

## Valentine, Nicholee

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**From:** Rodriguez, Veronica - *NVR*  
**Sent:** Friday, March 11, 2011 3:28 PM  
**To:** Astwood, Heather; Boger, Bruce; Cullingford, Michael; Hopkins, Jon; Quinones, Lauren; Regan, Christopher  
**Subject:** RE: INFO Japan: Radioactive Steam Could Be Released From Troubled Plant  
**Attachments:** Status\_of\_Fukushima\_Daiichi\_NPP\_1830\_03112011[1].pdf

FYI – see attached.

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**From:** Astwood, Heather  
**Sent:** Friday, March 11, 2011 2:56 PM  
**To:** Boger, Bruce; Valentine, Nicholee; Titus, Brett; Susco, Jeremy; Roquecruz, Carla; Nguyen, Quynh; Meighan, Sean; Heida, Bruce; Fields, Leslie; Cusumano, Victor; Cartwright, William; Azeem, Almas  
**Cc:** Cullingford, Michael; Hopkins, Jon; Quinones, Lauren; Regan, Christopher; Rodriguez, Veronica  
**Subject:** INFO Japan: Radioactive Steam Could Be Released From Troubled Plant

FYI

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**From:** Breskovic, Clarence  
**Sent:** Friday, March 11, 2011 1:56 PM  
**To:** Breskovic, Clarence  
**Subject:** Japan: Radioactive Steam Could Be Released From Troubled Plant

### Radioactive Steam Could Be Released From Troubled Plant

Tokyo *Kyodo World Service* 1819 GMT 11 Mar 11

Tokyo, March 12 Kyodo -- Japanese authorities are nearing a decision to release radioactive steam from a troubled nuclear reactor, industry minister Benri Kaieda said Saturday.

Kaieda was referring to the rising pressure inside the No. 1 reactor of the Fukushima No. 1 plant, which was hit by a powerful earthquake Friday.



**IAEA**

International Atomic Energy Agency

## **INCIDENT AND EMERGENCY CENTRE**

**Subject: Status of the Fukushima Daiichi nuclear power plant**

The Incident and Emergency Centre (IEC) is continuing to monitor the status of the nuclear power plants in Japan following the earthquake earlier today. At 18:30 UTC on March 11, 2011 the IEC spoke to its counterparts in Japan the Nuclear and Industrial Safety Agency (NISA) and Ministry of Education, Culture, Sports, Science and Technology (MEXT).

NISA and MEXT confirmed the following information about the three reactor units at the Fukushima Daiichi nuclear power plant:

### Unit 1

The reactor is being maintained shutdown. However there is no information regarding the status of the supply of power to Unit 1. The reactor water level is reported to be oscillating. At 15:30 UTC the reactor water was approximately 130 cm above the top of the core. Containment is intact in Unit 1, however due to an increase of pressure within containment the decision has been made to perform a limited controlled venting to avoid over pressurization of the containment.

### Unit 2

The reactor is being maintained shutdown. There is currently no supply of power to Unit 2. Work is currently being undertaken to restore power. At 15:30 UTC the reactor water level is reported to be at approximately 350 cm above the top of the core. Containment is intact in Unit 2.

### Unit 3

The reactor is being maintained shutdown. Power is being supplied to Unit 3. At 13:00 UTC the reactor water level is reported to be at approximately 450 cm above the top of the core. Containment is intact in Unit 3.

A mobile power generator has arrived at the site of the Fukushima Daiichi nuclear power plant.

Florian Baciú  
Emergency Response Manager  
11-March-2011 19:45 UTC

**Murphy, Andrew**

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**From:** Jean.GAUVAIN@oecd.org  
**Sent:** Friday, March 11, 2011 7:52 AM  
**Subject:** FW: OECD/NEA - WGPC Secretariat - Japan Friday 11 March 13:45 UTC - Evacuation order to residents

WGPC Members

Cc CNRA, CSNI, WGOE, WGIP, IAGE, IAGESEISM

Please read below update and correction to previous message

Jean Gauvain - NEA/NSD - Phone +33 1 45 24 10 52 - Mobile +33 6 79 94 81 93

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**From:** Akihiro YAMAMOTO [<mailto:a-yamamoto@houshasen.tsuruga.fukui.jp>]

**Sent:** Friday, March 11, 2011 13:41

**Subject:** [Yama] Evacuation order to residents

The people of a town near Fukushima Daiichi Units (Within 2 km) were ordered to evacuate their homes.

