April 7, 2011 0600 EDT

Briefing Sheet
Fukushima Daiichi

ET Overview and Priorities:

- U-1 containment pressure is slowly decreasing (pressure now 7.0 psig) due to unspecified leak (Site Team indicates TEPCO estimates 10-30% leakage rate).
- TEPCO began filling Unit 1 containment with nitrogen (DOE)
- Site Team developing "current state" assessment using prior assessments/field data; supports high-level discussion on protective actions, to be cleared by NRC, and given to US and GoJ high level. Plan is to include Sandia NL MELCOR and MACCS assessments (under development).

RST Overview and Priorities:

- Responded to CDC request for high level information on the accident
- RST continuing to work with consortium on defining "stable" site conditions, draft document has been circulated. Document requested by Site Team to support alignment with NISA.
- RST is evaluating roles and responsibilities regarding the industry consortium now that INPO has established clear communication paths and points of contact with TEPCO.
- SFP white paper has been drafted and sent to site team and consortium members for comments. Comments are due back with concurrence at 1000 EDT on Thursday April 7th.
- RST drafted "one-pagers" on RPV injection rate and containment fill. These draft documents have been shared with the technical consortium and sent to the site team.
- Will be coordinating with OPA, OCA, OGC and NRR to consider options associated with multiple requests for RST Assessment(s) based on an article in the NY Times. Also, coordinating with OPA regarding responding to recent media requests around the release of an NRC email on status of the Unit 2 core and reactor vessel.
- Goop (synthetic resin) document sent to the site.

PMT Overview and Priorities:

- Continue assessment of radiological conditions, dose projections and protective action recommendations. Available dose information continues to show downward trends.
- Working with EPA staff to determine if EPA plans to deploy RADNET monitors within Japan. Preliminary answer is that EPA is focused on the long term planning and does not intend to deploy RADNET monitors to Japan, however, they will check back with the NRC/PMT after discussing with EPA management.
- To support Sandia National Laboratories offsite dose estimates using MACCS, a one year historical data bank of meteorological conditions in Japan needs to be obtained. NOAA may have this information and PMT will attempt to contact to obtain it.

LT Overview and Priorities:

- IAEA's Incident and Emergency Centre (IEC) is tracking offers for assistance; database posted on ENAC. LT provided U.S. list to Mark Schaffer in Vienna who will clear release of the list through UNVIE to IAEA.
- Maintain a database of any actions assigned to the NRC during Deputies Committee or Principals meeting.
- USAID has requested information on NRC site team regarding roles and responsibilities and time in service, likely from a cost and budget perspective. The NRC team in Japan has provided a list of names assigned to each team there (mirroring the ET, LT, RST, and PMT).

KK/SS

April 7, 2011 0600 EDT

- LT contacted OCFO regarding contingency planning should longer term USAID support of embedded NRC staff become an issue.
- NRC/Consortium calls have been re-established and are now held daily at 2000 EDT. The NRC Site Team in Japan is serving as a clearinghouse by reviewing material and assistance requests from the Japanese Government (GoJ) and combining them into a central list to avoid duplication.
- The U.S. Embassy is working to consolidate the consortium list with the Embassy list so the Embassy can take over maintenance of the consolidated list by the end of this week. GoJ has been asked to prioritize all requests on the list. Meetings continue daily between the Embassy team (supported by NRC and DOE) and the GoJ to discuss GoJ requests for assistance and equipment. International liaisons have suggested that the U.S. Embassy take the lead in communicating to International Atomic Energy Agency (IAEA) all U.S. assistance to Japan and coordinating that assistance if DOS-HQ is agreeable. It was discussed in the Agency Deputies meeting earlier in the week that DOE is the lead for interagency technical support to Japan.

OFFICIAL USE ONLY

April 7, 2011 1500 EDT

Briefing Sheet
Fukushima Daiichi

ET Overview and Priorities

- TEPCO continues nitrogen inerting of Unit 1. GE has proposed we take a look at how what is happening in Unit 1 would change our assessment.
- No changes reported for other units
- A 7.4 magnitude earthquake occurred this morning. A Tsunami warning was issued but later rescinded. The site was evacuated in response to the warning to leave coastal areas and go to higher ground. Eventually site personnel were returned to the site.

RST Overview and Priorities

- Working on answering questions from site team about the potential to use a slurry mixture in the spent-fuel pools. An answer is desired by 5:00 EDT but will not be ready. The RST will share the draft information currently in circulation with the consortium with the site team.
- An issue was raised at the congressional hearing yesterday by Congressman Markey who asked Marty Virgilio if any of the core had exited the reactor vessel. Chuck Castro confirmed the RST understanding but indicated the Japanese would say the vessel was in tact.

PMT Overview and Priorities

- It was decided to provide the site team with the results of the RASCAL runs associated with the 50-mile evacuation recommendation.
- Vince Holahan has requested some information for PACCOM. Examples include guidance on the return of U.S. citizens and the report cited in the NY Times article on Wednesday, April 6, 2011. Also PACCOM has 60 questions that NRC is trying to get.
- We continue to request EPA show us the radiation maps it has of Japan.

LT Overview and Priorities

- There was a meeting this morning on how to handle the report in the NY Times article. A FOIA request for the report was submitted this morning and it was agreed we would follow the FOIA process.
- There is a meeting at 3:00, April 7, 2011 with OMB and Jim Dyer to discuss supplemental funding from the Japan event.
- Logistics for the 4th team to Japan are being put in place, with the first individual to go Saturday, April 9, 2011.
- Developing list of actions and responsible organization to ensure commitments from the Deputy Committee and implemented. Expect completion by 1900 EDT April 7, 2011.

KK/56

From:	Weber, Michael
To:	Johnson, Michael; ET01 Hoc; ET05 Hoc; OST02 HOC; RST01 Hoc
Subject:	FYI - NRC"s Daily Assessment of Conditions at Fukushima Daiichi
Date:	Friday, April 08, 2011 5:46:00 AM
Attachments:	NRC Daily Assessment of Daiichi - 4-8-11.pdf

From: Salay, Michael
To: Jaczko, Gregory
Cc: Borchardt, Bill; Weber, Michael; Virgilio, Martin; Casto, Chuck; Leeds, Eric; RST01 Hoc
Sent: Fri Apr 08 04:28:17 2011
Subject: NRC's Daily Assessment of Conditions at Fukushima Daiichi

Dear Chairman,

Attached please find the NRC Japan Team's Daily Assessment of conditions at the Fukushima Daiichi nuclear power plants and spent fuel pools. There are two changes of note for today. Following the earthquake last night the unit 1 feedwater nozzle temperature and drywell radiation monitors indicated higher levels. This is reflected by a down arrow in the attached for cooling of the Unit 1 Vessel. The injection flow rate to the Unit 2 reactor vessel was reduced from 8 cubic meters per hour to 7 cubic meters per hour. This is reflected by a down arrow in the attached for cooling of the Unit 2 Vessel. We will continue to discuss these issues with NISA and TEPCO.

If you have any questions, please don't hesitate to ask.

Best regards,
Mike Salay
NRC Japan Team

KK/57

~~Official Use Only~~

NRC's Daily Assessment of Conditions at Fukushima Daiichi Nuclear Power Plant

Unit 1		Today	Yesterday
Vessel	Cooling	Challenged	Challenged
		↓	↓
	Integrity	Intact	Intact
		↔	↔
Containment	Flooding	Inc./Needed	Inc./Needed
		↔	↔
	Integrity	Challenged	Challenged
		↔	↔
Spent Fuel Pool	Cooling/Level	Adequate	Adequate
		↔	↔
	Integrity	Intact	Intact
		↔	↔

Unit 2		Today	Yesterday
Vessel	Cooling	Challenged	Challenged
		↓	↔
	Integrity	Failed	Failed
		↔	↔
Containment	Flooding	Inc./Needed	Inc./Needed
		↔	↔
	Integrity	Failed	Failed
		↔	↔
Spent Fuel Pool	Cooling/Level	Adequate	Adequate
		↔	↔
	Integrity	Intact	Intact
		↔	↔

Unit 3		Today	Yesterday
Vessel	Cooling	Adequate	Adequate
		↔	↔
	Integrity	Failed	Failed
		↔	↔
Containment	Flooding	Challenged	Challenged
		↔	↔
	Integrity	Failed	Failed
		↔	↔
Spent Fuel Pool	Cooling/Level	Challenged	Challenged
		↔	↔
	Integrity	Challenged	Challenged
		↔	↔

Unit 4		Today	Yesterday
Spent Fuel Pool	Cooling/Level	Challenged	Challenged
		↔	↔
	Integrity	Failed	Failed
		↔	↔

		Today	Yesterday
Protective Measures	Exposure Risk	Low	Low
		↔	↔

Methodology for Developing the Fukushima Daiichi Daily Assessment Report

PURPOSE: The report is prepared to provide a qualitative high level assessment of daily conditions at Fukushima Daiichi that the U.S. Ambassador can use to assess the safety of American citizens in Japan.

DISCLAIMER: The development of the daily assessment report includes a number of inputs. Some of these are objective, such as plant data provided by TEPCO, while others are subjective, such as engineering insights from the NRC's reactor and protective measures specialists in Japan. It should be recognized that there are many unknowns and uncertainties associated with having a complete understanding of conditions in each of the Daiichi reactors and spent fuel pools. As such, this tool represents the collective judgment of the NRC staff in Japan based on all available data.

For each of the major plant parameters listed below, the NRC staff assesses its status daily and bins it into one of the three categories listed. The staff uses the listed plant information and conditions in making its assessment. The arrows on the report indicate the relative trend in plant conditions from the previous day.

1. Reactor Pressure Vessel
    a. Cooling – Adequate, Challenged, or Inadequate.
        i. Flow or Injection Rate
        ii. Reliability of Injection
        iii. Source of Water
    b. Integrity – Intact, Challenged, or Failed.
        i. Temperature indications
        ii. Pressure readings
2. Primary Containment
    a. Flooding Status – Complete/Not needed, Challenged, or Incomplete/Needed.
        i. Water Level
        ii. Sources
        iii. Injection capacity/rate
    b. Integrity - Intact, Challenged, or Failed.
        i. Pressure readings
        ii. Bypass evaluations
        iii. Temperature indications
3. Spent Fuel Pools
    a. Cooling/Level – Adequate, Challenged, or Inadequate.
        i. Flow or Injection Rate
        ii. Reliability of Injection
        iii. Source of Water
    b. Integrity – Intact, Challenged, or Failed. Due to limited available data, this assessment relies strongly on the NRC team's engineering judgment.
4. Protective Measures – Exposure Risk to American citizens in Japan outside the U.S. government's recommended 50-mile evacuation zone.
    a. Low – 50-mile recommendation remains sufficient
    b. Medium – New information has raised questions regarding the sufficiency of the 50-mile recommendation.
    c. High – 50-mile recommendation is no longer sufficient due to changing plant condition

Japanese Government (GoJ), comparing them to the consortium list and combining all requests into a central list to avoid duplication. As of 4/8/11, the U.S. Embassy list and the consortium list have been consolidated. This is in preparation to transfer the GOJ request list to the Embassy for maintenance. GoJ has been asked to prioritize all requests on the list. Meetings continue daily between the Embassy team (supported by NRC and DOE) and the GoJ to discuss GoJ requests for assistance and equipment. International liaisons have suggested that the U.S. Embassy take the lead in communicating to International Atomic Energy Agency (IAEA) all U.S. assistance to Japan and coordinating that assistance if DOS-HQ is agreeable. It was discussed in the Agency Deputies meeting earlier in the week that DOE is the lead for interagency technical support to Japan.

KK/58

~~Official Use Only~~

NRC's Daily Assessment of Conditions at Fukushima Daiichi Nuclear Power Plant

Unit 1		Today	Yesterday
Vessel	Cooling	Challenged	Challenged
		↓	↓
	Integrity	Intact	Intact
		↔	↔
Containment	Flooding	Inc./Needed	Inc./Needed
		↔	↔
	Integrity	Challenged	Challenged
		↔	↔
Spent Fuel Pool	Cooling/Level	Adequate	Adequate
		↔	↔
	Integrity	Intact	Intact
		↔	↔

Unit 2		Today	Yesterday
Vessel	Cooling	Challenged	Challenged
		↓	↔
	Integrity	Failed	Failed
		↔	↔
Containment	Flooding	Inc./Needed	Inc./Needed
		↔	↔
	Integrity	Failed	Failed
		↔	↔
Spent Fuel Pool	Cooling/Level	Adequate	Adequate
		↔	↔
	Integrity	Intact	Intact
		↔	↔

Unit 3		Today	Yesterday
Vessel	Cooling	Adequate	Adequate
		↔	↔
	Integrity	Failed	Failed
		↔	↔
Containment	Flooding	Challenged	Challenged
		↔	↔
	Integrity	Failed	Failed
		↔	↔
Spent Fuel Pool	Cooling/Level	Challenged	Challenged
		↔	↔
	Integrity	Challenged	Challenged
		↔	↔

Unit 4		Today	Yesterday
Spent Fuel Pool	Cooling/Level	Challenged	Challenged
		↔	↔
	Integrity	Failed	Failed
		↔	↔

		Today	Yesterday
Protective Measures	Exposure Risk	Low	Low
		↔	↔

Methodology for Developing the Fukushima Daiichi Daily Assessment Report

PURPOSE: The report is prepared to provide a qualitative high level assessment of daily conditions at Fukushima Daiichi that the U.S. Ambassador can use to assess the safety of American citizens in Japan.

DISCLAIMER: The development of the daily assessment report includes a number of inputs. Some of these are objective, such as plant data provided by TEPCO, while others are subjective, such as engineering insights from the NRC's reactor and protective measures specialists in Japan. It should be recognized that there are many unknowns and uncertainties associated with having a complete understanding of conditions in each of the Daiichi reactors and spent fuel pools. As such, this tool represents the collective judgment of the NRC staff in Japan based on all available data.

For each of the major plant parameters listed below, the NRC staff assesses its status daily and bins it into one of the three categories listed. The staff uses the listed plant information and conditions in making its assessment. The arrows on the report indicate the relative trend in plant conditions from the previous day.

1. Reactor Pressure Vessel
    a. Cooling – Adequate, Challenged, or Inadequate.
        i. Flow or Injection Rate
        ii. Reliability of Injection
        iii. Source of Water
    b. Integrity – Intact, Challenged, or Failed.
        i. Temperature indications
        ii. Pressure readings
2. Primary Containment
    a. Flooding Status – Complete/Not needed, Challenged, or Incomplete/Needed.
        i. Water Level
        ii. Sources
        iii. Injection capacity/rate
    b. Integrity - Intact, Challenged, or Failed.
        i. Pressure readings
        ii. Bypass evaluations
        iii. Temperature indications
3. Spent Fuel Pools
    a. Cooling/Level – Adequate, Challenged, or Inadequate.
        i. Flow or Injection Rate
        ii. Reliability of Injection
        iii. Source of Water
    b. Integrity – Intact, Challenged, or Failed. Due to limited available data, this assessment relies strongly on the NRC team's engineering judgment.
4. Protective Measures – Exposure Risk to American citizens in Japan outside the U.S. government's recommended 50-mile evacuation zone.
    a. Low – 50-mile recommendation remains sufficient
    b. Medium – New information has raised questions regarding the sufficiency of the 50-mile recommendation.
    c. High – 50-mile recommendation is no longer sufficient due to changing plant condition

April 8, 2011 0600 EDT

Briefing Sheet
Fukushima Daiichi

ET Overview and Priorities

- TEPCO continued nitrogen inerting of Unit 1. Chuck Casto reported that the Unit 1 FW nozzle temperature increased when they started injection of nitrogen (not sure why?)
- A 7.1 magnitude earthquake occurred yesterday morning. No additional damage reported at the Fukushima Daiichi Site; however, a number of other nuclear plants and a reprocessing facility lost offsite power and were relying on emergency diesel generators for power.
- Need to finalize papers/documents for Chairman in support of 4/11 Deputies Meeting.

RST Overview and Priorities

- Working on Stable Plant Conditions document. Incorporated Naval Reactors comments, awaiting Site Team review, then will issue a revised draft for review by the technical consortium.
- An issue was raised at the congressional hearing Wednesday day by Rep. Markey who asked Marty Virgilio if any of the reactor core had exited the reactor vessel. Chuck Casto confirmed the RST understanding but indicated the Japanese would say the vessel was intact. RST responded to Elliot Brenner by phone on the question.

PMT Overview and Priorities

- Vince Holahan has requested some information for PACCOM. Examples include guidance on the return of U.S. citizens and the report cited in the NY Times article on Wednesday, April 6, 2011.
- We continue to request EPA for "maps" or information on historical background radiation levels in Japan.
- The PMT is working on a summary "one-pager" of radiological conditions around the Fukushima site, and assisting in the review of guidance for consideration in re-assessing protective action recommendations for US citizens.
- Attempting to get the latest draft of the document being prepared by Embassy staff regarding voluntary departure.

LT Overview and Priorities

- A meeting was held this morning on how to handle the report in the NY Times article. A FOIA request for the report was submitted this morning and it was agreed we would follow the FOIA process. The LT is awaiting comments on draft talking points which were submitted in preparation for the next Interagency Policy Committee (IPC) secure video teleconference (SVTC) to address lessons learned and corrective actions.
- There was a meeting at 3:00, April 7, 2011 with OMB and Jim Dyer to discuss cost responding to the Japan event, and what may be reimbursed. We have not received any feedback from this meeting.
- Logistics for the 4th team to Japan are being put in place, with the first individual to go Saturday, April 9, 2011. Conference call with Chairman Jaczko, Chuck Casto, and the ET indicated the size of the team will be set at eleven (two additional) and stay time will be three weeks. One individual would have expertise in project management and the other in health physics.
- NRC/Consortium calls are held daily at 2000 EDT. The NRC Site Team in Japan has served as a clearinghouse by reviewing material and assistance requests from the

KK/59

USNRC Emergency Operations Center Status Update

April 8, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report includes NRC's current understanding of the ongoing situation in Japan. Historical and background information can be found in past reports.

NRC's Top Priorities

1) Continued assessment of radiological conditions, dose projections, and protective action recommendations. Currently, the NRC Japan Team reports that no PMT additional support or actions are being requested (offsite radiological assessments, RASCAL source term updates).

2) Providing technical assistance to the US Ambassador in Japan and the Japanese Government, including a particular focus on the Unit 1 drywell and the Unit 3 and 4 spent fuel pools.

3) Coordination with other US Departments and Agencies, the Institute of Nuclear Power Operations (INPO), Bechtel, General Electric Hitachi (GEH), Tokyo Electric Power Company (TEPCO), and the Japanese military.

Status

At 0946 EST, March 11, 2011, the NRC entered Monitoring Mode and the agency continues to monitor the unfolding events in Japan. The Headquarters Operations Center is staffed 24/7.

The team of NRC experts in Japan continues to support the US Ambassador and his staff.

NRC has issued numerous press releases related to the earthquake and tsunami. These press releases can be found online at: http://www.nrc.gov/reading-rm/doc-collections/news/2011/

On March 14, 2011, the NRC experts in Japan reported that the Japanese had requested US technical assistance for cooling the Fukushima Daiichi Units, as needed. The effort to provide assistance is being coordinated by the US Ambassador.

The current protective action recommendation for US citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate.

One pump that was deployed to the site is being used to pump fresh water from one of the barges to a clean water holding tank as a source of fresh water to cool the reactors and the spent fuel pools. A second pump is ready as a spare, if necessary.

The NRC Reactor Safety Team completed an assessment and recommendations for the Fukushima Daiichi units based on the severe accident management guidelines. The

KK/60

assessment included the input and concurrence of INPO, GEH, EPRI, Naval Reactors, and DOE/NE. This document has been provided to the NRC Site Team in Japan. The document is now being cited in the news media (New York Times). NRC is evaluating what steps may be appropriate to address an OUO document being provided to the public.

The US Department of Energy and the US Environmental Protection Agency are the Federal communicators for questions regarding possible domestic impacts from the events in Japan and on domestic monitoring.

The Commission established a senior level agency task force to conduct a systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

Air sample and standing water sample results from US nuclear plant licensees have been entered into a password protected database established by the Nuclear Energy Institute (NEI). NRC and Federal partners have access to the plant data.

Industry Consortium / Contractor Activities

NRC/Consortium calls are held daily at 2000 EDT. The NRC Site Team in Japan has served as a clearinghouse by reviewing material and assistance requests from the Japanese Government (GoJ), comparing them to the consortium list and combining all requests into a central list to avoid duplication. As of 4/8/11, the U.S. Embassy list and the consortium list have been consolidated. This is in preparation to transfer the GOJ request list to the Embassy for maintenance. GoJ has been asked to prioritize all requests on the list. Meetings continue daily between the Embassy team (supported by NRC and DOE) and the GoJ to discuss GoJ requests for assistance and equipment. International liaisons have suggested that the U.S. Embassy take the lead in communicating to International Atomic Energy Agency (IAEA) all U.S. assistance to Japan and coordinating that assistance if DOS-HQ is agreeable. It was decided in the Agency Deputies meeting earlier in the week that DOE is the lead for interagency technical support to Japan.

Current Understanding of Japanese Facilities

(This information is compiled from the NRC in-country team, TEPCO press releases, NISA press releases, Japan Atomic Industrial Forum (JAIF) compiled data and assessments, IAEA information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, Department of Energy (DOE) and others.)

Fukushima Daiichi

The Japanese national government has encouraged evacuation for local residents within the 20-30 km radius of the site boundary. This is a slight change from the previous voluntary evacuation with shelter in place for the 20-30 km zone. GOJ has required some evacuations in towns/villages outside of 30 km in areas Northwest of the Fukushima site. IAEA confirms a no-

fly zone out to 30 km around the Fukushima Daiichi plant. No additional damage has been reported as a result of the 4/7/11 magnitude 7.1 aftershock.

STATUS as of 0430 EDT, April 8, 2011 - (1730 Japan, April 8)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 70% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). The volume of sea water injected to cool the core has left enough salt to fill the lower plenum to the core plate (Source: GEH, US Industry). Vessel temperatures 116.2°C at bottom drain, 250°C and trending down at FW nozzle (Source: TEPCO 4/8). RPV pressure (Ch A: 45.7 psig, Ch B: 94.2 psig) (Source: TEPCO 4/6) Stuck open SRV on Unit 1 (Site Team, confirmed by TEPCO 4/7).

Core Cooling: Fresh water injection via fire extension line to FW line at 26.4 gpm (Source: TEPCO 4/5). Recirculation pump seals have likely failed. (Source: GEH)

Primary Containment: Damage suspected, slow leakage, DW and torus pressure at 7.1 psig; however recent reports indicate that pressure may be rising from N_2 injection (Source: NISA 4/5). Losing 10-30% drywell volume per day (Source: TEPCO via Site Team 4/2). Stuck open SRV (Source: Site Team, confirmed by TEPCO 4/7). Began injecting nitrogen to drywell at 0130 Japan on April 7 (Source: IAEA, 4/7).

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 18°C (Source: JAIF 4/5). Periodic freshwater spray using concrete pump truck (Source: DOE 4/3). SFP has 292 assemblies with last transfer of 64 assemblies from reactor to SFP in March 2010 (Source: GEH 4/2).

Rad Levels: DW: 18700 R/hr (Source: TEPCO 4/8), Reported instrument failure (Source: INPO 4/8), Torus: 840 R/hr (Source: TEPCO 4/6), Outside site at plant gate(s): 5.8 mR/hr at west gate (very slight trend downward) (Source: MOFA and IAEA).

Power: On external power (Source: NISA); equipment testing in progress (Source: JAIF, NISA, TEPCO). External AC power to the Main Control Room of Unit 1 lighting and instrument power is available.

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 30% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature not available (TEPCO), feed water nozzle temperature 144.2°C (Source: TEPCO 4/7). RPV pressure -2.6 psig (Source: TEPCO 4/7).

