April 26, 2011 0700 EDT

One-Pager - Fukushima Daiichi

ET Overview and Priorities

- ET turnover: WebEOC turnover list, one-pager, list of major documents, tasker list, ET Log Book.
- Plant and fuel pool conditions are generally unchanged.
- Headquarters Operations Center transition activities continue. Documented the process for tasking actions to Line Organizations. See Ops Center Transition Plan Document (WebEOC).
- USAID will transition support for NRC Japan Site Team to NRC (OCFO/OIP) on May 1. USAID will continue to support until May 1.
- NRC reviewed and provided to Japan Site Team Lead the analysis of the adequacy of the TEPCO Roadmap on April 25. This document was also sent to the Consortium for comment by 4/27.

RST Overview and Priorities

- Continued monitoring of Units. Conditions at the units were static.
- Completed NRC review of the TEPCO Roadmap, which was provided to the site team. NRC review will be provided to Japanese Government early Tuesday morning (Japan time). Consortium to provide comments on accuracy only by COB Wednesday, April 27.
- "RST Assessment Rev. 2"- received feedback from Japan Site team to hold (or freeze) continued revisions. Japan Site Team believes a number of recommendations proposed in the document may not be implementable under current conditions. The consensus is that a more forward-looking document can be developed when more information on actual conditions are received.
- "Interim Comprehensive Assessment" (Global Assessment/Interim Safety Assessment) will be worked by NRR with data from previous two assessment document; target completion by Friday, April 29.

PMT Overview and Priorities

- PMT, via the line organization, continues to work on the final "Composite" document (4969) aligning it with Japan's evacuation instruction, commensurate with a "Travel Advisory." Goal: Receive Line Organization comment by COB Tuesday April 26, and release document to the Federal Family middle of next week.
- Japan Team is actively tracking radiation readings, and investigating agricultural and marine impacts.
- The Japanese government will begin euthanizing debilitated and dying livestock within the No-go zone (20 km around site) on or after April 25. The government must have owners' consent to euthanize. Euthanized animals will be disinfected with slaked lime and wrapped in vinyl sheeting. Prefectural government staff and veterinarians are in charge of this activity with a daily maximum exposure limit of 50 mSv. At this time, they will not work in a few towns with relatively higher radiation levels.
- On April 25, Ned Wright (NSIR) obtained information from a U.S. news report that the Navy is tracking floating debris fields of about 60 to 70 miles in length. Vince Holahan (PACOM) provided information that the University of Hawaii is tracking this under contract with NOAA, and that the U.S. Coast Guard will probably be tasked to monitor the debris field as it migrates eastward. Other assets are monitoring the situation as well.
- Also on April 25 we received information that NOAA was placing the plume modeling on hold for two weeks. NOAA said that the government of Japan has requested input from IAEA representatives. There is a two week or more delay due to the representatives' arrival.

LT Overview and Priorities

- Next Industry Consortium call scheduled for Tuesday, April 26, 2011 at 2000 (EDT) – U.S. Embassy Japan will send the Request Matrix out for updating.
- Working with Japan Site Team to determine approximate number of U.S. Citizens who live within the 12- and 50- mile radius of the Daiichi Nuclear Power Plant.
- U.S.- Japan Economic Strategy Institute in Tokyo requested help in obtaining acceptable shipping containers for radioactive materials. Helen Peterson in the Foreign Commercial Services Unit U.S. Embassy Japan has this for action.

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April 26, 2011 1500 EDT

One-Pager - Fukushima Daiichi

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- According to the Japan Site Team there are no U.S. Citizens who live within the 12- and 50- mile radius of the Daiichi Nuclear Power Plant. They verified this information with the Embassy.
- U.S.- Japan Economic Strategy Institute in Tokyo requested help in obtaining acceptable shipping containers for radioactive materials. Helen Peterson in the Foreign Commercial Services Unit U.S. Embassy Japan has this for action.

KK/120

April 26, 2011 2300 EDT

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KK/12/1

USNRC Emergency Operations Center Status Update

April 27, 2011
Earthquake / Tsunami Status Update
Compiled by Liaison Coordinator

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. 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/.

Japan has scheduled a national stand-down on Friday April 29th, and Tuesday through Thursday, May 3rd, 4th, and 5th 2011 inclusive.

NISA and TEPCO have started holding joint press conferences to improve communications with the public. The first press conference occurred April 26 and lasted 3 hours. More joint press conferences are scheduled for the week.

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. According to media sources, Japan decided Thursday April 21, 2011 to prohibit residents from staying within a 20-kilometer radius of Fukushima NPP. People will only be allowed to enter the zone for up to two hours to collect belongings under government supervision. No member of the public would be allowed within 3 km of the site. The

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government added some towns outside the 20-km radius to the list of areas covered by its "no-entry" directive (Kyodo New, 22 April.)(0600 4/22 SITREP)

As reported by Kyodo News early Thursday 21 April, TEPCO announced highly radioactive water that leaked into the Pacific Ocean from the Daiichi nuclear plant in early April contained an estimated 5,000 terabecquerels of radioactive substances – 20,000 times the annual allowable limit for the plant – with TEPCO reporting total leakage amounting to 520 tons. TEPCO estimates the leakage to have lasted for six days through April 6.

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 typically held daily on technical issues at 11:00 EDT and are held at 2000 EDT on days agreed to by the consortium for topics including supply needs by GoJ.

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

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 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. 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)

Groundwater sampling near Units 1 & 2 showed increased radiation levels 6-38 times greater than previous measurements, based on isotope analysis. Groundwater flow leads to the ocean (Source: Site Team 4/15). TEPCO completed pumping out low-level liquid radwaste from the common-area radwaste building and applied sealant. TEPCO is transferring highly radioactive water from the Unit 2 turbine building basement to the radwaste facility; expecting 26 days to complete. (Source: Site Team 4/19).

TEPCO expects to have a tanker barge available by mid-May that will be able to hold 27,000 Tons of liquid radwaste, giving them a total of 60,400 Tons of liquid radwaste storage capacity. TEPCO estimates that a total of 50,000 Tons of highly contaminated liquid radwaste will have been generated onsite by the end of May. (Source: Site Team 4/16).

On April 17, TEPCO released a document titled "*Roadmap towards Restoration from the Accident at Fukushima Daiichi Nuclear Power Station.*" This document sets out a two-phase action plan to bring "the reactors and spent fuel pools to a stable cooling condition and [mitigate] the release of radioactive materials ...." This plan envisions actions over the next six to nine months. (Source: TEPCO 4/17). Staff is currently reviewing the document and seeking Consortium input.

TEPCO is considering adding boric acid to the core cooling water.

TEPCO has concerns regarding flooding up the drywell and prefers the existing approach of //feed and bleed for core cooling, with some leakage into the drywell. Concerns involve not having the exact water level and how to dispose of the water in the drywell.

TEPCO is considering: 1) entombment of the Unit 2 reactor building to stop leakage believed to be emanating from the suppression pool, 2) trying to ascertain whether the water in the Unit 2 basement may be coming from another unit, 3) requesting US assistance and expertise with processing high level radwaste, and 4) inerting Unit 3 drywell however difficult due to high rad levels and debris in the area.

TEPCO is experiencing challenges in accessing portions of the facility due to highly radioactive sludge and is exploring methods to address the problem. (Source: TEPCO)

Earthquake/Tsunami Status Update April 27, 2011 1200 EDT

STATUS as of 1200 EDT, April 27, 2011 (0100 Japan, April 28)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 55% 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 111.3°C at bottom drain, 137.7°C at FW nozzle (Source: IAEA 4/18). RPV pressure (Ch A: 78 psig, Ch B: 183 psig) (Source: DOE 4/25).

Core Cooling: Fresh water injection via temporary electrical pump to FW line at 26.4 gpm (Source: IAEA 4/25). 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 decreased to 10 psig, torus pressure at 10 psig and slowly increasing from N_2 injection (Source: IAEA 4/18). Leakage rate estimated at 3m3/hr

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 36°C (Source: IAEA 4/16, 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).

Actions: TEPCO increased flow to the RPV from 5.9 m3/hr to 10.0 m3/hr for a period of 6 hours (complete at app. 0300 4/27/2011) attempting to raise the primary containment water level from an estimated 2 feet below RPV lower head to above lower RPV lower head. It is expected to change the RPV lower head temperature indication. Robotics was unsuccessful at locating primary containment leakage paths. TEPCO will continue the robotics leak detection activities with the higher water level in the primary containment. (Source: Site Team 4/27)

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 35% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV Level 3/5 TAF (NISA 4/8) Bottom head temperature no data, feed water nozzle temperature 122.9°C (Source: DOE 4/25). RPV pressure: Ch A: 12 psig, Ch D: 11 psig (Source: DOE4/25). 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 (Source: IAEA 4/25).

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). DW Pressure: 0 psig (Source: IAEA 4/15).

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 41°C (Source: IAEA 4/18). 60 Tons of fresh water added 4/10 (Source: IAEA 4/14).

Actions: Refilled SFP to overflow (Source: Site Team4/27)

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).
Power: On offsite power (Source: NISA 4/3)

Unit 3 – (NRC Priority: 3)
Core Status: Estimated 30% damage (Source: TEPCO), Bottom head temperature 110.8°C, FW nozzle temperature: 74.6°C (Source: IAEA 4/25/2011). RPV pressure Ch A: 0 psig, Ch B: 0 psig (Source: IAEA 4/18). 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: IAEA 4/25). Recirculation pump seals have likely failed (Source: GEH).
Primary Containment: Damage suspected. Drywell Pressure: 0 psig and Torus Pressure 9 psig (Source: IAEA 4/18). Nitrogen injection delayed due to problems accessing equipment (Source: NHK).
Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Low water level. Temperature 41.6°C estimated (Source: DOE 4/25), Fresh water sprayed via concrete pump on 4/8 (Source: TEPCO 4/9). ~30 Tons added on 4/18 (site team 4/20).
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 (Source: 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 20°C (Source: JAIF 4/18). Freshwater added via concrete pump 4/9, additional spraying as needed (Source: TEPCO 4/9). 195 Tons fresh water added 4/12 (Source: IAEA 4/14). Fresh water spraying restarted by concrete pump truck on 4/15 (Source: IAEA 4/16). TEPCO acknowledges there is a leak in the SFP (Source: TEPCO, unconfirmed). Water level ~2.5m above top of fuel (Source: TEPCO, uncertain). The extent of fuel damage, if any, is uncertain. Analyzed isotope levels from the pool may not be indicative of the actual state of fuel in the pool and may be more indicative of the isotopes from the water sprayed into the pool. Further sampling has been suggested by the NRC Site Team, but due to the complexity of obtaining samples from the pool, TEPCO has not planned further sampling.
Actions: Installed SFP T/C level indication stalk (Source: Site Team4/27)
TEPCO has added 140-210 tons of water through April 26, 2011, resultant level 10 to 40 centimeters lower than expected. Surmise water leaking from spent fuel pool (Source TEPCO, 4/27)
Plans to install concrete pillars to support the fuel pool by around July to increase its earthquake resistance (Source: TEPCO 4/27)
Power: On offsite AC power (Source: 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.

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.

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.

As requested by the Japan Site Team, PMT is coordinating the review of Japan's emergency preparedness, planning and programs to identify differences between the U.S. and Japan approaches to protective measures.

International Response

- On April 15, 2011 the US Embassy in Japan has lifted the voluntary authorized departure for dependents of US government staff who voluntarily relocated from the Tokyo area. A travel alert has been issued on the subject and can be found online at: http://japan.usembassy.gov/e/acs/tacs-alert20110415.html.
- 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 weekly 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.

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
$T_F = (9/5 \times T_C + 32)$
1Kilometer (km) = 0.62 mile (mi)

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 27, 2011 0700 EDT

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KK/123

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- NRC internal review of composite report ongoing (NSIR lead) with plans to seek interagency review, finished product due by April 29
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- Completed NRC review of the TEPCO Roadmap, which was provided to the site team. NRC received favorable comments from Japanese government. Agreed on comments related to using risk assessment to reduce risk, safety culture, human factors, sharing information and lessons learned, and independent oversight. They are looking to get IAEA and WANO added to future independent reviews. Consortium provided comments by 1800 EDT, Wednesday, April 27.
- No further work will be done on the RST assessment or the"Interim Comprehensive Assessment" (Global Assessment/Interim Safety Assessment).
- Japan Team priorities are now in order of importance: 1. Waste Water Management, 2. Erratic and failing instrumentation, and 3. Decay heat removal.
- Sandia has provided analysis that if U3 has not gone ex-vessel, it won't. Radiation heat rejection off the bottom head will accommodate the decay heat load even if water contact with the lower head cannot be attained by containment flooding.
- Unit 1 RPV injection increased from 5.9 m^3/hr to 14 m^3/hr. Looking for a change in Rx vessel bottom head temperature as an indication of water level. No data at this time.

PMT Overview and Priorities

- The "Composite" document (item #4969) which provides recommendations for re-entry of US citizens back into the 50 mile evacuation zone is in final review by NSIR management.
- OPA has been contacted to obtain their feedback regarding the content of any press release(s) that may be issued by NRC in conjunction with a Department of State travel advisory related to relaxation of the 50 mi evacuation recommendation.
- M. Virgilio indicated that he would like to send the composite document out to federal agencies, incorporate comments, and finalize the document by the end of this week.
- Prior to the accident at Fukushima Daiichi, approximately 1200 U.S. citizens were known to have lived within 50 miles of the plant but outside of the 20 km evacuation zone. This information was provided by the consulate to the Japan PMT (Heather Gepford).
- Bullet train service between Tokyo and Sendai resumes within the next week. Also, the highway route from Tokyo to Sendai runs parallel to the bullet train. Both routes contain segments that are within the 50 mile zone but outside 30 km. DOE has been performing rad readings of the highway route and will be providing the data to the Japan PMT. Once data is available, we will be requested to provide a recommendation for U.S. citizens who would like to use the highway and/or train. Without these options, it takes over 10 hours to travel between these destinations.
- PMT is resuming daily conference call with PMT Japan at 6:30pm EST.

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LT Overview and Priorities

- U.S. - Japan Economic Strategy Institute in Tokyo requested help in obtaining acceptable shipping containers for radioactive materials. Helen Peterson in the Foreign Commercial Services Unit U.S. Embassy Japan has this for action.
- Earlier today, April 26, 2011, the Executive Team sent out a message stating future updates of the USNRC Status Update will be loaded to the Japan SharePoint page at http://nsir-ops.nrc.gov/. You may subscribe to email alerts through the SharePoint page (instructions in 2nd attachment). Several people responded stating they were unable to access SharePoint via their Blackberry. The computer folks were contacted and after investigating they said currently you cannot access the SharePoint site from your Blackberry.
- The TAs and CAs 1000 briefing call needs to be rescheduled due to the Japan/SBO Commission meeting. The call is tentatively moved to 1430 on Thursday.

USNRC Emergency Operations Center Status Update

April 28, 2011
Earthquake / Tsunami Status Update
Compiled by Liaison Coordinator

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. 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/.

Japan has scheduled a national stand-down on Friday April 29th, and Tuesday through Thursday, May 3rd, 4th, and 5th 2011 inclusive.

NISA and TEPCO have started holding joint press conferences to improve communications with the public. The first press conference occurred April 26 and lasted 3 hours. More joint press conferences are scheduled for the week.

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. According to media sources, Japan decided Thursday April 21, 2011 to prohibit residents from staying within a 20-kilometer radius of Fukushima NPP. People will only be allowed to enter the zone for up to two hours to collect belongings under government supervision. No member of the public would be allowed within 3 km of the site. The

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government added some towns outside the 20-km radius to the list of areas covered by its "no-entry" directive (Kyodo New, 22 April.)(0600 4/22 SITREP)

As reported by Kyodo News early Thursday 21 April, TEPCO announced highly radioactive water that leaked into the Pacific Ocean from the Daiichi nuclear plant in early April contained an estimated 5,000 terabecquerels of radioactive substances – 20,000 times the annual allowable limit for the plant – with TEPCO reporting total leakage amounting to 520 tons. TEPCO estimates the leakage to have lasted for six days through April 6.

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 typically held daily on technical issues at 11:00 EDT and are held at 2000 EDT on days agreed to by the consortium for topics including supply needs by GoJ.

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

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 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. 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)

Groundwater sampling near Units 1 & 2 showed increased radiation levels 6-38 times greater than previous measurements, based on isotope analysis. Groundwater flow leads to the ocean (Source: Site Team 4/15). TEPCO completed pumping out low-level liquid radwaste from the common-area radwaste building and applied sealant. TEPCO is transferring highly radioactive water from the Unit 2 turbine building basement to the radwaste facility; expecting 26 days to complete. (Source: Site Team 4/19).

TEPCO expects to have a tanker barge available by mid-May that will be able to hold 27,000 Tons of liquid radwaste, giving them a total of 60,400 Tons of liquid radwaste storage capacity. TEPCO estimates that a total of 50,000 Tons of highly contaminated liquid radwaste will have been generated onsite by the end of May. (Source: Site Team 4/16).