I was mentioned previous emails with regard to ECCS but I think this is very strange that ECCS are really being driven even diesel generators has failed to start.

Please correct that following plants are just in the emergency mode and not in the ECCS mode.

- Fukushima 1-1 - State of emergency
- Fukushima 1-2 - Call off the emergency
- Fukushima 1-3 - State of emergency
- Fukushima 2-1 - State of emergency
- Fukushima 2-2 - State of emergency
- Fukushima 2-4 - State of emergency

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Yama

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**Akihiro YAMAMOTO**  
Ageing Management Specialist,  
Nuclear Safety Measurement Division  
Fukui Prefectural Government

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E-mail: [a-yamamoto@houshasen.tsuruga.fukui.jp](mailto:a-yamamoto@houshasen.tsuruga.fukui.jp)

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**From:** Akihiro YAMAMOTO [<mailto:a-yamamoto@houshasen.tsuruga.fukui.jp>]  
**Sent:** Friday, March 11, 2011 8:00 PM  
**To:** 'Akihiro YAMAMOTO'; [Jean.GAUVAIN@oecd.org](mailto:Jean.GAUVAIN@oecd.org)  
**Cc:** [Javier.REIG@oecd.org](mailto:Javier.REIG@oecd.org); [Luis.ECHAVARRI@oecd.org](mailto:Luis.ECHAVARRI@oecd.org); [Uichiro.YOSHIMURA@oecd.org](mailto:Uichiro.YOSHIMURA@oecd.org); [Serge.GAS@oecd.org](mailto:Serge.GAS@oecd.org); [Axel.BREEST@oecd.org](mailto:Axel.BREEST@oecd.org); [Elisabeth.MAUNY@oecd.org](mailto:Elisabeth.MAUNY@oecd.org); [Greg.LAMARRE@oecd.org](mailto:Greg.LAMARRE@oecd.org); [Radomir.REHACEK@oecd.org](mailto:Radomir.REHACEK@oecd.org); [Alejandro.HUERTA@oecd.org](mailto:Alejandro.HUERTA@oecd.org); [Diane.JACKSON@oecd.org](mailto:Diane.JACKSON@oecd.org); [Jean.GAUVAIN@oecd.org](mailto:Jean.GAUVAIN@oecd.org); [John.NAKOSKI@oecd.org](mailto:John.NAKOSKI@oecd.org); [Philippe.GRESS@oecd.org](mailto:Philippe.GRESS@oecd.org); [Lawrence.BURKHART@oecd.org](mailto:Lawrence.BURKHART@oecd.org); 'Carlo Vitanza'; [Abdallah.amri@oecd.org](mailto:Abdallah.amri@oecd.org)  
**Subject:** [Yama] Situation update (19:45 Japan time)

NISA is now holding a press conference.

- Fukushima 1-1 (ECCS mode)
- Fukushima 1-2 (ECCS mode) - Call off the emergency
- Fukushima 1-3 (ECCS mode)
- Fukushima 2-1 (ECCS mode)

The problem is that they can't monitor water injection (ECCS).  
It might be a problem of the monitoring system.

In fact, TEPCO called off the emergency of unit 1-2 a while ago because they are able to monitoring the water level in the reactor now.

Yama

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**From:** Akihiro YAMAMOTO [<mailto:a-yamamoto@houshasen.tsuruga.fukui.jp>]  
**Sent:** Friday, March 11, 2011 7:30 PM

**To:** 'Jean.GAUVAIN@oecd.org'

**Cc:** 'Javier.REIG@oecd.org'; 'Luis.ECHAVARRI@oecd.org'; 'Uichiro.YOSHIMURA@oecd.org'; 'Lydie.GUYOT@oecd.org';  
'Marie-Laure.PEYRAT@oecd.org'; 'Serge.GAS@oecd.org'; 'Axel.BREEST@oecd.org'; 'Elisabeth.MAUNY@oecd.org';  
'Greg.LAMARRE@oecd.org'; 'Radomir.REHACEK@oecd.org'; 'Alejandro.HUERTA@oecd.org'; 'Diane.JACKSON@oecd.org';  
'Jean.GAUVAIN@oecd.org'; 'John.NAKOSKI@oecd.org'; 'Philippe.GRESS@oecd.org'; 'Lawrence.BURKHART@oecd.org';  
'Nicolina.IANNOLO@oecd.org'; 'Roopa.CHAUHAN@oecd.org'; 'christele.tephanympania@oecd.org';  
'Aileen.LITTLE@oecd.org'; 'Carlo Vitanza'; 'Abdallah.amri@oecd.org'