Core Cooling: Fresh water injecting at 30.8 gpm fire line (Source: TEPCO 4/8)

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). Pressure: -0.2 psig (Source: TEPCO 4/7). Site Team believes an SRV is stuck open, but TEPCO opinion currently differs. May begin injecting nitrogen (Source: NHK).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO), blowout panels removed from side of reactor building to reduce hydrogen buildup (Source: visual)

Spent Fuel Pool: Full fresh water injection continuing (Source: DOE 4/3), fuel pool temperature 48°C (Source: TEPCO 4/7). 36 tons of water added 4/7 (Source: Site Team 4/8).

Rad Levels: DW: 3130 R/hr (Source: TEPCO 4/6); Torus 83 R/hr (Source: TEPCO 4/6); Outside site at plant gate(s): 5.8 mR/hr at west gate (very slight trend downward) (Source: MOFA and IAEA); > 100 R/hr at discharge to sea (Source: IAEA 4/3); The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

Power: On offsite power (NISA 4/3)

Unit 3 – (NRC Priority: 3)

Core Status: Estimated 25% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature 115.8ºC, FW nozzle temperature: 83.4ºC (Source: TEPCO 4/7). RPV pressure Ch A: -0.3 psig, Ch B: -11.4 psig) (Source: TEPCO 4/7). RPV level ~2/5 TAF (Source: IAEA 4/3).

Core Cooling: Freshwater injection via fire line at 30.8 gpm via temporary electrical pump (Source: TEPCO 4/7). Recirculation pump seals have likely failed. (Source: GEH)

Primary Containment: NRC assessment is that damage is suspected. Pressure: 0.9 psig (Source: TEPCO 4/7). May begin to inject nitrogen (Source: NHK).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)

Spent Fuel Pool: Low water level. Temperature 56ºC estimated (Source: JAIF 4/5, uncertain, overhead thermography). Spraying fresh water periodically into SFP (Source: DOE 4/3). Water will be added on 4/8 (Source: Site Team 4/8). Intermittent steam-like substance emitting from SFP 1,2,3,4 from injection/spray (Source: JAIF 4/1).

Rad Levels: DW: 1980 R/hr, Torus: 81 R/hr (Source: TEPCO 4/6); Outside site at plant gate(s): 5.8 mR/hr at west gate (very slight trend downward) (Source: MOFA and IAEA); 100 R/hr debris outside Rx building (covered).

Power: On offsite power (NISA 4/3)

Unit 4 – (NRC Priority: 4)

Core Status: Offloaded 105 days at time of accident (Source: JAIF, NISA, TEPCO)

Core Cooling: Not necessary (Source: JAIF, NISA, TEPCO)

Primary Containment: Not applicable (Source: JAIF, NISA, TEPCO)

Secondary Containment: Severely damaged from hydrogen explosion. (Source: JAIF, NISA, TEPCO)

Spent Fuel Pool: Temperature 50ºC (Source: JAIF 4/7, uncertain, overhead thermography); periodic freshwater injection via an extended boom (Source: JAIF 3/31). 38 tons of water added 4/7 (Source: Site Team 4/8). Hydrogen from the fuel pool exploded on March 15 (Source: JAIF 3/31). Intermittent steam-like substance emitting from SFP from injection/spray (Source: JAIF 4/1). Level trending down (Source: Site Team 4/6).

Power: On offsite AC power (DOE 4/3)

Unit 5 – (NRC Priority: 5)

Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 34.8ºC (Source: TEPCO 4/7)

Core Cooling: Functional (Source: JAIF, NISA, TEPCO)

Primary Containment: Functional (Source: JAIF, NISA, TEPCO)

Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)

Spent Fuel Pool: Fuel pool cooling functional, RHR pump repaired, temperature 34.8ºC (Source: TEPCO 4/7)

Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)

Other: Groundwater leaking into turbine basement drain pits, being pumped into ocean (Source: TEPCO 4/5)

Unit 6 – (NRC Priority: 6)

Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 22.5ºC (Source: TEPCO 4/6)

Core Cooling: Functional (Source: JAIF, NISA, TEPCO)

Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, temperature 21.5°C (Source: TEPCO 4/7)
Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)
Other: Groundwater leaking into turbine basement drain pits, being pumped into ocean (Source: TEPCO 4/5)

Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water level maintained at 29°C (Source: TEPCO 4/6); normal cooling started 1805 JST March 24 (Source: NISA)
Electrical Power (NRC priority: 7): Offsite power connected to Unit 2 auxiliary transformer / distribution panel; work continues on energizing equipment in Unit 2.
Dry Cask Storage: Visual inspection revealed no problems. All casks are vertical casks manufactured by Hitachi Shipbuilding (Source: RST).

The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

NRC priorities are based on analyses by the Reactor Safety Team. Unit 1 is priority 1 based on the belief that primary containment functionality, though degraded, can still be preserved if the responders take actions to inject to the RPV and primary containment. Unit 2 is priority 2 because of the apparent damage to primary containment and the other barriers to release. This damage requires continued attention to cool the core and provide water to the primary containment to minimize potential for release. Unit 3 is priority 3 because primary containment may be nominally functional but continued attention is required to pursue core cooling and injection. Unit 4 is priority 4 because progress has been made in addressing the spent fuel pool heat removal requirements, and the SFP area has indicated temperatures of less than 100°C.

Other Plants

No new information to report.

Protective Measures Team (PMT) Update

The PMT continues to assess available dose rate information from DOE AMS data, the US Navy, TEPCO, and MEXT. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several days. On April 6, 2011 dose rates at the west gate were about 6 mR/hr (Source: (Japan) Ministry of Foreign Affairs and IAEA). Note that dose rates are lower than previously reported but the monitoring location was slightly changed from previous reporting. PMT is trending near site dose rates using the MOFA/IAEA data and will use this source in future.

DOE continues to take field measurements around the site. To date, over 110,000 field measurements have been taken by DOE teams. The 4/17 AMS flyover approximately 30 miles west of the site detected low levels of deposition.

International Response

- The IAEA has announced that it will hold a high-level conference on preliminary lessons learned from Fukushima on June 20-24, 2011. Information is available at www.iaea.org.
- NRC has daily teleconferences with the United Kingdom's Health and Safety Executive, Canadian Nuclear Safety Commission, and French Nuclear Safety Authority. IAEA and Finland also participate intermittently.
- France has publicly posted its assessment of projected doses in Tokyo on the French Radioprotection and Nuclear Safety Institute (IRSN) website.
- The NRC RST and PMT will have a call with Taiwan early in the week of 4/11 to discuss current status and source term issues.
- An Institute of Nuclear Power Operations (INPO) staff member in Tokyo is coordinating with US government staff at the Embassy concerning equipment requests.
- An IAEA team visited the Fukushima Daiichi site on 4/6.

Reference

Units

1 rem (rem) = 1,000 millirem (mrem)
1 Sievert (Sv) = 1,000 milliSieverts (mSv) = 1,000,000 microsieverts (μSv)
1 rem = 0.01 Sv = 10 mSv
1 Sv = 100 rem

Reactor Abbreviations

atm – Atmosphere (unit of pressure)
DW – Drywell
FW – Feed Water
gpm – gallons per minute
RHR – Residual Heat Removal
RPV – Reactor Pressure Vessel
SFP – Spent Fuel Pool
SRV – Safety Relief Valve
TAF – Top of Active Fuel

~~OFFICIAL USE ONLY~~

April 9, 2011 0600 EDT

Briefing Sheet
Fukushima Daiichi

ET Overview and Priorities

- No significant changes on status of reactors
- OEDO memo was approved for Ops Center reduced staffing. New structure to be developed/implemented by NSIR & ET Director.
- Two more people are being sent to Japan (a HP and PM). USAID still covering the cost even though they are starting to ramp down their involvement.

RST Overview and Priorities

- Briefing material for Chuck Casto to use with Secretary of State Clinton is being prepared. Meeting is anticipated the week of 17 April. PMT/RST providing input.
- RST is considering a revision to its assessment now that inerting has begun. There is currently a revision 1.
- Rev 0 and Rev 1 of the RST Assessment Document have been provided to Vince Holahan.
- Final Rev 1 Option B document provided to the site team for review.
- Continuing disagreement between the site team and TEPCO on whether the fuel in Unit #4 SFP is covered.
- Miscommunication between Naval Reactors and Charlie Tinkler on adding water to SFP if it is dry. PMT will seek clarification.

PMT Overview and Priorities

- PMT has lead to develop the "composite" document crafted, input from RST. Covers the 3 issues, 1. Grab n Go criteria, 2. Defining 50-mile EPZ re-entry criteria, and 3. Defining stable conditions for Rx.
- PMT is working on a source term for NOAA. PMT will send an email to NOAA explaining the need to coordinate with the Federal family.
- State document has the lead for the "document" on re-entry into Tokyo. This will be conveyed via email today as a one-pager from the Ambassador to the State Department.
- PMT to review a draft long-term habitability document developed by Knolls Atomic Power Laboratories (KAPL).

LT Overview and Priorities

- . The LT will prepare an executive summary/1-pager to support the "composite" document.
- Vince Holahan is seeking relief.
- The next consortium call will be Sunday evening.

KK/6/1

OFFICIAL USE ONLY

April 9, 2011 1500 EDT

Briefing Sheet
Fukushima Daiichi

ET Overview and Priorities

- No significant changes on status of reactors
- Working on transition plan for staffing at 6 persons. Documents are in Web EOC under ET Miscellaneous documents collection.
- Working on transition 6 person team staffing through 4-16 and plan for continued staffing starting 4-17.
- Working to staff an 11-person Site Team.
- Chairman call on 4-9 and 4-10 only at 15:15, TA brief at 8:30 a.m.
-

RST Overview and Priorities

- Briefing material for Chuck Casto to use with Secretary of State Clinton has been provided. Meeting is anticipated the week of 17 April. PMT/RST providing input.
- RST is considering a revision to its assessment now that inerting has begun. The spent fuel pool assessment document is complete.
- Rev 0 and Rev 1 of the RST Assessment Document have been provided to Vince Holahan.

PMT Overview and Priorities

- PMT developed the "composite" document crafted, input from RST. Covers the 3 issues, 1. Grab n Go criteria, 2. Defining 50-mile EPZ re-entry criteria, and 3. Defining stable conditions for Rx. Will coordinate with other agencies on Sunday.
- PMT reviewed a draft long-term habitability document developed by Knolls Atomic Power Laboratories (KAPL) and will provide to Naval Reactors.

LT Overview and Priorities

- . The LT will prepare an executive summary/1-pager to support the "composite" document as inputs are received from RST and PMT.
- The next consortium call will be Sunday evening.
- LT developed a draft template for a daily status document (1-2 pager) to distribute to smaller core of Federal family as replacement for current status documents.

KK/62

USNRC Emergency Operations Center Status Update

April 8, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report includes NRC's current understanding of the ongoing situation in Japan. Historical and background information can be found in past reports.

NRC's Top Priorities

1) Continued assessment of radiological conditions, dose projections, and protective action recommendations. Currently, the NRC Japan Team reports that no PMT additional support or actions are being requested (offsite radiological assessments, RASCAL source term updates).

2) Providing technical assistance to the US Ambassador in Japan and the Japanese Government, including a particular focus on the Unit 1 drywell and the Unit 3 and 4 spent fuel pools.

3) Coordination with other US Departments and Agencies, the Institute of Nuclear Power Operations (INPO), Bechtel, General Electric Hitachi (GEH), Tokyo Electric Power Company (TEPCO), and the Japanese military.

Status

At 0946 EST, March 11, 2011, the NRC entered Monitoring Mode and the agency continues to monitor the unfolding events in Japan. The Headquarters Operations Center is staffed 24/7.

The team of NRC experts in Japan continues to support the US Ambassador and his staff. A fourth team to Japan is scheduled to begin departing on April 9, 2011.

NRC has issued numerous press releases related to the earthquake and tsunami. These press releases can be found online at: http://www.nrc.gov/reading-rm/doc-collections/news/2011/

On March 14, 2011, the NRC experts in Japan reported that the Japanese had requested US technical assistance for cooling the Fukushima Daiichi Units, as needed. The effort to provide assistance is being coordinated by the US Ambassador.

The current protective action recommendation for US citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate.

One pump that was deployed to the site is being used to pump fresh water from one of the barges to a clean water holding tank as a source of fresh water to cool the reactors and the spent fuel pools. A second pump is ready as a spare, if necessary.

KK 163

Earthquake/Tsunami Status Update April 8, 2011 1800 EDT

The NRC Reactor Safety Team completed an assessment and recommendations for the Fukushima Daiichi units based on the severe accident management guidelines. The assessment included the input and concurrence of INPO, GEH, EPRI, Naval Reactors, and DOE/NE. This document has been provided to the NRC Site Team in Japan. The document is now being cited in the news media (New York Times). NRC is evaluating what steps may be appropriate to address an OUO document being provided to the public. An updated assessment is underway to account for current plant conditions (e.g. inerting Unit 1 drywell).

The US Department of Energy and the US Environmental Protection Agency are the Federal communicators for questions regarding possible domestic impacts from the events in Japan and on domestic monitoring.

The Commission established a senior level agency task force to conduct a systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

Air sample and standing water sample results from US nuclear plant licensees have been entered into a password protected database established by the Nuclear Energy Institute (NEI). NRC and Federal partners have access to the plant data.

Industry Consortium / Contractor Activities

NRC/Consortium calls are held daily at 2000 EDT. The NRC Site Team in Japan has served as a clearinghouse by reviewing material and assistance requests from the Japanese Government (GoJ), comparing them to the consortium list and combining all requests into a central list to avoid duplication. As of 4/8/11, the U.S. Embassy list and the consortium list have been consolidated. This is in preparation to transfer the GOJ request list to the Embassy for maintenance. GoJ has been asked to prioritize all requests on the list. Meetings continue daily between the Embassy team (supported by NRC and DOE) and the GoJ to discuss GoJ requests for assistance and equipment. International liaisons have suggested that the U.S. Embassy take the lead in communicating to International Atomic Energy Agency (IAEA) all U.S. assistance to Japan and coordinating that assistance if DOS-HQ is agreeable. It was decided in the Agency Deputies meeting earlier in the week that DOE is the lead for interagency technical support to Japan.

Earthquake/Tsunami Status Update April 8, 2011 1800 EDT

Current Understanding of Japanese Facilities

(This information is compiled from the NRC in-country team, TEPCO press releases, NISA press releases, Japan Atomic Industrial Forum (JAIF) compiled data and assessments, IAEA information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, Department of Energy (DOE) and others.)

Fukushima Daiichi

The Japanese national government has encouraged evacuation for local residents within the 20-30 km radius of the site boundary. This is a slight change from the previous voluntary evacuation with shelter in place for the 20-30 km zone. GOJ has required some evacuations in towns/villages outside of 30 km in areas Northwest of the Fukushima site. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. No additional damage has been reported as a result of the 4/7/11 magnitude 7.1 aftershock.

STATUS as of 1800 EDT, April 8, 2011 - (0700 Japan, April 9)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 70% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). The volume of sea water injected to cool the core has left enough salt to fill the lower plenum to the core plate (Source: GEH, US Industry). Vessel temperatures 119.4°C at bottom drain, 250°C at FW nozzle (Source: NISA 4/8). RPV pressure (Ch A: 57.3 psig, Ch B: 115.0 psig) (Source: NISA 4/8). Stuck open SRV on Unit 1 (Site Team, confirmed by TEPCO 4/7).

Core Cooling: Fresh water injection via fire extension line to FW line at 26.4 gpm (Source: TEPCO 4/5). Recirculation pump seals have likely failed. (Source: GEH)

Primary Containment: Damage suspected, slow leakage, DW pressure increased to 12.1 psig, torus pressure at 7.8 psig and slowly increasing from N_2 injection (Source: NISA 4/8). Losing 10-30% drywell volume per day (Source: TEPCO via Site Team 4/2). Stuck open SRV (Source: Site Team, confirmed by TEPCO 4/7). Began injecting nitrogen to drywell at 0130 Japan on April 7 (Source: IAEA, 4/7).

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 24°C (Source: JAIF 4/6, uncertain, overhead thermography). Periodic freshwater spray using concrete pump truck (Source: DOE 4/3). SFP has 292 assemblies with last transfer of 64 assemblies from reactor to SFP in March 2010 (Source: GEH 4/2).

Rad Levels: DW: 6830 R/hr (Source: NISA 4/8), Reported instrument failure (Source: INPO 4/8), Torus: 1220 R/hr (Source: NISA 4/8), Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF).

Power: On external power (Source: NISA); equipment testing in progress (Source: JAIF, NISA, TEPCO). External AC power to the Main Control Room of Unit 1 lighting and instrument power is available.

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 30% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature not available (TEPCO), feed water nozzle temperature 141.2°C (Source: NISA 4/8). RPV pressure -2.9 psig (Source: NISA 4/8).

Core Cooling: Fresh water injecting at 30.8 gpm fire line (Source: TEPCO 4/8)

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). Pressure: -0.2 psig (Source: NISA 4/8). Site Team believes an SRV is stuck open, but TEPCO opinion currently differs. May begin injecting nitrogen (Source: NHK).
Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO), blowout panels removed from side of reactor building to reduce hydrogen buildup (Source: visual)
Spent Fuel Pool: Full fresh water injection continuing (Source: IAEA 4/5), fuel pool temperature 58ºC (Source: JAIF 4/8). 36 tons of water added 4/7 (Source: Site Team 4/8).
Rad Levels: DW: 2940 R/hr (Source: JAIF 4/8); Torus 77 R/hr (Source: NISA 4/8); Outside site at plant gate(s): 5.8 mR/hr at west gate (very slight trend downward) (Source: JAIF); >100 R/hr at discharge to sea (Source: IAEA 4/3); The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).
Power: On offsite power (NISA 4/3)

Unit 3 – (NRC Priority: 3)
Core Status: Estimated 25% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature 110.8ºC, FW nozzle temperature: 88.8ºC (Source: NISA 4/8). RPV pressure Ch A: -0.6 psig, Ch B: -11.4 psig) (Source: NISA 4/8). RPV level ~2/5 TAF (Source: IAEA 4/3).
Core Cooling: Freshwater injection via fire line at 30.8 gpm via temporary electrical pump (Source: NISA 4/8). Recirculation pump seals have likely failed. (Source: GEH)
Primary Containment: NRC assessment is that damage is suspected. Pressure: 0.6 psig (Source: NISA 4/8). May begin to inject nitrogen (Source: NHK).
Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Low water level. Temperature 60ºC estimated (Source: JAIF 4/6, uncertain, overhead thermography). Freshwater injection via SF cooling system and spraying fresh water periodically into SFP (Source: IAEA 4/5). Water will be added on 4/8 (Source: Site Team 4/8).
Rad Levels: DW: 1880 R/hr, Torus: 73.8 R/hr (Source: NISA 4/8); Outside site at plant gate(s): 4.0 mR/hr at west gate (very slight trend downward) (Source: JAIF); 100 R/hr debris outside Rx building (covered).
Power: On offsite power (NISA 4/3)

Unit 4 – (NRC Priority: 4)
Core Status: Offloaded 105 days at time of accident (Source: JAIF, NISA, TEPCO)
Core Cooling: Not necessary (Source: JAIF, NISA, TEPCO)
Primary Containment: Not applicable (Source: JAIF, NISA, TEPCO)
Secondary Containment: Severely damaged from hydrogen explosion. (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Temperature 57ºC (Source: JAIF 4/7, uncertain, overhead thermography); periodic freshwater injection via an extended boom (Source: JAIF 3/31). 38 tons of water added 4/7 (Source: Site Team 4/8). Hydrogen from the fuel pool exploded on March 15 (Source: JAIF 3/31). Intermittent steam-like substance emitting from SFP from injection/spray (Source: JAIF 4/1). Level trending down (Source: Site Team 4/6). TEPCO considering adding sand slurry to SFP (Source: Site Team 4/7).
Power: On offsite AC power (DOE 4/3)

Unit 5 – (NRC Priority: 5)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 45.5ºC (increasing) (Source: NISA 4/8)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)

Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, RHR pump repaired, temperature 34.7ºC (Source: NISA 4/8)
Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)
Other: Groundwater leaking into turbine basement drain pits, being pumped into ocean (Source: TEPCO 4/5)

Unit 6 – (NRC Priority: 6)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 22.7ºC (Source: NISA 4/8)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, temperature 30.5ºC (Source: NISA 4/8)
Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)
Other: Groundwater leaking into turbine basement drain pits, being pumped into ocean (Source: TEPCO 4/5)

Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water level maintained at 29ºC (Source: TEPCO 4/6); normal cooling started 1805 JST March 24 (Source: NISA)
Electrical Power (NRC priority: 7): Offsite power connected to Unit 2 auxiliary transformer / distribution panel; work continues on energizing equipment in Unit 2.
Dry Cask Storage: Visual inspection revealed no problems. All casks are vertical casks manufactured by Hitachi Shipbuilding (Source: RST).

The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

NRC priorities are based on analyses by the Reactor Safety Team. Unit 1 is priority 1 based on the belief that primary containment functionality, though degraded, can still be preserved if the responders take actions to inject to the RPV and primary containment. Unit 2 is priority 2 because of the apparent damage to primary containment and the other barriers to release. This damage requires continued attention to cool the core and provide water to the primary containment to minimize potential for release. Unit 3 is priority 3 because primary containment may be nominally functional but continued attention is required to pursue core cooling and injection. Unit 4 is priority 4 because progress has been made in addressing the spent fuel pool heat removal requirements, and the SFP area has indicated temperatures of less than 100ºC.

Other Plants

No new information to report.

Earthquake/Tsunami Status Update April 8, 2011 1800 EDT

Protective Measures Team (PMT) Update

The PMT continues to assess available dose rate information from DOE AMS data, the US Navy, TEPCO, and MEXT. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several days. On April 8, 2011 dose rates at the west gate were about 5 mR/hr (Source: Japan Ministry of Foreign Affairs and IAEA). PMT is trending near site dose rates using the MOFA/IAEA data and will use this source in future.

DOE continues to take field measurements around the site. To date, over 110,000 field measurements have been taken by DOE teams. The 4/17 AMS flyover approximately 30 miles west of the site detected low levels of deposition.

The PMT was requested to support NOAA with information on the source term released. This will be used to assist in ocean modeling.

International Response

- Secretary of State Clinton tentatively visiting Japan on April 18, 2011.
- The IAEA has announced that it will hold a high-level conference on preliminary lessons learned from Fukushima on June 20-24, 2011. Information is available at www.iaea.org.
- NRC has daily teleconferences with the United Kingdom's Health and Safety Executive, Canadian Nuclear Safety Commission, and French Nuclear Safety Authority. IAEA and Finland also participate intermittently.
- France has publicly posted its assessment of projected doses in Tokyo on the French Radioprotection and Nuclear Safety Institute (IRSN) website.
- The NRC RST and PMT will have a call with Taiwan early in the week of 4/11 to discuss current status and source term issues.
- An Institute of Nuclear Power Operations (INPO) staff member in Tokyo is coordinating with US government staff at the Embassy concerning equipment requests.

Reference

Units

1 rem (rem) = 1,000 millirem (mrem)
1 Sievert (Sv) = 1,000 milliSieverts (mSv) = 1,000,000 microsieverts (μSv)
1 rem = 0.01 Sv = 10 mSv
1 Sv = 100 rem

Reactor Abbreviations

atm – Atmosphere (unit of pressure)
DW – Drywell
FW – Feed Water
gpm – gallons per minute
RHR – Residual Heat Removal
RPV – Reactor Pressure Vessel
SFP – Spent Fuel Pool
SRV – Safety Relief Valve
TAF – Top of Active Fuel

USNRC Emergency Operations Center Status Update

April 9, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report includes NRC's current understanding of the ongoing situation in Japan. Historical and background information can be found in past reports.

NRC's Top Priorities

1) Continued assessment of radiological conditions, dose projections, and protective action recommendations. Currently, the NRC Japan Team reports that no PMT additional support or actions are being requested (offsite radiological assessments, RASCAL source term updates).

2) Providing technical assistance to the US Ambassador in Japan and the Japanese Government.