On April 17, TEPCO released a document titled "*Roadmap towards Restoration from the Accident at Fukushima Daiichi Nuclear Power Station*." This document sets out a two-phase action plan to bring "the reactors and spent fuel pools to a stable cooling condition and [mitigate] the release of radioactive materials …." This plan envisions actions over the next six to nine months. (Source: TEPCO 4/17). Staff is currently reviewing the document and seeking Consortium input.

TEPCO is considering adding boric acid to the core cooling water.

TEPCO has concerns regarding flooding up the drywell and prefers the existing approach of feed and bleed for core cooling, with some leakage into the drywell. TEPCO's concerns involve the inability to measure the exact water level and disposal of the contaminated water that may leak out of the reactor building.

TEPCO is considering: 1) entombment of the Unit 2 reactor building to stop leakage that is believed to be emanating from the suppression pool, 2) trying to ascertain whether the water in the Unit 2 turbine building basement may be coming from another unit, 3) requesting US assistance and expertise with processing high level radwaste, and 4) inerting Unit 3 drywell, however, it may be difficult due to high rad levels and debris in the Unit 3 reactor building.

TEPCO is experiencing challenges in accessing portions of the facility due to highly radioactive sludge and is exploring methods to address the problem. (Source: TEPCO)

Earthquake/Tsunami Status Update April 28, 2011 1200 EDT

STATUS as of 1200 EDT, April 27, 2011 (0100 Japan, April 28)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 55% 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, when fresh water was not available, has left enough salt to fill the lower plenum to the core plate (Source: GEH, US Industry). Vessel temperatures 98.5°C at bottom drain, 107.3°C at FW nozzle (Source: TEPCO 4/28). RPV pressure (Ch A: 66 psig, Ch B: 171 psig) (Source: DOE 4/27).

Core Cooling: Fresh water injection via temporary electrical pump to FW line at 44.0 gpm (Source: Site Team 4/28). 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 decreased to 10 psig, torus pressure at 10 psig and slowly increasing from N_2 injection (Source: IAEA 4/18). Leakage rate estimated at 3m3/hr

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 20°C (Source: IAEA 4/27, 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).

Actions: TEPCO increased flow to the RPV from 5.9 m3/hr to 10.0 m3/hr for a period of 6 hours (complete at app. 0300 4/27/2011) to raise the primary containment water level from an estimated 2 feet below RPV lower head to above lower RPV lower head. TEPCO reported that the RPV lower head temperatures decreased to less than 100 °C (4/28/2011). Robotics was unsuccessful at locating primary containment leakage paths. TEPCO will continue the robotics leak detection activities with the higher water level in the primary containment. (Source: Site Team 4/27)

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 35% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV Level A -59.0" Level B -79.0" below TAF (DOE 4/27) Bottom head temperature no data, feed water nozzle temperature 120.4°C (Source: IAEA 4/27). RPV pressure: Ch A: 2.3 psig, Ch D: 4.0 psig (Source: DOE 4/27). Stabilized at atmospheric pressure since 3/18/11 (Source: IAEA 4/9).

Core Cooling: Fresh water injecting at 30.8 gpm (Source: IAEA 4/27).

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). DW Pressure: 0 psig (Source: IAEA 4/15).

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 70°C (Source: DOE 4/27). 135 Tons of fresh water added 4/25 (Source: IAEA 4/27).

Actions: Refilled SFP to overflow (Source: Site Team4/27)

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).
Power: On offsite power (Source: NISA 4/3)

Unit 3 – (NRC Priority: 3)
Core Status: Estimated 30% damage (Source: TEPCO), Bottom head temperature 110.7°C, FW nozzle temperature: 72.0°C (Source: IAEA 4/27). RPV pressure Ch A: 0 psig, Ch B: 0 psig (Source: IAEA 4/18). RPV level A -73", level B-86" below TAF (Source: IAEA 4/27). 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: IAEA 4/25). Recirculation pump seals have likely failed (Source: GEH).
Primary Containment: Damage suspected. Drywell Pressure: 0 psig and Torus Pressure 9 psig (Source: IAEA 4/18). Nitrogen injection delayed due to problems accessing equipment (Source: NHK).
Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Low water level. Temperature 47.0°C estimated (Source: IAEA 4/27), Fresh water sprayed via concrete pump on 4/8 (Source: TEPCO 4/9). ~30 Tons added on 4/18 (site team 4/20). ~47.5 Tons added on 4/26 (IAEA 4/27)
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 (Source: 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 83°C (Source: TEPCO 4/26). Freshwater added via concrete pump 4/9, additional spraying as needed (Source: TEPCO 4/9). 195 Tons fresh water added 4/12 (Source: IAEA 4/14). Fresh water spraying restarted by concrete pump truck on 4/15 (Source: IAEA 4/16). 140 Tons fresh water added on 4/23, 130 Tones added 4/26 (IAEA 4/27) TEPCO acknowledges there is a leak in the SFP (Source: TEPCO, unconfirmed). Water level ~2.5m above top of fuel (Source: TEPCO, uncertain). The extent of fuel damage, if any, is uncertain. Analyzed isotope levels from the pool may not be indicative of the actual state of fuel in the pool and may be more indicative of the isotopes from the water sprayed into the pool. Further sampling has been suggested by the NRC Site Team, but due to the complexity of obtaining samples from the pool, TEPCO has not planned further sampling.
Actions: Installed SFP T/C level indication stalk (Source: Site Team4/27)
TEPCO has added 140-210 tons of water through April 26, 2011, resultant level 10 to 40 centimeters lower than expected. Surmise water leaking from spent fuel pool (Source TEPCO, 4/27)
Plans to install concrete pillars to support the fuel pool by around July to increase its earthquake resistance (Source: TEPCO 4/27)
Power: On offsite AC power (Source: 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.

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.

Other Plants

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.

As requested by the Japan Site Team, PMT is coordinating the review of Japan's emergency preparedness, planning and programs to identify differences between the U.S. and Japan approaches to protective measures.

International Response

- On April 15, 2011 the US Embassy in Japan has lifted the voluntary authorized departure for dependents of US government staff who voluntarily relocated from the Tokyo area. A travel alert has been issued on the subject and can be found online at: http://japan.usembassy.gov/e/acs/tacs-alert20110415.html.
- 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 weekly 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.

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
$T_F = (9/5 \times T_C + 32)$
1Kilometer (km) = 0.62 mile (mi)

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 28, 2011 1500 EDT

One-Pager - Fukushima Daiichi

ET Overview and Priorities

- ET turnover: WebEOC turnover list, one-pager, list of major documents, tasker list, ET Log Book.
- Plant and fuel pool conditions are generally static. See RST Overview below for specific changes.
- USAID will transition support for NRC Japan Site Team to NRC (OCFO/OIP) on May 1.
- NRC reviewed and provided to Japan Site Team Lead the analysis of the adequacy of the TEPCO Roadmap on April 25. Consortium commented on April 27. Final internal review ongoing. Product due April 29.
- NRC internal review of composite report (Updated Travel Advisory) is ongoing (NSIR lead) with plans to seek interagency review. Rev 14 received. Finished product due by April 29.
- Site Team priorities: (1) water management; (2) erratic instrumentation behavior; and (3) decay heat removal.
- In light of the 0930 Commission Meeting (Thursday 4/28), the 1000 TAs & CAs Briefing with the ET has been rescheduled for 1300 (Thursday, 4/28).

RST Overview and Priorities

- Continued monitoring of Units. Conditions for Units 2 & 3 were static. Unit 1 RPV injection increased from 5.9 m^3/hr to 10 m^3/hr.
- TEPCO changed their #4 spent fuel pool assessment from yesterday and now indicated there is no leak on #4 spent fuel pool. GEH indicated that #4 spent fuel pool appears to be intact below the fuel transfer canal gate.
- It appears water level in the DW has reached the RPV lower head. RPV lower head temperature has dropped to 98.5°C.

PMT Overview and Priorities

- The "Composite" document (Rev 15) providing recommendations for re-entry of US citizens into the 50 mile evacuation was received, and has gone to M. Virgilio, who is waiting for feedback from Chairman, and then the federal family and finalize the document by the end of this week (04-29-11).
- OPA was contacted to obtain feedback regarding press release(s) that may be issued by NRC in conjunction with a Department of State travel advisory related to any US evacuation relaxation.
- Prior to the accident at Fukushima Daiichi, approximately 1200 U.S. citizens were identified to have lived within 50 miles of the plant, but outside of the 20 km evacuation zone. This information was provided by the consulate to the Japan PMT (Heather Gepford).
- Bullet train service between Tokyo and Sendai resumes within the next week. The highway route from Tokyo to Sendai runs parallel to the bullet train. Both routes contain segments that are within the 50 mile zone but outside 30 km. DOE performed radiation measurements of the highway route and will provide the data to the Japan PMT. We will then be requested to provide a recommendation for U.S. citizens regarding highway and/or train use.
- PMT is resuming daily conference call with PMT Japan at 6:30pm EST.

LT Overview and Priorities

- U.S. - Japan Economic Strategy Institute in Tokyo requested help in obtaining acceptable shipping containers for radioactive materials. Helen Peterson in the Foreign Commercial Services Unit U.S. Embassy Japan has this for action.
- All USNRC Status Updates now accessible on the Japan SharePoint page at http://nsir-ops.nrc.gov/. You may subscribe to email alerts through the SharePoint page (instructions in 2nd attachment). You cannot access the SharePoint site from your Blackberry at this time.

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April 28, 2011 2300 EDT

One-Pager - Fukushima Daiichi

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- USAID will transition support for NRC Japan Site Team to NRC (OCFO/OIP) on May 1.
- NRC reviewed and provided to Japan Site Team Lead the analysis of the adequacy of the TEPCO Roadmap on April 25. See RST overview below for specific changes.
- Composite report (Updated Travel Advisory): Current revision is with the Chairman for review. See PMT overview below for specific changes. Finished product due by April 29.
- Site Team priorities: (1) water management; (2) erratic instrumentation behavior; and (3) decay heat removal.
- Biweekly call with Industry Consortium conducted. Open items were reviewed and status updated where possible.

RST Overview and Priorities

- Continued monitoring of Units. Conditions for Units 2 & 3 were static. With the higher injection of 10 m^3/hr for Unit 1, RPV bottom head temperature has dropped from 110.5C to 98.5C and drywell pressure has dropped from 7.8 psig to 3.4 psig. The Site Team stated that TEPCo may reduce injection flow to prevent drywell pressure from going subatmospheric.
- TEPCO changed their #4 spent fuel pool assessment from yesterday and now indicated there is no leak on #4 spent fuel pool. GEH indicated that #4 spent fuel pool appears to be intact below the fuel transfer canal gate.
- The evaluation of the TEPCO Roadmap, Revision 5, has been completed by NRR and sent to the Industry Consortium for comments by tomorrow at 2:00pm. It is to be issued by the end of the day tomorrow.

PMT Overview and Priorities

- The "Composite" document (Rev 15) providing recommendations for re-entry of US citizens into the 50 mile evacuation was spent by M. Virgilio to the Chairman, who will then provide to the federal family by the end of this week (04-29-11).
- OPA was contacted to obtain feedback regarding press release(s) that may be issued by NRC in conjunction with a Department of State travel advisory related to any US evacuation relaxation.
- Prior to the accident at Fukushima Daiichi, approximately 1200 U.S. citizens were identified to have lived within 50 miles of the plant, but outside of the 20 km evacuation zone. This information was provided by the consulate to the Japan PMT (Heather Gepford).
- Bullet train service between Tokyo and Sendai resumes within the next week. There is also a highway route from Tokyo to Sendai that runs parallel to the bullet train. Both routes contain segments that are within the 50 mile zone but outside 30 km zone. DOE performed radiation measurements of the highway route and provided the data to the Japan PMT. HQ PMT has provided input to the Japan Team who will be providing a final recommendation to the US Ambassador to Japan.
- PMT is resuming daily conference call with PMT Japan at 6:30pm EST.
- As per the Japan PMT input, the HQ PMT is recommending not to staff over the weekend but to remain on-call.

LT Overview and Priorities

- U.S. - Japan Economic Strategy Institute in Tokyo requested help in obtaining acceptable shipping containers for radioactive materials. Helen Peterson in the Foreign Commercial Services Unit U.S. Embassy Japan has this for action.
- All USNRC Status Updates now accessible on the Japan SharePoint page at http://nsir-ops.nrc.gov/. You may subscribe to email alerts through the SharePoint page (instructions in 2nd attachment). You cannot access the SharePoint site from your Blackberry at this time.
- Next Industry Consortium (supplies) call is scheduled for Monday, 5/02/11 at 2000 – U.S. Embassy Japan has the lead for updating the Request Matrix.

KK/27

April 28, 2011 0700 EDT

One-Pager - Fukushima Daiichi

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RST Overview and Priorities

- Continued monitoring of Units. Conditions for Units 2 & 3 were static. Unit 1 RPV injection increased from 5.9 m^3/hr to 10 m^3/hr.
- As a result of their mass balance calculations, TEPCO indicated publicly that a potential leak in spent fuel pool Unit 4 may exist.
- Completing final NRC internal review of the TEPCO Roadmap, which was provided to the site team. Consortium provided comments by 1800 EDT, Wednesday, April 27.
- Sandia has provided analysis that if U3 has not gone ex-vessel, it won't. Radiation heat rejection off the bottom head will accommodate the decay heat load even if water contact with the lower head cannot be attained by containment flooding.
- No further work will be done on the RST assessment or the "Interim Comprehensive Assessment" (Global Assessment/Interim Safety Assessment).

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USNRC Emergency Operations Center Status Update

April 29, 2011
Earthquake / Tsunami Status Update
Compiled by Liaison Coordinator

This report includes NRC's current understanding of the ongoing situation in Japan. Historical and background information can be found in past reports.
NOTE: The next NRC update will be distributed @ 1200 EDT on Monday, May 2, 2011

NRC's Top Priorities

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

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

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. 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/.

Japan has scheduled a national stand-down on Friday April 29th, and Tuesday through Thursday, May 3rd, 4th, and 5th 2011 inclusive.

NISA and TEPCO have started holding joint press conferences to improve communications with the public. The first press conference occurred April 26 and lasted 3 hours. More joint press conferences are scheduled for the week.

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. According to media sources, Japan decided Thursday April 21, 2011 to prohibit residents from staying within a 20-kilometer radius of Fukushima NPP. People will only be allowed to enter the zone for up to two hours to collect belongings under government supervision. No member of the public would be allowed within 3 km of the site. The

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government added some towns outside the 20-km radius to the list of areas covered by its "no-entry" directive (Kyodo New, 22 April.)(0600 4/22 SITREP)

As reported by Kyodo News early Thursday 21 April, TEPCO announced highly radioactive water that leaked into the Pacific Ocean from the Daiichi nuclear plant in early April contained an estimated 5,000 terabecquerels of radioactive substances – 20,000 times the annual allowable limit for the plant – with TEPCO reporting total leakage amounting to 520 tons. TEPCO estimates the leakage to have lasted for six days through April 6.

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 typically held daily on technical issues at 11:00 EDT and are held at 2000 EDT on days agreed to by the consortium for topics including supply needs by GoJ.

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

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 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. 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)

Groundwater sampling near Units 1 & 2 showed increased radiation levels 6-38 times greater than previous measurements, based on isotope analysis. Groundwater flow leads to the ocean (Source: Site Team 4/15). TEPCO completed pumping out low-level liquid radwaste from the common-area radwaste building and applied sealant. TEPCO is transferring highly radioactive water from the Unit 2 turbine building basement to the radwaste facility; expecting 26 days to complete. (Source: Site Team 4/19).

TEPCO expects to have a tanker barge available by mid-May that will be able to hold 27,000 Tons of liquid radwaste, giving them a total of 60,400 Tons of liquid radwaste storage capacity. TEPCO estimates that a total of 50,000 Tons of highly contaminated liquid radwaste will have been generated onsite by the end of May. (Source: Site Team 4/16).

On April 17, TEPCO released a document titled "*Roadmap towards Restoration from the Accident at Fukushima Daiichi Nuclear Power Station*." This document sets out a two-phase action plan to bring "the reactors and spent fuel pools to a stable cooling condition and [mitigate] the release of radioactive materials ...." This plan envisions actions over the next six to nine months. (Source: TEPCO 4/17). Staff is currently reviewing the document and seeking Consortium input.

TEPCO is considering adding boric acid to the core cooling water.

TEPCO has concerns regarding flooding up the drywell and prefers the existing approach of feed and bleed for core cooling, with some leakage into the drywell. TEPCO's concerns involve the inability to measure the exact water level and disposal of the contaminated water that may leak out of the reactor building.

TEPCO is considering: 1) entombment of the Unit 2 reactor building to stop leakage that is believed to be emanating from the suppression pool, 2) trying to ascertain whether the water in the Unit 2 turbine building basement may be coming from another unit, 3) requesting US assistance and expertise with processing high level radwaste, and 4) inerting Unit 3 drywell, however, it may be difficult due to high rad levels and debris in the Unit 3 reactor building.