**Subject:** [Yama] Situation now - ECCS mode

Dear all,

TEPCO (Tokyo Electric Power Company) declared the state of emergency of following NPPs:

Fukushima 1-1

Fukushima 1-2

Fukushima 1-3

Fukushima 2-1 **(ECCS mode now)**

I am trying to get information why DG can't start up (problem of intake sea water for the cooling DG system?)

There is a fire from turbine building (B1 floor) at Onagawa NPP unit 1 but the fire fighting was completely succeeded.

<http://www.yomiuri.co.jp/dy/national/20110311dy01.htm>

A while ago, Fukui (my office located) had also earthquake (M4.1). We have 15 NPPs but no damage to the NPPs.

Yama

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**Akihiro YAMAMOTO**

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Fukui Prefectural Government

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E-mail: [a-yamamoto@houshasen.tsuruga.fukui.jp](mailto:a-yamamoto@houshasen.tsuruga.fukui.jp)

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NSIR

**Murphy, Andrew**

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**From:** Toledo, Myrna A. [Myrna.A.Toledo@abc.com]  
**Sent:** Friday, March 11, 2011 11:47 AM  
**To:** Murphy, Andrew  
**Subject:** ABC News Inquiry

**Importance:** High

Dear Dr. Murphy,

We are working on a special tonight for ABC News 20/20 about the tsunami in Japan and were wondering if we could talk to you about your work regarding the safety of nuclear plants in earthquakes. Can you please give me a call at 212-456-2017 or let me know how to best reach you? I also have just left you a voice mail message at 301-251-7659.

I look forward to hearing from you soon.

Thank you,

Myrna

Myrna A. Toledo  
ABC News 20/20  
147 Columbus Ave.  
9th Floor  
New York, NY 10023  
Phone: 212-456-2017  
Fax: 212-456-6092  
Email: [Myrna.A.Toledo@abc.com](mailto:Myrna.A.Toledo@abc.com)

N/3

**Murphy, Andrew**

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**From:** Richards, Stuart  
**Sent:** Friday, March 11, 2011 6:12 PM  
**To:** Hogan, Rosemary; Graves, Herman; Kammerer, Annie; Murphy, Andrew  
**Cc:** Case, Michael; Uhle, Jennifer  
**Subject:** Follow-up to the Japanese Earthquake/Tsunami

Brian wants us to be prepared to answer questions on the earthquake/tsunami, particularly as it is related to US plants.

For example:

- Was the ground motion at the Japanese sites beyond their design basis?
- Why do we have confidence that US nuclear power plants are adequately designed for earthquakes and tsunamis?
- If the earthquake in Japan was a larger magnitude than considered by plant design, why can't the same thing happen in the US?
- What would be the results of a tsunami generated off the coast of a US plant? (Or why are we confident that large tsunamis will not occur relatively close to US shores?)

Mike will likely get additional guidance on Monday morning.

Thanks  
Stu

NSIR

**Murphy, Andrew**

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**From:** Schaperow, Jason  
**Sent:** Friday, March 11, 2011 1:59 PM  
**To:** Murphy, Andrew  
**Subject:** Hi

Hi Andy,

How are you?

The PRA folks talk to us in terms of pga. For example, one of the SBOs in SOARCA is the result of an earthquake with a pga in the range of 0.5 g to 1 g. The news media are saying that today's Japanese earthquake is 8.9 on the Richter scale. How do I convert this to g's?

Thanks,  
Jason

N/5

NSIR

**Murphy, Andrew**

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**From:** Orbovic, Nebojsa [Nebojsa.Orbovic@cnscccsn.gc.ca]  
**Sent:** Friday, March 11, 2011 8:10 AM  
**To:** Murphy, Andrew  
**Subject:** Japan earthquake

Andy,

Do you have any news regarding the NPPs in Japan?