3) Coordination with other US Departments and Agencies, the Institute of Nuclear Power Operations (INPO), Bechtel, General Electric Hitachi (GEH), Tokyo Electric Power Company (TEPCO), and the Japanese military.

Status

At 0946 EST, March 11, 2011, the NRC entered Monitoring Mode and the agency continues to monitor the unfolding events in Japan. In an effort to better provide NRC support, and in recognition of a less dynamic situation at the site, on April 11, NRC will be transitioning a great portion of its support to Japan to its line organizations, resulting in a reduction in the HQ Operations Center staffing. The HQ Operations Center will continue to have increased staffing 24/7.

The team of NRC experts in Japan continues to support the US Ambassador and his staff. A fourth team to Japan is scheduled to begin departing on April 9, 2011.

Press releases related to the situation in Japan can be found online at: http://www.nrc.gov/reading-rm/doc-collections/news/2011/.

On March 14, 2011, the NRC experts in Japan reported that the Japanese had requested US technical assistance for cooling the Fukushima Daiichi Units, as needed. The effort to provide assistance is being coordinated by the US Ambassador.

The current protective action recommendation for US citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate.

KK164

One pump that was deployed to the site is being used to pump fresh water from one of the barges to a clean water holding tank as a source of fresh water to cool the reactors and the spent fuel pools. A second pump is ready as a spare, if necessary.

The NRC Reactor Safety Team completed an assessment and recommendations for the Fukushima Daiichi units based on the severe accident management guidelines. The assessment included the input and concurrence of INPO, GEH, EPRI, Naval Reactors, and DOE/NE. This document has been provided to the NRC Site Team in Japan. The document is now being cited in the news media (New York Times). NRC is evaluating what steps may be appropriate to address an OUO document being provided to the public. An updated assessment is underway to account for current plant conditions (e.g. inerting Unit 1 drywell and status of the fuel in the Unit 2 reactor vessel).

The US Department of Energy and the US Environmental Protection Agency are the Federal communicators for questions regarding possible domestic impacts from the events in Japan and on domestic monitoring.

The Commission established a senior level agency task force to conduct a systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

Air sample and standing water sample results from US nuclear plant licensees have been entered into a password protected database established by the Nuclear Energy Institute (NEI). NRC and Federal partners have access to the plant data.

Industry Consortium / Contractor Activities

NRC/Consortium calls are held at 2000 EDT. The NRC Site Team in Japan has served as a clearinghouse by reviewing material and assistance requests from the Japanese Government (GoJ), comparing them to the consortium list and combining all requests into a central list to avoid duplication. As of 4/8/11, the U.S. Embassy list and the consortium list have been consolidated. This is in preparation to transfer the GOJ request list to the Embassy for maintenance. GoJ has been asked to prioritize all requests on the list. Meetings continue between the Embassy team (supported by NRC and DOE) and the GoJ to discuss GoJ requests for assistance and equipment. International liaisons have suggested that the U.S. Embassy take the lead in communicating to the International Atomic Energy Agency (IAEA) all U.S. assistance to Japan and coordinating that assistance if DOS-HQ is agreeable. The Japan At some point next week the Embassy will transition to take the lead. The Embassy (Tim Cipullo at Embassy-Tokyo's Econ Section) will continue to "own" the list and will be responsible for sending out the updated list as it is revised. A decision was made during an Agency Principal's meeting on April 1 that DOE is the lead for interagency technical support to Japan.

Current Understanding of Japanese Facilities

(This information is compiled from the NRC in-country team, TEPCO press releases, NISA press releases, Japan Atomic Industrial Forum (JAIF) compiled data and assessments, IAEA

information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, Department of Energy (DOE) and others.)

Fukushima Daiichi

The Japanese national government has encouraged evacuation for local residents within the 20-30 km radius of the site boundary. This is a slight change from the previous voluntary evacuation with shelter in place for the 20-30 km zone. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. No additional damage has been reported as a result of the 4/7/11 magnitude 7.1 aftershock.

STATUS as of 1800 EDT, April 9, 2011 - (0700 Japan, April 10)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 70% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV level ½ TAF (NISA 4/8). The volume of sea water injected to cool the core has left enough salt to fill the lower plenum to the core plate (Source: GEH,US Industry). Vessel temperatures 120.3°C at bottom drain, 232.0°C at FW nozzle (Source: NISA 4/9). RPV pressure (Ch A: 59.8 psig, Ch B: 120.3 psig) (Source: NISA 4/9)

Core Cooling: Fresh water injection via fire extension line to FW line at 26.4 gpm (Source: NISA 4/9). Recirculation pump seals have likely failed. (Source: GEH) Stuck open SRV (Source: Site Team, confirmed by TEPCO 4/7). Began injecting nitrogen to drywell at 0130 Japan on April 7 (Source: IAEA, 4/7).

Primary Containment: Damage suspected, slow leakage, DW pressure increased to 12.9 psig, torus pressure at 8.5 psig and slowly increasing from N_2 injection (Source: NISA 4/9). Losing 10-30% drywell volume per day (Source: TEPCO via Site Team 4/2).

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 24°C (Source: JAIF 4/6, uncertain, overhead thermography). Periodic freshwater spray using concrete pump truck (Source: DOE 4/3). SFP has 292 assemblies with last transfer of 64 assemblies from reactor to SFP in March 2010 (Source: GEH 4/2).

Rad Levels: DW: 6830 R/hr (Source: NISA 4/8), Reported instrument failure (Source: INPO 4/8), Torus: 1190 R/hr (Source: NISA 4/9), Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF).

Power: On external power (Source: NISA); equipment testing in progress (Source: JAIF, NISA, TEPCO). External AC power to the Main Control Room lighting and instrument.

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 30% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV Level 3/5 TAF (NISA 4/8) Bottom head temperature not available (TEPCO), feed water nozzle temperature 146.0°C (Source: NISA 4/9). RPV pressure: Ch A: -2.6 psig, Ch B: -4.0 psig (Source NISA 4/9). Stabilized at atmospheric pressure since 3/18/11 (Source: IAEA 4/9) Site Team believes an SRV is stuck open, but TEPCO opinion currently differs. May begin injecting nitrogen (Source: NHK).

Core Cooling: Fresh water injecting at 30.8 gpm fire line (Source: NISA 4/8)

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). Drywell Pressure: -0.9 psig (Source: NISA 4/9).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO), blowout panels removed from side of reactor building to reduce hydrogen buildup (Source: visual)

Spent Fuel Pool: Full fresh water injection continuing (Source: IAEA 4/5), fuel pool temperature 47°C (Source: NISA 4/9). 36 tons of water added 4/7 (Source: Site Team 4/8).
Rad Levels: DW: 2920 R/hr (Source: NISA 4/9); Torus 74.3 R/hr (Source: NISA 4/9); Outside site at plant gate(s): 5.8 mR/hr at west gate (very slight trend downward) (Source: JAIF); >100 R/hr at discharge to sea (Source: IAEA 4/3); The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).
Power: On offsite power (NISA 4/3)

Unit 3 – (NRC Priority: 3)
Core Status: Estimated 25% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature 109.8°C, FW nozzle temperature: 97.1°C (Source: NISA 4/9). RPV pressure Ch A: -1.6 psig, Ch B: -11.5 psig) (Source: NISA 4/9). RPV level ~2/5 TAF (Source: NISA 4/8). Stabilized at atmospheric pressure since 3/22/11 (Source: IAEA 4/9)
Core Cooling: Freshwater injection via fire line at 30.8 gpm via temporary electrical pump (Source: NISA 4/8). Recirculation pump seals have likely failed. (Source: GEH)
Primary Containment: NRC assessment is that damage is suspected. Pressure: 0.6 psig (Source: NISA 4/8). May begin to inject nitrogen (Source: NHK).
Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Low water level. Temperature 60°C estimated (Source: JAIF 4/6, uncertain, overhead thermography). Freshwater injection via SF cooling system and spraying fresh water periodically into SFP (Source: IAEA 4/5). Fresh water sprayed via concrete pump on 4/8 (Source: TEPCO 4/9)
Rad Levels: DW: 1840 R/hr, Torus: 71.7 R/hr (Source: NISA 4/9); Outside site at plant gate(s): 4.0 mR/hr at west gate (very slight trend downward) (Source: JAIF); 100 R/hr debris outside Rx building (covered).
Power: On offsite power (NISA 4/3)

Unit 4 – (NRC Priority: 4)
Core Status: Offloaded 105 days at time of accident (Source: JAIF, NISA, TEPCO)
Core Cooling: Not necessary (Source: JAIF, NISA, TEPCO)
Primary Containment: Not applicable (Source: JAIF, NISA, TEPCO)
Secondary Containment: Severely damaged from hydrogen explosion. (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Temperature 57°C (Source: JAIF 4/7, uncertain, overhead thermography); 38 tons of water added 4/7 via concrete pump. Freshwater added via concrete pump 4/9, additional spraying as needed (Source: TEPCO 4/9). Hydrogen from the fuel pool exploded on March 15 (Source: JAIF 3/31). Intermittent steam-like substance emitting from SFP from injection/spray (Source: JAIF 4/1). Level trending down (Source: Site Team 4/6). TEPCO considering adding sand slurry to SFP (Source: Site Team 4/7).
Power: On offsite AC power (DOE 4/3)

Unit 5 – (NRC Priority: 5)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 50.9°C (increasing) (Source: NISA 4/9)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)

Spent Fuel Pool: Fuel pool cooling functional, RHR pump repaired, temperature 31.8°C (Source: NISA 4/9)
Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)
Other: Groundwater leaking into turbine basement drain pits, being pumped into ocean (Source: TEPCO 4/5)

Unit 6 – (NRC Priority: 6)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 23.1°C (Source: NISA 4/9)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, temperature 23.0°C (Source: NISA 4/9)
Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)
Other: Groundwater leaking into turbine basement drain pits, being pumped into ocean (Source: TEPCO 4/5)
Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water level maintained at 32°C (Source: IAEA 4/7); normal cooling started 1805 JST March 24 (Source: NISA)
Electrical Power (NRC priority: 7): Offsite power connected to Unit 2 auxiliary transformer / distribution panel; work continues on energizing equipment in Unit 2.
Dry Cask Storage: Visual inspection revealed no problems. All casks are vertical casks manufactured by Hitachi Shipbuilding (Source: RST).

The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

NRC priorities are based on analyses by the Reactor Safety Team. Unit 1 is priority 1 based on the belief that primary containment functionality, though degraded, can still be preserved if the responders take actions to inject to the RPV and primary containment. Unit 2 is priority 2 because of the apparent damage to primary containment and the other barriers to release. This damage requires continued attention to cool the core and provide water to the primary containment to minimize potential for release. Unit 3 is priority 3 because primary containment may be nominally functional but continued attention is required to pursue core cooling and injection. Unit 4 is priority 4 because progress has been made in addressing the spent fuel pool heat removal requirements, and the SFP area has indicated temperatures of less than 100°C.

Other Plants

No new information to report.

Protective Measures Team (PMT) Update

The PMT continues to assess available dose rate information from DOE AMS data, the US Navy, TEPCO, and MEXT. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several days. On April 9, 2011 dose rates at the west gate were about 4.8 mR/hr (Source: Japan Ministry of Foreign Affairs and IAEA). PMT is trending near site dose rates using the MOFA/IAEA data and will use this source in future.

DOE continues to take field measurements around the site. To date, over 110,000 field measurements have been taken by DOE teams.

The PMT was requested to support NOAA with information on the source term released. This will be used to assist in ocean modeling.

PMT finalized the "Summary of Radiological Hazards in Japan" which was provided to the Japan Site Team.

"Guidance for Return (Short Term and Permanent Re-entry) of US Citizens to Areas around Fukushima Daiichi NPP" continues to be developed with the RST.

International Response

- Secretary of State Clinton tentatively visiting Japan on April 18, 2011.
- The IAEA has announced that it will hold a high-level conference on preliminary lessons learned from Fukushima on June 20-24, 2011. Information is available at www.iaea.org.
- NRC has daily teleconferences with the United Kingdom's Health and Safety Executive, Canadian Nuclear Safety Commission, and French Nuclear Safety Authority. IAEA and Finland also participate intermittently.
- France has publicly posted its assessment of projected doses in Tokyo on the French Radioprotection and Nuclear Safety Institute (IRSN) website.
- The NRC RST and PMT will have a call with Taiwan early in the week of 4/11 to discuss current status and source term issues.
- An Institute of Nuclear Power Operations (INPO) staff member in Tokyo is coordinating with US government staff at the Embassy concerning equipment requests.

Reference

Units

1 rem (rem) = 1,000 millirem (mrem)
1 Sievert (Sv) = 1,000 milliSieverts (mSv) = 1,000,000 microsieverts (μSv)
1 rem = 0.01 Sv = 10 mSv
1 Sv = 100 rem

Reactor Abbreviations

atm – Atmosphere (unit of pressure)
DW – Drywell
FW – Feed Water
gpm – gallons per minute
RHR – Residual Heat Removal
RPV – Reactor Pressure Vessel
SFP – Spent Fuel Pool
SRV – Safety Relief Valve
TAF – Top of Active Fuel

USNRC Emergency Operations Center Status Update

April 9, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report includes NRC's current understanding of the ongoing situation in Japan. Historical and background information can be found in past reports.

NRC's Top Priorities

1) Continued assessment of radiological conditions, dose projections, and protective action recommendations. Currently, the NRC Japan Team reports that no PMT additional support or actions are being requested (offsite radiological assessments, RASCAL source term updates).

2) Providing technical assistance to the US Ambassador in Japan and the Japanese Government, including a particular focus on the Unit 1 drywell and the Unit 3 and 4 spent fuel pools.

3) Coordination with other US Departments and Agencies, the Institute of Nuclear Power Operations (INPO), Bechtel, General Electric Hitachi (GEH), Tokyo Electric Power Company (TEPCO), and the Japanese military.

Status

At 0946 EST, March 11, 2011, the NRC entered Monitoring Mode and the agency continues to monitor the unfolding events in Japan. The Headquarters Operations Center is staffed 24/7.

The team of NRC experts in Japan continues to support the US Ambassador and his staff. A fourth team to Japan is scheduled to begin departing on April 9, 2011.

NRC has issued numerous press releases related to the earthquake and tsunami. These press releases can be found online at: http://www.nrc.gov/reading-rm/doc-collections/news/2011/

On March 14, 2011, the NRC experts in Japan reported that the Japanese had requested US technical assistance for cooling the Fukushima Daiichi Units, as needed. The effort to provide assistance is being coordinated by the US Ambassador.

The current protective action recommendation for US citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate.

One pump that was deployed to the site is being used to pump fresh water from one of the barges to a clean water holding tank as a source of fresh water to cool the reactors and the spent fuel pools. A second pump is ready as a spare, if necessary.

KK165

Earthquake/Tsunami Status Update April 9, 2011 0430 EDT

The NRC Reactor Safety Team completed an assessment and recommendations for the Fukushima Daiichi units based on the severe accident management guidelines. The assessment included the input and concurrence of INPO, GEH, EPRI, Naval Reactors, and DOE/NE. This document has been provided to the NRC Site Team in Japan. The document is now being cited in the news media (New York Times). NRC is evaluating what steps may be appropriate to address an OUO document being provided to the public. An updated assessment is underway to account for current plant conditions (e.g. inerting Unit 1 drywell).

The US Department of Energy and the US Environmental Protection Agency are the Federal communicators for questions regarding possible domestic impacts from the events in Japan and on domestic monitoring.

The Commission established a senior level agency task force to conduct a systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

Air sample and standing water sample results from US nuclear plant licensees have been entered into a password protected database established by the Nuclear Energy Institute (NEI). NRC and Federal partners have access to the plant data.

Industry Consortium / Contractor Activities

NRC/Consortium calls are held daily at 2000 EDT. The NRC Site Team in Japan has served as a clearinghouse by reviewing material and assistance requests from the Japanese Government (GoJ), comparing them to the consortium list and combining all requests into a central list to avoid duplication. As of 4/8/11, the U.S. Embassy list and the consortium list have been consolidated. This is in preparation to transfer the GOJ request list to the Embassy for maintenance. GoJ has been asked to prioritize all requests on the list. Meetings continue daily between the Embassy team (supported by NRC and DOE) and the GoJ to discuss GoJ requests for assistance and equipment. International liaisons have suggested that The U.S. Embassy take the lead in communicating to the International Atomic Energy Agency (IAEA) all U.S. assistance to Japan and coordinating that assistance if DOS-HQ is agreeable. The Japan Team anticipates that the NRC (HQ Emergency Operations Center) will continue to take the lead on the call on Sunday and for a few days thereafter. At some point next week the Embassy will transition to take the lead. The Embassy (Tim Cipullo at Embassy-Tokyo's Econ Section) will continue to "own" the list and will be responsible for sending out the updated list as it is revised after each call. A decision was made during an Agency Deputies meeting earlier in the week that DOE is the lead for interagency technical support to Japan.

Current Understanding of Japanese Facilities

(This information is compiled from the NRC in-country team, TEPCO press releases, NISA press releases, Japan Atomic Industrial Forum (JAIF) compiled data and assessments, IAEA information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, Department of Energy (DOE) and others.)

Earthquake/Tsunami Status Update April 9, 2011 0430 EDT

Fukushima Daiichi

The Japanese national government has encouraged evacuation for local residents within the 20-30 km radius of the site boundary. This is a slight change from the previous voluntary evacuation with shelter in place for the 20-30 km zone. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. No additional damage has been reported as a result of the 4/7/11 magnitude 7.1 aftershock.

STATUS as of 0430 EDT, April 9, 2011 - (1730 Japan, April 9)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 70% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). The volume of sea water injected to cool the core has left enough salt to fill the lower plenum to the core plate (Source: GEH, US Industry). Vessel temperatures 119.4°C at bottom drain, 246.6°C at FW nozzle (Source: NISA 4/8). RPV pressure (Ch A: 57.3 psig, Ch B: 115.0 psig) (Source: NISA 4/8). Stuck open SRV on Unit 1 (Site Team, confirmed by TEPCO 4/7).

Core Cooling: Fresh water injection via fire extension line to FW line at 26.4 gpm (Source: TEPCO 4/5). Recirculation pump seals have likely failed. (Source: GEH)

Primary Containment: Damage suspected, slow leakage, DW pressure increased to 12.1 psig, torus pressure at 7.8 psig and slowly increasing from N_2 injection (Source: NISA 4/8). Losing 10-30% drywell volume per day (Source: TEPCO via Site Team 4/2). Stuck open SRV (Source: Site Team, confirmed by TEPCO 4/7). Began injecting nitrogen to drywell at 0130 Japan on April 7 (Source: IAEA, 4/7).

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 24°C (Source: JAIF 4/6, uncertain, overhead thermography). Periodic freshwater spray using concrete pump truck (Source: DOE 4/3). SFP has 292 assemblies with last transfer of 64 assemblies from reactor to SFP in March 2010 (Source: GEH 4/2).

Rad Levels: DW: 6830 R/hr (Source: NISA 4/8), Reported instrument failure (Source: INPO 4/8), Torus: 1220 R/hr (Source: NISA 4/8), Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF).

Power: On external power (Source: NISA); equipment testing in progress (Source: JAIF, NISA, TEPCO). External AC power to the Main Control Room of Unit 1 lighting and instrument power is available.

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 30% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature not available (TEPCO), feed water nozzle temperature 141.2°C (Source: NISA 4/8). RPV pressure -2.9 psig (Source: NISA 4/8). Stabilized at atmospheric pressure since 3/18/11 (Source: IAEA 4/9)

Core Cooling: Fresh water injecting at 30.8 gpm fire line (Source: TEPCO 4/8)

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). Pressure: -0.2 psig (Source: NISA 4/8). Site Team believes an SRV is stuck open, but TEPCO opinion currently differs. May begin injecting nitrogen (Source: NHK).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO), blowout panels removed from side of reactor building to reduce hydrogen buildup (Source: visual)

Spent Fuel Pool: Full fresh water injection continuing (Source: IAEA 4/5), fuel pool temperature 58°C (Source: JAIF 4/8). 36 tons of water added 4/7 (Source: Site Team 4/8).

Rad Levels: DW: 2940 R/hr (Source: JAIF 4/8); Torus 77 R/hr (Source: NISA 4/8); Outside site at plant gate(s): 5.8 mR/hr at west gate (very slight trend downward) (Source: JAIF); >100 R/hr at discharge to sea (Source: IAEA 4/3); The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).
Power: On offsite power (NISA 4/3)

Unit 3 – (NRC Priority: 3)
Core Status: Estimated 25% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature 110.8°C, FW nozzle temperature: 88.8°C (Source: NISA 4/8). RPV pressure Ch A: -0.6 psig, Ch B: -11.4 psig) (Source: NISA 4/8). RPV level ~2/5 TAF (Source: IAEA 4/3). Stabilized at atmospheric pressure since 3/22/11 (Source: IAEA 4/9)
Core Cooling: Freshwater injection via fire line at 30.8 gpm via temporary electrical pump (Source: NISA 4/8). Recirculation pump seals have likely failed. (Source: GEH)
Primary Containment: NRC assessment is that damage is suspected. Pressure: 0.6 psig (Source: NISA 4/8). May begin to inject nitrogen (Source: NHK).
Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Low water level. Temperature 60°C estimated (Source: JAIF 4/6, uncertain, overhead thermography). Freshwater injection via SF cooling system and spraying fresh water periodically into SFP (Source: IAEA 4/5). Fresh water sprayed via concrete pump on 4/8 (Source: TEPCO 4/8)
Rad Levels: DW: 1880 R/hr, Torus: 73.8 R/hr (Source: NISA 4/8); Outside site at plant gate(s): 4.0 mR/hr at west gate (very slight trend downward) (Source: JAIF); 100 R/hr debris outside Rx building (covered).
Power: On offsite power (NISA 4/3)

Unit 4 – (NRC Priority: 4)
Core Status: Offloaded 105 days at time of accident (Source: JAIF, NISA, TEPCO)
Core Cooling: Not necessary (Source: JAIF, NISA, TEPCO)
Primary Containment: Not applicable (Source: JAIF, NISA, TEPCO)
Secondary Containment: Severely damaged from hydrogen explosion. (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Temperature 57°C (Source: JAIF 4/7, uncertain, overhead thermography); 38 tons of water added 4/7 via concrete pump. Further spraying will be planned if needed (Source: TEPCO 4/8). Hydrogen from the fuel pool exploded on March 15 (Source: JAIF 3/31). Intermittent steam-like substance emitting from SFP from injection/spray (Source: JAIF 4/1). Level trending down (Source: Site Team 4/6). TEPCO considering adding sand slurry to SFP (Source: Site Team 4/7).
Power: On offsite AC power (DOE 4/3)

Unit 5 – (NRC Priority: 5)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 45.5°C (increasing) (Source: NISA 4/8)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, RHR pump repaired, temperature 34.7°C (Source: NISA 4/8)

Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)
Other: Groundwater leaking into turbine basement drain pits, being pumped into ocean (Source: TEPCO 4/5)

Unit 6 – (NRC Priority: 6)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 22.7°C (Source: NISA 4/8)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, temperature 30.5°C (Source: NISA 4/8)
Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)
Other: Groundwater leaking into turbine basement drain pits, being pumped into ocean (Source: TEPCO 4/5)

Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water level maintained at 29°C (Source: TEPCO 4/6); normal cooling started 1805 JST March 24 (Source: NISA)
Electrical Power (NRC priority: 7): Offsite power connected to Unit 2 auxiliary transformer / distribution panel; work continues on energizing equipment in Unit 2.
Dry Cask Storage: Visual inspection revealed no problems. All casks are vertical casks manufactured by Hitachi Shipbuilding (Source: RST).

The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

NRC priorities are based on analyses by the Reactor Safety Team. Unit 1 is priority 1 based on the belief that primary containment functionality, though degraded, can still be preserved if the responders take actions to inject to the RPV and primary containment. Unit 2 is priority 2 because of the apparent damage to primary containment and the other barriers to release. This damage requires continued attention to cool the core and provide water to the primary containment to minimize potential for release. Unit 3 is priority 3 because primary containment may be nominally functional but continued attention is required to pursue core cooling and injection. Unit 4 is priority 4 because progress has been made in addressing the spent fuel pool heat removal requirements, and the SFP area has indicated temperatures of less than 100°C.