TEPCO is experiencing challenges in accessing portions of the facility due to highly radioactive sludge and is exploring methods to address the problem. (Source: TEPCO)

STATUS as of 1200 EDT, April 29, 2011 (0100 Japan, April 30, 2011)

Unit 1 – (NRC Priority: 1)

Core Status: Estimated 55% 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, when fresh water was not available, has left enough salt to fill the lower plenum to the core plate (Source: GEH, US Industry). Vessel temperatures 98.5ºC at bottom drain, 107.3ºC at FW nozzle (Source: TEPCO 4/28). RPV pressure (Ch A: 66 psig, Ch B: 171 psig) (Source: DOE 4/27).

Core Cooling: Fresh water injection via temporary electrical pump to FW line at 44.0 gpm (Source: Site Team 4/28). 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 decreased to 10 psig, torus pressure at 10 psig and slowly increasing from N_2 injection (Source: IAEA 4/18). Leakage rate estimated at 3m3/hr

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Temperature is at 20ºC (Source: IAEA 4/27, 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).

Actions: TEPCO increased flow to the RPV from 5.9 m3/hr to 10.0 m3/hr for a period of 6 hours (complete at app. 0300 4/27/2011) to raise the primary containment water level from an estimated 2 feet below RPV lower head to above lower RPV lower head. TEPCO reported that the RPV lower head temperatures decreased to less than 100 ºC (4/28/2011). Robotics was unsuccessful at locating primary containment leakage paths. TEPCO will continue the robotics leak detection activities with the higher water level in the primary containment. (Source: Site Team 4/27)

Unit 2 – (NRC Priority: 2)

Core Status: Estimated 35% damage (Source: TEPCO), fuel partially or fully exposed (Source: JAIF, NISA, TEPCO). RPV Level A -59.0" Level B -79.0" below TAF (DOE 4/27) Bottom head temperature no data, feed water nozzle temperature 120.4ºC (Source: IAEA 4/27). RPV pressure: Ch A: 2.3 psig, Ch D: 4.0 psig (Source: DOE 4/27). Stabilized at atmospheric pressure since 3/18/11 (Source: IAEA 4/9).

Core Cooling: Fresh water injecting at 30.8 gpm (Source: IAEA 4/27).

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO). DW Pressure: 0 psig (Source: IAEA 4/15).

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

Spent Fuel Pool: Fresh water is being supplied by the fuel pool cooling system piping, but not through the associated FPC pumps or heat exchangers (Source: Japan Site Team, 4/29), fuel pool temperature 70ºC (Source: DOE 4/27). 135 Tons of fresh water added 4/25 (Source: IAEA 4/27).

Actions: Refilled SFP to overflow (Source: Site Team4/27)

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).
Power: On offsite power (Source: NISA 4/3)

Unit 3 – (NRC Priority: 3)
Core Status: Estimated 30% damage (Source: TEPCO), Bottom head temperature 110.7°C, FW nozzle temperature: 72.0°C (Source: IAEA 4/27). RPV pressure Ch A: 0 psig, Ch B: 0 psig (Source: IAEA 4/18). RPV level A -73", level B-86" below TAF (Source: IAEA 4/27). 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: IAEA 4/25). Recirculation pump seals have likely failed (Source: GEH).
Primary Containment: Damage suspected. Drywell Pressure: 0 psig and Torus Pressure 9 psig (Source: IAEA 4/18). Nitrogen injection delayed due to problems accessing equipment (Source: NHK).
Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO)
Spent Fuel Pool: Low water level. Temperature 47.0°C estimated (Source: IAEA 4/27), Fresh water is being supplied by the fuel pool cooling system piping, but not through the associated FPC pumps or heat exchangers (Source: Japan Site Team, 4/29). ~30 Tons added on 4/18 (site team 4/20). ~47.5 Tons added on 4/26 (IAEA 4/27)
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 (Source: 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 83°C (Source: TEPCO 4/26). Freshwater added via concrete pump 4/9, additional spraying as needed (Source: TEPCO 4/9). 195 Tons fresh water added 4/12 (Source: IAEA 4/14). Fresh water spraying restarted by concrete pump truck on 4/15 (Source: IAEA 4/16). 140 Tons fresh water added on 4/23, 130 Tones added 4/26 (IAEA 4/27) TEPCO acknowledges there is a leak in the SFP (Source: TEPCO, unconfirmed). Water level ~2.5m above top of fuel (Source: TEPCO, uncertain). The extent of fuel damage, if any, is uncertain. Analyzed isotope levels from the pool may not be indicative of the actual state of fuel in the pool and may be more indicative of the isotopes from the water sprayed into the pool. Further sampling has been suggested by the NRC Site Team, but due to the complexity of obtaining samples from the pool, TEPCO has not planned further sampling.
Actions: Installed SFP T/C level indication stalk (Source: Site Team4/27)
TEPCO has added 140-210 tons of water through April 26, 2011, resultant level 10 to 40 centimeters lower than expected. Surmise water leaking from spent fuel pool (Source TEPCO, 4/27)
Plans to install concrete pillars to support the fuel pool by around July to increase its earthquake resistance (Source: TEPCO 4/27)
Power: On offsite AC power (Source: 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.

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.

Other Plants

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 today with a request for comments by Monday, May 2, 2011.

International Response

- On April 15, 2011 the US Embassy in Japan has lifted the voluntary authorized departure for dependents of US government staff who voluntarily relocated from the Tokyo area. A travel alert has been issued on the subject and can be found online at: http://japan.usembassy.gov/e/acs/tacs-alert20110415.html.
- 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 weekly 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.

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

Earthquake/Tsunami Status Update April 29, 2011 1200 EDT

1 Sv = 100 rem
$T_F = (9/5 \times T_C + 32)$
1Kilometer (km) = 0.62 mile (mi)

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 29, 2011 1500 EDT

One-Pager - Fukushima Daiichi
(NOTE: NRC Headquarters Operations Center will not be staffed from 4/29 1500 EDT to 5/2 0700 EDT)

ET Overview and Priorities

- Plant and fuel pool conditions are generally static. See RST Overview below for specific changes.
- USAID will transition support for NRC Japan Site Team to NRC (OCFO/OIP) on May 1.
- TEPCO Roadmap Review (Rev 5) provided to industry consortium for comment (due 4/29/11).
- Composite report (Updated Travel Advisory): Current revision is with the Chairman for review. Sendai corridor (highway and rail) opening currently tied to composite release. Product anticipated to be distributed to interagency 4/29/11 1200 EDT. See PMT overview below for specifics.
- Site Team priorities: (1) water management; (2) erratic instrumentation behavior; and (3) decay heat removal.

RST Overview and Priorities

- Continued monitoring of Units. Conditions for Units 2 & 3 were static. The Site Team stated that TEPCO reduced injection flow (to prevent drywell pressure from going sub-atmospheric) from 10 to 6 m^3/hr for Unit 1. RPV bottom head temperature continues to slowly decrease below 98.5C and drywell pressure has also continued to slowly decrease below 3.4 psig.
- TEPCO changed their #4 spent fuel pool assessment from yesterday and now indicated there is no leak on #4 spent fuel pool. GEH indicated that #4 spent fuel pool appears to be intact below the fuel transfer canal gate.
- TEPCO is using the 1F2 and 1F3 spent fuel pool cooling system piping (not the associated pumps and heat exchangers) to inject fresh water into the fuel pools.
- The evaluation of the TEPCO Roadmap, Revision 5, has been completed by NRR and sent to the Industry Consortium for comments by 4/29/11 at 1400 EDT. It is to be issued by the end of the day 4/29/11.
- NRR is currently working on risk assessments of units 1-3, and unit 4 spent fuel pool. To be delivered to the Site Team next week.
- NRR has been tasked with Mass Balance to support determination of turbine building inleakage on unit 2. Due by COB 5/2/11.

PMT Overview and Priorities

- The "Composite" document (Rev 15) providing recommendations for re-entry of US citizens into the 50 mile evacuation was sent to the interagency on 4/29/11. NRC is expecting comments by COB on Monday and will then coordinate comments and transmit to the Japan Team. Embassy ultimately decided to wait for this document rather than open Sendai corridor separately.
- OPA was contacted to obtain feedback regarding press release(s) that may be issued by NRC in conjunction with a Department of State travel advisory related to any US evacuation relaxation.
- Prior to the accident at Fukushima Daiichi, approximately 1200 U.S. citizens were identified to have lived within 50 miles of the plant, but outside of the 20 km evacuation zone. This information was provided by the consulate to the Japan PMT (Heather Gepford).
- Bullet train service between Tokyo and Sendai resumes within the next week. There is also a highway route from Tokyo to Sendai that runs parallel to the bullet train. Both routes contain segments that are within the 50 mile zone but outside 30 km zone. DOE performed radiation measurements of the highway route and provided the data to the Japan PMT. HQ PMT has provided input to the Japan Team who will be providing a final recommendation to the US Ambassador to Japan.
- PMT is resuming daily conference call with PMT Japan at 6:30pm EST.

LT Overview and Priorities

- All USNRC Status Updates now accessible on the Japan SharePoint page at http://nsir-ops.nrc.gov/. You may subscribe to email alerts through the SharePoint page (instructions in 2nd attachment). You cannot access the SharePoint site from your Blackberry at this time.
- Next Industry Consortium (supplies) call is scheduled for Monday, 5/02/11 at 2000 – U.S. Embassy Japan has the lead for updating the Request Matrix.

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April 29, 2011 0700 EDT

One-Pager - Fukushima Daiichi

ET Overview and Priorities

- Plant and fuel pool conditions are generally static. See RST Overview below for specific changes.
- USAID will transition support for NRC Japan Site Team to NRC (OCFO/OIP) on May 1.
- TEPCO Roadmap Review (Rev 5) provided to industry consortium for comment (due 4/29/11).
- Composite report (Updated Travel Advisory): Current revision is with the Chairman for review. Sendai corridor (highway and rail) opening currently tied to composite release. Product anticipated to be distributed to interagency 4/29/11 1200 EDT. See PMT overview below for specifics.
- Site Team priorities: (1) water management; (2) erratic instrumentation behavior; and (3) decay heat removal.

RST Overview and Priorities

- Continued monitoring of Units. Conditions for Units 2 & 3 were static. With the higher injection of 10 m^3/hr for Unit 1, RPV bottom head temperature has dropped from 110.5C to 98.5C and drywell pressure has dropped from 7.8 psig to 3.4 psig. The Site Team stated that TEPCO may reduce injection flow to prevent drywell pressure from going sub-atmospheric.
- TEPCO changed their #4 spent fuel pool assessment from yesterday and now indicated there is no leak on #4 spent fuel pool. GEH indicated that #4 spent fuel pool appears to be intact below the fuel transfer canal gate.
- The evaluation of the TEPCO Roadmap, Revision 5, has been completed by NRR and sent to the Industry Consortium for comments by 4/29/11 at 1400 EDT. It is to be issued by the end of the day 4/29/11.
- NRR is currently working on risk assessments of units 1-3, and unit 4 spent fuel pool. To be delivered to Jeff Mitman (Site Team) by 5/1/11 1800 EDT.
- NRR has been tasked with Mass Balance to support determination of turbine building inleakage on unit 2. Due by COB 5/2/11.

PMT Overview and Priorities

- The "Composite" document (Rev 15) providing recommendations for re-entry of US citizens into the 50 mile evacuation was sent by M. Virgilio to the Chairman, who will then provide to the federal family by the end of this week (04/29/11). Embassy ultimately decided to wait for this document rather than open Sendai corridor separately.
- OPA was contacted to obtain feedback regarding press release(s) that may be issued by NRC in conjunction with a Department of State travel advisory related to any US evacuation relaxation.
- Prior to the accident at Fukushima Daiichi, approximately 1200 U.S. citizens were identified to have lived within 50 miles of the plant, but outside of the 20 km evacuation zone. This information was provided by the consulate to the Japan PMT (Heather Gepford).
- Bullet train service between Tokyo and Sendai resumes within the next week. There is also a highway route from Tokyo to Sendai that runs parallel to the bullet train. Both routes contain segments that are within the 50 mile zone but outside 30 km zone. DOE performed radiation measurements of the highway route and provided the data to the Japan PMT. HQ PMT has provided input to the Japan Team who will be providing a final recommendation to the US Ambassador to Japan.
- PMT is resuming daily conference call with PMT Japan at 6:30pm EST.
- As per the Japan PMT input, the HQ PMT is recommending not to staff over the weekend but to remain on-call.

LT Overview and Priorities

- All USNRC Status Updates now accessible on the Japan SharePoint page at http://nsir-ops.nrc.gov/. You may subscribe to email alerts through the SharePoint page (instructions in 2nd attachment). You cannot access the SharePoint site from your Blackberry at this time.
- Next Industry Consortium (supplies) call is scheduled for Monday, 5/02/11 at 2000 – U.S. Embassy Japan has the lead for updating the Request Matrix.

RK/13/

April 30, 2011 1500 EDT

One-Pager - Fukushima Daiichi
(NOTE: NRC Headquarters Operations Center will not be staffed from 4/29 1500 EDT to 5/2 0700 EDT)
Weekend updates provided by ET Director in coordination with NRC Japan Site Team

ET Overview and Priorities

- Plant and fuel pool conditions are generally static. See RST Overview below for specific changes.
- USAID will transition support for NRC Japan Site Team to NRC (OCFO/OIP) on May 1.
- TEPCO Roadmap analysis: RST incorporated consortium comments and provided to NRC Site Team on 4/29/11.
- Composite report (Updated Travel Advisory): approved by Chairman and sent to interagency for comment on 4/29/11. Comments expected by COB on Monday 5/1/11 Sendai corridor (highway and rail) opening currently tied to composite release. See PMT overview below for specifics.
- Site Team priorities: (1) water management; (2) erratic instrumentation behavior; and (3) decay heat removal.

RST Overview and Priorities

- Conditions for Units 2 & 3 were static. The Site Team stated that TEPCO reduced injection flow (to prevent drywell pressure from going sub-atmospheric) from 10 to 6 m^3/hr for Unit 1. RPV bottom head temperature increased to 123 C (up about 25 C, where it was before flow was increased on Thursday) and drywell pressure also increased, as expected. These parameters will be monitored over the next few days to ensure they stabilize.
- TEPCO changed their #4 spent fuel pool assessment from Thursday and now indicated there is no leak on #4 spent fuel pool. GEH indicated that #4 spent fuel pool appears to be intact below the fuel transfer canal gate.
- TEPCO is using the 1F2 and 1F3 spent fuel pool cooling system piping (but not the associated pumps and heat exchangers) to inject fresh water into the fuel pools.
- NRR comments on the TEPCO Roadmap were completed on 4/28/11 and sent to the Industry Consortium for comments. Comments were incorporated and the document was sent to the Site Team on 4/29/11.
- NRR is performing risk assessments of spent fuel pools. Due to the Site Team by 5/2/11.
- NRR is performing a rough Mass Balance analysis to support determination of turbine building inleakage on unit 2. Due by COB 5/2/11.

PMT Overview and Priorities

- The "Composite" document (aka - updated travel advisory) providing recommendations for re-entry of US citizens into the 50 mile evacuation, was sent to the interagency on 4/29/11. Comments are due COB Monday and will then coordinate comments and transmit to the Japan Team. Embassy decided to wait for this document rather than open Sendai corridor separately.
- OPA was contacted to obtain feedback regarding press release(s) that may be issued by NRC in conjunction with a Department of State travel advisory related to any US evacuation relaxation.
- Prior to the accident at Fukushima Daiichi, approximately 1200 U.S. citizens were identified to have lived within 50 miles of the plant, but outside of the 20 km evacuation zone. This information was provided by the consulate to the Japan PMT (Heather Gepford).
- Bullet train service between Tokyo and Sendai resumes within the next week. There is also a highway route from Tokyo to Sendai that runs parallel to the bullet train. Both routes contain segments that are within the 50 mile zone but outside 30 km zone. DOE performed radiation measurements of the highway route and provided the data to the Japan PMT. HQ PMT has provided input to the Japan Team who will be providing a final recommendation to the US Ambassador to Japan.
- PMT is resuming daily conference call with PMT Japan at 6:30pm EST.

LT Overview and Priorities

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- Next Industry Consortium (supplies) call is scheduled for Monday, 5/02/11 at 2000 – U.S. Embassy Japan has the lead for updating the Request Matrix.

USNRC Emergency Operations Center Status Update

March 19, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report was changed to include 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) Facilitating a March 19, 2011 kick-off meeting between government and industry to engineer a solution. Industry participants expected to attend include representatives from: INPO, GE Hitachi, Bechtel, AREVA, Exelon, EPRI, and Babcock. DOE and Naval Reactors are also attending.

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

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

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.

A total of 10 NRC experts supporting USAID response efforts from the NRC are in Japan and have engaged with the US Ambassador and his staff. Tim Kolb coming home ((b)(6)) - lands 3:30 p.m. on Saturday. Currently staffing a relief team- Dan Dorman will depart Saturday at 1:20 p.m.; arrive in Japan Sunday at 4:30 p.m. (3:30 a.m. EST).

