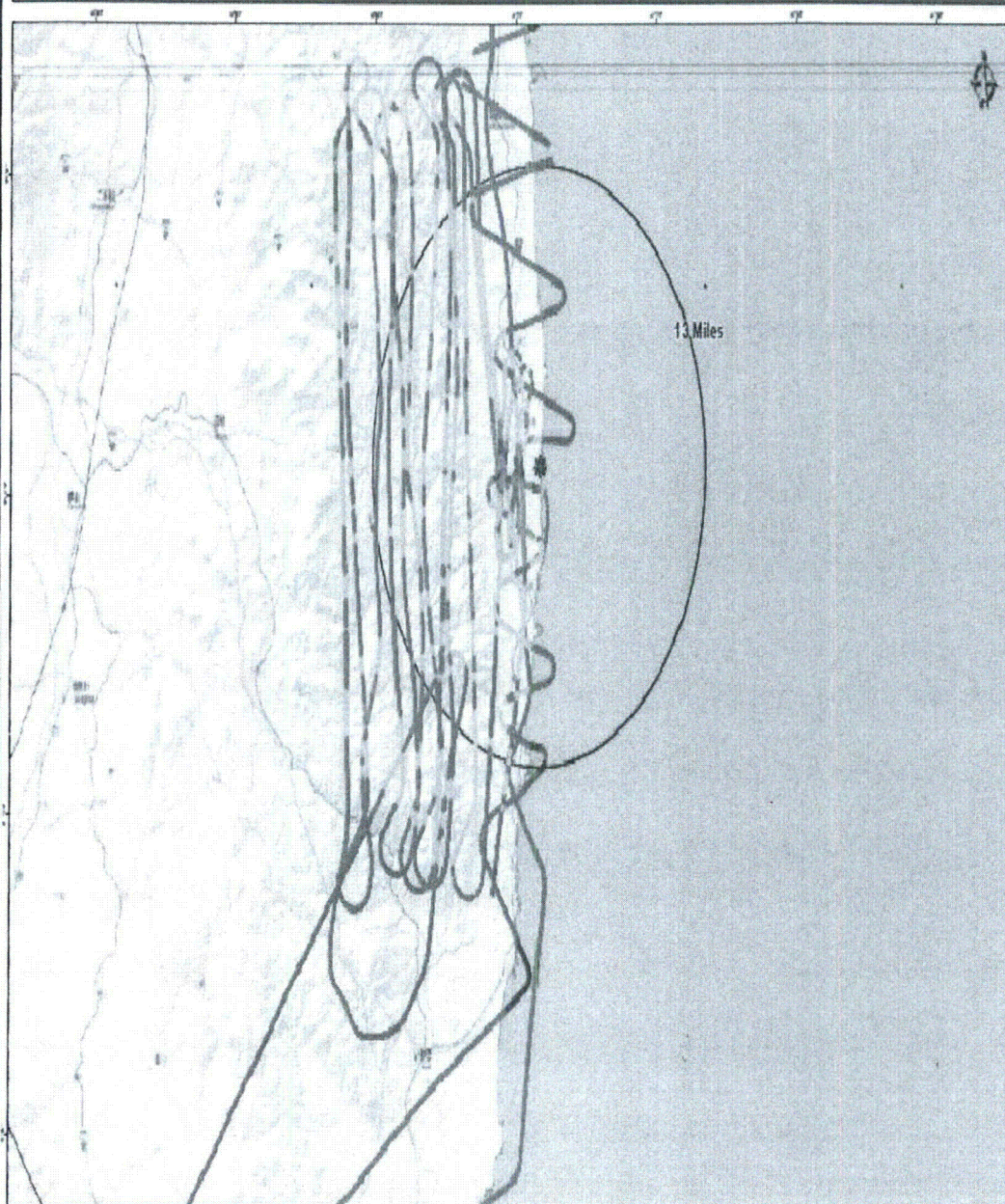
AMS Measurements

- 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.