Thanks in advance,  
Neb

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N/4

**Murphy, Andrew**

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**From:** Richards, Stuart  
**Sent:** Friday, March 11, 2011 6:36 AM  
**To:** Hogan, Rosemary; Kammerer, Annie; Murphy, Andrew  
**Cc:** Sheron, Brian; Case, Michael; Uhle, Jennifer  
**Subject:** Japanese Earthquake

**Importance:** High

Rosemary/Annie/Andy

I'm sure you have heard about the 8.9 earthquake off the coast of Japan.

It resulted in a large tsunami on the Japanese coast. There is a report of problems at a Japanese nuclear plant.

We should be prepared to brief on our tsunami research. Maybe also seismic.

Additionally the tsunami wave is predicted to hit the coast of California in a few hours. Although the news reports that no damage is expected, we may be called on to comment on the impact on San Onofre and Diablo Canyon.

Thanks  
Stu

**Case, Michael**

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**From:** Case, Michael  
**Sent:** Friday, March 11, 2011 7:45 AM  
**To:** Kammerer, Annie  
**Subject:** RE: M8.9 NEAR THE EAST COAST OF HONSHU, JAPAN

Thanks Annie. Shakecast is nice.

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**From:** Kammerer, Annie  
**Sent:** Friday, March 11, 2011 7:33 AM  
**To:** RES\_DE\_SGSEB; Case, Michael; Richards, Stuart; Chokshi, Nilesh; Munson, Clifford; Karas, Rebecca; Markley, Michael; Manoly, Kamal; Sheron, Brian; Uhle, Jennifer; Cook, Christopher; Bagchi, Goutam; Khanna, Meena  
**Subject:** FW: M8.9 NEAR THE EAST COAST OF HONSHU, JAPAN

FYI. This is from the working version of our beta ShakeCAST system

**From:** [ISSC-Notification@iaea.org](mailto:ISSC-Notification@iaea.org) [mailto:[ISSC-Notification@iaea.org](mailto:ISSC-Notification@iaea.org)]  
**Sent:** Friday, March 11, 2011 4:38 AM  
**To:** [ISSC-Notification@iaea.org](mailto:ISSC-Notification@iaea.org)  
**Cc:** Kammerer, Annie  
**Subject:** M8.9 NEAR THE EAST COAST OF HONSHU, JAPAN

The following New Earthquake occurred:

Location

NEAR THE EAST COAST OF HONSHU, JAPAN

Magnitude

3.9

Time

2011-03-11 06:46:23

Lat

38.322

Lon

142.369

ISSC ShakeCast Notification System

IAEA

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N/8

- > reports I have access to. I don't know how long a BWR can go w/o
- > emergency core cooling and not sustain significant core damage but it
- > seems like we're well into that time domain. Is there anything that
- > can be done to help? I don't know, I'm searching.
- > The one thing we learned from MCCI though: if you fear vessel failure
- > and you have any means to flood the cavity then you should do that.
- > They have siliceous concrete in Japan; too much interaction ex-vessel
- > w/o water and coolability is lost. Let me know if there is anything I
- > can do.
- >
- > Mitch
- >
- >

NSIR

**From:** [Operations Center Bulletin](#)  
**To:** [Operations Center Bulletin](#)  
**Subject:** \*\*\*NRC IS RESPONDING TO AN EMERGENCY OUTSIDE OF THE UNITED STATES\*\*  
**Date:** Friday, March 11, 2011 3:04:10 PM  
**Importance:** High

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**THIS IS NOT A DRILL.**

The NRC and other Federal agencies are closely following an emergency occurring outside of the United States. Press releases about NRC actions are posted on [www.nrc.gov](http://www.nrc.gov). Information is also available on the NRC External Blog at: <http://public-blog.nrc-gateway.gov>. Employees contacted by the media are asked to refer the calls to the Office of Public Affairs at 301-415-8200

Two important reminders:

It is possible that some of us will be requested by colleagues in another country to provide technical advice and assistance during this emergency. It is essential that all such communications be handled through the NRC Operations Center. Any assistance to a foreign government or entity must be coordinated through the NRC Operations Center and the U.S. Department of State (DOS). If you receive such a request, contact the NRC Operations Officer (301-816-5100 or via the NRC Operator) immediately.