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/

At 0550 EDT, March 14, 2011, the NRC experts in Japan reported that the Japanese have requested US technical assistance with cooling the Fukushima Daiichi Units, as needed. The effort is being coordinated by the US Ambassador. At 0900 EDT, March 15, 2011, the Japanese government accepted DOE's Radiological Assistance Program (RAP) team assistance, which includes Aerial Measuring System (AMS) flyovers. UK and Canada have requested NRC to share this information and we are working with DOE to see if this can be shared.

On March 16, NRC provided the White House with information on protective measures for NRC staff in Japan and information to provide advice for other federal workers in Japan. The current

protective action recommendation for U.S. citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate. Four buses were provided for what Department of State (DOS) call "voluntary departure" from Japan. Two buses already left; two buses are loading currently in Sendai and will leave around 6:00 p.m. today in Japan. All four buses are headed to Tokyo (13 hour bus ride). DOS believes all U.S. citizens interested in evacuating have done so and there are no plans for additional buses.

Japanese Ministry of Defense (MOD) has assumed the lead role in Japanese response activities. TEPCO is now in an advisory role to MOD.

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

Commission Meeting scheduled for Monday, March 21. (Public/Media expected) Bill Borchardt presenting – supporting activities in Japan; justification for continued operation of U.S. facilities; path forward for NRC staff.

Status of NRC Licensee and Agreement State Facilities

NRC issued Information Notice 2011-05 to the U.S. nuclear power reactor fleet on March 18.

The Institute of Nuclear Power Operations (INPO) issued a Level 1 Event Report (highest level) to its members on the afternoon of March 15, 2011. It identifies 4 actions, with due dates, and requires a written response. In general, the actions include walkdowns and verifications of aspects of facility capabilities to address B.5.b equipment and procedures, Severe Accident Management Guidelines (SAMGs), mitigation of station blackout (SBO) conditions, mitigation of internal and external flooding, and fire and flooding events that could be impacted by a concurrent seismic event.

The Nuclear Energy Institute (NEI) issued several fact sheets, the latest on March 17, 2011: "Perspective on Radiation Releases and Emergency Planning at U.S. Nuclear Power Plants"

Current Understanding of Japanese Facilities

(This information is compiled from 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, Japan Atomic Industrial Forum, World Association of Nuclear Operators, the NRC in-country team and others.)

Fukushima Daiichi

Japanese national government instructed evacuation for local residents within a 20km radius of the site boundary and sheltering in place out to 30 km for residents who stayed behind. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. As of 1830 EDT on March 15, 2011, there have been no updates to protective actions.

Earthquake/Tsunami Status Update March 19, 2011 0600 EDT

On March 17, Japanese authorities have changed the classification of the event from a Level 4 to a Level 5 "Accident with Wider Consequences" on the International Nuclear and Radiological Event Scale (INES).

NHK media report on March 17, 0100 EDT stated that helicopter crews dumping water on Unit 3 reactor building reported dose rates at 375 R/hr at 300 ft. above the building.

All available information indicates that the majority of releases from the Fukushima site have been carried out to sea by the prevailing winds. Forecast meteorological data for the next 48 hour period (March 19 – 21, 2011) indicates wind headed offshore until Sunday, with a shift counter clockwise to onshore. This onshore shift remains predicted to last approximately 12 hours before shifting back offshore.

DOE Aerial Measurement Teams have completed two flyovers of the Daiichi site. NRC has received the data and the analyses, which support a concentration of ground deposition in the NW quadrant (from the plant site) also reported by Ministry of Education, Culture, Sports, Science and Technology (MEXT) field monitoring teams following the March 15 on-shore wind shift.

Fukushima Daiichi
STATUS as of 0600 EDT, March 19, 2011 - (1900 Japan)

Unit 1 – (NRC priority: 4)
Core Status: Damaged, extent undetermined
Core Cooling: RCS depressurized (Source: FEPC); sea water injected to cool core (Source: NISA)
Primary Containment: functional (Source: JAIF)
Secondary Containment: lost (visual)
Spent Fuel Pool: 292 bundles in pool (Source: GEH); water level unknown (Source: JAIF)

Unit 2 – (NRC priority: 3)
Core Status: damaged, extent undetermined
Core Cooling: RCS pressures unknown (Source: IAEA, March 19); sea water injected to cool core (Source: NISA)
Primary Containment: Possible Torus damage
Secondary Containment: Hole cut in side of fuel floor metal to reduce H_2 buildup. Steam coming from hole (visual).
Spent Fuel Pool: 587 bundles in pool (Source: GEH)
Other: TEPCO has outside power to Auxiliary Transformer (TEPCO)

Unit 3 – (NRC priority: 1)
Core Status: Damaged, extent undetermined
Core Cooling: RCS depressurized (Source: FEPC); radiation released; sea water injected to cool core (Source: NISA)

Primary Containment: status unknown
Secondary Containment: lost (visual); white smoke (Source: IAEA – Interpreted by NRC as steam)
Spent Fuel Pool: 514 bundles in pool (Source: GEH); **Pool Dry (Source: NRC Team)**; helicopters flew to drop water and water cannon truck sprayed water on March 17 (Source: METI); 7 fire trucks are supplying seawater for cooling spray periodically

Unit 4 – (NRC priority: 2)
Core Status: offloaded
Core Cooling: N/A
Primary Containment: N/A
Secondary Containment: lost (visual)
Spent Fuel Pool: 1201 bundles in pool (Source: GEH); pool may be dry; damage to fuel rods suspected (Source: JAIF); water was dumped on site with water cannons

Unit 5 – Shutdown since January 3, 2011 (NRC priority: 5)
Core Status: Core in RPV (Source: INPO)
Spent Fuel Pool: 950 bundles (Source: GEH); (temperature 69C) Unit 6 emergency diesel generator is available; fire truck spray has been staged

Unit 6 – Shutdown since August 14, 2010 (NRC priority: 6)
Core Status: Core in RPV (Source: INPO)
Spent Fuel Pool: 876 bundles (Source: GEH); (temperature 66C) Unit's emergency diesel generator is available.

Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH) located on land side of Unit 4 (visual)
Electrical Power (NRC priority: 7): Restoration from switchyard to Unit 2 480V in progress
Dry Cask Storage: Visual inspection didn't reveal any problems.

Other Plants

Fukushima Daini

- No changes to report

Onagawa

- No changes to report

Rokkasho

- No changes to report

Protective Measures Team (PMT)

Earthquake/Tsunami Status Update March 19, 2011 0600 EDT

The following is a synopsis of efforts and details of source team determination for use by the National Atmospheric Release Advisory Center (NARAC) in modeling potential exposure to U.S. populations:

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

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

The overall timing (sequence) of releases from each unit are as follows: Unit 1 reactor at 15:36 on 3/12/2011; Unit 3 reactor at 11:15 on 3/14/2011; Unit 2 reactor at 06:15 on 3/15/2011; Unit 3 and 4 spent fuel pools at 6:15 on 3/16/2011 (assumed 24 hrs after previous reactor release); Unit 2 spent fuel pool at 6:15 on 3/17/2011 (assumed 24 hrs after previous spent fuel pool release); Unit 1 spent fuel pool at 6:15 on 3/18/2011 (assumed 24 hrs after previous spent fuel pool release).

The PMT is working with DOE/NARAC to refine source term models in an effort to develop dose projections beyond 50 miles. The 50 mile distinction is made because NRC RASCAL modeling is only capable to estimate dose values out to 50 miles. Therefore, NRC has the responsibility to develop source terms and dose projections within Japan, up to 50 miles from the reactor site, while DOE has the lead for dose projections beyond 50 miles and for the United States and territories.

The source term provided to NARAC was: (1) 25% of the total fuel in unit 2 released to the atmosphere, (2) 50% of the total spent fuel from unit 3 was released to the atmosphere, and (3) 100% of the total spent fuel was released to the atmosphere from unit 4. All 96 hour dose projections (Alaska, Hawaii, West Coast) are well below the 1 rem total effective dose (TED) Protective Action Guide (PAG) based on predicted Cs-137 deposition. Except for Alaska, all thyroid dose estimates are well below the EPA 5 rem PAG. The thyroid estimate is very conservative and does not consider intervention actions like distribution of potassium iodide, removing dairy cows from contaminated pastures, or interdicting milk or leafy vegetables contaminated with I-131.

Earthquake/Tsunami Status Update March 19, 2011 0600 EDT

The PMT has received information from several various sources regarding radiological conditions around the reactors. Some information (from March 17) around the plant indicates dose rates between 36 mr/hr and 65 mr/hr at approximately ½ mile from the site (over land). Information recorded onsite on March 16, 2011 indicated approximately 30 R/hr near the reactor buildings and an unconfirmed dose rate of 375 R/hr approximately 300 feet above the Unit 3 reactor (during a helicopter fly over). Department of Energy Aerial Monitoring System (AMS) fly over data on March 18, 2011 generally agrees with MESA supplied field monitoring team data out to approximately 30 km (18 miles) west of the site. Data shows that ground level dose rates from deposition are highest in the NW quadrant, with 20 – 40 mr/hr readings (recorded by AMS) and 18 mr/hr (field team) readings between 20km and 30 km in that quadrant.

Department of Energy Aerial Monitoring operations were conducted on March 17-18, 2011. Two missions using fixed wing (C-12 aircraft) conducted parallel and serpentine patterns near the Fukushima nuclear power plant. A narrow band to the northwest, 13 to 20 miles from the site, has a high concentration of contaminated materials.

AMS information shows that dose rates from ground deposition exist between 20 and 30 km that would result in a whole body dose of greater than 1 REM over continuous exposure for 4 days. This information agrees with Ministry of Education, Culture, Sports, Science and Technology (MEXT) field measurements in the same area. The Government of Japan may want to consider extending their evacuation zone beyond the current 20 km (12 mile) radius.

International Response

- IAEA sent a two person team to conduct coordination activities and to take measurements. NRC communicated with IAEA to discuss the status and concerns. The team's updates have been added to the IAEA Early Notification and Assistance Conventions Website (ENAC) website and NRC has this information.
- France has shared technical data with the NRC and publicly posted its assessment of projected doses in Tokyo on the IRSN website.
- Spain Parliament is still reviewing and deciding on support levels.
- Italy is interested in discussing what the USG is doing, and might be interested in helping in some way.
- China has offered to help.
- Russia has sent a team to Tokyo. The U.S. team has met with the Russians. We believe the Russians are departing.

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

USNRC Emergency Operations Center Status Update

March 23, 2011
Earthquake / Tsunami Status Update
Compiled by Executive Briefing Team

This report was changed to include 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.

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

3) Coordination with other U.S. 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.

A team of NRC experts supporting USAID response efforts is in Japan and has engaged with the US Ambassador and his staff. A relief team is being staffed and dispatched.

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. On March 15, 2011, the Japanese government accepted DOE's Radiological Assistance Program (RAP) team assistance, which includes Aerial Monitoring System (AMS) flyovers.

On March 16, 2011, NRC provided the White House with information on protective measures for NRC staff in Japan and information to provide advice for other federal workers in Japan. The current protective action recommendation for U.S. citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate. The Bureau of Consular Affairs reported that three U.S. chartered buses departed Sendai March 19. The consular team in Sendai finished door-to-

4/2

door searches for U.S. citizens and returned to Tokyo. No further U.S.-chartered flights are planned at this time.

Japanese Ministry of Defense (MOD) has assumed the lead role in Japanese response activities.

NRC is participating in ongoing discussions with the White House, Ambassador Roos, Naval Reactors, PACOM, and USFJ regarding precautions for and protection of US citizens in Japan.

NRC continues to work with other Federal agencies to deliver temporary cooling equipment to the Daiichi site. Initial shipments of equipment arrived in Japan on March 21 and 22. A third is anticipated to arrive on March 24.

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

A Commission Meeting was held on Monday, March 21, 2011. Topics included supporting activities in Japan, justification for continued operation of U.S. facilities, and path forward for NRC staff. The Commission is finalizing direction to the NRC staff to establish a senior level agency task force to conduct a methodical and systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

NRC issued Information Notice 2011-05 to the U.S. nuclear power reactor fleet on March 18.

The Institute of Nuclear Power Operations (INPO) issued a Level 1 Event Report (highest level) to its members on the afternoon of March 15, 2011. It identifies 4 actions, with due dates, and requires a written response. In general, the actions include walkdowns and verifications of aspects of facility capabilities to address B.5.b equipment and procedures, Severe Accident Management Guidelines (SAMGs), mitigation of station blackout (SBO) conditions, mitigation of internal and external flooding, and fire and flooding events that could be impacted by a concurrent seismic event.

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Earthquake/Tsunami Status Update March 23, 2011 0600 EDT

Fukushima Daiichi

The Japanese national government instructed evacuation for local residents within a 20km radius of the site boundary and sheltering in place out to 30 km. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. There have been no updates to protective actions since 15 March, 2011.

On March 17, Japanese authorities changed the classification of the event from a Level 4 to a Level 5 "Accident with Wider Consequences" on the International Nuclear and Radiological Event Scale (INES).

All available information indicates that the majority of releases from the Fukushima site have been carried out to sea by the prevailing winds. Forecast meteorological data through March 24, 2011 indicates light wind from the West (offshore), shifting to from SSE (onshore) at 0800 JDT March 24, 2011. The onshore shift is predicted to last approximately 10 hours before shifting back offshore.

The most recent survey data, from 03/21/2011, does not indicate any substantial change of dose measurements at the site.

A research vessel of the Japan Agency for Marine-Earth Science and Technology departed on 03/23/2011 to measure the air dose rates over and collect seawater samples from the coastal waters near the nuclear facility. The seawater samples collected will be brought back and sent to the Japan Atomic Energy Agency for analysis (Source: IAEA).

Fukushima Daiichi
STATUS as of 0600 EDT, March 23, 2011 - (1900 Japan, March 23)

Unit 1 – (NRC priority: 4)

Core Status: Damaged, extent undetermined; RPV level ~1/2 of TAF (Source: IAEA)
Core Cooling: RCS pressure: 26 psig (Source: NRC Team); fire truck providing seawater to core spray line to cool core (Source: NISA); recent information indicates that a second seawater injection path through a feedwater line was established.
Primary Containment: functional, drywell pressure: 22 psig (Source: NRC Team)
Secondary Containment: lost during hydrogen explosion
Spent Fuel Pool: 292 bundles in pool (Source: GEH); water level unknown (Source: JAIF); Time margin to uncovering fuel: 127 days; pool/area temp < 100 C (Source: NRC Team)
Power: Offsite power line connected to Unit 1, power restoration ongoing (Source: IAEA)

Unit 2 – (NRC priority: 3)

Core Status: damaged, extent undetermined; RPV level ~1/2 of TAF
Core Cooling: RCS pressure 0 psig (Source: NRC Team); fire truck providing seawater to recirculation line to cool core (Source: NISA)

Primary Containment: damaged, pressure: 15.9 psia (Source: NRC Team)
Secondary Containment: Blowout panel opened in side of reactor building to reduce hydrogen buildup; steam reported coming from hole (Source: visual/multiple media outlets)
Spent Fuel Pool: 587 bundles in pool (Source: GEH); Time margin to uncovering fuel: 39 days (Source: NRC Team); pool/area temp <100 C (Source: IAEA)
Power: offsite power restored to load-side power panel (Source: NISA); condition of pump motors and instrumentation being evaluated (Source: IAEA); restoration is ongoing

Unit 3 – (NRC priority: 1)
Core Status: Damaged, extent undetermined; RPV level ~1/2 of TAF;
Core Cooling: RCS Pressure: 0-5 psig (Source: NRC Team); fire truck providing seawater to recirculation line to cool core (Source: NISA)
Primary Containment: damaged, pressure: 14.5 psig (Source: NRC Team)
Secondary Containment: lost during hydrogen explosion; white smoke (Source: IAEA)
Spent Fuel Pool: 514 bundles in pool (Source: GEH); water sprayed from ground several times (Source: NISA); time margin to uncovering fuel: 0 days (Source: NRC Team); At 0250 EDT March 21, 2011, grey smoke was observed coming from the Southeast corner of the Unit 3 SFP. Workers were evacuated. The smoke lessened 2 hours later (Source: IAEA) and news reports indicate that workers have returned. Extent of fuel coverage is undetermined.
Power: power has been restored to Unit 3 control room.