Other Plants

No new information to report.

Protective Measures Team (PMT) Update

The PMT continues to assess available dose rate information from DOE AMS data, the US Navy, TEPCO, and MEXT. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several days. On April 8, 2011 dose rates at the west gate were about 5 mR/hr (Source: Japan Ministry of Foreign Affairs and IAEA). PMT is trending near site dose rates using the MOFA/IAEA data and will use this source in future.

Earthquake/Tsunami Status Update April 9, 2011 0430 EDT

DOE continues to take field measurements around the site. To date, over 110,000 field measurements have been taken by DOE teams. The 4/17 AMS flyover approximately 30 miles west of the site detected low levels of deposition.

The PMT was requested to support NOAA with information on the source term released. This will be used to assist in ocean modeling.

PMT is finalizing the "Summary of Radiological Hazards in Japan" which will be provided to the Japan Site Team. The PMT is also in the process of analyzing data from soil samples from the area around the Fukushima site.

"Guidance for Return (Short Term and Permanent Re-entry) of US Citizens to Areas around Fukushima Daiichi NPP", is also being finalized and will be used at the 04/11/2011 Deputies Meeting.

International Response

- Secretary of State Clinton tentatively visiting Japan on April 18, 2011.
- The IAEA has announced that it will hold a high-level conference on preliminary lessons learned from Fukushima on June 20-24, 2011. Information is available at www.iaea.org.
- NRC has daily teleconferences with the United Kingdom's Health and Safety Executive, Canadian Nuclear Safety Commission, and French Nuclear Safety Authority. IAEA and Finland also participate intermittently.
- France has publicly posted its assessment of projected doses in Tokyo on the French Radioprotection and Nuclear Safety Institute (IRSN) website.
- The NRC RST and PMT will have a call with Taiwan early in the week of 4/11 to discuss current status and source term issues.
- An Institute of Nuclear Power Operations (INPO) staff member in Tokyo is coordinating with US government staff at the Embassy concerning equipment requests.

Reference

Units

1 rem (rem) = 1,000 millirem (mrem)
1 Sievert (Sv) = 1,000 milliSieverts (mSv) = 1,000,000 microsieverts (μSv)
1 rem = 0.01 Sv = 10 mSv
1 Sv = 100 rem

Reactor Abbreviations

atm – Atmosphere (unit of pressure)
DW – Drywell
FW – Feed Water
gpm – gallons per minute
RHR – Residual Heat Removal
RPV – Reactor Pressure Vessel
SFP – Spent Fuel Pool
SRV – Safety Relief Valve
TAF – Top of Active Fuel

April 9, 2011 2200 EDT

Briefing Sheet
Fukushima Daiichi

ET Overview and Priorities

- No significant changes on status of reactors – Analysis of U-2 possible Core Ex-vessel events provided to RST
- Working on transition plan for staffing at 6 persons through 4-16 and plan for continued staffing starting 4-17. Documents are in Web EOC under ET Miscellaneous documents collection.
- Working to staff an 11-person Site Team.
- Chairman call on 4-9 and 4-10 only at 15:15, TA brief at 8:30 a.m.
- Received strong adverse reaction to discontinuing SitRep in current form. Fed Partners may be open to reduced frequency; however content is needed to inform their products. Current plan is maintain format, reduce to 1 per daily issuance.

RST Overview and Priorities

- Briefing material for Secretary of State Clinton developed by site team. Meeting is anticipated the week of 17 April.
- Rev 2 of the RST Assessment Document is work in progress, INPO has comments.
- Ed Fuller provided analysis (D.Dube peer reviewed) of U2 core ex-vessel events occurring as early as 3/15/11. Providing analysis to Site Team, NR, GEH, and INPO for consideration regarding influence on SAMGs. Comments due Monday,4/11.
- Global assessment draft received from Mike Hay 4/9/11 @ 2115. Need to assign staff to follow-up.

PMT Overview and Priorities

- PMT developed the "composite" document crafted, input from RST. Covers the 3 issues, 1. Grab n Go criteria, 2. Defining 50-mile EPZ re-entry criteria, and 3. Defining stable conditions for Rx. Will coordinate with other agencies on Monday. T. Milligan also providing talking Pts for same.
- PMT reviewed a draft long-term habitability document developed by Knolls Atomic Power Laboratories (NR's recommendations regarding long-term re-entry based on KAPL). PMT provided comments to Naval Reactors.

LT Overview and Priorities

- The next consortium call will be Sunday evening.

KK 6/6

OFFICIAL USE ONLY

April 10, 2011 0600 EDT

Briefing Sheet
Fukushima Daiichi

ET Overview and Priorities

- No significant changes on status of reactors – Analysis of U-2 possible Core Ex-vessel events provided to RST. Assessment provided to INPO, GEH, and N.R. for review.
- Working on transition plan for staffing 6 people as a pilot to begin on 4-11. Documents are in Web EOC under ET Miscellaneous documents collection.
- Working to staff an 11-person Site Team. Reduced USAID staffing in support of the Japanese effort may pose challenges with making travel arrangements for staff going to Japan. It will likely take longer to make travel arrangements.
- Chairman briefing scheduled for 4/10 at 0830 EDT.

RST Overview and Priorities

- Briefing material for Secretary of State Clinton developed by site team. Meeting is anticipated the week of 17 April.
- Rev 2 of the RST Assessment Document is work in progress. GEH will provide comments on Monday. Comments provided by the Japan Team.
- Ed Fuller provided analysis (D.Dube peer reviewed) of U2 core ex-vessel events occurring as early as 3/15/11. Providing analysis to Site Team, NR, GEH, and INPO for consideration regarding influence on SAMGs. Comments due Monday,4/11.
- Global assessment draft received from Mike Hay 4/9/11 @ 2115. Site team needs a 24-hour turn around.
- Use of slurry now considered to be a low priority.

PMT Overview and Priorities

- PMT developed the "composite" document crafted, input from RST. Covers the 3 issues, 1. Grab n Go criteria, 2. Defining 50-mile EPZ re-entry criteria, and 3. Defining stable conditions for Rx. Will coordinate with other agencies on Monday. T. Milligan also providing talking Pts for same. Draft of the document provided to Marty Virgilio and Vince Holahan for comments.
- PMT has provided NOAA with the source term used in the "Plausible Realistic Case, " Version 3.

LT Overview and Priorities

- The next consortium call will be Sunday at 20:00 EDT.

KK167

April 10, 2011 1400 EDT

Briefing Sheet
Fukushima Daiichi

ET Overview and Priorities

- No significant changes on status of reactors – Analysis of U-2 possible Core Ex-vessel events provided to RST. Assessment provided to INPO, GEH, and N.R. for review.
- Documents are in Web EOC under ET Miscellaneous documents collection.
- Working to staff an 11-person Site Team. Reduced USAID staffing in support of the Japanese effort may pose challenges with making travel arrangements for staff going to Japan. It will likely take longer to make travel arrangements.
- Commissioners' Assistants briefing completed at 0830 EDT, 4/10/11. Reduced Ops Center staffing beginning 0700 to 1500 shift, Monday 4/11/11. Three shifts, six staff. Commissioners' Assistants briefings will be Tuesdays and Thursdays 1000 EDT.
- Transition Plan to reduce Ops Center staffing finalized. Messaging-NRC is not reducing its involvement, but is realigning its functions to better serve stakeholders. Need to identify proper communication vehicles for external stakeholders through Recurring Daily Actions and Calls.
- SitRep will continue to be provided in current form, but update frequency will be reduced to once per day at 1600 EDT.

RST Overview and Priorities

- Briefing material for Secretary of State Clinton developed by site team. Meeting is anticipated the week of 17 April.
- Rev 2 of the RST Assessment Document is work in progress. GEH will provide comments on Monday 4/11/11. Comments provided by the Japan Team.
- Ed Fuller provided analysis (D.Dube peer reviewed) of U2 core ex-vessel events occurring as early as 3/15/11. Providing analysis to Site Team, NR, GEH, and INPO for consideration regarding influence on SAMGs. Comments due Monday,4/11.
- Global assessment draft received from Mike Hay 4/9/11 @ 2115. Site team needs a 24-hour turn around.
- Use of slurry remains a low priority.

PMT Overview and Priorities

- PMT developed the "composite" document crafted, input from RST. Covers the 3 issues, 1. Grab 'n Go criteria, 2. Defining 50-mile EPZ re-entry criteria, and 3. Defining stable conditions for Rx. Will coordinate with other agencies on Monday 4/11/11. T. Milligan also providing talking Pts for same. Draft of the document provided to Marty Virgilio and Vince Holahan for comments.
- PMT has provided NOAA with the source term used in the "Plausible Realistic Case," Version 3.

LT Overview and Priorities

- The next consortium call will be Sunday 4/10/11at 2000 EDT.

KK/68

USNRC Emergency Operations Center Status Update

April 10, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report includes NRC's current understanding of the ongoing situation in Japan. Historical and background information can be found in past reports.

NRC's Top Priorities

1) Continued assessment of plant and radiological conditions, dose projections, and protective action recommendations.

2) Providing technical assistance to the US Ambassador in Japan and the Japanese Government.

3) Coordination with other US Departments and Agencies, the Institute of Nuclear Power Operations (INPO), Bechtel, General Electric Hitachi (GEH), Tokyo Electric Power Company (TEPCO), and the Japanese military.

Status

At 0946 EST, March 11, 2011, the NRC entered Monitoring Mode, and the agency continues to monitor the unfolding events in Japan. In that the situation is not yet stable, NRC continues its 24-7 support in HQ and a fully-engaged site team in Japan. During the week of April 11th, NRC will be increasing the size and adjusting the skill set of its site team to better support the work activities in Japan. In an effort to better provide NRC HQ support, on April 11, NRC will be transitioning a great portion of its HQ support to Japan to its line organizations, resulting in a reduction in the HQ Operations Center staffing. The HQ Operations Center will continue to have a core team of managers and experts 24/7.

Press releases related to the situation in Japan can be found online at: http://www.nrc.gov/reading-rm/doc-collections/news/2011/.

On March 14, 2011, the NRC experts in Japan reported that the Japanese had requested US technical assistance for cooling the Fukushima Daiichi Units, as needed. The effort to provide assistance is being coordinated by the US Ambassador.

The current protective action recommendation for US citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate.

One pump that was deployed to the site is being used to pump fresh water from one of the barges to a clean water holding tank as a source of fresh water to cool the reactors and the spent fuel pools. A second pump is ready as a spare, if necessary.

KK 169

The site team continues to work with TEPCO to strengthen the reliability of the reactor and spent fuel pool cooling.

The NRC Reactor Safety Team (RST) completed an assessment and recommendations for the Fukushima Daiichi units based on the severe accident management guidelines. The assessment included the input and concurrence of INPO, GEH, Electric Power Research Institute EPRI), Naval Reactors, and US Department of Energy Office of Nuclear Energy (DOE/NE). This document has been provided to the NRC Site Team in Japan. The document is now being cited in the news media (New York Times). NRC is evaluating what steps may be appropriate to address an OUO document being provided to the public. An updated assessment is underway to account for current plant conditions (e.g., inerting Unit 1 drywell and status of the fuel in the Unit 2 reactor vessel).

The RST is seeking peer review of an analysis of the reactor vessel and core conditions for Unit 2.

The site team, with support from Sandia, continues its analysis of the potential for a release and time lines should a release occur.

The US DOE and the US Environmental Protection Agency are the Federal communicators for questions regarding possible domestic impacts from the events in Japan and on domestic monitoring.

The Commission established a senior-level agency task force to conduct a systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

Air sample and standing water sample results from US nuclear plant licensees have been entered into a password protected database established by the Nuclear Energy Institute (NEI). NRC and Federal partners have access to the plant data.

Industry Consortium / Contractor Activities

The industry consortium is comprised of government and industry representatives working to respond to Government of Japan (GoJ) requests for material and assistance. Consortium calls are held at 2000 EDT on days agreed to by the consortium. The NRC Site Team is assisting the US Embassy in Japan review and validate material and assistance requests from the GoJ. The NRC Site Team is maintaining and distributing the validated US Embassy list, which is planned to be transferred to the US Embassy (Tim Cipullo at the US Embassy - Tokyo's Econ Section) in the near future. At that point, the US Embassy will revise the list as input is received and send it out prior to consortium meetings. Meetings continue between the Embassy team (supported by NRC and DOE) and the GoJ to discuss GoJ requests for assistance and equipment, including priorities. International liaisons have suggested that the US Embassy take the lead in communicating to the International Atomic Energy Agency (IAEA) all US assistance to Japan and coordinating that assistance if the US Department of State HQ agrees.

Current Understanding of Japanese Facilities

(This information is compiled from the NRC in-country team, TEPCO press releases, NISA press releases, Japan Atomic Industrial Forum (JAIF) compiled data and assessments, IAEA information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, DOE and others.)

Fukushima Daiichi

The Japanese national government has encouraged evacuation for local residents within the 20-30 km radius of the site boundary. This is a slight change from the previous voluntary evacuation with shelter in place for the 20-30 km zone. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. No additional damage has been reported as a result of the April 7th magnitude 7.1 aftershock.

STATUS as of 1800 EDT, April 10, 2011 (0730 Japan, April 11)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 70% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV level ½ TAF (NISA 4/8). The volume of sea water injected to cool the core has left enough salt to fill the lower plenum to the core plate (Source: GEH, US Industry). Vessel temperatures 119°C at bottom drain, 246°C at FW nozzle (Source: NISA 4/9). RPV pressure (Ch A: 59 psig, Ch B: 119 psig) (Source: NISA 4/10).

Core Cooling: Fresh water injection via fire extension line to FW line at 26.4 gpm (Source: NISA 4/9). Recirculation pump seals have likely failed (Source: GEH). Stuck open SRV (Source: Site Team, confirmed by TEPCO 4/7). Began injecting nitrogen (N_2) to drywell at 0130 Japan time on April 7 (Source: IAEA, 4/7).

Primary Containment: Damage suspected, slow leakage, DW pressure increased to 12.9 psig, torus pressure at 8.5 psig and slowly increasing from N_2 injection (Source: NISA 4/9). Losing 10-30% drywell volume per day (Source: TEPCO via Site Team 4/2).

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 24°C (Source: JAIF 4/6, uncertain, overhead thermography). Periodic freshwater spray using concrete pump truck (Source: DOE 4/3). SFP has 292 assemblies with last transfer of 64 assemblies from reactor to SFP in March 2010 (Source: GEH 4/2).

Rad Levels: DW: 6830 R/hr (Source: NISA 4/8), Reported instrument failure (Source: INPO 4/8), Torus: 1190 R/hr (Source: NISA 4/9), Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF).

Power: On external power (Source: NISA); equipment testing in progress (Source: JAIF, NISA, TEPCO). External AC power to the Main Control Room lighting and instrument.

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 30% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV Level 3/5 TAF (NISA 4/8) Bottom head temperature not available (TEPCO), feed water nozzle temperature 146.0°C (Source: NISA 4/9). RPV pressure: Ch A: -2.6 psig, Ch B: -4.0 psig (Source NISA 4/9). Stabilized at atmospheric pressure since 3/18/11 (Source: IAEA 4/9). Site Team believes a SRV is stuck open, but TEPCO opinion currently differs. May begin injecting nitrogen (Source: NHK).

Core Cooling: Fresh water injecting at 30.8 gpm fire line (Source: NISA 4/8).

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). DW Pressure: -0.9 psig (Source: NISA 4/9).
Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO), blowout panels removed from side of reactor building to reduce hydrogen buildup (Source: visual).
Spent Fuel Pool: Full fresh water injection continuing (Source: IAEA 4/5), fuel pool temperature 53°C (Source: DOE 4/9). 36 tons of water added 4/7 (Source: Site Team 4/8).
Rad Levels: DW: 2920 R/hr (Source: NISA 4/9); Torus 74.3 R/hr (Source: NISA 4/9); Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF); >100 R/hr at discharge to sea (Source: IAEA 4/3). The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).
Power: On offsite power (NISA 4/3)

Unit 3 – (NRC Priority: 3)
Core Status: Estimated 25% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature 109.8°C, FW nozzle temperature: 89°C (Source: NISA 4/9). RPV pressure Ch A: -1.6 psig, Ch B: -11.5 psig (Source: NISA 4/9). RPV level ~2/5 TAF (Source: NISA 4/8). Stabilized at atmospheric pressure since 3/22/11 (Source: IAEA 4/9).
Core Cooling: Freshwater injection via fire line at 30.8 gpm via temporary electrical pump (Source: NISA 4/8). Recirculation pump seals have likely failed (Source: GEH).
Primary Containment: NRC assessment is that damage is suspected. Drywell Pressure: 0.6 psig and Torus Pressure 10.2 psig (Source: NISA 4/8). May begin to inject nitrogen (Source: NHK).
Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Low water level. Temperature 60°C estimated (Source: JAIF 4/6, uncertain, overhead thermography). Freshwater injection via SF cooling system and spraying fresh water periodically into SFP (Source: IAEA 4/5). Fresh water sprayed via concrete pump on 4/8 (Source: TEPCO 4/9).
Rad Levels: DW: 1840 R/hr, Torus: 71.7 R/hr (Source: NISA 4/9); Outside site at plant gate(s): 4.0 mR/hr at west gate (very slight trend downward) (Source: JAIF); 100 R/hr debris outside Rx building (covered).
Power: On offsite power (NISA 4/3)

Unit 4 – (NRC Priority: 4)
Core Status: Offloaded 105 days at time of accident (Source: JAIF, NISA, TEPCO)
Core Cooling: Not necessary (Source: JAIF, NISA, TEPCO)
Primary Containment: Not applicable (Source: JAIF, NISA, TEPCO)
Secondary Containment: Severely damaged from hydrogen explosion. (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Temperature 57°C (Source: JAIF 4/7, uncertain, overhead thermography); 38 tons of water added 4/7 via concrete pump. Freshwater added via concrete pump 4/9, additional spraying as needed (Source: TEPCO 4/9). Hydrogen from the fuel pool exploded on March 15 (Source: JAIF 3/31). Intermittent steam-like substance emitting from SFP from injection/spray (Source: JAIF 4/1). Level trending down (Source: Site Team 4/6). TEPCO considering adding sand slurry to SFP (Source: Site Team 4/7).
Power: On offsite AC power (DOE 4/3)

Unit 5 – (NRC Priority: 5)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 50.9°C (increasing) (Source: NISA 4/9)

Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, RHR pump repaired, temperature 31.8°C (Source: NISA 4/9)
Power: External AC power supplying the unit, diesel generators available (Source: JAIF, NISA, TEPCO).
Other: Groundwater leaking into turbine basement drain pits; being pumped into ocean (Source: TEPCO 4/5).

Unit 6 – (NRC Priority: 6)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 23.1°C (Source: NISA 4/9)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, temperature 23.0°C (Source: NISA 4/9)
Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)
Other: Groundwater leaking into turbine basement drain pits; being pumped into ocean (Source: TEPCO 4/5).

Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water maintained at 32°C (Source: IAEA 4/7); normal cooling started 1805 JST March 24 (Source: NISA).
Electrical Power (NRC priority: 7): Offsite power connected to Unit 2 auxiliary transformer / distribution panel; work continues on energizing equipment in Unit 2.
Dry Cask Storage: Visual inspection revealed no problems. All casks are vertical casks manufactured by Hitachi Shipbuilding (Source: RST).

The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

NRC priorities are based on analyses by the Reactor Safety Team. Unit 1 is priority 1 based on the belief that primary containment functionality, though degraded, can still be preserved if the responders take actions to inject to the RPV and primary containment. Unit 2 is priority 2 because of the apparent damage to primary containment and the other barriers to release. This damage requires continued attention to cool the core and provide water to the primary containment to minimize potential for release. Unit 3 is priority 3 because primary containment may be nominally functional but continued attention is required to pursue core cooling and injection. Unit 4 is priority 4 because progress has been made in addressing the spent fuel pool heat removal requirements, and the SFP area has indicated temperatures of less than 100°C.

Other Plants

No new information to report.

Protective Measures Team (PMT) Update

The PMT continues to assess available dose rate information from DOE AMS data, the US Navy, TEPCO, and MEXT. Multi-day trending of available onsite monitors shows slightly

declining dose rates over the past several days. On April 9, 2011 dose rates at the west gate were about 4.3 mR/hr (Source: Japan Ministry of Foreign Affairs and IAEA). PMT is trending near-site dose rates using the MOFA/IAEA data and will use this source in the future.

DOE continues to take field measurements around the site. To date, over 136,000 field measurements have been taken by DOE teams.

The PMT was requested to support NOAA with information on the source term released. This will be used to assist in ocean modeling. The PMT has provided NOAA with the 20-nuclide source term that was used in the analysis that was called "Plausible Realistic Case (PRC) V3, which has been vetted by DOE/ NIT, OSTP and NARAC.

PMT finalized the "Summary of Radiological Hazards in Japan," which was provided to the Japan Site Team.

"Guidance for Return (Short Term and Permanent Re-entry) of US Citizens to Areas around Fukushima Daiichi NPP" continues to be developed with the RST. Additionally a "Global Assessment Document" is being developed with PMT input, portions of which will be used to brief Secretary of State Clinton upon her visit to Japan.

International Response

- Secretary of State Clinton tentatively visiting Japan on April 18, 2011.
- The IAEA has announced that it will hold a high-level conference on preliminary lessons learned from Fukushima on June 20-24, 2011. Information is available at www.iaea.org.
- NRC has daily teleconferences with the United Kingdom's Health and Safety Executive, the Canadian Nuclear Safety Commission, and the French Nuclear Safety Authority. IAEA and Finland also participate intermittently.
- France has publicly posted its assessment of projected doses in Tokyo on the French Radioprotection and Nuclear Safety Institute (IRSN) website.
- The NRC RST and PMT will have a call with Taiwan early in the week of April 11th to discuss current status and source term issues.
- An Institute of Nuclear Power Operations (INPO) staff member in Tokyo is coordinating with US Government staff at the US Embassy concerning equipment requests.

Reference

Units

1 rem (rem) = 1,000 millirem (mrem)
1 Sievert (Sv) = 1,000 milliSieverts (mSv) = 1,000,000 microsieverts (μSv)
1 rem = 0.01 Sv = 10 mSv
1 Sv = 100 rem

Reactor Abbreviations

atm – Atmosphere (unit of pressure)
DW – Drywell
FW – Feed Water
gpm – gallons per minute
RHR – Residual Heat Removal
SFP – Spent Fuel Pool
SRV – Safety Relief Valve
TAF – Top of Active Fuel
RPV – Reactor Pressure Vessel

USNRC Emergency Operations Center Status Update

April 11, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report includes NRC's current understanding of the ongoing situation in Japan. Historical and background information can be found in past reports.

NRC's Top Priorities

1) Continued assessment of plant and radiological conditions, dose projections, and protective action recommendations.

2) Providing technical assistance to the US Ambassador in Japan and the Japanese Government.

3) Coordination with other US Departments and Agencies, the Institute of Nuclear Power Operations (INPO), Bechtel, General Electric Hitachi (GEH), Tokyo Electric Power Company (TEPCO), and the Japanese military.

Status

At 0946 EST, March 11, 2011, the NRC entered Monitoring Mode, and the agency continues to monitor the unfolding events in Japan. In that the situation is not yet stable, NRC continues its 24-7 support in HQ and a fully-engaged site team in Japan. During the week of April 11th, NRC will be increasing the size and adjusting the skill set of its site team to better support the work activities in Japan. In an effort to better provide NRC HQ support, on April 11, NRC will be transitioning a great portion of its HQ support to Japan to its line organizations, resulting in a reduction in the HQ Operations Center staffing. The HQ Operations Center will continue to have a core team of managers and experts 24/7.

Press releases related to the situation in Japan can be found online at: http://www.nrc.gov/reading-rm/doc-collections/news/2011/.