If you receive information regarding this or any emergency (foreign or domestic) and you are not certain that the NRC's Incident Response Operations Officer is already aware of that information, you should contact the NRC Operations Officer (301-816-5100 or via the NRC Operator) and provide that information.

No response to this message is required.

**THIS IS NOT A DRILL**

N/9

**Weaver, Tonna**

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**From:** Ruland, William *INRR*  
**Sent:** Saturday, March 12, 2011 10:07 PM  
**To:** Mendiola, Anthony  
**Subject:** Re: Sea Water and Boron

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

We have had repeated contacts with GE and Exelon (Dresden/Quad) which has similar designs.

Bill  
Bill Ruland, from  
USNRC Blackberry

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**From:** Mendiola, Anthony *INRR*  
**To:** Ruland, William  
**Sent:** Sat Mar 12 22:02:10 2011  
**Subject:** RE: Sea Water and Boron

Spoke with Paul.

He feels that the near term strategy is to keep the core covered, deal with the consequences of the use of borated sea water later.

I asked him about the fuel and sea water. The fuel components should be fine for the near term if subjected to sea water. Zr should be very resistant.

He is concerned that the NRC folks following this issue outside of the Op center can't really tell what is going on and thus may offer less than perfect suggestions of what is going on in Japan. He suggests that some of the licensing and operational departments of some of the domestic BWRs may have better knowledge and understanding than we do, so we should consider be asking them for information. As an aside, I heard that GEH had over 70 employees onsite at the time of the quake, so there maybe some info there in Wilmington. Also, we may have additional BWR system experts on the staff that management is not aware of that may lend additional advice.

Tony

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**From:** Ruland, William *INRR*  
**Sent:** Saturday, March 12, 2011 9:46 PM  
**To:** Mendiola, Anthony  
**Subject:** Re: Sea Water and Boron

Thanks!  
Bill Ruland, from  
USNRC Blackberry

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**From:** Mendiola, Anthony *INRR*  
**To:** Ruland, William

**Sent:** Sat Mar 12 20:56:26 2011

**Subject:** Sea Water and Boron

Bill,

Have discussed with Tony A. From a neutronic point of view, boron and sea water work together to reduce  $K_{eff}$ , boron as it is a poison and sea water as it is contaminated with impurities that disrupt the neutron process. Chemically, you can only get so much boron in solution in "room temperature" sea water, so the use of sea water improves the shutdown neutronics.

I haven't raised Len yet to get the precipitation point of view. From our previous discussions, there are concerns with what could be formed (particulates) within the core environment, as well as other precipitation that could occur. The concerns are for long term core cooling, maintenance for cool able geometry, and corrosion effects on core internals. Generally, GSI 191 stuff.

Our recommendations – minimize the amount of borated sea water injected if possible and restore the injection of pure water when possible to flush the core systems from impurities.

That's what we have for now. I will follow-up with any other input from Len when I reach him.

Tony

NS'

**From:** Operations Center Bulletin  
**To:** OST02\_HOC  
**Subject:** NRC IS RESPONDING TO AN EMERGENCY OUTSIDE of the United States  
**Date:** Saturday, March 12, 2011 4:21:22 PM

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**THIS IS NOT A DRILL.**

The NRC and other Federal agencies are continuing to follow an emergency occurring outside of the United States. Press releases about NRC actions are posted on [www.nrc.gov](http://www.nrc.gov). Information is also available on the NRC External Blog at: <http://public-blog.nrc-gateway.gov>. Employees contacted by the media are asked to refer the calls to the Office of Public Affairs at 301-415-8200

Two important reminders:

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No response to this message is required.

**THIS IS NOT A DRILL**

N/11

NSUR

**Murphy, Andrew**

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**From:** Operations Center Bulletin  
**Sent:** Sunday, March 13, 2011 11:12 AM  
**To:** OST02 HOC  
**Subject:** FW: NRC IS RESPONDING TO AN EMERGENCY OUTSIDE of the United States

**THIS IS NOT A DRILL**

The NRC is coordinating its actions with other Federal agencies as part of the U.S. government response to the events in Japan. The NRC is examining all available information as part of the effort to analyze the event and understand its implications both for Japan and the United States. The NRC's Headquarters Operations Center in Rockville, MD has been stood up since the beginning of the emergency in Japan and is operating on a 24-hour basis.