Unit 4 – (NRC priority: 2)
Core Status: offloaded to spent fuel pool
Core Cooling: N/A
Primary Containment: open for refueling operations
Secondary Containment: lost (visual)
Spent Fuel Pool: 1201 to 1331 bundles in pool (Source: GEH & NISA); pool likely dry at one point causing significant fuel damage; water sprayed into pool for cooling; pool/area temp <100 C
Power: external electrical cable connected to power center

Unit 5 – Shutdown since January 3, 2011 (NRC priority: 5)
Core Status: Cold Shutdown; RPV intact; RPV level + 164 cm above TAF (Source: IAEA, March 20)
Core Cooling: RHR providing cooling.
Spent Fuel Pool: 950 bundles (Source: GEH); temperature: 42 C (Source: JAIF); RHR providing cooling (Source: NISA)
Power: offsite electrical power restored (Source: NISA)

Unit 6 – Shutdown since August 14, 2010 (NRC priority: 6)
Core Status: Cold Shutdown; RPV Intact; RPV level +175 cm above TAF (Source: IAEA, March 20)
Core Cooling: RHR providing cooling
Spent Fuel Pool: 876 bundles (Source: GEH); (temperature 36 C (Source: JAIF)); Injection to SFP via normal make-up water system; RHR is cooling SFP (Source: NISA)
Power: offsite electrical power restored (Source: NISA); 2 unit EDGs available

Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH) maintained at 57 C (Source: NISA); water spray started at 2137 EDT March 20 (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)

Other Plants

Fukushima Daini

- No changes to report

Onagawa

- No changes to report

Rokkasho

- No changes to report

Acronyms

atm – Atmosphere (unit of pressure)
EDG – Emergency Diesel Generator
RCS – Reactor Coolant System
RHR – Residual Heat Removal
RPV – Reactor Pressure Vessel
SFP – Spent Fuel Pool
TAF – Top of Active Fuel

Protective Measures Team (PMT) Update

Department of Energy Aerial Monitoring operations were conducted on March 17-21, 2011; no sorties have been flown in the last two days due to inclement weather. Missions conducted parallel and serpentine patterns near the Fukushima nuclear power plant. A narrow band to the northwest, 13 to 20 miles from the site, has a high concentration of contaminated materials. Air sampling was also conducted by the U.S. Navy on March 20 and 21, 2011. Samples were taken approximately 90 miles north of Tokyo, and at Yokosuka Naval Base, which is approximately 175 miles away from the Fukushima site. Air samples were taken in 15 minute intervals and resulted in detectable levels.

The PMT continues to aggregate and assess available dose rate information. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several days. On-site surveys of the exterior of the reactor buildings show dose rates of 60 mR/hr to 15 R/hr with the highest doses around reactor building 3.

In addition to monitoring the evacuation protective action recommendations, the PMT is also cognizant of potential ingestion pathway protective action recommendations and measurements on food made by the Japanese government. Levels reported in the media exceeded the values in the U.S. Food and Drug Administration (FDA) derived levels for action. Based on data in the media reports, the PMT agrees with Japanese action to interdict those foodstuffs. The media is also reporting that Tokyo government officials advised residents to stop giving tap water to infants based on radioactive levels.

The PMT continues to assess monitoring performed by U.S. assets, including EPA Radnet stations, and U.S. reactors. The PMT has no new data that would support changing the current protective action recommendations for Americans in Japan of evacuation to 50 miles. (b)(5)

(b)(5)

International Response

- The IAEA held a special session of the Board of Governors on March 21, 2011. Director General Amano provided a summary of his trip to Japan. The IAEA continues to have daily press and technical briefings.
- NRC has coordinated daily with the United Kingdom's Health and Safety Executive, Canadian Nuclear Safety Commission, and French Nuclear Safety Authority.
- France has publicly posted its assessment of projected doses in Tokyo on the French Radioprotection and Nuclear Safety Institute (IRSN) website.
- Taiwan staffed their Operations Center, beginning on Saturday, March 12th, and continues to do so.
- The German regulator, BMU, has sent one technical staff person to Tokyo. The assumption is that he would be located at the German embassy.
- The Institute of Nuclear Power Operations (INPO) is sending staff to Japan to prioritize requests and organize the US industry response.

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March 23, 2011
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Earthquake/Tsunami Status Update March 23, 2011 0700 EDT

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The most recent survey data, from 03/21/2011, does not indicate any substantial change of dose measurements at the site.

A research vessel of the Japan Agency for Marine-Earth Science and Technology departed on 03/23/2011 to measure the air dose rates over and collect seawater samples from the coastal waters near the nuclear facility. The seawater samples collected will be brought back and sent to the Japan Atomic Energy Agency for analysis (Source: IAEA).

Fukushima Daiichi
STATUS as of 0600 EDT, March 23, 2011 - (1900 Japan, March 23)

Unit 1 – (NRC priority: 4)

Core Status: Damaged, extent undetermined; RPV level ~1/2 of TAF (Source: IAEA)
Core Cooling: RCS pressure: 26 psig (Source: TEPCO via NRC Team); fire truck providing seawater to core spray line to cool core (Source: NISA); recent information indicates that a second seawater injection path through a feedwater line was established.
Primary Containment: functional, drywell pressure: 22 psig (Source: TEPCO via NRC Team)
Secondary Containment: lost during hydrogen explosion
Spent Fuel Pool: 292 bundles in pool (Source: GEH); water level unknown (Source: JAIF); Time margin to uncovering fuel: 127 days; pool/area temp < 100 C (Source: NRC Team)
Power: Offsite power line connected to Unit 1, power restoration ongoing (Source: IAEA)

Unit 2 – (NRC priority: 3)

Core Status: damaged, extent undetermined; RPV level ~1/2 of TAF

Core Cooling: RCS pressure 0 psig (Source: TEPCO via NRC Team); fire truck providing seawater to recirculation line to cool core (Source: NISA)
Primary Containment: damaged, pressure: 15.9 psia (Source: TEPCO via NRC Team)
Secondary Containment: Blowout panel opened in side of reactor building to reduce hydrogen buildup; steam reported coming from hole (Source: visual/multiple media outlets)
Spent Fuel Pool: 587 bundles in pool (Source: GEH); Time margin to uncovering fuel: 39 days (Source: NRC Team); pool/area temp <100 C (Source: IAEA)
Power: offsite power restored to load-side power panel (Source: NISA); condition of pump motors and instrumentation being evaluated (Source: IAEA); restoration is ongoing

Unit 3 – (NRC priority: 1)
Core Status: Damaged, extent undetermined; RPV level ~1/2 of TAF;
Core Cooling: RCS Pressure: 0-5 psig (Source: TEPCO via NRC Team); fire truck providing seawater to recirculation line to cool core (Source: NISA)
Primary Containment: damaged, pressure: 14.5 psig (Source: TEPCO via NRC Team)
Secondary Containment: lost during hydrogen explosion; white smoke (Source: IAEA)
Spent Fuel Pool: 514 bundles in pool (Source: GEH); water sprayed from ground several times (Source: NISA); time margin to uncovering fuel: 0 days (Source: NRC Team); At 0250 EDT March 21, 2011, grey smoke was observed coming from the Southeast corner of the Unit 3 SFP. Workers were evacuated. The smoke lessened 2 hours later (Source: IAEA) and news reports indicate that workers have returned. Extent of fuel coverage is undetermined.
Power: power has been restored to Unit 3 control room.

Unit 4 – (NRC priority: 2)
Core Status: offloaded to spent fuel pool
Core Cooling: N/A
Primary Containment: open for refueling operations
Secondary Containment: lost (visual)
Spent Fuel Pool: 1201 to 1331 bundles in pool (Source: GEH & NISA); pool likely dry at one point causing significant fuel damage; water sprayed into pool for cooling; pool/area temp <100 C
Power: external electrical cable connected to power center

Unit 5 – Shutdown since January 3, 2011 (NRC priority: 5)
Core Status: Cold Shutdown; RPV intact; RPV level + 164 cm above TAF (Source: IAEA, March 20)
Core Cooling: RHR providing cooling.
Spent Fuel Pool: 950 bundles (Source: GEH); temperature: 42 C (Source: JAIF); RHR providing cooling (Source: NISA)
Power: offsite electrical power restored (Source: NISA)

Unit 6 – Shutdown since August 14, 2010 (NRC priority: 6)
Core Status: Cold Shutdown; RPV Intact; RPV level +175 cm above TAF (Source: IAEA, March 20)
Core Cooling: RHR providing cooling

Spent Fuel Pool: 876 bundles (Source: GEH); (temperature 36 C (Source: JAIF)); Injection to SFP via normal make-up water system; RHR is cooling SFP (Source: NISA)
Power: offsite electrical power restored (Source: NISA); 2 unit EDGs available

Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH) maintained at 57 C (Source: NISA); water spray started at 2137 EDT March 20 (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)

Other Plants

Fukushima Daini

- No changes to report

Onagawa

- No changes to report

Rokkasho

- No changes to report

Acronyms

atm – Atmosphere (unit of pressure)
EDG – Emergency Diesel Generator
RCS – Reactor Coolant System
RHR – Residual Heat Removal
RPV – Reactor Pressure Vessel
SFP – Spent Fuel Pool
TAF – Top of Active Fuel

Protective Measures Team (PMT) Update

Department of Energy Aerial Monitoring operations were conducted on March 17-21, 2011; no sorties have been flown in the last two days due to inclement weather. Missions conducted parallel and serpentine patterns near the Fukushima nuclear power plant. A narrow band to the northwest, 13 to 20 miles from the site, has a high concentration of contaminated materials. Air sampling was also conducted by the U.S. Navy on March 20 and 21, 2011. Samples were taken approximately 90 miles north of Tokyo, and at Yokosuka Naval Base, which is approximately 175 miles away from the Fukushima site. Air samples were taken in 15 minute intervals and resulted in detectable levels.

The PMT continues to aggregate and assess available dose rate information. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several

days. On-site surveys of the exterior of the reactor buildings show dose rates of 60 mR/hr to 15 R/hr with the highest doses around reactor building 3.

In addition to monitoring the evacuation protective action recommendations, the PMT is also cognizant of potential ingestion pathway protective action recommendations and measurements on food made by the Japanese government. Levels reported in the media exceeded the values in the U.S. Food and Drug Administration (FDA) derived levels for action. Based on data in the media reports, the PMT agrees with Japanese action to interdict those foodstuffs. The media is also reporting that Tokyo government officials advised residents to stop giving tap water to infants based on radioactive levels.

The PMT continues to assess monitoring performed by U.S. assets, including EPA Radnet stations, and U.S. reactors. The PMT has no new data that would support changing the current protective action recommendations for Americans in Japan of evacuation to 50 miles. (b)(5)

(b)(5)

International Response

- The IAEA held a special session of the Board of Governors on March 21, 2011. Director General Amano provided a summary of his trip to Japan. The IAEA continues to have daily press and technical briefings.
- NRC has coordinated daily with the United Kingdom's Health and Safety Executive, Canadian Nuclear Safety Commission, and French Nuclear Safety Authority.
- France has publicly posted its assessment of projected doses in Tokyo on the French Radioprotection and Nuclear Safety Institute (IRSN) website.
- Taiwan staffed their Operations Center, beginning on Saturday, March 12th, and continues to do so.
- The Institute of Nuclear Power Operations (INPO) is sending staff to Japan to prioritize requests and organize the US industry response.

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

Earthquake/Tsunami Status Update March 23, 2011 1800 EDT

USNRC Emergency Operations Center Status Update

March 23, 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.

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

3) Coordination with other U.S. 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.

A team of NRC experts supporting USAID response efforts is in Japan and has engaged with the US Ambassador and his staff. A relief team is being staffed and dispatched.

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. On March 15, 2011, the Japanese government accepted DOE's Radiological Assistance Program (RAP) team assistance, which includes Aerial Monitoring System (AMS) flyovers.

On March 16, 2011, NRC provided the White House with information on protective measures for NRC staff in Japan and information to provide advice for other federal workers in Japan. The current protective action recommendation for U.S. citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate. The Bureau of Consular Affairs reported that three U.S. chartered buses departed Sendai on March 19. The consular team in Sendai finished

door-to-door searches for U.S. citizens and returned to Tokyo. No further U.S.-chartered flights are planned at this time.

Japanese Ministry of Defense (MOD) has assumed the lead role in Japanese response activities.

NRC is participating in ongoing discussions with the White House, Ambassador Roos, Naval Reactors, PACOM, and USFJ regarding precautions for and protection of US citizens in Japan.

NRC continues to work with other Federal agencies to deliver temporary cooling equipment to the Daiichi site. Initial shipments of equipment arrived in Japan on March 21 and 22. A third is anticipated to arrive on March 24.

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

A Commission Meeting was held on Monday, March 21, 2011. Topics included supporting activities in Japan, justification for continued operation of U.S. facilities, and path forward for NRC staff. The Commission is finalizing direction to the NRC staff to establish a senior level agency task force to conduct a methodical and systematic review of NRC processes and regulations with specific near-term and long-term objectives.

Status of NRC Licensee and Agreement State Facilities

NRC issued Information Notice 2011-05 to the U.S. nuclear power reactor fleet on March 18.

The Institute of Nuclear Power Operations (INPO) issued a Level 1 Event Report (highest level) to its members on the afternoon of March 15, 2011. It identifies 4 actions, with due dates, and requires a written response. In general, the actions include walkdowns and verifications of aspects of facility capabilities to address B.5.b equipment and procedures, Severe Accident Management Guidelines (SAMGs), mitigation of station blackout (SBO) conditions, mitigation of internal and external flooding, and fire and flooding events that could be impacted by a concurrent seismic event.

INPO is organizing response efforts for the US industry. INPO has sent one person to Japan to serve as a primary point of contact between entities in Japan and the US industry response effort. The industry response team at INPO includes the entire utility supply chain and has oversight in place to monitor and assure accountability for results. Additional information regarding the INPO response team will be provided in future updates.

The Nuclear Energy Institute (NEI) issued several fact sheets, the latest on March 18, 2011: "Perspective on Radiation Releases and Emergency Planning at U.S. Nuclear Power Plants."

Earthquake/Tsunami Status Update March 23, 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, International Atomic Energy Agency (IAEA) information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, and others.)

Fukushima Daiichi

The Japanese national government instructed evacuation for local residents within a 20km radius of the site boundary and sheltering in place out to 30 km. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. There have been no updates to protective actions since March 15, 2011.

On March 17, Japanese authorities changed the classification of the event from a Level 4 to a Level 5 "Accident with Wider Consequences" on the International Nuclear and Radiological Event Scale (INES).

All available information indicates that the majority of releases from the Fukushima site have been carried out to sea by the prevailing winds. Forecast meteorological data through March 24, 2011 indicates light wind from the West (offshore), shifting to from SSE (onshore) at 0800 JDT March 24, 2011. The onshore shift is predicted to last approximately 10 hours before shifting back offshore.

The most recent survey data, from 03/21/2011, does not indicate any substantial change of dose measurements at the site.

A research vessel of the Japan Agency for Marine-Earth Science and Technology departed on 03/23/2011 to measure the air dose rates over and collect seawater samples from the coastal waters near the nuclear facility. The seawater samples collected will be brought back and sent to the Japan Atomic Energy Agency for analysis (Source: IAEA).

STATUS as of 1800 EDT, March 23, 2011 - (0700 Japan, March 24)

Unit 1 – (NRC priority: 4)

Core Status: Damaged, extent undetermined; RPV level ~1/2 of TAF (Source: IAEA)
Core Cooling: RCS pressure: 54 psig (Source: JAIF); fire truck providing seawater to core spray line to cool core (Source: NISA); recent information indicates that a second seawater injection path through a feedwater line was established.
Primary Containment: functional, drywell pressure: 50 psia (Source: JAIF)
Secondary Containment: lost during hydrogen explosion
Spent Fuel Pool: 292 bundles in pool (Source: GEH); water level unknown (Source: JAIF); time margin to uncovering fuel: 123 days; pool/area temp < 100°C (Source: NRC Team based on report from NISA, assuming pool intact)
Power: Offsite power line connected to Unit 1, power restoration ongoing (Source: IAEA)

Unit 2 – (NRC priority: 3)

Core Status: damaged, extent undetermined; RPV level ~1/2 of TAF

Core Cooling: RCS pressure 0 psig (Source: JAIF); fire truck providing seawater to recirculation line to cool core (Source: NISA)
Primary Containment: damaged, pressure: 15.9 psia (Source: JAIF)
Secondary Containment: Blowout panel opened in side of reactor building to reduce hydrogen buildup; steam reported coming from hole (Source: visual/multiple media outlets)
Spent Fuel Pool: 587 bundles in pool (Source: GEH); time margin to uncovering fuel: 35 days (Source: NRC Team based on report from NISA, assuming pool intact); pool/area temp <100°C (Source: IAEA)
Power: offsite power restored to load-side power panel (Source: NISA); condition of pump motors and instrumentation being evaluated (Source: IAEA); restoration is ongoing

Unit 3 – (NRC priority: 1)
Core Status: Damaged, extent undetermined; RPV level ~1/2 of TAF;
Core Cooling: RCS Pressure: 0 psig (Source: JAIF); fire truck providing seawater to recirculation line to cool core (Source: NISA)
Primary Containment: damaged, atmospheric pressure (Source: JAIF)
Secondary Containment: lost during hydrogen explosion; white smoke (Source: IAEA)
Spent Fuel Pool: 514 bundles in pool (Source: GEH); water sprayed from ground several times (Source: NISA); time margin to uncovering fuel: 0 days (Source: NRC Team based on report from NISA, assuming pool intact); at 0250 EDT March 21, 2011, grey smoke was observed coming from the southeast corner of the Unit 3 SFP. Workers were evacuated. The smoke lessened 2 hours later (Source: IAEA) and news reports indicate that workers have returned. Extent of fuel coverage is undetermined.
Power: power has been restored to Unit 3 control room.