On March 14, 2011, the NRC experts in Japan reported that the Japanese had requested US technical assistance for cooling the Fukushima Daiichi Units, as needed. The effort to provide assistance is being coordinated by the US Ambassador.

The current protective action recommendation for US citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate.

One pump that was deployed to the site is being used to pump fresh water from one of the barges to a clean water holding tank as a source of fresh water to cool the reactors and the spent fuel pools. A second pump is ready as a spare, if necessary.

KK/70

The site team continues to work with TEPCO to strengthen the reliability of the reactor and spent fuel pool cooling.

The NRC Reactor Safety Team (RST) completed an assessment and recommendations for the Fukushima Daiichi units based on the severe accident management guidelines. The assessment included the input and concurrence of INPO, GEH, Electric Power Research Institute EPRI), Naval Reactors, and US Department of Energy Office of Nuclear Energy (DOE/NE). This document has been provided to the NRC Site Team in Japan. The document is now being cited in the news media (New York Times). NRC is evaluating what steps may be appropriate to address an OUO document being provided to the public. An updated assessment is underway to account for current plant conditions (e.g., inerting Unit 1 drywell and status of the fuel in the Unit 2 reactor vessel).

The RST is seeking peer review of an analysis of the reactor vessel and core conditions for Unit 2.

The site team, with support from Sandia, continues its analysis of the potential for a release and time lines should a release occur.

The US DOE and the US Environmental Protection Agency are the Federal communicators for questions regarding possible domestic impacts from the events in Japan and on domestic monitoring.

The Commission established a senior-level agency task force to conduct a systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

Air sample and standing water sample results from US nuclear plant licensees have been entered into a password protected database established by the Nuclear Energy Institute (NEI). NRC and Federal partners have access to the plant data.

Industry Consortium / Contractor Activities

The industry consortium is comprised of government and industry representatives working to respond to Government of Japan (GoJ) requests for material and assistance. Consortium calls are held at 2000 EDT on days agreed to by the consortium. The NRC Site Team is assisting the US Embassy in Japan review and validate material and assistance requests from the GoJ. The NRC Site Team is maintaining and distributing the validated US Embassy list, which is planned to be transferred to the US Embassy (Tim Cipullo at the US Embassy - Tokyo's Econ Section) in the near future. At that point, the US Embassy will revise the list as input is received and send it out prior to consortium meetings. Meetings continue between the Embassy team (supported by NRC and DOE) and the GoJ to discuss GoJ requests for assistance and equipment, including priorities. International liaisons have suggested that the US Embassy take the lead in communicating to the International Atomic Energy Agency (IAEA) all US assistance to Japan and coordinating that assistance if the US Department of State HQ agrees.

Earthquake/Tsunami Status Update April 11, 2011 0430 EDT

Current Understanding of Japanese Facilities

(This information is compiled from the NRC in-country team, TEPCO press releases, NISA press releases, Japan Atomic Industrial Forum (JAIF) compiled data and assessments, IAEA information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, DOE and others.)

Fukushima Daiichi

The Japanese national government has encouraged evacuation for local residents within the 20-30 km radius of the site boundary. This is a slight change from the previous voluntary evacuation with shelter in place for the 20-30 km zone. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. No additional damage has been reported as a result of the April 7th magnitude 7.1 aftershock.

STATUS as of 0430 EDT, April 11, 2011 (1730 Japan, April 11)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 70% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV level ½ TAF (NISA 4/8). The volume of sea water injected to cool the core has left enough salt to fill the lower plenum to the core plate (Source: GEH, US Industry). Vessel temperatures 121°C at bottom drain, 228°C at FW nozzle (Source: NISA 4/10). RPV pressure (Ch A: 59 psig, Ch B: 119 psig) (Source: NISA 4/10).

Core Cooling: Fresh water injection via fire extension line to FW line at 26.4 gpm (Source: NISA 4/9). Recirculation pump seals have likely failed (Source: GEH). Stuck open SRV (Source: Site Team, confirmed by TEPCO 4/7). Began injecting nitrogen (N_2) to drywell at 0130 Japan time on April 7 (Source: IAEA, 4/7).

Primary Containment: Damage suspected, slow leakage, DW pressure increased to 13.6 psig, torus pressure at 9.2 psig and slowly increasing from N_2 injection (Source: NISA 4/10).

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 24°C (Source: JAIF 4/6, uncertain, overhead thermography). Periodic freshwater spray using concrete pump truck (Source: DOE 4/3). SFP has 292 assemblies with last transfer of 64 assemblies from reactor to SFP in March 2010 (Source: GEH 4/2).

Rad Levels: DW: 6830 R/hr (Source: NISA 4/8), Reported instrument failure (Source: INPO 4/8), Torus: 1160 R/hr (Source: NISA 4/10), Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF).

Power: On external power (Source: NISA); equipment testing in progress (Source: JAIF, NISA, TEPCO). External AC power to the Main Control Room lighting and instrument.

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 30% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV Level 3/5 TAF (NISA 4/8) Bottom head temperature not available (TEPCO), feed water nozzle temperature 149.4°C (Source: NISA 4/10). RPV pressure: Ch A: -2.9 psig, Ch B: -3.6 psig (Source NISA 4/10). Stabilized at atmospheric pressure since 3/18/11 (Source: IAEA 4/9). Site Team believes a SRV is stuck open, but TEPCO opinion currently differs. May begin injecting nitrogen (Source: NHK).

Core Cooling: Fresh water injecting at 30.8 gpm fire line (Source: NISA 4/10).

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). DW Pressure: -0.9 psig (Source: NISA 4/10).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO), blowout panels removed from side of reactor building to reduce hydrogen buildup (Source: visual).
Spent Fuel Pool: Full fresh water injection continuing (Source: IAEA 4/5), fuel pool temperature 47°C (Source: NISA 4/10). 36 tons of water added 4/7 (Source: Site Team 4/8).
Rad Levels: DW: 2900 R/hr (Source: NISA 4/10); Torus 73.7 R/hr (Source: NISA 4/10); Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF); >100 R/hr at discharge to sea (Source: IAEA 4/3). The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).
Power: On offsite power (NISA 4/3)

Unit 3 – (NRC Priority: 3)
Core Status: Estimated 25% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature 110.8°C, FW nozzle temperature: 91.7°C (Source: NISA 4/10). RPV pressure Ch A: -1.3 psig, Ch B: -11.2 psig (Source: NISA 4/10). RPV level ~2/5 TAF (Source: NISA 4/8). Stabilized at atmospheric pressure since 3/22/11 (Source: IAEA 4/9).
Core Cooling: Freshwater injection via fire line at 30.8 gpm via temporary electrical pump (Source: NISA 4/8). Recirculation pump seals have likely failed (Source: GEH).
Primary Containment: NRC assessment is that damage is suspected. Drywell Pressure: 0.7 psig and Torus Pressure 10.2 psig (Source: NISA 4/10). May begin to inject nitrogen (Source: NHK).
Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Low water level. Temperature 60°C estimated (Source: JAIF 4/6, uncertain, overhead thermography). Freshwater injection via SF cooling system and spraying fresh water periodically into SFP (Source: IAEA 4/5). Fresh water sprayed via concrete pump on 4/8 (Source: TEPCO 4/9).
Rad Levels: DW: 1810 R/hr, Torus: 70.3 R/hr (Source: NISA 4/10); Outside site at plant gate(s): 4.0 mR/hr at west gate (very slight trend downward) (Source: JAIF); 100 R/hr debris outside Rx building (covered).
Power: On offsite power (NISA 4/3)

Unit 4 – (NRC Priority: 4)
Core Status: Offloaded 105 days at time of accident (Source: JAIF, NISA, TEPCO)
Core Cooling: Not necessary (Source: JAIF, NISA, TEPCO)
Primary Containment: Not applicable (Source: JAIF, NISA, TEPCO)
Secondary Containment: Severely damaged from hydrogen explosion. (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Temperature 57°C (Source: JAIF 4/7, uncertain, overhead thermography); 38 tons of water added 4/7 via concrete pump. Freshwater added via concrete pump 4/9, additional spraying as needed (Source: TEPCO 4/9).
Power: On offsite AC power (DOE 4/3)

Unit 5 – (NRC Priority: 5)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 33.6°C (increasing) (Source: NISA 4/10)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)

Spent Fuel Pool: Fuel pool cooling functional, RHR pump repaired, temperature 35.2ºC (Source: NISA 4/10)
Power: External AC power supplying the unit, diesel generators available (Source: JAIF, NISA, TEPCO).
Other: Groundwater leaking into turbine basement drain pits; being pumped into ocean (Source: TEPCO 4/5).

Unit 6 – (NRC Priority: 6)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 22.3ºC (Source: NISA 4/10)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, temperature 29.0ºC (Source: NISA 4/10)
Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)
Other: Groundwater leaking into turbine basement drain pits; being pumped into ocean (Source: TEPCO 4/5).
Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water maintained at 32ºC (Source: IAEA 4/7); normal cooling started 1805 JST March 24 (Source: NISA).
Electrical Power (NRC priority: 7): Offsite power connected to Unit 2 auxiliary transformer / distribution panel; work continues on energizing equipment in Unit 2.
Dry Cask Storage: Visual inspection revealed no problems. All casks are vertical casks manufactured by Hitachi Shipbuilding (Source: RST).

The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

NRC priorities are based on analyses by the Reactor Safety Team. Unit 1 is priority 1 based on the belief that primary containment functionality, though degraded, can still be preserved if the responders take actions to inject to the RPV and primary containment. Unit 2 is priority 2 because of the apparent damage to primary containment and the other barriers to release. This damage requires continued attention to cool the core and provide water to the primary containment to minimize potential for release. Unit 3 is priority 3 because primary containment may be nominally functional but continued attention is required to pursue core cooling and injection. Unit 4 is priority 4 because progress has been made in addressing the spent fuel pool heat removal requirements, and the SFP area has indicated temperatures of less than 100ºC.

Other Plants

No new information to report.

Protective Measures Team (PMT) Update

The PMT continues to assess available dose rate information from DOE AMS data, the US Navy, TEPCO, and MEXT. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several days. On April 10, 2011 dose rates at the west gate were about 4.3 mR/hr (Source: Japan Ministry of Foreign Affairs and IAEA). PMT is trending near-site dose rates using the MOFA/IAEA data and will use this source in the future.

Earthquake/Tsunami Status Update April 11, 2011 0430 EDT

DOE continues to take field measurements around the site. To date, over 126,000 field measurements have been taken by DOE teams.

The PMT was requested to support NOAA with information on the source term to be used for ocean plume modeling. The PMT has provided NOAA with the 20-nuclide source term that was used in the analysis that was called "Plausible Realistic Case (PRC) V3, which has been vetted by DOE/ NIT, OSTP and NARAC.

PMT finalized the "Summary of Radiological Hazards in Japan," which was provided to the Japan Site Team.

"Guidance for Return (Short Term and Permanent Re-entry) of US Citizens to Areas around Fukushima Daiichi NPP" was provided to PMT for review. Additionally, a "Global Assessment Document" is being developed by the Japan site team with PMT and RST inputs, portions of which will be used to brief Secretary of State Clinton upon her visit to Japan.

Japanese authority is revising the emergency plans for Fukushima Daiichi to establish potential evacuation zones in case of another emergency. The Chief Cabinet Secretary indicated this is being done because plant conditions are not yet stable.

International Response

- Secretary of State Clinton tentatively visiting Japan on April 18, 2011.
- The IAEA has announced that it will hold a high-level conference on preliminary lessons learned from Fukushima on June 20-24, 2011. Information is available at www.iaea.org.
- NRC has daily teleconferences with the United Kingdom's Health and Safety Executive, the Canadian Nuclear Safety Commission, and the French Nuclear Safety Authority. IAEA and Finland also participate intermittently.
- France has publicly posted its assessment of projected doses in Tokyo on the French Radioprotection and Nuclear Safety Institute (IRSN) website.
- The NRC RST and PMT will have a call with Taiwan early in the week of April 11th to discuss current status and source term issues.
- An Institute of Nuclear Power Operations (INPO) staff member in Tokyo is coordinating with US Government staff at the US Embassy concerning equipment requests.

Reference

Units

1 rem (rem) = 1,000 millirem (mrem)
1 Sievert (Sv) = 1,000 milliSieverts (mSv) = 1,000,000 microsieverts (μSv)
1 rem = 0.01 Sv = 10 mSv
1 Sv = 100 rem

Reactor Abbreviations

atm – Atmosphere (unit of pressure)
DW – Drywell
FW – Feed Water
gpm – gallons per minute
RHR – Residual Heat Removal
SFP – Spent Fuel Pool
SRV – Safety Relief Valve
TAF – Top of Active Fuel
RPV – Reactor Pressure Vessel

USNRC Emergency Operations Center Status Update

April 10, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report includes NRC's current understanding of the ongoing situation in Japan. Historical and background information can be found in past reports.

NRC's Top Priorities

1) Continued assessment of radiological conditions, dose projections, and protective action recommendations. Currently, the NRC Japan Team reports that no PMT additional support or actions are being requested (offsite radiological assessments, RASCAL source term updates).

2) Providing technical assistance to the US Ambassador in Japan and the Japanese Government.

3) Coordination with other US Departments and Agencies, the Institute of Nuclear Power Operations (INPO), Bechtel, General Electric Hitachi (GEH), Tokyo Electric Power Company (TEPCO), and the Japanese military.

Status

At 0946 EST, March 11, 2011, the NRC entered Monitoring Mode and the agency continues to monitor the unfolding events in Japan. In an effort to better provide NRC support, and in recognition of a less dynamic situation at the site, on April 11, NRC will be transitioning a great portion of its support to Japan to its line organizations, resulting in a reduction in the HQ Operations Center staffing. The HQ Operations Center will continue to have increased staffing 24/7.

The team of NRC experts in Japan continues to support the US Ambassador and his staff. A fourth team to Japan is scheduled to begin departing on April 9, 2011.

Press releases related to the situation in Japan can be found online at: http://www.nrc.gov/reading-rm/doc-collections/news/2011/.

On March 14, 2011, the NRC experts in Japan reported that the Japanese had requested US technical assistance for cooling the Fukushima Daiichi Units, as needed. The effort to provide assistance is being coordinated by the US Ambassador.

The current protective action recommendation for US citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate.

One pump that was deployed to the site is being used to pump fresh water from one of the barges to a clean water holding tank as a source of fresh water to cool the reactors and the spent fuel pools. A second pump is ready as a spare, if necessary.

KK71

The NRC Reactor Safety Team completed an assessment and recommendations for the Fukushima Daiichi units based on the severe accident management guidelines. The assessment included the input and concurrence of INPO, GEH, EPRI, Naval Reactors, and DOE/NE. This document has been provided to the NRC Site Team in Japan. The document is now being cited in the news media (New York Times). NRC is evaluating what steps may be appropriate to address an OUO document being provided to the public. An updated assessment is underway to account for current plant conditions (e.g. inerting Unit 1 drywell and status of the fuel in the Unit 2 reactor vessel).

The US Department of Energy and the US Environmental Protection Agency are the Federal communicators for questions regarding possible domestic impacts from the events in Japan and on domestic monitoring.

The Commission established a senior level agency task force to conduct a systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

Air sample and standing water sample results from US nuclear plant licensees have been entered into a password protected database established by the Nuclear Energy Institute (NEI). NRC and Federal partners have access to the plant data.

Industry Consortium / Contractor Activities

NRC/Consortium calls are held at 2000 EDT. The NRC Site Team in Japan has served as a clearinghouse by reviewing material and assistance requests from the Japanese Government (GoJ), comparing them to the consortium list and combining all requests into a central list to avoid duplication. As of 4/8/11, the U.S. Embassy list and the consortium list have been consolidated. This is in preparation to transfer the GOJ request list to the Embassy for maintenance. GoJ has been asked to prioritize all requests on the list. Meetings continue between the Embassy team (supported by NRC and DOE) and the GoJ to discuss GoJ requests for assistance and equipment. International liaisons have suggested that the U.S. Embassy take the lead in communicating to the International Atomic Energy Agency (IAEA) all U.S. assistance to Japan and coordinating that assistance if DOS-HQ is agreeable. The Japan At some point next week the Embassy will transition to take the lead. The Embassy (Tim Cipullo at Embassy-Tokyo's Econ Section) will continue to "own" the list and will be responsible for sending out the updated list as it is revised. A decision was made during an Agency Principal's meeting on April 1 that DOE is the lead for interagency technical support to Japan.

Current Understanding of Japanese Facilities

(This information is compiled from the NRC in-country team, TEPCO press releases, NISA press releases, Japan Atomic Industrial Forum (JAIF) compiled data and assessments, IAEA information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, Department of Energy (DOE) and others.)

Earthquake/Tsunami Status Update April 10, 2011 0430 EDT

Fukushima Daiichi

The Japanese national government has encouraged evacuation for local residents within the 20-30 km radius of the site boundary. This is a slight change from the previous voluntary evacuation with shelter in place for the 20-30 km zone. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. No additional damage has been reported as a result of the 4/7/11 magnitude 7.1 aftershock.

STATUS as of 0430 EDT, April 10, 2011 - (1730 Japan, April 10)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 70% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV level ½ TAF (NISA 4/8). The volume of sea water injected to cool the core has left enough salt to fill the lower plenum to the core plate (Source: GEH,US Industry). Vessel temperatures 119ºC at bottom drain, 246ºC at FW nozzle (Source: NISA 4/9). RPV pressure (Ch A: 59 psig, Ch B: 119 psig) (Source: NISA 4/10)

Core Cooling: Fresh water injection via fire extension line to FW line at 26.4 gpm (Source: NISA 4/9). Recirculation pump seals have likely failed. (Source: GEH) Stuck open SRV (Source: Site Team, confirmed by TEPCO 4/7). Began injecting nitrogen to drywell at 0130 Japan on April 7 (Source: IAEA, 4/7).

Primary Containment: Damage suspected, slow leakage, DW pressure increased to 12.9 psig, torus pressure at 8.5 psig and slowly increasing from N_2 injection (Source: NISA 4/9). Losing 10-30% drywell volume per day (Source: TEPCO via Site Team 4/2).

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 24ºC (Source: JAIF 4/6, uncertain, overhead thermography). Periodic freshwater spray using concrete pump truck (Source: DOE 4/3). SFP has 292 assemblies with last transfer of 64 assemblies from reactor to SFP in March 2010 (Source: GEH 4/2).

Rad Levels: DW: 6830 R/hr (Source: NISA 4/8), Reported instrument failure (Source: INPO 4/8), Torus: 1190 R/hr (Source: NISA 4/9), Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF).

Power: On external power (Source: NISA); equipment testing in progress (Source: JAIF, NISA, TEPCO). External AC power to the Main Control Room lighting and instrument.

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 30% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV Level 3/5 TAF (NISA 4/8) Bottom head temperature not available (TEPCO), feed water nozzle temperature 146.0ºC (Source: NISA 4/9). RPV pressure: Ch A: -2.6 psig, Ch B: -4.0 psig (Source NISA 4/9). Stabilized at atmospheric pressure since 3/18/11 (Source: IAEA 4/9) Site Team believes an SRV is stuck open, but TEPCO opinion currently differs. May begin injecting nitrogen (Source: NHK).

Core Cooling: Fresh water injecting at 30.8 gpm fire line (Source: NISA 4/8)

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). Drywell Pressure: -0.9 psig (Source: NISA 4/9).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO), blowout panels removed from side of reactor building to reduce hydrogen buildup (Source: visual)

Spent Fuel Pool: Full fresh water injection continuing (Source: IAEA 4/5), fuel pool temperature 53ºC (Source: DOE 4/9). 36 tons of water added 4/7 (Source: Site Team 4/8).

Rad Levels: DW: 2920 R/hr (Source: NISA 4/9); Torus 74.3 R/hr (Source: NISA 4/9); Outside site at plant gate(s): 5.8 mR/hr at west gate (very slight trend downward) (Source: JAIF);

>100 R/hr at discharge to sea (Source: IAEA 4/3); The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

Power: On offsite power (NISA 4/3)

Unit 3 – (NRC Priority: 3)

Core Status: Estimated 25% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature 109.8°C, FW nozzle temperature: 89°C (Source: NISA 4/9). RPV pressure Ch A: -1.6 psig, Ch B: -11.5 psig) (Source: NISA 4/9). RPV level ~2/5 TAF (Source: NISA 4/8). Stabilized at atmospheric pressure since 3/22/11 (Source: IAEA 4/9)

Core Cooling: Freshwater injection via fire line at 30.8 gpm via temporary electrical pump (Source: NISA 4/8). Recirculation pump seals have likely failed. (Source: GEH)

Primary Containment: NRC assessment is that damage is suspected. Drywell Pressure: 0.6 psig and Torus Pressure 10.2 psig (Source: NISA 4/8). May begin to inject nitrogen (Source: NHK).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)

Spent Fuel Pool: Low water level. Temperature 60°C estimated (Source: JAIF 4/6, uncertain, overhead thermography). Freshwater injection via SF cooling system and spraying fresh water periodically into SFP (Source: IAEA 4/5). Fresh water sprayed via concrete pump on 4/8 (Source: TEPCO 4/9)

Rad Levels: DW: 1840 R/hr, Torus: 71.7 R/hr (Source: NISA 4/9); Outside site at plant gate(s): 4.0 mR/hr at west gate (very slight trend downward) (Source: JAIF); 100 R/hr debris outside Rx building (covered).

Power: On offsite power (NISA 4/3)

Unit 4 – (NRC Priority: 4)

Core Status: Offloaded 105 days at time of accident (Source: JAIF, NISA, TEPCO)

Core Cooling: Not necessary (Source: JAIF, NISA, TEPCO)

Primary Containment: Not applicable (Source: JAIF, NISA, TEPCO)

Secondary Containment: Severely damaged from hydrogen explosion. (Source: JAIF, NISA, TEPCO)

Spent Fuel Pool: Temperature 57°C (Source: JAIF 4/7, uncertain, overhead thermography); 38 tons of water added 4/7 via concrete pump. Freshwater added via concrete pump 4/9, additional spraying as needed (Source: TEPCO 4/9). Hydrogen from the fuel pool exploded on March 15 (Source: JAIF 3/31). Intermittent steam-like substance emitting from SFP from injection/spray (Source: JAIF 4/1). Level trending down (Source: Site Team 4/6). TEPCO considering adding sand slurry to SFP (Source: Site Team 4/7).

Power: On offsite AC power (DOE 4/3)

Unit 5 – (NRC Priority: 5)

Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 50.9°C (increasing) (Source: NISA 4/9)

Core Cooling: Functional (Source: JAIF, NISA, TEPCO)

Primary Containment: Functional (Source: JAIF, NISA, TEPCO)

Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)

Spent Fuel Pool: Fuel pool cooling functional, RHR pump repaired, temperature 31.8°C (Source: NISA 4/9)

Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)

Other: Groundwater leaking into turbine basement drain pits, being pumped into ocean (Source: TEPCO 4/5)

Unit 6 – (NRC Priority: 6)

Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 23.1°C (Source: NISA 4/9)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, temperature 23.0°C (Source: NISA 4/9)
Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)
Other: Groundwater leaking into turbine basement drain pits, being pumped into ocean (Source: TEPCO 4/5)
Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water maintained at 32°C (Source: IAEA 4/7); normal cooling started 1805 JST March 24 (Source: NISA)
Electrical Power (NRC priority: 7): Offsite power connected to Unit 2 auxiliary transformer / distribution panel; work continues on energizing equipment in Unit 2.
Dry Cask Storage: Visual inspection revealed no problems. All casks are vertical casks manufactured by Hitachi Shipbuilding (Source: RST).

The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

NRC priorities are based on analyses by the Reactor Safety Team. Unit 1 is priority 1 based on the belief that primary containment functionality, though degraded, can still be preserved if the responders take actions to inject to the RPV and primary containment. Unit 2 is priority 2 because of the apparent damage to primary containment and the other barriers to release. This damage requires continued attention to cool the core and provide water to the primary containment to minimize potential for release. Unit 3 is priority 3 because primary containment may be nominally functional but continued attention is required to pursue core cooling and injection. Unit 4 is priority 4 because progress has been made in addressing the spent fuel pool heat removal requirements, and the SFP area has indicated temperatures of less than 100°C.