NRC Incident Responders at Headquarters have spoken with the agency's counterpart in Japan and offered the assistance of U.S. technical experts. Two officials from the NRC with expertise on boiling water nuclear reactors have deployed to Japan as part of a U.S. International Agency for International Development (USAID) team. USAID is the Federal government agency primarily responsible for providing assistance to countries recovering from disasters.

U.S. nuclear power plants are built to withstand environmental hazards, including earthquakes and tsunamis. Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster. The NRC requires that safety significant structures, systems, and components be designed to take in account the most severe natural phenomena historically estimated for the site and surrounding area.

The NRC will **not** provide information on the status of Japan's nuclear power plants. For the latest information on NRC actions see the NRC's web site at [www.nrc.gov](http://www.nrc.gov) or blog at <http://public-blog.nrc-gateway.gov>.

**Two important reminders:**

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If you receive information regarding this or any emergency (foreign or domestic) and you are not certain that the NRC's Incident Response Operations Officer is already aware of that information, you should contact the NRC Operations Officer (301-816-5100 or via the NRC Operator) and provide that information.

**Other Sources of Information:**

- USAID – [www.usaid.gov](http://www.usaid.gov)
- U.S. Department of State – [www.state.gov](http://www.state.gov)
- FEMA – [www.fema.gov](http://www.fema.gov)
- White House – [www.whitehouse.gov](http://www.whitehouse.gov)
- Nuclear Energy Institute – [www.nei.org](http://www.nei.org)
- International Atomic Energy Agency – [www.iaea.org/press](http://www.iaea.org/press)

No response to this message is required.

N/12

**THIS IS NOT A DRILL**

NSIR

**From:** [OST03 HOC](#)  
**To:** [DOI](#); [DTRA](#); [chardin](#); [rfraass@crcpd.org](#); [james.d.loyd@nasa.gov](#); [PN Distribution](#); [FDA](#); [State Dept](#); [White House Sit Room](#); [Bernie Beaudin](#); [Canadian Nuclear Safety Commission \(CNSC\)](#); [eoc2@cnscccsn.gc.ca](#); [DOEHQEOC@OEM.DOE.GOV](#); [fldr-nrc@comdt.uscg.mil](#); [EOC.EPAHQ@EPAMAIL.EPA.GOV](#); [Lawrence Koleff](#); [SIOC](#); [FEMA-operations-center@dhs.gov](#); [Health Canada Operations Center](#); [IAEA Emergency Response Unit](#); [USDA](#); [Screnci, Diane](#); [Sheehan, Neil](#); [Dricks, Victor](#); [Clifford, James](#); [Gamberoni, Marsha](#); [Heater, Keith](#); [Holian, Brian](#); [Kay Gallagher](#); [Kinneman, John](#); [Lew, David](#); [Nick, Joseph](#); [ODaniell, Cynthia](#); [Powell, Raymond](#); [R1 IRC](#); [Roberts, Darrell](#); [Thompson, Margaret](#); [Davenport, Patricia](#); [McCallie, Karen](#); [Miles, Patricia](#); [Quinones-Navarro, Joylynn](#); [R2 IRC](#); [Rudisail, Steven](#); [R3 IRC](#); [Smith, Desiree](#); [Alferink, Beth](#); [Andrews, Tom](#); [Howell, Linda](#); [R4 IRC](#)  
**Subject:** NRC Revised Press Release #5  
**Date:** Sunday, March 13, 2011 4:10:37 PM  
**Attachments:** [Revised Press Release 5.pdf](#)

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\*\*\*\*\*Event Information is Attached\*\*\*\*\*

The NRC is responding to an event.

Please contact the NRC Executive Support Team if necessary at 301-816-5100 or reply to this e-mail.

N/13



# NRC NEWS

## U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Telephone: 301/415-8200

Washington, D.C. 20555-0001

E-mail: [opa.resource@nrc.gov](mailto:opa.resource@nrc.gov) Site: [www.nrc.gov](http://www.nrc.gov)

Blog: <http://public-blog.nrc-gateway.gov>

No. 11-046

March 13, 2011

(Revised)

### **NRC SEES NO RADIATION AT HARMFUL LEVELS REACHING U.S. FROM DAMAGED JAPANESE NUCLEAR POWER PLANTS**

The Nuclear Regulatory Commission is coordinating with the Department of Energy and other federal agencies in providing whatever assistance the Japanese government requests as they respond to conditions at several nuclear power plant sites following the March 11 earthquake and tsunami. The NRC has sent two boiling-water reactor experts to Japan as part of a U.S. Agency for International Development team.