Unit 4 – (NRC priority: 2)
Core Status: offloaded to spent fuel pool
Core Cooling: N/A
Primary Containment: open for refueling operations
Secondary Containment: lost (visual)
Spent Fuel Pool: 1201 to 1331 bundles in pool (Source: GEH & NISA); pool likely was dry at one point causing significant fuel damage; water sprayed into pool for cooling; pool/area temp <100°C
Power: external electrical cable connected to power center

Unit 5 – Shutdown since January 3, 2011 (NRC priority: 5)
Core Status: Cold Shutdown; RPV intact; RPV level +164 cm above TAF (Source: IAEA, March 20)
Core Cooling: RHR providing cooling.
Spent Fuel Pool: 950 bundles (Source: GEH); temperature: 42°C (Source: JAIF); RHR pump failed subsequent to switchover to external power (Source: TEPCO)
Power: Switched from EDG to external power supply (Source: NISA)

Unit 6 – Shutdown since August 14, 2010 (NRC priority: 6)
Core Status: Cold Shutdown; RPV Intact; RPV level +175 cm above TAF (Source: IAEA, March 20)
Core Cooling: RHR providing cooling

Spent Fuel Pool: 876 bundles (Source: GEH); temperature 36°C (Source: JAIF); injection to SFP via normal make-up water system; RHR is cooling SFP (Source: NISA)
Power: Switch from EDG to external power supply (Source: NISA); 2 unit EDGs available

Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water level maintained full since March 18, at 61°C (Source: NISA); water spray started at 2137 EDT March 20 (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)

Other Plants

Fukushima Daini

- No changes to report

Onagawa

- No changes to report

Rokkasho

- No changes to report

Acronyms

atm – Atmosphere (unit of pressure)
EDG – Emergency Diesel Generator
RCS – Reactor Coolant System
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RPV – Reactor Pressure Vessel
SFP – Spent Fuel Pool
TAF – Top of Active Fuel

Protective Measures Team (PMT) Update

Department of Energy Aerial Monitoring operations were conducted on March 17-21, 2011; no sorties were flown March 21-22 due to inclement weather. The flights resumed today (March 23, 2011) and results are due late this afternoon or this evening. The earlier missions conducted parallel and serpentine patterns near the Fukushima nuclear power plant. A narrow band to the northwest, 13 to 20 miles from the site, had a high concentration of contaminated materials. Air sampling was also conducted by the U.S. Navy on March 20 and 21, 2011. Samples were taken approximately 90 miles north of Tokyo, and at Yokosuka Naval Base, which is approximately 175 miles away from the Fukushima site. Air samples were taken in 15 minute intervals and resulted in detectable levels.

The PMT continues to aggregate and assess available dose rate information. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several days. On-site surveys of the exterior of the reactor buildings show dose rates of 60 mR/hr to 15 R/hr with the highest doses around reactor building 3.

In addition to monitoring the evacuation protective action recommendations, the PMT is also cognizant of potential ingestion pathway protective action recommendations and measurements on food made by the Japanese government. Levels reported in the media exceeded the values in the U.S. Food and Drug Administration (FDA) derived levels for action. Based on data in the media reports, the PMT agrees with Japanese action to interdict those foodstuffs. The media is also reporting that Tokyo government officials advised residents to stop giving tap water to infants based on radioactive levels.

The PMT continues to assess monitoring performed by U.S. assets, including EPA Radnet stations, and U.S. reactors. The PMT has no new data that would support changing the current protective action recommendations for Americans in Japan of evacuation to 50 miles. (b)(5)

(b)(5)

International Response

- The IAEA held a special session of the Board of Governors on March 21, 2011. Director General Amano provided a summary of his trip to Japan. The IAEA continues to have daily press and technical briefings.
- NRC has coordinated daily with the United Kingdom's Health and Safety Executive, Canadian Nuclear Safety Commission, and French Nuclear Safety Authority.
- France has publicly posted its assessment of projected doses in Tokyo on the French Radioprotection and Nuclear Safety Institute (IRSN) website.
- Taiwan staffed their Operations Center, beginning on Saturday, March 12th, and continues to do so.
- The Institute of Nuclear Power Operations (INPO) is sending staff to Japan to prioritize requests and organize the US industry response. One INPO staff member arrived in Tokyo and is trying to coordinate with US government staff at the Embassy.

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

USNRC Emergency Operations Center Status Update

March 24, 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.

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

3) Coordination with other U.S. 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.

A team of NRC experts supporting USAID response efforts is in Japan and has engaged with the US Ambassador and his staff. A relief team is being staffed and dispatched.

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. On March 15, 2011, the Japanese government accepted DOE's Radiological Assistance Program (RAP) team assistance, which includes Aerial Monitoring System (AMS) flyovers.

On March 16, 2011, NRC provided the White House with information on protective measures for NRC staff in Japan and information to provide advice for other federal workers in Japan. The current protective action recommendation for U.S. citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate. The Bureau of Consular Affairs reported that three U.S. chartered buses departed Sendai on March 19. The consular team in Sendai finished

door-to-door searches for U.S. citizens and returned to Tokyo. No further U.S.-chartered flights are planned at this time.

Japanese Ministry of Defense (MOD) has assumed the lead role in Japanese response activities.

NRC is participating in ongoing discussions with the White House, Ambassador Roos, Naval Reactors, PACOM, and USFJ regarding precautions for and protection of US citizens in Japan.

NRC continues to work with other Federal agencies to deliver temporary cooling equipment to the Daiichi site. Initial shipments of equipment arrived in Japan on March 21 and 22. A third is anticipated to arrive on March 24.

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

A Commission Meeting was held on Monday, March 21, 2011. Topics included supporting activities in Japan, justification for continued operation of U.S. facilities, and path forward for NRC staff. The Commission has established a senior level agency task force to conduct a methodical and systematic review of NRC processes and regulations with specific near-term and long-term objectives.

The government of Japan has expressed to the NRC an interest in acquiring robotics, unmanned aerial vehicles, protective gear, and stockpiles of potassium iodide.

Status of NRC Licensee and Agreement State Facilities

NRC issued Information Notice 2011-05 to the U.S. nuclear power reactor fleet on March 18.

The Institute of Nuclear Power Operations (INPO) issued a Level 1 Event Report (highest level) to its members on the afternoon of March 15, 2011. It identifies 4 actions, with due dates, and requires a written response. In general, the actions include walkdowns and verifications of aspects of facility capabilities to address B.5.b equipment and procedures, Severe Accident Management Guidelines (SAMGs), mitigation of station blackout (SBO) conditions, mitigation of internal and external flooding, and fire and flooding events that could be impacted by a concurrent seismic event.

The Nuclear Energy Institute (NEI) issued several fact sheets, the latest on March 18, 2011: "Perspective on Radiation Releases and Emergency Planning at U.S. Nuclear Power Plants."

Industry Consortium

The commercial nuclear industry has established an industry support team to immediately facilitate industry support for TEPCO during the Fukushima event response. INPO facilitated the formation of this team.

This team will complement efforts of the US government and is intended to provide easy access to the capabilities of the US nuclear industry and assure a timely and effective industry response to emergency needs.

The following actions have been taken to make this team operational:

- An individual has been dispatched to Tokyo to coordinate requests for assistance and technical support. This individual will work closely with the NRC team already in place and function as a key interface to communicate the technical needs of TEPCO to the industry.
- A support organization is in place at the INPO offices in Atlanta to facilitate the location and delivery of supplies, services and materials. This organization has close contacts with all US utilities and will be expanded by Friday March 26, 2011 with additional staffing and suppliers from the broader nuclear industry.
- A technical support organization is also in place at INPO to facilitate the timely response to requests for technical support. This organization coordinates and channels requests for technical support to utility and industry experts, EPRI and suppliers as appropriate to ensure timely and effective technical advice is provided. This group works closely with the NRC and other government agencies.

This team is intended to function during the mitigation and stabilization phase of the Fukushima Daiichi event. It is anticipated the commercial market structure will function during the longer-term recovery and remediation phases.

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, International Atomic Energy Agency (IAEA) information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, and others.)

Fukushima Daiichi

The Japanese national government instructed evacuation for local residents within a 20km radius of the site boundary and sheltering in place out to 30 km. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. There have been no updates to protective actions since March 15, 2011.

On March 17, Japanese authorities changed the classification of the event from a Level 4 to a Level 5 "Accident with Wider Consequences" on the International Nuclear and Radiological Event Scale (INES).

All available information indicates that the majority of releases from the Fukushima site have been carried out to sea by the prevailing winds. Forecast meteorological data through March 25, 2011 indicates prolonged onshore winds, shifting offshore through midnight JST on March 25. Variable winds on March 25, including periods of onshore flow. 50% chance of rain later in the day on March 25.

Earthquake/Tsunami Status Update March 24, 2011 1800 EDT

The most recent survey data, from March 23, 2011, does not indicate any substantial change of dose measurements at the site.

A research vessel of the Japan Agency for Marine-Earth Science and Technology departed on March 23, 2011, to measure the air dose rates over and collect seawater samples from the coastal waters near the nuclear facility. The seawater samples collected will be brought back and sent to the Japan Atomic Energy Agency for analysis (Source: IAEA).

To combat salt accumulation, it is a priority to find a source of fresh water for use in cooling operations rather than the sea water. The U.S. Navy is prepared to provide 2 barges to the Fukushima site, each with a capacity of approximately 350,000 gallons. (Source: NRC Team)

STATUS as of 1400 EDT, March 24, 2011 - (0300 Japan, March 25)

Unit 1 – (NRC priority: 4)

Core Status: Damaged, extent undetermined; RPV level ~1/2 of TAF (Source: IAEA)
Core Cooling: RCS pressure: 58 psig (Source: NISA); RPV, DW, Torus pressure increasing (Source: NISA); fire truck providing seawater to core spray line to cool core (Source: NISA); recent information indicates that a second seawater injection path through a feedwater line was established; increased amount of water sprayed, leading to reduction in temperature of RPV from 400 to 230 °C (Source: NRC Team per TEPCO)
Primary Containment: functional, drywell pressure: 58 psia (Source: JAIF), considering venting (Source: NISA)
Secondary Containment: lost during hydrogen explosion
Spent Fuel Pool: 292 bundles in pool (Source: GEH); water level unknown (Source: JAIF); time margin to uncovering fuel: 127 days; pool/area temp < 100°C (Source: NRC Team based on report from NISA, assuming pool intact)
Power: Offsite power line connected to Unit 1, power restoration ongoing (Source: IAEA)

Unit 2 – (NRC priority: 3)

Core Status: damaged, extent undetermined; RPV level ~1/3 of TAF (Source: JAIF)
Core Cooling: RCS pressure 9.4 psia (Source: NISA); fire truck providing seawater to recirculation line to cool core (Source: NISA); Bottom Head Temperature: 105 °C (Source: NISA); Feedwater Nozzle Temperature: 100 °C (Source: NISA)
Primary Containment: damaged, pressure: 16 psia (Source: JAIF)
Secondary Containment: Blowout panel opened in side of reactor building to reduce hydrogen buildup; steam reported coming from hole (Source: visual/multiple media outlets)
Spent Fuel Pool: 587 bundles in pool (Source: GEH); time margin to uncovering fuel: 39 days (Source: NRC Team based on report from NISA, assuming pool intact); pool/area temp 40°C (Source: JAIF)
Power: offsite power restored to load-side power panel (Source: NISA); condition of pump motors and instrumentation being evaluated (Source: IAEA); restoration is ongoing

Unit 3 – (NRC priority: 1)

Core Status: Damaged, extent undetermined; RPV level ~1/2 of TAF;

Core Cooling: RCS Pressure: ~5 psig (Source: NISA); fire truck providing seawater to recirculation line to cool core (Source: NISA); Bottom Head Temperature: 185 °C (Source: JAIF, NISA, TEPCO); Feedwater Nozzle Temperature: 81 °C (Source: JAIF, NISA, TEPCO)
Primary Containment: damaged, ~atmospheric pressure (Source: JAIF)
Secondary Containment: lost during hydrogen explosion; white smoke (Source: IAEA)
Spent Fuel Pool: 514 bundles in pool (Source: GEH); water sprayed from ground several times (Source: NISA); time margin to uncovering fuel: 0 days (Source: NRC Team based on report from NISA, assuming pool intact); at 0250 EDT March 21, 2011, grey smoke was observed coming from the southeast corner of the Unit 3 SFP. Workers were evacuated. The smoke lessened 2 hours later (Source: IAEA) and news reports indicate that workers have returned. Extent of fuel coverage is undetermined. Attempts to cool using an internal cooling system (Source: NRC Team per TEPCO)
Power: power has been restored to Unit 3 control room.
Other: Black smoke was detected rising out of unit 3 building at ~1630 (Japan) on March 23, 2011, causing temporary evacuation of workers. Smoke continued through nightfall (Source: NRC Team per TEPCO)

Unit 4 – (NRC priority: 2)
Core Status: offloaded to spent fuel pool
Core Cooling: N/A
Primary Containment: open for refueling operations
Secondary Containment: lost (visual)
Spent Fuel Pool: 1201 to 1331 bundles in pool (Source: GEH & NISA); pool likely was dry at one point causing significant fuel damage; water sprayed into pool for cooling; pool/area temp <100°C, SFP temperature unknown
Power: external electrical cable connected to power center; power has been restored to central control room (Source: NRC Team per TEPCO)

Unit 5 – Shutdown since January 3, 2011 (NRC priority: 5)
Core Status: Cold Shutdown; RPV intact; RPV level +172 cm above TAF (Source: IAEA, March 20)
Core Cooling: RHR providing cooling.
Spent Fuel Pool: 950 bundles (Source: GEH); temperature: 49°C (Source: NISA); RHR pump failed subsequent to switchover to external power (Source: TEPCO)
Power: Switched from EDG to external power supply (Source: NISA)

Unit 6 – Shutdown since August 14, 2010 (NRC priority: 6)
Core Status: Cold Shutdown; RPV Intact; RPV level +276 cm above TAF (Source: NISA)
Core Cooling: RHR providing cooling
Spent Fuel Pool: 876 bundles (Source: GEH); temperature 36°C (Source: JAIF); injection to SFP via normal make-up water system; RHR is cooling SFP (Source: NISA)
Power: Switch from EDG to external power supply (Source: NISA); 2 unit EDGs available

Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water level maintained full since March 18, at 73°C (Source: NISA); water spray started at 2137 EDT March 20 (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)

Other Plants

Fukushima Daini

- No changes to report

Onagawa

- No changes to report

Rokkasho

- No changes to report

Acronyms

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The PMT continues to aggregate and assess available dose rate information. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several days. On-site surveys of the exterior of the reactor buildings show dose rates of 60 mR/hr to 15 R/hr with the highest doses around reactor building 3.

In addition to monitoring the evacuation protective action recommendations, the PMT is also cognizant of potential ingestion pathway protective action recommendations and measurements on food made by the Japanese government. Levels reported in the media exceeded the values in the U.S. Food and Drug Administration (FDA) derived levels for action. Based on data in the

media reports, the PMT agrees with Japanese action to interdict those foodstuffs. The media is also reporting that Tokyo government officials advised residents to stop giving tap water to infants based on radioactive levels.

The PMT continues to assess monitoring performed by U.S. assets, including EPA Radnet stations, and U.S. reactors. The PMT has no new data that would support changing the current protective action recommendations for Americans in Japan of evacuation to 50 miles. (b)(5)

(b)(5)

Per a conference call with OSTP, DOE, NARAC and NRC, NARAC is running a new case on a plausible realistic case for Tokyo. Once agreed upon by the inter-agency group, this analysis will be provided to the Japanese government. The attendees agreed that the source term would include:

- No spent fuel pool fires
- Core damage in Units 1, 2 and 3, assumed as 33% each
- Design containment leakage rate (0.5% per day)
- Release period starts at 21:15Z on March 15.
- Release is assumed to occur at a constant rate for 12 days.
- NARAC will use actual and forecast meteorological conditions.

Estimates of TEDE, Thyroid dose, worker protection dose rate and total deposition in Japan will be calculated.

The PMT recently identified a need to update the source term and the release rate from those that we previously provided to NARAC about 12 hours ago, based on information obtained from the Japanese officials (core damage in Unit 1 is 70% versus the previously assumed 33%) and the NRC's Reactor Safety Team (100% containment breach in Units 2 and 3 versus the previously assumed design containment leakage rate). NRC held a teleconference with NARAC at 1700 EDT on March 24, 2011 to request these changes. Results should be available tomorrow morning.