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

FUKUSHIMA DAICHI
JAPAN



 FUKUSHIMA DAICHI

C-12 Aerial Data
Exposure Rate at 1 meter (mR/hr)

- < 0.02
- $0.02 - 0.10$
- $0.10 - 1.00$
- $1.00 - 5.00$
- $5.00 - 10.00$
- $10.00 - 20.00$
- $20.00 - 30.42$

Technical Characteristics and Values

- This product is a conservative estimate based upon the assumption that all flowers are discarded along the ground
- Can be used to estimate when flowering begins
- Can be used to estimate the flowering period and the intensity of specific seasons
- Two different time series taken for flowering in light and dark from November onwards
- Data reported in 10-day intervals, time data are correlated with 10-day intervals between days

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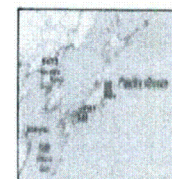
Page Number

12-0000000, 12-0000000 and 12-0000000

This paper was produced by The Geographic Information Systems Department of NOAA's Pacific Storming Laboratory (PSL), at NOAA APM, Los Angeles, Nevada. PSL (and DPM, DPM) Third Street 1000, 94401, California, used to be the publisher.

DOI: 10.1002/for

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

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< Unofficial Translation >

News Release

Readings at Monitoring Post out of 20 Km Zone of Fukushima Dai-ichi NPP

As of 20:00 March 16, 2011

Ministry of Education, Culture, Sports, Science and Technology (MEXT)

1. Monitoring Outputs by MEXT (reverse chronological order)

Monitoring Post (length from NPP)	Monitoring Time	Reading (unit : $\mu\text{Sv/h}$)	Weather	Reading by
Reading Point [13] About 25 Km South/West	at 14:15 March 16	9.5 ^{*2}	No rain	MEXT
Reading Point [12] About 25 Km South/West	at 13:53 March 16	0.8 (2nd Floor of KAWAUCHI Village, Local Government)	No rain	MEXT
Reading Point [12] About 25 Km South/West	at 13:52 March 16	1.0 (1st Floor of KAWAUCHI Village, Local Government)	No rain	MEXT
Reading Point [12] About 25 Km South/West	at 13:47 March 16	6.7 ^{*2}	No rain	MEXT
Reading Point [11] About 25 Km South/West	at 13:36 March 16	10.5 ^{*2}	Snow	MEXT
Reading Point [10] About 20 Km West North/West	at 13:31 March 16	10.0 ^{*2}	Snow	MEXT
Reading Point [8] About 20 Km West	at 13:28 March 16	12.2 ^{*1}	Snow	MEXT
Reading Point [7] About 20 Km West	at 13:24 March 16	12.5 ^{*1}	Snow	MEXT
Reading Point [22] About 30 Km South/West	at 12:10 March 16	26.0 ^{*3} 2.6 $\mu\text{Sv}/\text{hr}$	Snow	JAEA (Japan Atomic Energy Agency)
Reading Point [5] About 25 Km West North/West	at 11:58 March 16	10.2 ^{*2}	Snow	MEXT
Reading Point [4] About 25 Km West North/West	at 11:35 March 16	80.0 ^{*2}	Snow	MEXT
Reading Point [21] About 30 Km South/West	at 11:30 March 16	80.0 ^{*3} 8 $\mu\text{Sv}/\text{hr}$	Snow	JAEA (Japan Atomic Energy Agency)
Reading Point [6] About 30 Km North/West	at 11:23 March 16	58.5 ^{*2}	No rain	MEXT
Reading Point [E] About 30 Km North/West	at 10:49 March 16	14.2 ^{*2}	No rain	MEXT
Reading Point [D] About 50 Km North/West	at 10:17 March 16	12.5 ^{*2}	No rain	MEXT
Reading Point [C] About 55 Km North/West	at 10:06 March 16	22.2 ^{*2}	No rain	MEXT
Reading Point [B] About 60 Km North/West	at 09:50 March 16	20.0 ^{*1}	No rain	MEXT
Reading Point [A] About 60 Km North/West	at 08:15 March 16	1.5 ^{*1} (Indoor) 18.0 ^{*1} (Outdoor)	No rain	MEXT