Other Plants

No new information to report.

Protective Measures Team (PMT) Update

The PMT continues to assess available dose rate information from DOE AMS data, the US Navy, TEPCO, and MEXT. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several days. On April 9, 2011 dose rates at the west gate were about 4.8 mR/hr (Source: Japan Ministry of Foreign Affairs and IAEA). PMT is trending near site dose rates using the MOFA/IAEA data and will use this source in future.

DOE continues to take field measurements around the site. To date, over 110,000 field measurements have been taken by DOE teams.

The PMT was requested to support NOAA with information on the source term released. This will be used to assist in ocean modeling. The PMT has provided NOAA with the 20-nuclide

source term that was used in the analysis that was called "Plausible Realistic Case (PRC) V3), which has been vetted by DOE/ NIT, OSTP and NARAC.

PMT finalized the "Summary of Radiological Hazards in Japan" which was provided to the Japan Site Team.

"Guidance for Return (Short Term and Permanent Re-entry) of US Citizens to Areas around Fukushima Daiichi NPP" continues to be developed with the RST. Additionally a "Global Assessment Document" is being developed with PMT input, portions of which will be used to brief Secretary of State Clinton upon her visit to Japan.

International Response

- Secretary of State Clinton tentatively visiting Japan on April 18, 2011.
- The IAEA has announced that it will hold a high-level conference on preliminary lessons learned from Fukushima on June 20-24, 2011. Information is available at www.iaea.org.
- NRC has daily teleconferences with the United Kingdom's Health and Safety Executive, Canadian Nuclear Safety Commission, and French Nuclear Safety Authority. IAEA and Finland also participate intermittently.
- France has publicly posted its assessment of projected doses in Tokyo on the French Radioprotection and Nuclear Safety Institute (IRSN) website.
- The NRC RST and PMT will have a call with Taiwan early in the week of 4/11 to discuss current status and source term issues.
- An Institute of Nuclear Power Operations (INPO) staff member in Tokyo is coordinating with US government staff at the Embassy concerning equipment requests.

Reference

Units

1 rem (rem) = 1,000 millirem (mrem)
1 Sievert (Sv) = 1,000 milliSieverts (mSv) = 1,000,000 microsieverts (μSv)
1 rem = 0.01 Sv = 10 mSv
1 Sv = 100 rem

Reactor Abbreviations

atm – Atmosphere (unit of pressure)
DW – Drywell
FW – Feed Water
gpm – gallons per minute
RHR – Residual Heat Removal
RPV – Reactor Pressure Vessel
SFP – Spent Fuel Pool
SRV – Safety Relief Valve
TAF – Top of Active Fuel

USNRC Emergency Operations Center Status Update

April 11, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report includes NRC's current understanding of the ongoing situation in Japan. Historical and background information can be found in past reports.

NRC's Top Priorities

1) Continued assessment of plant and radiological conditions, dose projections, and protective action recommendations.

2) Providing technical assistance to the US Ambassador in Japan and the Japanese Government.

3) Coordination with other US Departments and Agencies, the Institute of Nuclear Power Operations (INPO), Bechtel, General Electric Hitachi (GEH), Tokyo Electric Power Company (TEPCO), and the Japanese military.

Status

At 0946 EST, March 11, 2011, the NRC entered Monitoring Mode, and the agency continues to monitor the unfolding events in Japan. In that the situation is not yet stable, NRC continues its 24 hour support in headquarters and a fully-engaged site team in Japan. During the week of April 11th, NRC will be increasing the size and adjusting the skill set of its site team to better support the work activities in Japan. On April 11, NRC will be transitioning a great portion of its response support efforts to its line organizations, resulting in a reduction in staffing at the Headquarters Operations Center. A core team of managers and experts will continue to staff the Headquarters Operations Center on a 24 hour basis.

Press releases related to the situation in Japan can be found online at: http://www.nrc.gov/reading-rm/doc-collections/news/2011/.

On March 14, 2011, the NRC experts in Japan reported that the Japanese had requested US technical assistance for cooling the Fukushima Daiichi Units, as needed. The effort to provide assistance is being coordinated by the US Ambassador.

The current protective action recommendation for US citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate.

The site team continues to work with TEPCO and NISA, providing recommendations that should improve reactor and spent fuel pool cooling.

The NRC Reactor Safety Team (RST) completed an assessment and recommendations for the Fukushima Daiichi units based on the severe accident management guidelines. The

KK/72

assessment included the input and concurrence of INPO, GEH, Electric Power Research Institute EPRI), Naval Reactors, and US Department of Energy Office of Nuclear Energy (DOE/NE). This document has been provided to the NRC Site Team in Japan. The document is now being cited in the news media (New York Times). NRC is evaluating what steps may be appropriate to address an OUO document being provided to the public. An updated assessment is underway to account for current plant conditions (e.g., inerting Unit 1 drywell and status of the fuel in the Unit 2 reactor vessel).

The RST is seeking peer review of an analysis of the reactor vessel and core conditions for Unit 2.

The site team, with support from Sandia, continues its analysis of the potential for a release and time lines should a release occur.

The US DOE and the US Environmental Protection Agency are the Federal communicators for questions regarding possible domestic impacts from the events in Japan and on domestic monitoring.

The Commission established a senior-level agency task force to conduct a systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

Air sample and standing water sample results from US nuclear plant licensees have been entered into a password protected database established by the Nuclear Energy Institute (NEI). NRC and Federal partners have access to the plant data.

Industry Consortium / Contractor Activities

The industry consortium is composed of government and industry representatives working to respond to Government of Japan (GoJ) requests for material and assistance. Consortium calls are held at 2000 EDT on days agreed to by the consortium.

Current Understanding of Japanese Facilities

(This information is compiled from the NRC in-country team, TEPCO press releases, NISA press releases, Japan Atomic Industrial Forum (JAIF) compiled data and assessments, IAEA information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, DOE and others.)

Fukushima Daiichi

The Japanese national government has encouraged evacuation for local residents within the 20-30 km radius of the site boundary. This is a slight change from the previous voluntary evacuation with shelter in place for the 20-30 km zone. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. No additional damage has been reported as a result of the April 7th magnitude 7.1 aftershock.

Earthquake/Tsunami Status Update April 11, 2011 1200 EDT

Japanese government announced that it is revising the emergency plans for Fukushima Daiichi to establish potential evacuation zones in case of another emergency. The Chief Cabinet Secretary indicated this is being done because plant conditions are not yet stable.

On April 11, 2011, at 0416 EDT, a 6.6 magnitude earthquake occurred near the Fukushima Daiichi site. Workers were evacuated and NISA confirmed that offsite power was lost to the site for 50 minutes. During this time, water injection pumps for Units 1, 2, and 3 were off. Power has been restored to the site. TEPCO and NISA report that there were no changes to radiation readings as a result of the loss of power. (Source: IAEA, 4/11). NRC is awaiting updated data to assess.

STATUS as of 1200 EDT, April 11, 2011 (0100 Japan, April 12)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 70% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV level ½ TAF (NISA 4/8). The volume of sea water injected to cool the core has left enough salt to fill the lower plenum to the core plate (Source: GEH, US Industry). Vessel temperatures 121°C at bottom drain, 228°C at FW nozzle (Source: NISA 4/10). RPV pressure (Ch A: 59 psig, Ch B: 119 psig) (Source: NISA 4/10).

Core Cooling: Fresh water injection via fire extension line to FW line at 26.4 gpm (Source: NISA 4/9). Recirculation pump seals have likely failed (Source: GEH). Stuck open SRV (Source: Site Team, confirmed by TEPCO 4/7). Began injecting nitrogen (N_2) to drywell at 0130 Japan time on April 7 (Source: IAEA, 4/7).

Primary Containment: Damage suspected, slow leakage, DW pressure increased to 13.6 psig, torus pressure at 9.2 psig and slowly increasing from N_2 injection (Source: NISA 4/10).

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 24°C (Source: JAIF 4/6, uncertain, overhead thermography). Periodic freshwater spray using concrete pump truck (Source: DOE 4/3). SFP has 292 assemblies with last transfer of 64 assemblies from reactor to SFP in March 2010 (Source: GEH 4/2).

Rad Levels: DW: 6830 R/hr (Source: NISA 4/8), Reported instrument failure (Source: INPO 4/8), Torus: 1160 R/hr (Source: NISA 4/10), Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF).

Power: On external power (Source: NISA); equipment testing in progress (Source: JAIF, NISA, TEPCO). External AC power to the Main Control Room lighting and instrument.

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 30% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV Level 3/5 TAF (NISA 4/8) Bottom head temperature not available (TEPCO), feed water nozzle temperature 149.4°C (Source: NISA 4/10). RPV pressure: Ch A: -2.9 psig, Ch B: -3.6 psig (Source NISA 4/10). Stabilized at atmospheric pressure since 3/18/11 (Source: IAEA 4/9). May begin injecting nitrogen on April 20, 2011. (Source: NHK).

Core Cooling: Fresh water injecting at 30.8 gpm fire line (Source: NISA 4/10).

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). DW Pressure: -0.9 psig (Source: NISA 4/10).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO), blowout panels removed from side of reactor building to reduce hydrogen buildup (Source: visual).

Spent Fuel Pool: Full fresh water injection continuing (Source: IAEA 4/5), fuel pool temperature 47°C (Source: NISA 4/10). 36 tons of water added 4/7 (Source: Site Team 4/8).

Rad Levels: DW: 2900 R/hr (Source: NISA 4/10); Torus 73.7 R/hr (Source: NISA 4/10); Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF). The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).
Power: On offsite power (NISA 4/3)

Unit 3 – (NRC Priority: 3)
Core Status: Estimated 25% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature 110.8°C, FW nozzle temperature: 91.7°C (Source: NISA 4/10). RPV pressure Ch A: -1.3 psig, Ch B: -11.2 psig (Source: NISA 4/10). RPV level ~2/5 TAF (Source: NISA 4/8). Stabilized at atmospheric pressure since 3/22/11 (Source: IAEA 4/9).
Core Cooling: Freshwater injection via fire line at 30.8 gpm via temporary electrical pump (Source: NISA 4/8). Recirculation pump seals have likely failed (Source: GEH).
Primary Containment: Damage suspected. Drywell Pressure: 0.7 psig and Torus Pressure 10.2 psig (Source: NISA 4/10). Nitrogen injection delayed due to problems accessing equipment (Source: NHK).
Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Low water level. Temperature 60°C estimated (Source: JAIF 4/6, uncertain, overhead thermography). Freshwater injection via SF cooling system and spraying fresh water periodically into SFP (Source: IAEA 4/5). Fresh water sprayed via concrete pump on 4/8 (Source: TEPCO 4/9).
Rad Levels: DW: 1810 R/hr, Torus: 70.3 R/hr (Source: NISA 4/10); Outside site at plant gate(s): 4.0 mR/hr at west gate (very slight trend downward) (Source: JAIF); 100 R/hr debris outside Rx building (covered).
Power: On offsite power (NISA 4/3)

Unit 4 – (NRC Priority: 4)
Core Status: Offloaded 105 days at time of accident (Source: JAIF, NISA, TEPCO).
Core Cooling: Not necessary (Source: JAIF, NISA, TEPCO).
Primary Containment: Not applicable (Source: JAIF, NISA, TEPCO).
Secondary Containment: Severely damaged from hydrogen explosion (Source: JAIF, NISA, TEPCO).
Spent Fuel Pool: Temperature 57°C (Source: JAIF 4/7, uncertain, overhead thermography). Freshwater added via concrete pump 4/9, additional spraying as needed (Source: TEPCO 4/9).
Power: On offsite AC power (DOE 4/3)

Unit 5 – (NRC Priority: 5)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 33.6°C (increasing) (Source: NISA 4/10)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, RHR pump repaired, temperature 35.2°C (Source: NISA 4/10)
Power: External AC power supplying the unit, diesel generators available (Source: JAIF, NISA, TEPCO).

Other: Groundwater leaking into turbine basement drain pits; being pumped into ocean (Source: TEPCO 4/5).

Unit 6 – (NRC Priority: 6)

Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 22.3°C (Source: NISA 4/10)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, temperature 29.0°C (Source: NISA 4/10)
Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)
Other: Groundwater leaking into turbine basement drain pits; being pumped into ocean (Source: TEPCO 4/5).
Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water maintained at 32°C (Source: IAEA 4/7); normal cooling started 1805 JST March 24 (Source: NISA).
Electrical Power (NRC priority: 7): Offsite power connected to Unit 2 auxiliary transformer / distribution panel; work continues on energizing equipment in Unit 2.
Dry Cask Storage: Visual inspection revealed no problems. All casks are vertical casks manufactured by Hitachi Shipbuilding (Source: RST).

The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

NRC priorities are based on analyses by the Reactor Safety Team. Unit 1 is priority 1 based on the belief that primary containment functionality, though degraded, can still be preserved if the responders take actions to inject to the RPV and primary containment. Unit 2 is priority 2 because of the apparent damage to primary containment and the other barriers to release. This damage requires continued attention to cool the core and provide water to the primary containment to minimize potential for release. Unit 3 is priority 3 because primary containment may be nominally functional but continued attention is required to pursue core cooling and injection. Unit 4 is priority 4 because progress has been made in addressing the spent fuel pool heat removal requirements, and the SFP area has indicated temperatures of less than 100°C.

Other Plants

There was no reported impact from the April 11, 2011 earthquake on other facilities.

Protective Measures Team (PMT) Update

The PMT continues to assess available dose rate information from DOE AMS data, the US Navy, TEPCO, and MEXT.

DOE continues to take field measurements around the site. To date, over 126,000 field measurements have been taken by DOE teams.

The PMT has the lead for a "composite" document that takes conditions such as plant stability, radiological conditions, and local infrastructure into consideration in order to re-evaluate the current 50-mile evacuation recommendations. Additionally, a "Global Assessment Document" is being developed by the Japan site team with PMT and RST inputs.

International Response

- The IAEA has announced that it will hold a high-level conference on preliminary lessons learned from Fukushima on June 20-24, 2011. Information is available at www.iaea.org.
- NRC has daily teleconferences with the United Kingdom's Health and Safety Executive, the Canadian Nuclear Safety Commission, and the French Nuclear Safety Authority. IAEA and Finland also participate intermittently.
- The NRC RST and PMT will have a call with Taiwan early in the week of April 11th to discuss current status and source term issues.
- An Institute of Nuclear Power Operations (INPO) staff member in Tokyo is coordinating with US Government staff at the US Embassy concerning equipment requests.

Reference

Units

1 rem (rem) = 1,000 millirem (mrem)
1 Sievert (Sv) = 1,000 milliSieverts (mSv) = 1,000,000 microsieverts (μSv)
1 rem = 0.01 Sv = 10 mSv
1 Sv = 100 rem

Reactor Abbreviations

atm – Atmosphere (unit of pressure)
DW – Drywell
FW – Feed Water
gpm – gallons per minute
RHR – Residual Heat Removal
SFP – Spent Fuel Pool
SRV – Safety Relief Valve
TAF – Top of Active Fuel
RPV – Reactor Pressure Vessel

April 12, 2011 1500 EDT

Briefing Sheet Fukushima Daiichi

ET Overview and Priorities

- A 6.6 magnitude earthquake occurred on 4/11 causing a LOOP and site evacuation. Water injection for Units 1-3 was disrupted for 50 minutes. MELCOR Analysis indicates potential for further core damage in less than 10 hours.
- A 6.4 magnitude earthquake 0n 4/12 at 6:38 a.m. (JDT); small fire at distribution switchboard was controlled. No significant changes to status of other Japanese reactors
- GOJ revised the INES Rating of the Fukushima Daiichi Event to Level 7.
- Headquarters Operations Center transition activities continue. Process is being developed for tasking actions to technical staff in the line organizations. Existing Tasks to be transferred to new system. Assessment (M.Evans, NSIR Lead) of the new process/staffing level will be developed by COB Thursday, 4/14, for Chairman presentation on Friday, 4/15.
- ET turnover includes: one page briefing sheet, list of major documents and tasker list
- Sen. Mikulski will visit NRC Monday April 18 at 10:00 a.m. Will meet with Chairman for 30 minutes, then senior officials, then Ops Center for short tour. Will then hold press conference – EDO lead to prepare presentation.
- USAID will transition support for NRC Japan Site Team to NRC (OCFO/OIP) on May 1, 2011.
- Pete Lyons'(DOE) notes from his Japan Trip (April 5-8, 2011) can be found here on the M drive

RST Overview and Priorities

- The RST has a copy of the Toshiba(Shaw) Recovery Proposal slides for review.
- Continuing work on RST Assessment(R2) and Global Assessment documents. Comments provided to Japan Team on proposed slides for high level briefing on Global Assessment.
- RST reviewing staff assessment that potential exists for a March 20 RPV breach in Units 2 and 3. GEH still evaluating and does not believe breach occurred.

PMT Overview and Priorities

- Trish Milligan (NSIR) revising "Guidance for Return (Permanent Re-entry) of US Citizens to Areas around Fukushima Daiichi NPP." The paper is being restructured to make it a decision paper on criteria for reentry. Topic for the 4/12 IPC Meeting.
- Working through FSME to answer White House request for information on low level radioactive waste disposition. Due – Tuesday COB

LT Overview and Priorities

-LT working with the Site Team to clarify responsibilities for logistical support and document updates in support of the consortium calls.
- Sandra Sloan from Areva designated POC for Fukushima Daiichi recovery proposal to TEPCO

KK/13

USNRC Emergency Operations Center Status Update

April 12, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report includes NRC's current understanding of the ongoing situation in Japan. Historical and background information can be found in past reports.

NRC's Top Priorities

1) Continued assessment of plant and radiological conditions, dose projections, and protective action recommendations.

2) Providing technical assistance to the US Ambassador in Japan and the Japanese Government.

3) Coordination with other US Departments and Agencies, the Institute of Nuclear Power Operations (INPO), Bechtel, General Electric Hitachi (GEH), Tokyo Electric Power Company (TEPCO), and the Japanese military.

Status

At 0946 EST, March 11, 2011, the NRC entered Monitoring Mode, and the agency continues to monitor the unfolding events in Japan. In that the situation is not yet stable, NRC continues its 24 hour support in headquarters and a fully-engaged site team in Japan. During the week of April 11th, NRC will be increasing the size and adjusting the skill set of its site team to better support the work activities in Japan. On April 11, NRC will be transitioning a great portion of its response support efforts to its line organizations, resulting in a reduction in staffing at the Headquarters Operations Center. A core team of managers and experts will continue to staff the Headquarters Operations Center on a 24 hour basis.

Press releases related to the situation in Japan can be found online at: http://www.nrc.gov/reading-rm/doc-collections/news/2011/.

On March 14, 2011, the NRC experts in Japan reported that the Japanese had requested US technical assistance for cooling the Fukushima Daiichi Units, as needed. The effort to provide assistance is being coordinated by the US Ambassador.

The current protective action recommendation for US citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate.

The site team continues to work with TEPCO and NISA, providing recommendations that should improve reactor and spent fuel pool cooling.

The NRC Reactor Safety Team (RST) completed an assessment and recommendations for the Fukushima Daiichi units based on the severe accident management guidelines. The

KH174

assessment included the input and concurrence of INPO, GEH, Electric Power Research Institute EPRI), Naval Reactors, and US Department of Energy Office of Nuclear Energy (DOE/NE). This document has been provided to the NRC Site Team in Japan. The document is now being cited in the news media (New York Times). NRC is evaluating what steps may be appropriate to address an OUO document being provided to the public. An updated assessment is underway to account for current plant conditions (e.g., inerting Unit 1 drywell and status of the fuel in the Unit 2 reactor vessel).

The RST is seeking peer review of an analysis of the reactor vessel and core conditions for Unit 2.

The site team, with support from Sandia, continues its analysis of the potential for a release and time lines should a release occur.

The US DOE and the US Environmental Protection Agency are the Federal communicators for questions regarding possible domestic impacts from the events in Japan and on domestic monitoring.

The Commission established a senior-level agency task force to conduct a systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

Air sample and standing water sample results from US nuclear plant licensees have been entered into a password protected database established by the Nuclear Energy Institute (NEI). NRC and Federal partners have access to the plant data.

Industry Consortium / Contractor Activities

The industry consortium is composed of government and industry representatives working to respond to Government of Japan (GoJ) requests for material and assistance. Consortium calls are held at 2000 EDT on days agreed to by the consortium.

Current Understanding of Japanese Facilities

(This information is compiled from the NRC in-country team, TEPCO press releases, Japanese Nuclear and Industrial Safety Agency (NISA) press releases, Japan Atomic Industrial Forum (JAIF) compiled data and assessments, IAEA information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, DOE and others.)

Fukushima Daiichi

The Japanese national government has encouraged evacuation for local residents within the 20-30 km radius of the site boundary. This is a slight change from the previous voluntary evacuation with shelter in place for the 20-30 km zone. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. No additional damage has been reported as a result of the April 7th magnitude 7.1 aftershock.

Earthquake/Tsunami Status Update April 12, 2011 1200 EDT

Japanese government announced that it is revising the emergency plans for Fukushima Daiichi to establish potential evacuation zones in case of another emergency. The Chief Cabinet Secretary indicated this is being done because plant conditions are not yet stable.

On April 11, 2011, at 0416 EDT, a 6.6 magnitude earthquake occurred near the Fukushima Daiichi site. Workers were evacuated and NISA confirmed that offsite power was lost to the site for 50 minutes. During this time, water injection pumps for Units 1, 2, and 3 were off. Power has been restored to the site. TEPCO and NISA report that there were no changes to radiation readings as a result of the loss of power. (Source: IAEA, 4/11). NRC is awaiting updated data to assess.

At approximately 0638 JST on April 12, 2011 a magnitude 6.3 aftershock was felt at the Fukushima Daiichi site and a small fire occurred in a switchboard. The fire was quickly extinguished and resulted in no impacts regarding external release of radioactive material or the efforts to cool the units. (Source: Media outlets and TEPCO 4/12)

On April 12, 2011, NISA raised the rating for the events at the Fukushima Daiichi site on the International Nuclear and Radiological Event Scale (INES) from 5, "Accident with Wider Consequences," to 7, "Major Accident," citing calculations by both NISA and the Nuclear Safety Commission of Japan (NSC) of radioactive materials released from the Fukushima Daiichi reactors. This new provisional rating considers the accidents that occurred at Units 1, 2, and 3 as a single event on INES. Previously, separate INES level 5 ratings had been applied for Units 1, 2, and 3. The provisional INES level 3 rating assigned for Unit 4 still applies. NISA notes that while an INES rating of 7 is the same as that of the Chernobyl accident, their current estimated amount of radioactive materials released is approximately 10% of the amount from the Chernobyl accident. (Source: NISA and IAEA 4/12)

STATUS as of 1200 EDT, April 12, 2011 (0100 Japan, April 13)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 70% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV level ½ TAF (NISA 4/8). The volume of sea water injected to cool the core has left enough salt to fill the lower plenum to the core plate (Source: GEH, US Industry). Vessel temperatures 119°C at bottom drain, 216°C at FW nozzle (Source: TEPCO 4/12). RPV pressure (Ch A: 60 psig, Ch B: 132 psig) (Source: TEPCO 4/12).

Core Cooling: Fresh water injection via fire extension line to FW line at 26.4 gpm (Source: NISA 4/9). Recirculation pump seals have likely failed (Source: GEH). Stuck open SRV (Source: Site Team, confirmed by TEPCO 4/7). Began injecting nitrogen (N_2) to drywell at 0130 Japan time on April 7 (Source: IAEA, 4/7).

Primary Containment: Damage suspected, slow leakage, DW pressure increased to 12.9 psig, torus pressure at 9.2 psig and slowly increasing from N_2 injection (Source: TEPCO 4/12).

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 23°C (Source: NISA 4/8, uncertain, overhead thermography). Periodic freshwater spray using concrete pump truck (Source: DOE 4/3). SFP has 292 assemblies with last transfer of 64 assemblies from reactor to SFP in March 2010 (Source: GEH 4/2).