PMT confirmed reports that INPO had access to one million KI pills from ANBEX, Inc. (866-463-6754) at (b)(4)

The PMT is continuing efforts to develop a reentry plans for short-term reentry and retrieval of personal effects. A long term reentry plan was developed on March 22, 2011 and was reviewed on March 24, 2011 with no changes recommended. The PMT is also working with the Environmental Protection Agency (EPA) with environmental data from US Nuclear Power plants. Finally, the PMT reviewed containment high range readings for potential indication of core damage, and determined it appears to indicate some core melt but not likely to be representative of actual core status.

International Response

- The IAEA held a special session of the Board of Governors on March 21, 2011. Director General Amano provided a summary of his trip to Japan. The IAEA continues to have daily press and technical briefings.
- NRC has coordinated daily with the United Kingdom's Health and Safety Executive, Canadian Nuclear Safety Commission, and French Nuclear Safety Authority.
- France has publicly posted its assessment of projected doses in Tokyo on the French Radioprotection and Nuclear Safety Institute (IRSN) website.
- Taiwan staffed their Operations Center, beginning on Saturday, March 12th, and continues to do so.
- An Institute of Nuclear Power Operations (INPO) staff member has arrived in Tokyo and is coordinating with US government staff at the Embassy.
- NRC is coordinating with the State Department to provide the US Ambassador the plume analysis to share with the Japanese government.

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

USNRC Emergency Operations Center Status Update

March 24, 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.

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

3) Coordination with other U.S. 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.

A team of NRC experts supporting USAID response efforts is in Japan and has engaged with the US Ambassador and his staff. A relief team is being staffed and dispatched.

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. On March 15, 2011, the Japanese government accepted DOE's Radiological Assistance Program (RAP) team assistance, which includes Aerial Monitoring System (AMS) flyovers.

On March 16, 2011, NRC provided the White House with information on protective measures for NRC staff in Japan and information to provide advice for other federal workers in Japan. The current protective action recommendation for U.S. citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate. The Bureau of Consular Affairs reported that three U.S. chartered buses departed Sendai on March 19. The consular team in Sendai finished

door-to-door searches for U.S. citizens and returned to Tokyo. No further U.S.-chartered flights are planned at this time.

Japanese Ministry of Defense (MOD) has assumed the lead role in Japanese response activities.

NRC is participating in ongoing discussions with the White House, Ambassador Roos, Naval Reactors, PACOM, and USFJ regarding precautions for and protection of US citizens in Japan.

NRC continues to work with other Federal agencies to deliver temporary cooling equipment to the Daiichi site. Initial shipments of equipment arrived in Japan on March 21 and 22. A third is anticipated to arrive on March 24.

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

A Commission Meeting was held on Monday, March 21, 2011. Topics included supporting activities in Japan, justification for continued operation of U.S. facilities, and path forward for NRC staff. The Commission is finalizing direction to the NRC staff to establish a senior level agency task force to conduct a methodical and systematic review of NRC processes and regulations with specific near-term and long-term objectives.

The government of Japan has expressed to the NRC an interest in acquiring robotics, unmanned aerial vehicles, protective gear, and stockpiles of potassium iodide.

Status of NRC Licensee and Agreement State Facilities

NRC issued Information Notice 2011-05 to the U.S. nuclear power reactor fleet on March 18.

The Institute of Nuclear Power Operations (INPO) issued a Level 1 Event Report (highest level) to its members on the afternoon of March 15, 2011. It identifies 4 actions, with due dates, and requires a written response. In general, the actions include walkdowns and verifications of aspects of facility capabilities to address B.5.b equipment and procedures, Severe Accident Management Guidelines (SAMGs), mitigation of station blackout (SBO) conditions, mitigation of internal and external flooding, and fire and flooding events that could be impacted by a concurrent seismic event.

The commercial nuclear industry has established an industry support team to immediately facilitate industry support for TEPCO during the Fukushima event response. INPO facilitated the formation of this team.

This team will complement efforts of the US government and is intended to provide easy access to the capabilities of the US nuclear industry and assure a timely and effective industry response to emergency needs.

The following actions have been taken to make this team operational:

- An individual has been dispatched to Tokyo to coordinate requests for assistance and technical support. This individual will work closely with the NRC team already in place and function as a key interface to communicate the technical needs of TEPCO to the industry.
- A support organization is in place at the INPO offices in Atlanta to facilitate the location and delivery of supplies, services and materials. This organization has close contacts with all US utilities and will be expanded by Friday March 26, 2011 with additional staffing and suppliers from the broader nuclear industry.
- A technical support organization is also in place at INPO to facilitate the timely response to requests for technical support. This organization coordinates and channels requests for technical support to utility and industry experts, EPRI and suppliers as appropriate to ensure timely and effective technical advice is provided. This group works closely with the NRC and other government agencies.

This team is intended to function during the mitigation and stabilization phase of the Fukushima Daiichi event. It is anticipated the commercial market structure will function during the longer-term recovery and remediation phases.

The Nuclear Energy Institute (NEI) issued several fact sheets, the latest on March 18, 2011: "Perspective on Radiation Releases and Emergency Planning at U.S. Nuclear Power Plants."

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, International Atomic Energy Agency (IAEA) information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, and others.)

Fukushima Daiichi

The Japanese national government instructed evacuation for local residents within a 20km radius of the site boundary and sheltering in place out to 30 km. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. There have been no updates to protective actions since March 15, 2011.

On March 17, Japanese authorities changed the classification of the event from a Level 4 to a Level 5 "Accident with Wider Consequences" on the International Nuclear and Radiological Event Scale (INES).

All available information indicates that the majority of releases from the Fukushima site have been carried out to sea by the prevailing winds. Forecast meteorological data through March 25, 2011 indicates prolonged onshore winds, shifting offshore through midnight JST on 25 March. Variable winds on 25 March, including periods of onshore flow. 50% chance of rain later in the day on 25 March.

The most recent survey data, from 03/23/2011, does not indicate any substantial change of dose measurements at the site.

A research vessel of the Japan Agency for Marine-Earth Science and Technology departed on 03/23/2011 to measure the air dose rates over and collect seawater samples from the coastal waters near the nuclear facility. The seawater samples collected will be brought back and sent to the Japan Atomic Energy Agency for analysis (Source: IAEA).

To combat salt accumulation, it is a priority to find a source of fresh water for use in cooling operations rather than the sea water. The U.S. Navy is prepared to provide 2 barges to the Fukushima site, each with a capacity of approximately 350,000 gallons. (Source: NRC Team)

STATUS as of 0600 EDT, March 24, 2011 - (1900 Japan, March 24)

Unit 1 – (NRC priority: 4)

Core Status: Damaged, extent undetermined; RPV level ~1/2 of TAF (Source: IAEA)
Core Cooling: RCS pressure: 54 psig (Source: JAIF); fire truck providing seawater to core spray line to cool core (Source: NISA); recent information indicates that a second seawater injection path through a feedwater line was established; increased amount of water sprayed, leading to reduction in temperature of RPV from 400 to 230 °C (Source: NRC Team per TEPCO)
Primary Containment: functional, drywell pressure: 58 psia (Source: JAIF), considering venting
Secondary Containment: lost during hydrogen explosion
Spent Fuel Pool: 292 bundles in pool (Source: GEH); water level unknown (Source: JAIF); time margin to uncovering fuel: 123 days; pool/area temp < 100°C (Source: NRC Team based on report from NISA, assuming pool intact)
Power: Offsite power line connected to Unit 1, power restoration ongoing (Source: IAEA)

Unit 2 – (NRC priority: 3)

Core Status: damaged, extent undetermined; RPV level ~1/2 of TAF
Core Cooling: RCS pressure 0 psig (Source: JAIF); fire truck providing seawater to recirculation line to cool core (Source: NISA); Bottom Head Temperature: 185 °C; Feedwater Nozzle Temperature: 81 °C
Primary Containment: damaged, pressure: 15.9 psia (Source: JAIF)
Secondary Containment: Blowout panel opened in side of reactor building to reduce hydrogen buildup; steam reported coming from hole (Source: visual/multiple media outlets)
Spent Fuel Pool: 587 bundles in pool (Source: GEH); time margin to uncovering fuel: 35 days (Source: NRC Team based on report from NISA, assuming pool intact); pool/area temp <100°C (Source: IAEA)
Power: offsite power restored to load-side power panel (Source: NISA); condition of pump motors and instrumentation being evaluated (Source: IAEA); restoration is ongoing

Unit 3 – (NRC priority: 1)

Core Status: Damaged, extent undetermined; RPV level ~1/2 of TAF;
Core Cooling: RCS Pressure: 0 psig (Source: JAIF); fire truck providing seawater to recirculation line to cool core (Source: NISA)
Primary Containment: damaged, atmospheric pressure (Source: JAIF)
Secondary Containment: lost during hydrogen explosion; white smoke (Source: IAEA)

Spent Fuel Pool: 514 bundles in pool (Source: GEH); water sprayed from ground several times (Source: NISA); time margin to uncovering fuel: 0 days (Source: NRC Team based on report from NISA, assuming pool intact); at 0250 EDT March 21, 2011, grey smoke was observed coming from the southeast corner of the Unit 3 SFP. Workers were evacuated. The smoke lessened 2 hours later (Source: IAEA) and news reports indicate that workers have returned. Extent of fuel coverage is undetermined. Attempts to cool using an internal cooling system (Source: NRC Team per TEPCO
Power: power has been restored to Unit 3 control room.
Other: Black smoke was detected rising out of unit 3 building at ~1630 (Japan) on March 23, 2011, causing temporary evacuation of workers. Smoke continued through nightfall (Source: NRC Team per TEPCO)

Unit 4 – (NRC priority: 2)
Core Status: offloaded to spent fuel pool
Core Cooling: N/A
Primary Containment: open for refueling operations
Secondary Containment: lost (visual)
Spent Fuel Pool: 1201 to 1331 bundles in pool (Source: GEH & NISA); pool likely was dry at one point causing significant fuel damage; water sprayed into pool for cooling; pool/area temp <100°C
Power: external electrical cable connected to power center; power has been restored to central control room (Source: NRC Team per TEPCO)

Unit 5 – Shutdown since January 3, 2011 (NRC priority: 5)
Core Status: Cold Shutdown; RPV intact; RPV level +164 cm above TAF (Source: IAEA, March 20)
Core Cooling: RHR providing cooling.
Spent Fuel Pool: 950 bundles (Source: GEH); temperature: 42°C (Source: JAIF); RHR pump failed subsequent to switchover to external power (Source: TEPCO)
Power: Switched from EDG to external power supply (Source: NISA)

Unit 6 – Shutdown since August 14, 2010 (NRC priority: 6)
Core Status: Cold Shutdown; RPV Intact; RPV level +175 cm above TAF (Source: IAEA, March 20)
Core Cooling: RHR providing cooling
Spent Fuel Pool: 876 bundles (Source: GEH); temperature 36°C (Source: JAIF); injection to SFP via normal make-up water system; RHR is cooling SFP (Source: NISA)
Power: Switch from EDG to external power supply (Source: NISA); 2 unit EDGs available

Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water level maintained full since March 18, at 61°C (Source: NISA); water spray started at 2137 EDT March 20 (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)

Other Plants

Fukushima Daini

- No changes to report

Onagawa

- No changes to report

Rokkasho

- No changes to report

Acronyms

atm – Atmosphere (unit of pressure)
EDG – Emergency Diesel Generator
RCS – Reactor Coolant System
RHR – Residual Heat Removal
RPV – Reactor Pressure Vessel
SFP – Spent Fuel Pool
TAF – Top of Active Fuel

Protective Measures Team (PMT) Update

Department of Energy Aerial Monitoring operations were conducted on March 17-21, 2011; no sorties were flown March 21-22 due to inclement weather. The flights resumed March 23, 2011. The earlier missions conducted parallel and serpentine patterns near the Fukushima nuclear power plant. A narrow band to the northwest, 13 to 20 miles from the site, had a high concentration of contaminated materials. Air sampling was also conducted by the U.S. Navy on March 20 and 21, 2011. Samples were taken approximately 90 miles north of Tokyo, and at Yokosuka Naval Base, which is approximately 175 miles away from the Fukushima site. Air samples were taken in 15 minute intervals and resulted in detectable levels.

The PMT continues to aggregate and assess available dose rate information. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several days. On-site surveys of the exterior of the reactor buildings show dose rates of 60 mR/hr to 15 R/hr with the highest doses around reactor building 3.

In addition to monitoring the evacuation protective action recommendations, the PMT is also cognizant of potential ingestion pathway protective action recommendations and measurements on food made by the Japanese government. Levels reported in the media exceeded the values in the U.S. Food and Drug Administration (FDA) derived levels for action. Based on data in the media reports, the PMT agrees with Japanese action to interdict those foodstuffs. The media is also reporting that Tokyo government officials advised residents to stop giving tap water to infants based on radioactive levels.

The PMT continues to assess monitoring performed by U.S. assets, including EPA Radnet stations, and U.S. reactors. The PMT has no new data that would support changing the current protective action recommendations for Americans in Japan of evacuation to 50 miles. (b)(5)

(b)(5)

Per a conference call with OSTP, DOE, NARAC and NRC, NARAC is running a new case on a plausible realistic case for Tokyo. Once agreed upon by the inter-agency group, this analysis will be provided to the Japanese government. The attendees agreed that the source term would include:

- No spent fuel pool fires
- Core damage in Units 1, 2 and 3, assumed as 33% each
- Design containment leakage rate (0.5% per day)
- Release period starts at 21:15Z on March 15.
- Release is assumed to occur at a constant rate for 12 days.
- NARAC will use actual and forecast meteorological conditions.

Estimates of TEDE, Thyroid dose, worker protection dose rate and total deposition in Japan will be calculated.

PMT confirmed reports that INPO had access to one million KI pills from ANBEX, Inc. (866-463-6754) at (b)(4) 6+4

The PMT is continuing efforts to develop a reentry plans for short-term reentry and retrieval of personal effects. A long term reentry plan was developed on March 22, 2011 and was reviewed on March 24, 2011 with no changes recommended. The PMT is also working with the Environmental Protection Agency (EPA) with environmental data from US Nuclear Power plants. Finally, the PMT reviewed containment high range readings for potential indication of core damage, and determined it appears to indicate some core melt but not likely to be representative of actual core status.

International Response

- The IAEA held a special session of the Board of Governors on March 21, 2011. Director General Amano provided a summary of his trip to Japan. The IAEA continues to have daily press and technical briefings.
- NRC has coordinated daily with the United Kingdom's Health and Safety Executive, Canadian Nuclear Safety Commission, and French Nuclear Safety Authority.
- France has publicly posted its assessment of projected doses in Tokyo on the French Radioprotection and Nuclear Safety Institute (IRSN) website.

- Taiwan staffed their Operations Center, beginning on Saturday, March 12th, and continues to do so.
- An Institute of Nuclear Power Operations (INPO) staff member has arrived in Tokyo and is coordinating with US government staff at the Embassy.

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

USNRC Emergency Operations Center Status Update

March 25, 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.

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

3) Coordination with other U.S. 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 U.S. citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate.

One train of temporary cooling equipment has been transported to Yokota Air Force Base. Plans are being made for the U.S. Navy to provide two fresh water barges to the Daiichi site. TEPCO expects to swap to freshwater injection (from the Dam source) on Units 1-3 on 3/25.

4/7

Earthquake/Tsunami Status Update March 25, 2011 0430 EDT

The NRC Reactor Safety Team has provided a set of recommendations pertaining to severe accident management strategies to the NRC team in Japan. The recommendations were coordinated with GEH, EPRI, INPO, Naval Reactors, and DOE.

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

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

Status of NRC Licensee and Agreement State Facilities

No new information to report

Industry Consortium

No new information to report

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, International Atomic Energy Agency (IAEA) information releases, Federation of Electric Power Companies of Japan, World Association of Nuclear Operators, and others.)

Fukushima Daiichi

The Japanese national government instructed evacuation for local residents within a 20km radius of the site boundary and sheltering in place out to 30 km. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. There have been no updates to protective actions since March 15, 2011.

All available information indicates that the majority of releases from the Fukushima site have been carried out to sea by the prevailing winds.

Current forecast meteorological data through March 26, 2011 indicates prolonged onshore winds, shifting offshore on the morning of March 26.

The most recent survey data, from March 25, 2011, does not indicate any substantial change of dose measurements at the site.