* 1 Reading of Geiger-Müller counter

* 3 Reading of NaI scintillator

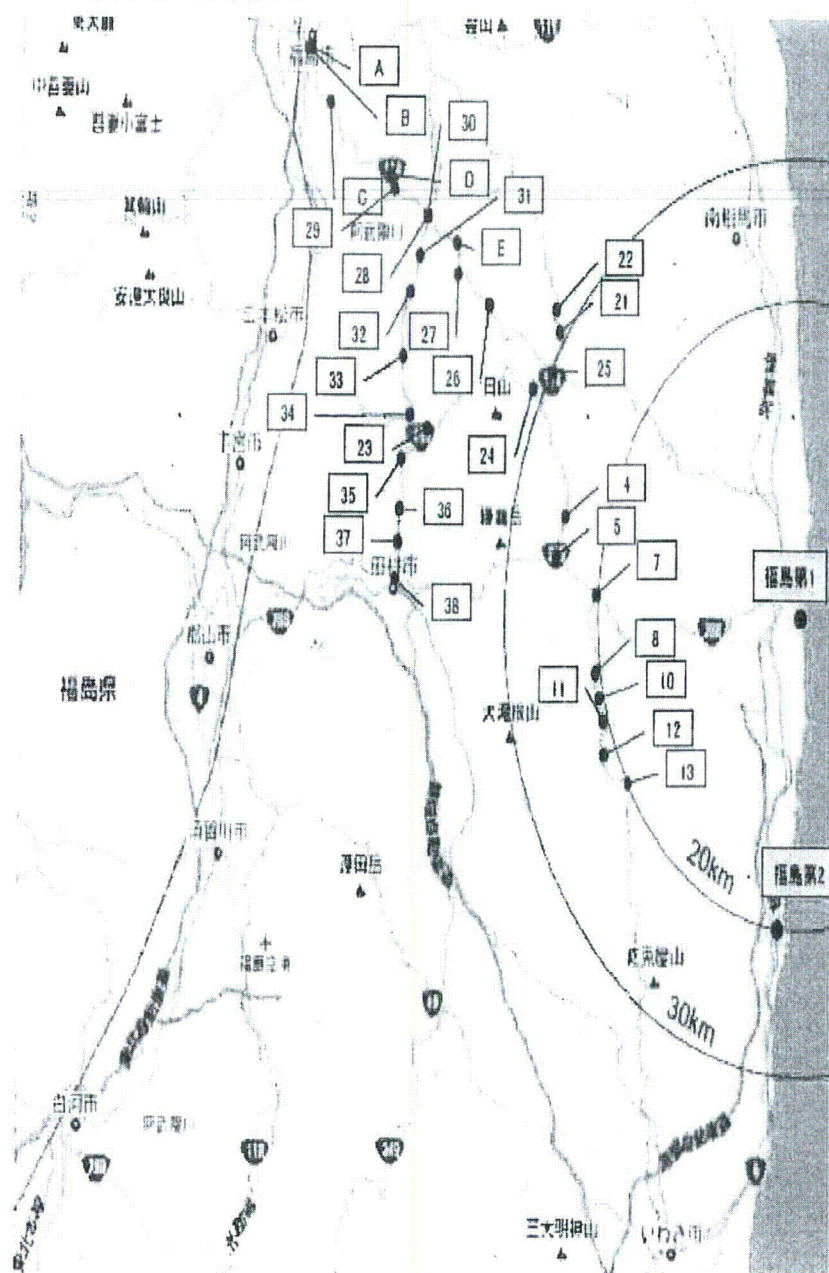
* 2 Reading of Ionization Chamber

* This time's additional data is underlined and bold

2. Under construction, Reading by TEPCO, National Police Agency

mar 15
12 hr Prime
Discussion

○ Reading Point from 08:15 to 14:15 March 16, 2011



Reading of environmental radioactivity
level by prefecture 3rd April 8:00-9:00
(μ Sv/h)

Radiation in Daily-life

	Radiation dose (μ Sv)
Level to which a person exposed on average per year	3000
Chest X-ray examination.	50
An air travel between Tokyo and New York (Round Trip).	200