Rad Levels: DW: 6830 R/hr (Source: NISA 4/8), Reported instrument failure (Source: INPO 4/8), Torus: 1080 R/hr (Source: TEPCO 4/12), Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF).

Power: On external power (Source: NISA); equipment testing in progress (Source: JAIF, NISA, TEPCO). External AC power to the Main Control Room lighting and instrument.

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 30% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV Level 3/5 TAF (NISA 4/8) Bottom head temperature 208°C (Source: TEPCO 4/12), feed water nozzle temperature 166°C (Source: TEPCO 4/12). RPV pressure: Ch A: -3.3 psig, Ch B: -3.6 psig (Source: TEPCO 4/12). Stabilized at atmospheric pressure since 3/18/11 (Source: IAEA 4/9). May begin injecting nitrogen on April 20, 2011 (Source: NHK).

Core Cooling: Fresh water injecting at 30.8 gpm fire line (Source: NISA 4/10).

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). DW Pressure: -1.6 psig (Source: TEPCO 4/12).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO), blowout panels removed from side of reactor building to reduce hydrogen buildup (Source: visual).

Spent Fuel Pool: Full fresh water injection continuing (Source: IAEA 4/5), fuel pool temperature 46°C (Source: TEPCO 4/12). 36 tons of water added 4/7 (Source: Site Team 4/8).

Rad Levels: DW: 2810 R/hr (Source: TEPCO 4/12); Torus 68.1 R/hr (Source: TEPCO 4/12); Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF). The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

Power: On offsite power (NISA 4/3)

Unit 3 – (NRC Priority: 3)

Core Status: Estimated 25% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature 115.6°C, FW nozzle temperature: 105.4°C (Source: TEPCO 4/12). RPV pressure Ch A: -2.8 psig, Ch B: -11.5 psig (Source: TEPCO 4/12). RPV level ~2/5 TAF (Source: NISA 4/8). Stabilized at atmospheric pressure since 3/22/11 (Source: IAEA 4/9).

Core Cooling: Freshwater injection via fire line at 30.8 gpm via temporary electrical pump (Source: NISA 4/8). Recirculation pump seals have likely failed (Source: GEH).

Primary Containment: Damage suspected. Drywell Pressure: 0.6 psig and Torus Pressure 9.8 psig (Source: TEPCO 4/12). Nitrogen injection delayed due to problems accessing equipment (Source: NHK).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)

Spent Fuel Pool: Low water level. Temperature 56°C estimated (Source: NISA 4/8, uncertain, overhead thermography). Freshwater injection via SF cooling system and spraying fresh water periodically into SFP (Source: IAEA 4/5). Fresh water sprayed via concrete pump on 4/8 (Source: TEPCO 4/9).

Rad Levels: DW: 1740 R/hr, Torus: 67.1 R/hr (Source: TEPCO 4/12); Outside site at plant gate(s): 4.0 mR/hr at west gate (very slight trend downward) (Source: JAIF); 100 R/hr debris outside Rx building (covered).

Power: On offsite power (NISA 4/3)

Unit 4 – (NRC Priority: 4)

Core Status: Offloaded 105 days at time of accident (Source: JAIF, NISA, TEPCO).

Core Cooling: Not necessary (Source: JAIF, NISA, TEPCO).

Primary Containment: Not applicable (Source: JAIF, NISA, TEPCO).

Secondary Containment: Severely damaged from hydrogen explosion (Source: JAIF, NISA, TEPCO).

Spent Fuel Pool: Temperature 57°C (Source: JAIF 4/7, uncertain, overhead thermography). Freshwater added via concrete pump 4/9, additional spraying as needed (Source: TEPCO 4/9).
Power: On offsite AC power (DOE 4/3)

Unit 5 – (NRC Priority: 5)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 33.6°C (increasing) (Source: NISA 4/10)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, RHR pump repaired, temperature 35.2°C (Source: NISA 4/10)
Power: External AC power supplying the unit, diesel generators available (Source: JAIF, NISA, TEPCO).
Other: Groundwater leaking into turbine basement drain pits; being pumped into ocean (Source: TEPCO 4/5).

Unit 6 – (NRC Priority: 6)
Core Status: In vessel (Source: JAIF, NISA, TEPCO), temperature 22.3°C (Source: NISA 4/10)
Core Cooling: Functional (Source: JAIF, NISA, TEPCO)
Primary Containment: Functional (Source: JAIF, NISA, TEPCO)
Secondary Containment: Vent hole drilled in rooftop to avoid hydrogen build up (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Fuel pool cooling functional, temperature 29.0°C (Source: NISA 4/10)
Power: External AC power supplying the unit, diesel generators available. (Source: JAIF, NISA, TEPCO)
Other: Groundwater leaking into turbine basement drain pits; being pumped into ocean (Source: TEPCO 4/5).
Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water maintained at 32°C (Source: IAEA 4/7); normal cooling started 1805 JST March 24 (Source: NISA).
Electrical Power (NRC priority: 7): Offsite power connected to Unit 2 auxiliary transformer / distribution panel; work continues on energizing equipment in Unit 2.
Dry Cask Storage: Visual inspection revealed no problems. All casks are vertical casks manufactured by Hitachi Shipbuilding (Source: RST).

The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

NRC priorities are based on analyses by the Reactor Safety Team. Unit 1 is priority 1 based on the belief that primary containment functionality, though degraded, can still be preserved if the responders take actions to inject to the RPV and primary containment. Unit 2 is priority 2 because of the apparent damage to primary containment and the other barriers to release. This damage requires continued attention to cool the core and provide water to the primary containment to minimize potential for release. Unit 3 is priority 3 because primary containment may be nominally functional but continued attention is required to pursue core cooling and injection. Unit 4 is priority 4 because progress has been made in addressing the spent fuel pool heat removal requirements, and the SFP area has indicated temperatures of less than 100°C.

Other Plants

Earthquake/Tsunami Status Update April 12, 2011 1200 EDT

There was no reported impact from the April 11, 2011 earthquake on other facilities.

Protective Measures Team (PMT) Update

The PMT continues to assess available dose rate information from DOE AMS data, the US Navy, TEPCO, and MEXT.

DOE continues to take field measurements around the site. To date, over 126,000 field measurements have been taken by DOE teams.

The PMT is the point of contact for a "composite" document that takes conditions such as plant stability, radiological conditions, and local infrastructure into consideration in order to re-evaluate the current 50-mile evacuation recommendations. The PMT will vet this document through Federal partners. The lead within NRC is the Office of Nuclear Security and Incident Response (NSIR) with PMT consultation.

Through the PMT, a question from the White House on low level radioactive waste is being answered by the staff.

International Response

- The IAEA has announced that it will hold a high-level conference on preliminary lessons learned from Fukushima on June 20-24, 2011. Information is available at www.iaea.org.
- NRC has daily teleconferences with the United Kingdom's Health and Safety Executive, the Canadian Nuclear Safety Commission, and the French Nuclear Safety Authority. IAEA and Finland also participate intermittently.
- The NRC RST and PMT will have a call with Taiwan early in the week of April 11th to discuss current status and source term issues.
- An Institute of Nuclear Power Operations (INPO) staff member in Tokyo is coordinating with US Government staff at the US Embassy concerning equipment requests.

Reference

Units

1 rem (rem) = 1,000 millirem (mrem)
1 Sievert (Sv) = 1,000 milliSieverts (mSv) = 1,000,000 microsieverts (μSv)
1 rem = 0.01 Sv = 10 mSv
1 Sv = 100 rem

Reactor Abbreviations

atm – Atmosphere (unit of pressure)
DW – Drywell
FW – Feed Water
gpm – gallons per minute
RHR – Residual Heat Removal
SFP – Spent Fuel Pool
SRV – Safety Relief Valve
TAF – Top of Active Fuel
RPV – Reactor Pressure Vessel

April 12, 2011 2300 EDT

Briefing Sheet Fukushima Daiichi

ET Overview and Priorities

- A 6.6 magnitude earthquake occurred on 4/11 causing a LOOP and site evacuation. Water injection for Units 1-3 was disrupted for 50 minutes. MELCOR Analysis indicates potential for further core damage in less than 10 hours.
- A 6.4 magnitude earthquake 0n 4/12 at 6:38 a.m. (JDT); small fire at distribution switchboard was controlled. No significant changes to status of other Japanese reactors
- GOJ revised the INES Rating of the Fukushima Daiichi Event to Level 7.
- Headquarters Operations Center transition activities continue. Process is being developed for tasking actions to technical staff in the line organizations. Existing Tasks to be transferred to new system. Assessment (M.Evans, NSIR Lead) of the new process/staffing level will be developed by COB Thursday, 4/14, for Chairman presentation on Friday, 4/15.
- ET turnover includes: one page briefing sheet, list of major documents and tasker list
- Sen. Mikulski will visit NRC Monday April 18 at 10:00 a.m. Will meet with Chairman for 30 minutes, then senior officials, then Ops Center for short tour. Will then hold press conference – EDO lead to prepare presentation.
- USAID will transition support for NRC Japan Site Team to NRC (OCFO/OIP) on May 1, 2011. USAID will continue to support until May 1.
- Pete Lyons' (DOE) notes from his Japan Trip (April 5-8, 2011) can be found here on the M drive
- Jim Dyer participated on IPC call – they asked for NRC confirmation of the statement in the Tokyo Re-Entry Recommendation that states, "…situation at the Fukushima plant remains serious, but risks to areas outside the 50 mi exclusion zone, and particularly Tokyo, are extremely low and manageable." Jim confirmed NRC agreement with statement.
- DOE Sitrep will now only be transmitted at 0600; are scaling back to once per day.

RST Overview and Priorities

- The RST has a copy of the Toshiba (Shaw) Recovery Proposal slides for review.
- Continuing work on RST Assessment (R2) and Global Assessment documents. Comments provided to Japan Team on proposed slides for high level briefing on Global Assessment.
- RST reviewing staff assessment that potential exists for a March 20 RPV breach in Units 2 and 3. GEH still evaluating and does not believe breach occurred.

PMT Overview and Priorities

- Trish Milligan (NSIR) revising "Guidance for Return (Permanent Re-entry) of US Citizens to Areas around Fukushima Daiichi NPP." The paper is being restructured to make it a decision paper on criteria for reentry. Marty had comments re permanent re-entry – is all this needed for re-entry. – RST and PMT are addressing comments. Following comments send to site team, then provide to Marty to discuss with Chairman, before it is sent to InterAgency Group.
- FSME completed answer to White House request for information on low level radioactive waste disposition and paper sent.

LT Overview and Priorities

- LT working with the Site Team to clarify responsibilities for logistical support and document updates in support of the consortium calls.
- Since there will not be another Cabinet meeting until Thursday (JDT), it was agreed that the next Consortium call will be Thursday evening at 2000 (EDT) (none on Wednesday).

KK175

April 12, 2011 0600 EDT

Briefing Sheet Fukushima Daiichi

ET Overview and Priorities

- A 6.6 magnitude earthquake occurred on 4/11 at approximately 17:15 (JDT) causing a LOOP at the site and evacuation of workers was ordered. Water injection for Units 1-3 was disrupted for 50 minutes. Japan team to follow up on site response. Another 6.4 magnitude earthquake at 6:38 a.m. (JDT); small fire at distribution switchboard containing batteries located in sampling equipment switchbox. Fire was controlled.
- No significant changes to status of other Japanese reactors
- GOJ revised their evacuation orders beyond the 20km radius in a modified keyhole strategy. A briefing is scheduled for USFJ tomorrow.
- Site team will call the Operations Center at 08:30 following the Cabinet meeting. The Chairman will join the call at 08:45.
- Headquarters Operations Center transition activities continue. Process is being developed for tasking actions to technical staff in the line organizations (red ticket). An assessment of the new process/staffing level will be developed by COB Thursday, 4/14, for Chairman presentation on Friday, 4/15. E-mail & Red ticket issued to Michele Evans as lead for assessment of transition.
- ET turnover includes: one page briefing sheet, list of major documents and tasker list
- Sen. Murkowski will visit NRC Monday April 18 at 10:00 a.m. Will meet with Chairman for 30 minutes, then senior officials, then Ops Center for short tour. Will then hold press conference – EDO lead to prepare presentation.
- NISA announcing that the event at Daiichi has been raised to Level 7 on INES scale.
- USAID will be staffing down and NRC has requested 2 weeks notice to take over travel processing and logistical support.
- Pete Lyons' notes from his Japan Trip (April 5-8, 2011) can be found here on the M drive
- The GOJ and TEPCO report that the discharge of low-level contaminated water into the sea from the central radioactive waste facility and from Units 5 and 6 was completed 4/10, and sampling of sea water did not show any substantive change in radiation levels. (Sources: DOE SITREP and 4/12 Crisis Mgt Team Report)

RST Overview and Priorities

- The RST has a copy of the Toshiba(Shaw) slides for review.
- Continuing work on RST Assessment and Global Assessment documents.
- RST believes that potential exists for a March 20 RPV breach in Units 2 and 3. GEH still evaluating and does not believe breach occurred.
- Addressed Thomas Zerr (White House) questions; response sent from RST.

PMT Overview and Priorities

- Continued reviewing comments to "Guidance for Return (Permanent Re-entry) of US Citizens to Areas around Fukushima Daiichi NPP." The paper is being restructured based on comments by Marty Virgilio.
- PMT will compare the information provided by the site team on the new evacuation recommendations against the IAEA criteria (4/12).
- Red ticket issued to FSME to answer White House request for information on low level radioactive waste disposition. Due – Tuesday COB
- Assisted Japan Team with PAR-related questions for GOJ

LT Overview and Priorities

-LT working with the Site Team to clarify responsibilities for logistical support and document updates in support of the consortium calls.
- Sandra Sloan from Areva designed POC for Fukushima Daiichi recovery proposal to TEPCO

KK/76

USNRC Emergency Operations Center Status Update

April 13, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report includes NRC's current understanding of the ongoing situation in Japan. Historical and background information can be found in past reports.

NRC's Top Priorities

1) Continued assessment of plant and radiological conditions and protective action recommendations.

2) Providing technical assistance to the US Ambassador in Japan and the Japanese Government.

3) Coordination with other US Departments and Agencies, the Institute of Nuclear Power Operations (INPO), Bechtel, General Electric Hitachi (GEH), Tokyo Electric Power Company (TEPCO), and the Japanese military.

Status

At 0946 EST, March 11, 2011, the NRC entered Monitoring Mode, and the agency continues to monitor the unfolding events in Japan. In that the situation is not yet stable, NRC continues its 24 hour support in headquarters and a fully-engaged site team in Japan. During the week of April 11th, NRC will be increasing the size and adjusting the skill set of its site team to better support the work activities in Japan. On April 11, NRC transitioned a great portion of its response support efforts to its line organizations, resulting in a reduction in staffing at the Headquarters Operations Center. A core team of managers and experts will continue to staff the Headquarters Operations Center on a 24 hour basis.

Press releases related to the situation in Japan can be found online at: http://www.nrc.gov/reading-rm/doc-collections/news/2011/.

On March 14, 2011, the NRC experts in Japan reported that the Japanese had requested US technical assistance for cooling the Fukushima Daiichi Units, as needed. The effort to provide assistance is being coordinated by the US Ambassador.

The current protective action recommendation for US citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate. The NRC continues to evaluate this recommendation.

The site team continues to work with TEPCO and NISA, providing recommendations that should improve reactor and spent fuel pool cooling.

KH77

Earthquake/Tsunami Status Update April 13, 2011 1200 EDT

The NRC Reactor Safety Team (RST) completed an assessment and recommendations for the Fukushima Daiichi units based on the severe accident management guidelines. The assessment included the input and concurrence of INPO, GEH, Electric Power Research Institute EPRI), Naval Reactors, and US Department of Energy Office of Nuclear Energy (DOE/NE). This document has been provided to the NRC Site Team in Japan. The document is now being cited in the news media (New York Times). NRC is evaluating what steps may be appropriate to address an OUO document being provided to the public. An updated assessment is underway to account for current plant conditions (e.g., inerting Unit 1 drywell and status of the fuel in the Unit 2 reactor vessel).

The RST is seeking peer review of an analysis of the reactor vessel and core conditions for Unit 2.

The site team, with support from Sandia, continues its analysis of the potential for a release and time lines should a release occur.

The US DOE and the US Environmental Protection Agency are the Federal communicators for questions regarding possible domestic impacts from the events in Japan and on domestic monitoring.

The Commission established a senior-level agency task force to conduct a systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

Air sample and standing water sample results from US nuclear plant licensees have been entered into a password protected database established by the Nuclear Energy Institute (NEI). NRC and Federal partners have access to the plant data.

Industry Consortium / Contractor Activities

The industry consortium is composed of government and industry representatives working to respond to Government of Japan (GoJ) requests for material and assistance. Consortium calls are held at 2000 EDT on days agreed to by the consortium.

Current Understanding of Japanese Facilities

(This information is compiled from the NRC in-country team, TEPCO press releases, Japanese Nuclear and Industrial Safety Agency (NISA) press releases, Japan Atomic Industrial Forum (JAIF) compiled data and assessments, IAEA information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, DOE and others.)

Fukushima Daiichi

The Japanese national government has encouraged evacuation for local residents in some areas within the 20-30 km of the site boundary. This is a slight change from the previous voluntary evacuation with shelter in place for the 20-30 km zone. IAEA confirms a no-fly zone

out to 30 km around the Fukushima Daiichi plant. The Japanese government announced that it is revising the emergency plans for Fukushima Daiichi to establish potential evacuation zones in case of another emergency. The Chief Cabinet Secretary indicated this is being done because plant conditions are not yet stable.

On April 11, 2011, at 0416 EDT, a 6.6 magnitude earthquake occurred near the Fukushima Daiichi site. Workers were evacuated and NISA confirmed that offsite power was lost to the site for 50 minutes. During this time, water injection pumps for Units 1, 2, and 3 were off. Power has been restored to the site. TEPCO and NISA report that there were no changes to radiation readings as a result of the loss of power. (Source: IAEA, 4/11).

At approximately 0638 JST on April 12, 2011 a magnitude 6.3 aftershock was felt at the Fukushima Daiichi site and a small fire occurred in a switchboard. The fire was quickly extinguished and resulted in no impacts regarding external release of radioactive material or the efforts to cool the units. (Source: Media outlets and TEPCO 4/12)

On April 12, 2011, NISA raised the rating for the events at the Fukushima Daiichi site on the International Nuclear and Radiological Event Scale (INES) from 5, "Accident with Wider Consequences," to 7, "Major Accident," citing calculations by both NISA and the Nuclear Safety Commission of Japan (NSC) of radioactive materials released from the Fukushima Daiichi reactors. This new provisional rating considers the accidents that occurred at Units 1, 2, and 3 as a single event on INES. Previously, separate INES level 5 ratings had been applied for Units 1, 2, and 3. The provisional INES level 3 rating assigned for Unit 4 still applies. NISA notes that while an INES rating of 7 is the same as that of the Chernobyl accident, their current estimated amount of radioactive materials released is approximately 10% of the amount from the Chernobyl accident. (Source: NISA and IAEA 4/12)

STATUS as of 1200 EDT, April 13, 2011 (0100 Japan, April 14)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 70% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV level ½ TAF (NISA 4/8). The volume of sea water injected to cool the core has left enough salt to fill the lower plenum to the core plate (Source: GEH, US Industry). Vessel temperatures 119°C at bottom drain, 206°C at FW nozzle (Source: TEPCO 4/12). RPV pressure (Ch A: 61.4 psig, Ch B: 134.6 psig) (Source: TEPCO 4/12).

Core Cooling: Fresh water injection via fire extension line to FW line at 26.4 gpm (Source: NISA 4/9). Recirculation pump seals have likely failed (Source: GEH). Stuck open SRV (Source: Site Team, confirmed by TEPCO 4/7). Began injecting nitrogen (N_2) to drywell at 0130 Japan time on April 7 (Source: IAEA, 4/7).

Primary Containment: Damage suspected, slow leakage, DW pressure increased to 12.9 psig, torus pressure at 9.2 psig and slowly increasing from N_2 injection (Source: TEPCO 4/12).

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 23°C (Source: NISA 4/8, uncertain, overhead thermography). Periodic freshwater spray using concrete pump truck (Source: DOE 4/3). SFP has 292 assemblies with last transfer of 64 assemblies from reactor to SFP in March 2010 (Source: GEH 4/2).

Rad Levels: DW: 6830 R/hr (Source: NISA 4/8), Reported instrument failure (Source: INPO 4/8), Torus: 1040 R/hr (Source: TEPCO 4/12), Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF).

Power: On external power (Source: NISA); equipment testing in progress (Source: JAIF, NISA, TEPCO). External AC power to the Main Control Room lighting and instrument.

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 30% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV Level 3/5 TAF (NISA 4/8) Bottom head temperature 208°C (Source: TEPCO 4/12), feed water nozzle temperature 170.1°C (Source: TEPCO 4/12). RPV pressure: Ch A: -3.3 psig, Ch B: -2.6 psig (Source: TEPCO 4/13). Stabilized at atmospheric pressure since 3/18/11 (Source: IAEA 4/9). May begin injecting nitrogen on April 20, 2011 (Source: NHK).

Core Cooling: Fresh water injecting at 30.8 gpm fire line (Source: NISA 4/10).

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). DW Pressure: -1.6 psig (Source: TEPCO 4/13).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO), blowout panels removed from side of reactor building to reduce hydrogen buildup (Source: visual).

Spent Fuel Pool: Full fresh water injection continuing (Source: IAEA 4/5), fuel pool temperature 46°C (Source: TEPCO 4/12). 36 tons of water added 4/7 (Source: Site Team 4/8).

Rad Levels: DW: 2790 R/hr (Source: TEPCO 4/12); Torus 65.6 R/hr (Source: TEPCO 4/12); Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF). The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

Power: On offsite power (NISA 4/3)

Unit 3 – (NRC Priority: 3)

Core Status: Estimated 25% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature 115.6°C, FW nozzle temperature: 96°C (Source: TEPCO 4/12). RPV pressure Ch A: -2.8 psig, Ch B: -12.5 psig (Source: TEPCO 4/12). RPV level ~2/5 TAF (Source: NISA 4/8). Stabilized at atmospheric pressure since 3/22/11 (Source: IAEA 4/9).

Core Cooling: Freshwater injection via fire line at 30.8 gpm via temporary electrical pump (Source: NISA 4/8). Recirculation pump seals have likely failed (Source: GEH).

Primary Containment: Damage suspected. Drywell Pressure: 0.6 psig and Torus Pressure 9.8 psig (Source: TEPCO 4/12). Nitrogen injection delayed due to problems accessing equipment (Source: NHK).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)

Spent Fuel Pool: Low water level. Temperature 56°C estimated (Source: NISA 4/8, uncertain, overhead thermography). Freshwater injection via SF cooling system and spraying fresh water periodically into SFP (Source: IAEA 4/5). Fresh water sprayed via concrete pump on 4/8 (Source: TEPCO 4/9).

Rad Levels: DW: 1710 R/hr, Torus: 66.1 R/hr (Source: TEPCO 4/12); Outside site at plant gate(s): 4.0 mR/hr at west gate (very slight trend downward) (Source: JAIF); 100 R/hr debris outside Rx building (covered).

Power: On offsite power (NISA 4/3)

Unit 4 – (NRC Priority: 4)

Core Status: Offloaded 105 days at time of accident (Source: JAIF, NISA, TEPCO).

Core Cooling: Not necessary (Source: JAIF, NISA, TEPCO).

Primary Containment: Not applicable (Source: JAIF, NISA, TEPCO).

Secondary Containment: Severely damaged from hydrogen explosion (Source: JAIF, NISA, TEPCO).

Spent Fuel Pool: Temperature 57°C (Source: JAIF 4/7, uncertain, overhead thermography). Freshwater added via concrete pump 4/9, additional spraying as needed (Source: TEPCO 4/9).
Power: On offsite AC power (DOE 4/3)

Unit 5 – (NRC Priority: 5)
Unit 5 remains in stable cold shutdown, with offsite power.