STATUS as of 0430 EDT, March 25, 2011 - (1730 Japan, March 25)

Earthquake/Tsunami Status Update March 25, 2011 0430 EDT

Unit 1 – (NRC priority: 1)

Core Status: Damaged, extent undetermined; RPV level ~1/2 of TAF (Source: IAEA)
Core Cooling: RCS pressure: 58 psig (Source: NISA); RPV, DW, Torus pressure increasing (Source: NISA); fire truck providing seawater to core spray line to cool core (Source: NISA); recent information indicates that a second seawater injection path through a feedwater line was established; increased amount of water sprayed, leading to reduction in temperature of RPV from 400 to 172 °C; Expect to swap to freshwater injection from the Dam source on units 1-3 on 3/25 (Source: NRC Team per TEPCO)
Primary Containment: functional, drywell pressure: 58 psia (Source: JAIF), considering venting (Source: NISA)
Secondary Containment: lost during hydrogen explosion
Spent Fuel Pool: 292 bundles in pool (Source: GEH); water level unknown (Source: JAIF); time margin to uncovering fuel: 127 days; pool/area temp < 100°C (Source: NRC Team based on report from NISA, assuming pool intact)
Power: Offsite power line connected to Unit 1, power restoration ongoing (Source: IAEA)

Unit 2 – (NRC priority: 2)

Core Status: damaged, extent undetermined; RPV level ~1/3 of TAF (Source: JAIF)
Core Cooling: RCS pressure 9.4 psia (Source: NISA); fire truck providing seawater to recirculation line to cool core (Source: NISA); Bottom Head Temperature: 105 °C (Source: NISA); Feedwater Nozzle Temperature: 100 °C (Source: NISA); Expect to swap to freshwater injection from the Dam source on units 1-3 on 3/25 (Source: NRC Team per TEPCO)
Primary Containment: damaged, pressure: 16 psia (Source: JAIF)
Secondary Containment: Blowout panel opened in side of reactor building to reduce hydrogen buildup; steam reported coming from hole (Source: visual/multiple media outlets)
Spent Fuel Pool: 587 bundles in pool (Source: GEH); time margin to uncovering fuel: 39 days (Source: NRC Team based on report from NISA, assuming pool intact); pool/area temp 40°C (Source: JAIF)
Power: offsite power restored to load-side power panel (Source: NISA); condition of pump motors and instrumentation being evaluated (Source: IAEA); restoration is ongoing

Unit 3 – (NRC priority: 3)

Core Status: Damaged, extent undetermined; RPV level ~1/2 of TAF;
Core Cooling: RCS Pressure: ~5 psig (Source: NISA); fire truck providing seawater to recirculation line to cool core (Source: NISA); Bottom Head Temperature: 185 °C (Source: JAIF, NISA, TEPCO); Feedwater Nozzle Temperature: 81 °C (Source: JAIF, NISA, TEPCO); Expect to swap to freshwater injection from the Dam source on units 1-3 on 3/25 (Source: NRC Team per TEPCO)
Primary Containment: had been thought damaged, JAIF stated that was not damaged on 3/25 (Source: JAIF)
Secondary Containment: lost during hydrogen explosion; white smoke (Source: IAEA)
Spent Fuel Pool: 514 bundles in pool (Source: GEH); water sprayed from ground several times (Source: NISA); time margin to uncovering fuel: 0 days (Source: NRC Team based on report from NISA, assuming pool intact); at 0250 EDT March 21, 2011, grey smoke was observed coming from the southeast corner of the Unit 3 SFP. Workers

were evacuated. The smoke lessened 2 hours later (Source: IAEA) and news reports indicate that workers have returned. Extent of fuel coverage is undetermined. Attempts to cool using an internal cooling system (Source: NRC Team per TEPCO)
Power: power has been restored to Unit 3 control room.
Other: Black smoke was detected rising out of unit 3 building at ~1630 (Japan) on March 23, 2011, causing temporary evacuation of workers. Smoke continued through nightfall. (Source: NRC Team per TEPCO)

Unit 4 – (NRC priority: 4)
Core Status: offloaded to spent fuel pool
Core Cooling: N/A
Primary Containment: open for refueling operations
Secondary Containment: lost (visual)
Spent Fuel Pool: 1201 to 1331 bundles in pool (Source: GEH & NISA); pool likely was dry at one point causing significant fuel damage; water sprayed into pool for cooling; pool/area temp <100°C, SFP temperature unknown
Power: external electrical cable connected to power center; power has been restored to central control room (Source: NRC Team per TEPCO)

Unit 5 – Shutdown since January 3, 2011 (NRC priority: 5)
Core Status: Cold Shutdown; RPV intact; RPV level +172 cm above TAF (Source: IAEA, March 20)
Core Cooling: RHR providing cooling.
Spent Fuel Pool: 950 bundles (Source: GEH); temperature: 49°C (Source: NISA); RHR pump failed subsequent to switchover to external power (Source: TEPCO)
Power: Switched from EDG to external power supply (Source: NISA)

Unit 6 – Shutdown since August 14, 2010 (NRC priority: 6)
Core Status: Cold Shutdown; RPV Intact; RPV level +276 cm above TAF (Source: NISA)
Core Cooling: RHR providing cooling
Spent Fuel Pool: 876 bundles (Source: GEH); temperature 36°C (Source: JAIF); injection to SFP via normal make-up water system; RHR is cooling SFP (Source: NISA)
Power: Switch from EDG to external power supply (Source: NISA); 2 unit EDGs available

Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water level maintained full since March 18, at 73°C (Source: NISA); water spray started at 2137 EDT March 20 (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)

Other Plants

Earthquake/Tsunami Status Update March 25, 2011 0430 EDT

No new information to report

Acronyms

atm – Atmosphere (unit of pressure)
EDG – Emergency Diesel Generator
RCS – Reactor Coolant System
RHR – Residual Heat Removal
RPV – Reactor Pressure Vessel
SFP – Spent Fuel Pool
TAF – Top of Active Fuel

Protective Measures Team (PMT) Update

The PMT continues to aggregate and assess available dose rate information from DOE Aerial Monitoring operations, the U.S. Navy, and TEPCO. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several days. On-site surveys of the exterior of the reactor buildings show dose rates of 60 mR/hr to 15 R/hr with the highest doses around reactor building 3.

Potential ingestion pathway radiation measurements made by the Japanese government on food from regions near the Daiichi site exceed the values established by the U.S. Food and Drug Administration (FDA). Tokyo government officials advised residents to stop giving tap water to infants based on radioactive levels.

The PMT continues to assess monitoring performed by U.S. assets, including EPA Radnet stations, and U.S. reactors. (b)(5)

(b)(5) E45

On March 24, 2011, the NRC recommended to OSTP, NARAC, and DOE that NARAC run a new Tokyo case. The RASCAL source terms were based upon the following major assumptions: Unit 1: assumed 70% core melt as provided by NRC RST and a 10% release rate/day as provided by the Japanese (translated report). Unit 2: assumed 33% core melt as before and a 5 in^2 hole in containment based on Japanese report. Unit 3: assumed 33% core melt as before and a 100% release rate/day based upon data provided by the Japanese. NRC held a teleconference with NARAC at 2230 on March 24, 2011 to confirm the above. NARAC results should be available on March 25, 2011 as directed by the White House.

PMT confirmed reports that INPO had access to one million KI pills from ANBEX, Inc. (866-463-6754) at (b)(4) E4

The PMT is continuing efforts to develop reentry plans for short-term reentry and retrieval of personal effects. A long term reentry plan was developed on March 22, 2011 and was reviewed on March 24, 2011 with no changes recommended. The PMT is also working with the Environmental Protection Agency (EPA) with environmental data from US Nuclear Power plants.

The PMT has begun efforts to compile a comprehensive list of all PMT Rascal runs conducted since the onset of the crisis in Japan that have been supplied to NARAC. Runs are summarized

in a matrix by date and reactor unit/ spent fuel pool, and percent fuel melt. Furthermore, the PMT is trending exposure rate data around the site based on Ministry of Education, Culture, Sports, Science and Technology (MEXT) data which is periodically sent to the PMT. The exposure rate data is being presented in a figure illustrating locations and trend data.

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International Response

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USNRC Emergency Operations Center Status Update

March 25, 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.

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

3) Coordination with other U.S. 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 U.S. citizens residing within 50 miles (80 km) of the Fukushima Daiichi site is to evacuate.

One train of temporary cooling equipment has been transported to Yokota Air Force Base. Plans are being made for the U.S. Navy to provide two fresh water barges to the Daiichi site. TEPCO expects to swap to freshwater injection (from the Dam source) on Units 1-3 on 3/25.

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Earthquake/Tsunami Status Update March 25, 2011 1800 EDT (rev2)

The NRC Reactor Safety Team has provided a set of recommendations pertaining to severe accident management strategies to the NRC team in Japan. The recommendations were coordinated with GEH, EPRI, INPO, Naval Reactors, and DOE.

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

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

Status of NRC Licensee and Agreement State Facilities

No new information to report

Industry Consortium

No new information to report

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, International Atomic Energy Agency (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 instructed evacuation for local residents within a 20km radius of the site boundary and sheltering in place out to 30 km. IAEA confirms a no-fly zone out to 30 km around the Fukushima Daiichi plant. There have been no updates to protective actions since March 15, 2011.

All available information indicates that the majority of releases from the Fukushima site have been carried out to sea by the prevailing winds.

Current forecast meteorological data through March 26, 2011 indicates prolonged onshore winds, shifting offshore on the morning of March 26.

The most recent survey data, from March 25, 2011, does not indicate any substantial change of dose measurements at the site.

Earthquake/Tsunami Status Update March 25, 2011 1800 EDT (rev2)

STATUS as of 1800 EDT, March 25, 2011 - (0700 Japan, March 26)

Unit 1 - (NRC Priority: 1)

Core Status: Damaged, 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 149C at bottom drain, 197C at FW nozzle (Source: NISA)
RPV at 65.7 psig (increasing trend), DW and torus pressure at 40 psig (decreasing trend) (Source: NISA).

Core Cooling: Fresh water injection initiated at 1537 hrs JDT 3/25, injecting through FW 120l/min or 31.7 g/m (Source: NISA).
Recirculation pump seals have likely failed. (Source: GEH)

Primary Containment: Not damaged, 40 psig (TEPCO was considering venting on 3/24)

Secondary Containment: Severely damaged (hydrogen explosion)

Spent Fuel Pool: Fuel covered, no seawater injected - (Source: JAIF, NISA, TEPCO)
The fuel in this pool is all over 12 years old and very little heat input (<0.1 MW) (Source: DOE).

Rad Levels: DW 4780 R/hr, Torus 3490 R/hr (source instruments unknown), Outside plant: 26mR/hr at gate (variable) (Source: US Industry)

Power: Electric power available, equipment testing in progress (Source: JAIF, NISA, TEPCO)
External AC power to the Main Control Room of Unit 1 became available at 11:30 JDT 3/24/2011. Lighting in Main Control Room operating in Unit 1 & Unit 3.

Unit 2 - (NRC Priority: 2)

Core Status: Damaged, fuel partially or fully exposed (Source: JAIF, NISA, TEPCO).
Suspect 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).

Core Cooling: Seawater injection through RHR via fire water, bottom head temperature 104C, feed water nozzle temperature 107C (Source: JAIF, NISA, TEPCO) Recirculation pump seals have likely failed. (Source: GEH)
Expect to go to freshwater late on 3/25

Primary Containment: Damage suspected (Source: JAIF, NISA, TEPCO)

Secondary Containment: Damaged (Source: JAIF, NISA, TEPCO), hole in refuel floor siding (Source: visual)

Spent Fuel Pool: Fuel covered, seawater injected on March 20, fuel pool temperature 52C (Source: JAIF, NISA, TEPCO)

Rad Levels: DW 4560 R/hr; Torus 154 R/hr (source instruments unknown); Outside plant: 26mR/hr at gate (variable) (Source: US Industry)

Power: External AC power has reached the unit, checking integrity of equipment before energizing.

Unit 3 - (NRC Priority: 3)

Core Status: Damaged, fuel partially or fully exposed (Source: JAIF, NISA, TEPCO).
Suspect the volume of sea water injected to cool the core has left enough salt to likely fill the lower plenum to the core plate (Source: GEH, US Industry).

Core Cooling: Freshwater injection via fire line initiated 1802 JDT 3/25/11 (Source: NISA)
Seawater injection through RHR, bottom head temperature 111C, FW nozzle

temperature: Unreliable (Source: JAIF, NISA 1800 JDT 3/25/11, TEPCO) Recirculation pump seals have likely failed. (Source: GEH); Expect to go freshwater cooling late on 3/25

Primary Containment: Damage suspected (Source: NISA, TEPCO). "Not damaged" (Source: JAIF). Need to resolve

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

Spent Fuel Pool: Low water level (Source: JAIF, NISA, TEPCO), spraying and pumping sea water into the SFP via the Cooling and Purification Line (Source: NISA)

Rad Levels: DW 5100 R/hr, torus 150 R/hr (INPO source instruments unknown); Outside plant: 26mR/hr at gate (variable) (Source: US Industry); 100 R/hr debris outside Rx building (covered).

Power: External AC power has reached the unit, checking integrity of equipment before energizing.

Unit 4 - (NRC Priority: 4)

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

Spent Fuel Pool: Low water level, spraying with sea water, hydrogen from the fuel pool exploded, fuel pool is cool heating up very slowly (Source: JAIF, NISA, TEPCO) Temperature is unknown (Source: NISA).
Video was to be taken of SFP pool on 3/24 (?)

Power: External AC power has reached the unit, checking electrical integrity of equipment before energizing. (Source: JAIF, NISA, TEPCO)

Unit 5 - (NRC Priority: 6)

Core Status: In vessel (Source: JAIF, NISA, TEPCO)

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 37.9 C (Source: JAIF, NISA, TEPCO)

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

Unit 6 - (NRC Priority: 5)

Core Status: In vessel (Source: JAIF, NISA, TEPCO)

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 22 C (Source: JAIF, NISA, TEPCO)

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

Common Spent Fuel Pool (NRC priority: 7): 6,000 bundles (Source: GEH); water level maintained at 53°C (Source: NISA); water spray started at 2137 EDT March 20 (Source: NISA); normal cooling started 1805 JDT 3/24/2011 (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)

On March 25, 2011, NRC assigned revised priorities to Units 1 through 4. This was based on analysis by the Reactor Safety Team. Unit 1 is priority 1 based on the fact that primary containment integrity can still be preserved if the responders take the correct 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 okay 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

Acronyms

atm – Atmosphere (unit of pressure)
DW – Drywell
EDG – Emergency Diesel Generator
FW – Feed Water
CS – Reactor Coolant System
RHR – Residual Heat Removal
RPV – Reactor Pressure Vessel
SFP – Spent Fuel Pool
TAF – Top of Active Fuel

Protective Measures Team (PMT) Update

The PMT continues to aggregate and assess available dose rate information from DOE Aerial Monitoring operations, the U.S. Navy, and TEPCO. Multi-day trending of available onsite monitors shows slightly declining dose rates over the past several days. On-site surveys of the exterior of the reactor buildings show dose rates of 60 mR/hr to 15 R/hr with the highest doses around reactor building 3.

Earthquake/Tsunami Status Update March 25, 2011 1800 EDT (rev2)

Potential ingestion pathway radiation measurements made by the Japanese government on food from regions near the Daiichi site exceed the values established by the U.S. Food and Drug Administration (FDA). Tokyo government officials advised residents to stop giving tap water to infants based on radioactive levels.

The PMT continues to assess monitoring performed by U.S. assets, including EPA Radnet stations, and U.S. reactors. (b)(5) E45

(b)(5)

On March 24, 2011, the NRC recommended to OSTP, NARAC, and DOE that NARAC run a new Tokyo case. The RASCAL source terms were based upon the following major assumptions: Unit 1: assumed 70% core melt as provided by NRC RST and a 10% release rate/day as provided by the Japanese (translated report). Unit 2: assumed 33% core melt as before and a 5 in^2 hole in containment based on Japanese report. Unit 3: assumed 33% core melt as before and a 100% release rate/day based upon data provided by the Japanese. NRC held a teleconference with NARAC at 2230 on March 24, 2011 to confirm the above. NARAC results should be available on March 25, 2011 as directed by the White House.

PMT confirmed reports that INPO had access to one million KI pills from ANBEX, Inc. (866-463-6754) at (b)(4) E44

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18 rem. Two of the workers had severely contaminated their feet (radiation doses above water was 40 R/hr) and were transferred to the Fukushima Prefecture Medical University. Isotopic analysis received on March 25, 2011 from TEPCO indicates presence of contaminated water (I-131 and other isotopes) in the Unit 3 turbine building at levels indicating damaged fuel from the core.

PMT has completed work with NARAC on the source term for Plausible Realistic Case model based on plant conditions as of March 24, 2011. Run was completed at 1400 EDT on March 25, 2011, and results have been verified by the PMT. The Plausible Realistic Case assumed partial melting of Unit 1 (70% core melt; 10%/day release), Unit 2 (33% core melt; a 5-inch sq. hole in containment), and Unit 3 (33% core melt; 100%/day release. The case did not assume any release from the spent fuel pools. Actual meteorological data and forecasts were used. Releases were assumed to occur over 12 days, and dose results were calculated for 14 days for locations in Japan. TEDE was greater than 5 rem out to around 2 miles and greater than 1 rem (TEDE PAG) out to around 8 miles from the plant. Adult thyroid dose was greater than 10 rem out to around 5.25 miles from the plant. Child thyroid dose was greater than 5 rem out to around 11 miles from the plant.

Japanese government officials have recommended to residents living within 20 to 30 km of the site to voluntarily evacuate their homes – not because of changing conditions at the site – but because of increasingly difficult logistical issues.

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