Unit 6 – (NRC Priority: 6)
Unit 6 remains in stable cold shutdown, with offsite power.

The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

NRC priorities are based on analyses by the Reactor Safety Team. Unit 1 is priority 1 based on the belief that primary containment functionality, though degraded, can still be preserved if the responders take actions to inject to the RPV and primary containment. Unit 2 is priority 2 because of the apparent damage to primary containment and the other barriers to release. This damage requires continued attention to cool the core and provide water to the primary containment to minimize potential for release. Unit 3 is priority 3 because primary containment may be nominally functional but continued attention is required to pursue core cooling and injection. Unit 4 is priority 4 because progress has been made in addressing the spent fuel pool heat removal requirements, and the SFP area has indicated temperatures of less than 100°C.

Other Plants

There was no reported impact from the April 11, 2011 earthquake on other facilities.

Protective Measures Team (PMT) Update

The PMT continues to assess available dose rate information from DOE AMS data, the US Navy, TEPCO, and MEXT.

The PMT is the point of contact for a "composite" document that takes conditions such as plant stability, radiological conditions, and local infrastructure into consideration in order to re-evaluate the current 50-mile evacuation recommendations. The PMT will vet this document through Federal partners. The lead within NRC is the Office of Nuclear Security and Incident Response (NSIR) with PMT consultation.

International Response

- The IAEA has announced that it will hold a high-level conference on preliminary lessons learned from Fukushima on June 20-24, 2011. Information is available at www.iaea.org.
- NRC has daily teleconferences with the United Kingdom's Health and Safety Executive, the Canadian Nuclear Safety Commission, and the French Nuclear Safety Authority. IAEA and Finland also participate intermittently.
- The NRC RST and PMT will have a call with Taiwan early in the week of April 11th to discuss current status and source term issues.

- An Institute of Nuclear Power Operations (INPO) staff member in Tokyo is coordinating with US Government staff at the US Embassy concerning equipment requests.

Reference

Units

1 rem (rem) = 1,000 millirem (mrem)
1 Sievert (Sv) = 1,000 milliSieverts (mSv) = 1,000,000 microsieverts (μSv)
1 rem = 0.01 Sv = 10 mSv
1 Sv = 100 rem

Reactor Abbreviations

atm – Atmosphere (unit of pressure)
DW – Drywell
FW – Feed Water
gpm – gallons per minute
RHR – Residual Heat Removal
SFP – Spent Fuel Pool
SRV – Safety Relief Valve
TAF – Top of Active Fuel
RPV – Reactor Pressure Vessel

April 13, 2011 2300 EDT

Briefing Sheet Fukushima Daiichi

ET Overview and Priorities

- A 6.6 magnitude earthquake occurred on 4/11 causing a LOOP and site evacuation. Water injection for Units 1-3 was disrupted for 50 minutes. MELCOR Analysis indicates potential for further core damage in less than 10 hours.
- A 6.4 magnitude earthquake on 4/12 at 6:38 a.m. (JDT); small fire at distribution switchboard was controlled. No significant changes to status of other Japanese reactors
- GOJ revised the INES Rating of the Fukushima Daiichi Event to Level 7.
- Headquarters Operations Center transition activities continue. Process is being developed for tasking actions to technical staff in the line organizations. Existing tasks to be closed or transferred to new system. Assessment (M. Evans, NSIR lead) of the new process/staffing level will be developed by COB Thursday, 4/14 for Chairman's presentation on Friday, 4/15.
- ET turnover includes: one page briefing sheet, list of major documents and tasker list
- Sen. Mikulski will visit NRC Monday, April 18 at 10:00 a.m. Will meet with Chairman for 30 minutes, then senior officials, then Ops Center for short tour. Will then hold press conference – EDO lead to prepare presentation.
- USAID will transition support for NRC Japan Site Team to NRC (OCFO/OIP) on May 1. USAID will continue to support until May 1.
- Pete Lyons' (DOE) notes from his Japan Trip (April 5-8, 2011) can be found on the M drive (M:\Japanese Earthquake & Tsunami Response\Japan One Pager\Documents mentioned in One-Pager)
- Agency Sitreps are scaling back to once per day prefer early release; need to determine best time for NRC.
- OPA will host two producers from the CBS 60 Minutes show in the Ops Center on 4/14 around 1 p.m.

RST Overview and Priorities

- RST Assessment (R2) and plant stability determination sent to line organization Assisting the Japan Site Team with the Global Assessment document as needed.
- RST reviewing staff assessment that potential exists for a breach in Units 2 and 3 RPVs. GEH still evaluating and does not believe breach occurred.
- TEPCO verified water level in Unit 4 SFP-2.5m above fuel with rad levels at 8 rem/hr
- Working on response to Congressman Markey's questions

PMT Overview and Priorities

- Trish Milligan (NSIR) revising "Guidance for Return (Permanent Re-entry) of US Citizens to Areas around Fukushima Daiichi NPP."
- Provided concurrence and comments to OSTP for technical basis to support Japan Ambassador recommendation to not renew the voluntary authorized departure from Tokyo.
- NRC to support NARAC request to update source terms based on informal White House request.

LT Overview and Priorities

- LT working with the Site Team to clarify responsibilities for logistical support and document updates in support of the Consortium calls.
- Since there will not be another Cabinet meeting until Thursday (JDT), it was agreed that the next Consortium call will be Thursday evening at 2000 (EDT) (none on Wednesday)
- The Cabinet meetings in Japan are now being held on just Tuesday/Thursday. The Site Team in Japan will discuss whether or not to move the Consortium calls to align with the evenings that the Cabinet meets. They will let HQ know their preference.
- Site Team has been experiencing some internet difficulties. To help resolve the issue, the AT& T air cards were reactivated.

KK178

April 13, 2011 0600 EDT

Briefing Sheet Fukushima Daiichi

ET Overview and Priorities

- A 6.6 magnitude earthquake occurred on 4/11 causing a LOOP and site evacuation. Water injection for Units 1-3 was disrupted for 50 minutes. MELCOR Analysis indicates potential for further core damage in less than 10 hours.
- A 6.4 magnitude earthquake 0n 4/12 at 6:38 a.m. (JDT); small fire at distribution switchboard was controlled. No significant changes to status of other Japanese reactors
- GOJ revised the INES Rating of the Fukushima Daiichi Event to Level 7.
- Headquarters Operations Center transition activities continue. Process is being developed for tasking actions to technical staff in the line organizations. Existing Tasks to be transferred to new system. Assessment (M.Evans, NSIR Lead) of the new process/staffing level will be developed by COB Thursday, 4/14, for Chairman presentation on Friday, 4/15.
- ET turnover includes: one page briefing sheet, list of major documents and tasker list
- Sen. Mikulski will visit NRC Monday April 18 at 10:00 a.m. Will meet with Chairman for 30 minutes, then senior officials, then Ops Center for short tour. Will then hold press conference – EDO lead to prepare presentation.
- USAID will transition support for NRC Japan Site Team to NRC (OCFO/OIP) on May 1, 2011. USAID will continue to support until May 1.
- Pete Lyons' (DOE) notes from his Japan Trip (April 5-8, 2011) can be found here on the M drive (M:\Japanese Earthquake & Tsunami Response\Japan One Pager\Documents mentioned in One-Pager)
- Jim Dyer participated on IPC call – they asked for NRC confirmation of the statement in the Tokyo Re-Entry Recommendation that states, "…situation at the Fukushima plant remains serious, but risks to areas outside the 50 mi exclusion zone, and particularly Tokyo, are extremely low and manageable." Jim confirmed NRC agreement with statement.
- DOE Sitrep will now only be transmitted at 0600; are scaling back to once per day.

RST Overview and Priorities

- The RST has a copy of the Toshiba (Shaw) Recovery Proposal slides for review.
- Continuing work on RST Assessment (R2) and Global Assessment documents. This includes revising the plant stability determination.
- RST reviewing staff assessment that potential exists for a March 20 RPV breach in Units 2 and 3. GEH still evaluating and does not believe breach occurred.
- TEPCO verified water level in Unit 4 SFP - 10 feet above fuel with rad levels at 8 rem/hr

PMT Overview and Priorities

- Trish Milligan (NSIR) revising "Guidance for Return (Permanent Re-entry) of US Citizens to Areas around Fukushima Daiichi NPP." The paper is being restructured to make it a decision paper on criteria for reentry. RST and PMT are addressing comments provided by MVirgilio.
- Assisted Japan site team with questions to NISA regarding protective action decision-making and re-entry criteria used by GOJ decision-makers.

LT Overview and Priorities

- LT working with the Site Team to clarify responsibilities for logistical support and document updates in support of the consortium calls.
- Since there will not be another Cabinet meeting until Thursday (JDT), it was agreed that the next Consortium call will be Thursday evening at 2000 (EDT) (none on Wednesday).

KK/79

April 13, 2011 1500 EDT

Briefing Sheet Fukushima Daiichi

ET Overview and Priorities

- A 6.6 magnitude earthquake occurred on 4/11 causing a LOOP and site evacuation. Water injection for Units 1-3 was disrupted for 50 minutes. MELCOR Analysis indicates potential for further core damage in less than 10 hours.
- A 6.4 magnitude earthquake 0n 4/12 at 6:38 a.m. (JDT); small fire at distribution switchboard was controlled. No significant changes to status of other Japanese reactors
- GOJ revised the INES Rating of the Fukushima Daiichi Event to Level 7.
- Headquarters Operations Center transition activities continue. Process is being developed for tasking actions to technical staff in the line organizations. Existing Tasks to be closed or transferred to new system. Assessment (M.Evans, NSIR Lead) of the new process/staffing level will be developed by COB Thursday, 4/14, for Chairman presentation on Friday, 4/15.
- ET turnover includes: one page briefing sheet, list of major documents and tasker list
- Sen. Mikulski will visit NRC Monday April 18 at 10:00 a.m. Will meet with Chairman for 30 minutes, then senior officials, then Ops Center for short tour. Will then hold press conference – EDO lead to prepare presentation.
- USAID will transition support for NRC Japan Site Team to NRC (OCFO/OIP) on May 1, 2011. USAID will continue to support until May 1.
- Pete Lyons' (DOE) notes from his Japan Trip (April 5-8, 2011) can be found on the M drive (M:\Japanese Earthquake & Tsunami Response\Japan One Pager\Documents mentioned in One-Pager)
- Agency Sitreps are scaling back to once per day prefer early release; need to determine best time for NRC.

RST Overview and Priorities

- Continuing work on RST Assessment (R2) and Global Assessment documents. This includes revising the plant stability determination.
- RST reviewing staff assessment that potential exists for a breach in Units 2 and 3 RPVs. GEH still evaluating and does not believe breach occurred.)
- TEPCO verified water level in Unit 4 SFP – 2.5m above fuel with rad levels at 8 rem/hr.

PMT Overview and Priorities

- Trish Milligan (NSIR) revising "Guidance for Return (Permanent Re-entry) of US Citizens to Areas around Fukushima Daiichi NPP."
- Provided concurrence and comments to OSTP for technical basis to support Japan Ambassador recommendation to not renew the voluntary authorized departure from Tokyo.
- NRC to support NARAC request to update source terms based on informal White House request.

LT Overview and Priorities

- LT working with the Site Team to clarify responsibilities for logistical support and document updates in support of the consortium calls.
- Since there will not be another Cabinet meeting until Thursday (JDT), it was agreed that the next Consortium call will be Thursday evening at 2000 (EDT) (none on Wednesday).

KK180

USNRC Emergency Operations Center Status Update

April 14, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report includes NRC's current understanding of the ongoing situation in Japan. Historical and background information can be found in past reports.

NRC's Top Priorities

1) Continued assessment of plant and radiological conditions and protective action recommendations.

2) Providing technical assistance to the US Ambassador in Japan and the Japanese Government.

3) Coordination with other US Departments and Agencies, the Institute of Nuclear Power Operations (INPO), Bechtel, General Electric Hitachi (GEH), Tokyo Electric Power Company (TEPCO), and the Japanese military.

Status

At 0946 EST, March 11, 2011, the NRC entered Monitoring Mode, and the agency continues to monitor the unfolding events in Japan. In that the situation is not yet stable, NRC continues its 24 hour support in headquarters and a fully-engaged site team in Japan. During the week of April 11th, NRC increased the size and adjusted the skill set of its site team to better support the work activities in Japan. On April 11, NRC transitioned a great portion of its response support efforts to its line organizations, resulting in a reduction in staffing at the Headquarters Operations Center. A core team of managers and experts will continue to staff the Headquarters Operations Center on a 24 hour basis.

Press releases related to the situation in Japan can be found online at: http://www.nrc.gov/reading-rm/doc-collections/news/2011/.

On March 14, 2011, the NRC experts in Japan reported that the Japanese had requested US technical assistance for cooling the Fukushima Daiichi Units, as needed. The effort to provide assistance is being coordinated by the US Ambassador.

The current protective action recommendation for US citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate. The NRC continues to evaluate this recommendation.

The site team continues to work with TEPCO and NISA, providing recommendations that should improve reactor and spent fuel pool cooling.

KK 181

Earthquake/Tsunami Status Update April 14, 2011 1200 EDT

To account for current plant conditions (e.g., inerting Unit 1 drywell and status of the fuel in the Unit 2 reactor vessel), the NRC Reactor Safety Team (RST) is updating an assessment and recommendations for the Fukushima Daiichi units based on the severe accident management guidelines. The initial assessment included the input and concurrence of INPO, GEH, Electric Power Research Institute EPRI), Naval Reactors, and US Department of Energy Office of Nuclear Energy (DOE/NE) and was provided to the NRC Site Team in Japan.

The RST is seeking peer review of an analysis of the reactor vessel and core conditions for Unit 2.

The site team, with support from Sandia, continues its analysis of the potential for a release and time lines should a release occur.

The US DOE and the US Environmental Protection Agency are the Federal communicators for questions regarding possible domestic impacts from the events in Japan and on domestic monitoring.

The Commission established a senior-level agency task force to conduct a systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

Air sample and standing water sample results from US nuclear plant licensees have been entered into a password protected database established by the Nuclear Energy Institute (NEI). NRC and Federal partners have access to the plant data.

Industry Consortium / Contractor Activities

The industry consortium is composed of government and industry representatives working to respond to Government of Japan (GoJ) requests for material and assistance. Consortium calls are held at 2000 EDT on days agreed to by the consortium.

Current Understanding of Japanese Facilities

(This information is compiled from the NRC in-country team, TEPCO press releases, Japanese Nuclear and Industrial Safety Agency (NISA) press releases, Japan Atomic Industrial Forum (JAIF) compiled data and assessments, IAEA information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, DOE and others.)

Fukushima Daiichi

The Japanese national government has encouraged evacuation for local residents in some areas within the 20-30 km of the site boundary. This is a slight change from the previous voluntary evacuation with shelter in place for the 20-30 km zone. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. The Japanese government announced that it is revising the emergency plans for Fukushima Daiichi to establish potential evacuation zones in

case of another emergency. The Chief Cabinet Secretary indicated this is being done because plant conditions are not yet stable.

At approximately 0638 JST on April 12, 2011 a magnitude 6.3 aftershock was felt at the Fukushima Daiichi site and a small fire occurred in a switchboard. The fire was quickly extinguished and resulted in no impacts regarding external release of radioactive material or the efforts to cool the units. (Source: Media outlets and TEPCO 4/12)

On April 12, 2011, NISA raised the rating for the events at the Fukushima Daiichi site on the International Nuclear and Radiological Event Scale (INES) from 5, "Accident with Wider Consequences," to 7, "Major Accident," citing calculations by both NISA and the Nuclear Safety Commission of Japan (NSC) of radioactive materials released from the Fukushima Daiichi reactors. This new provisional rating considers the accidents that occurred at Units 1, 2, and 3 as a single event on INES. Previously, separate INES level 5 ratings had been applied for Units 1, 2, and 3. The provisional INES level 3 rating assigned for Unit 4 still applies. NISA notes that while an INES rating of 7 is the same as that of the Chernobyl accident, their current estimated amount of radioactive materials released is approximately 10% of the amount from the Chernobyl accident. (Source: NISA and IAEA 4/12)

STATUS as of 1200 EDT, April 14, 2011 (0100 Japan, April 14)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 70% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV level ½ TAF (NISA 4/8). The volume of sea water injected to cool the core has left enough salt to fill the lower plenum to the core plate (Source: GEH, US Industry). Vessel temperatures 119°C at bottom drain, 206°C at FW nozzle (Source: TEPCO 4/12). RPV pressure (Ch A: 61.4 psig, Ch B: 131.7 psig) (Source: TEPCO 4/12).

Core Cooling: Fresh water injection via fire extension line to FW line at 26.4 gpm (Source: NISA 4/9). Recirculation pump seals have likely failed (Source: GEH). Stuck open SRV (Source: Site Team, confirmed by TEPCO 4/7). Began injecting nitrogen (N_2) to drywell at 0130 Japan time on April 7 (Source: IAEA, 4/7).

Primary Containment: Damage suspected, slow leakage, DW pressure increased to 12.9 psig, torus pressure at 9.2 psig and slowly increasing from N_2 injection (Source: TEPCO 4/12).

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 26°C (Source: JAIF 4/12, uncertain, overhead thermography). Periodic freshwater spray using concrete pump truck (Source: DOE 4/3). SFP has 292 assemblies with last transfer of 64 assemblies from reactor to SFP in March 2010 (Source: GEH 4/2).

Rad Levels: DW: 6830 R/hr (Source: NISA 4/8), Reported instrument failure (Source: INPO 4/8), Torus: 1040 R/hr (Source: TEPCO 4/12), Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF).

Power: On external power (Source: NISA); equipment testing in progress (Source: JAIF, NISA, TEPCO).

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 30% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV Level 3/5 TAF (NISA 4/8) Bottom head temperature 183.2°C (Source: TEPCO 4/13), feed water nozzle temperature 170.1°C (Source: TEPCO 4/12). RPV pressure: Ch A: -3.3 psig, Ch B: -2.6 psig (Source: TEPCO 4/13). Stabilized at

atmospheric pressure since 3/18/11 (Source: IAEA 4/9). May begin injecting nitrogen on April 20, 2011 (Source: NHK).

Core Cooling: Fresh water injecting at 30.8 gpm fire line (Source: Site Team 4/14).

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). DW Pressure: -1.6 psig (Source: TEPCO 4/13).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO), blowout panels removed from side of reactor building to reduce hydrogen buildup (Source: visual).

Spent Fuel Pool: Full fresh water injection continuing (Source: IAEA 4/5), fuel pool temperature 45ºC (Source: JAIF 4/13). 36 tons of water added 4/7 (Source: Site Team 4/8).

Rad Levels: DW: 2790 R/hr (Source: TEPCO 4/12); Torus 65.6 R/hr (Source: TEPCO 4/12); Outside site at plant gate(s): 4 mR/hr at west gate (very slight trend downward) (Source: JAIF). The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

Power: On offsite power (NISA 4/3)

Unit 3 – (NRC Priority: 3)

Core Status: Estimated 25% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). Bottom head temperature 119.3ºC, FW nozzle temperature: 96ºC (Source: TEPCO 4/12). RPV pressure Ch A: -2.8 psig, Ch B: -12.5 psig (Source: TEPCO 4/12). RPV level ~2/5 TAF (Source: NISA 4/8). Stabilized at atmospheric pressure since 3/22/11 (Source: IAEA 4/9).

Core Cooling: Freshwater injection via fire line at 30.8 gpm via temporary electrical pump (Source: Site Team 4/14). Recirculation pump seals have likely failed (Source: GEH).

Primary Containment: Damage suspected. Drywell Pressure: 0.6 psig and Torus Pressure 9.8 psig (Source: TEPCO 4/12). Nitrogen injection delayed due to problems accessing equipment (Source: NHK).

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)

Spent Fuel Pool: Low water level. Temperature 59ºC estimated (Source: JAIF 4/12, uncertain, overhead thermography). Freshwater injection via SF cooling system and spraying fresh water periodically into SFP (Source: IAEA 4/5). Fresh water sprayed via concrete pump on 4/8 (Source: TEPCO 4/9).

Rad Levels: DW: 1710 R/hr, Torus: 66.1 R/hr (Source: TEPCO 4/12); Outside site at plant gate(s): 4.0 mR/hr at west gate (very slight trend downward) (Source: JAIF); 100 R/hr debris outside Rx building (covered).

Power: On offsite power (NISA 4/3)

Unit 4 – (NRC Priority: 4)

Core Status: Offloaded 105 days at time of accident (Source: JAIF, NISA, TEPCO).

Core Cooling: Not necessary (Source: JAIF, NISA, TEPCO).

Primary Containment: Not applicable (Source: JAIF, NISA, TEPCO).

Secondary Containment: Severely damaged from hydrogen explosion (Source: JAIF, NISA, TEPCO).

Spent Fuel Pool: Temperature 37ºC (Source: JAIF 4/12, uncertain, overhead thermography). Freshwater added via concrete pump 4/9, additional spraying as needed (Source: TEPCO 4/9). Water level ~2.5 m above top of fuel (Source: TEPCO, uncertain). Based upon an isotopic analysis of the sampling from the spent fuel pool, TEPCO concluded that the likelihood of damaged fuel in the pool is low.

Power: On offsite AC power (DOE 4/3)

Unit 5 – (NRC Priority: 5)
Unit 5 remains in stable cold shutdown, with offsite power.

Unit 6 – (NRC Priority: 6)
Unit 6 remains in stable cold shutdown, with offsite power.

The leak of contaminated water into the ocean has been stopped (Source: Multiple Reports).

NRC priorities are based on analyses by the Reactor Safety Team. Unit 1 is priority 1 based on the belief that primary containment functionality, though degraded, can still be preserved if the responders take actions to inject to the RPV and primary containment. Unit 2 is priority 2 because of the apparent damage to primary containment and the other barriers to release. This damage requires continued attention to cool the core and provide water to the primary containment to minimize potential for release. Unit 3 is priority 3 because primary containment may be nominally functional but continued attention is required to pursue core cooling and injection. Unit 4 is priority 4 because progress has been made in addressing the spent fuel pool heat removal requirements, and the SFP area has indicated temperatures of less than 100°C.

Other Plants

There was no reported impact from the April 11, 2011 earthquake on other facilities.

Protective Measures Team (PMT) Update

The PMT continues to assess available dose rate information from DOE AMS data, the US Navy, TEPCO, and MEXT.

The PMT is the NRC Headquarters Operations Center point of contact for a "composite" document that takes conditions such as plant stability, radiological conditions, and local infrastructure into consideration in order to re-evaluate the current 50-mile evacuation recommendations. The PMT will vet this document through Federal partners. The lead within NRC is the Office of Nuclear Security and Incident Response (NSIR) with NRR Support.

The PMT is coordinating a request from NARAC to review source terms and will assign line organization staff to fulfill this request.

International Response

- The US Embassy in Japan is preparing for the return shortly of US citizens who voluntarily relocated from the Tokyo area.
- The IAEA has announced that it will hold a high-level conference on preliminary lessons learned from Fukushima on June 20-24, 2011. Information is available at www.iaea.org.
- NRC has daily teleconferences with the United Kingdom's Health and Safety Executive, the Canadian Nuclear Safety Commission, and the French Nuclear Safety Authority. IAEA and Finland also participate intermittently.
- An Institute of Nuclear Power Operations (INPO) staff member in Tokyo is coordinating with US Government staff at the US Embassy concerning equipment requests.

Earthquake/Tsunami Status Update April 14, 2011 1200 EDT

Reference

Units

1 rem (rem) = 1,000 millirem (mrem)
1 Sievert (Sv) = 1,000 milliSieverts (mSv) = 1,000,000 microsieverts (μSv)
1 rem = 0.01 Sv = 10 mSv
1 Sv = 100 rem

Reactor Abbreviations

atm – Atmosphere (unit of pressure)
DW – Drywell
FW – Feed Water
gpm – gallons per minute
RHR – Residual Heat Removal
SFP – Spent Fuel Pool
SRV – Safety Relief Valve
TAF – Top of Active Fuel
RPV – Reactor Pressure Vessel