In response to nuclear emergencies, the NRC works with other U.S. agencies to monitor radioactive releases and predict their path. All the available information indicates weather conditions have taken the small releases from the Fukushima reactors out to sea away from the population. Given the thousands of miles between the two countries, Hawaii, Alaska, the U.S. Territories and the U.S. West Coast are not expected to experience any harmful levels of radioactivity.

During a nuclear event the NRC has requirements to protect populations around reactors. For instance, the U.S. evacuation standard at 10 miles is roughly equivalent to the 20-kilometer distance recommended in Japan. The United States also uses sheltering in place and potassium iodide, protective measures also available in Japan. United States citizens in Japan are encouraged to follow the protective measures recommended by the Japanese government. These measures appear to be consistent with steps the United States would take.

The NRC will not comment on hour-to-hour developments at the Japanese reactors. This is an ongoing crisis for the Japanese who have primary responsibility.

###

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**From:** OST03 HOC  
**To:** DOI; DTRA; chardin; rfraass@crcpd.org; james.d.loyd@nasa.gov; PN Distribution; FDA; State Dept; White House Sit Room; Bernie Beaudin; Canadian Nuclear Safety Commission (CNSC); eoc2@cnsc-ccsn.gc.ca; DOEHQEOC@OEM.DOE.GOV; fldr-nrc@comdt.uscg.mil; EOC.EPAHQ@EPAMAIL.EPA.GOV; Lawrence Koleff; SIOC; FEMA-operations-center@dhs.gov; Health Canada Operations Center; IAEA Emergency Response Unit; USDA; Screnci, Diane; Sheehan, Neil; Dricks, Victor; Clifford, James; Gamberoni, Marsha; Heater, Keith; Holian, Brian; Kay Gallagher; Kinneman, John; Lew, David; Nick, Joseph; ODaniell, Cynthia; Powell, Raymond; R1 IRC; Roberts, Darrell; Thompson, Margaret; Davenport, Patricia; McCallie, Karen; Miles, Patricia; Quinones-Navarro, Jovlynn; R2 IRC; Rudisail, Steven; R3 IRC; Smith, Desiree; Alferink, Beth; Andrews, Tom; Howell, Linda; R4 IRC  
**Subject:** NRC Press Release #1 through 5 - Japan Event Earthquake/Tsunami  
**Date:** Sunday, March 13, 2011 3:08:44 PM  
**Attachments:** [Press Release 1.pdf](#)  
[Press Release 2.pdf](#)  
[Press Release 3.pdf](#)  
[Press Release 4.pdf](#)  
[Press Release 5.pdf](#)

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\*\*\*\*\*Event Information is Attached\*\*\*\*\*

The NRC is responding to an event.

Please contact the NRC Executive Support Team if necessary at 301-816-5100 or reply to this e-mail.



# NRC NEWS

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Blog: <http://public-blog.nrc-gateway.gov>

No. 11-042

March 11, 2011

## NRC MONITORS NOTICE OF UNUSUAL EVENT AT DIABLO CANYON POWER PLANT, TSUNAMI ISSUES

The U.S. Nuclear Regulatory Commission, through its regional office in Arlington, Tex., is monitoring a notice of unusual event (NOUE) at the Diablo Canyon Power Plant, located near San Luis Obispo, Calif. Senior NRC officials are working at the agency's Rockville, Md., headquarters to coordinate NRC activities with respect to the Japanese earthquake and subsequent tsunami.

"The NRC is closely monitoring this situation as it unfolds with respect to nuclear facilities within the United States. NRC staff is working closely with its resident inspectors who are on site to ensure safe operations," said NRC Chairman Gregory Jaczko.

Pacific Gas and Electric Co. (PG&E), operator of the Diablo Canyon two-reactor plant, declared a precautionary NOUE Unusual Event at 4:23 a.m. EST today after receiving a tsunami warning from the West California Emergency Management Agency. The tsunami warning was generated after an estimated 8.9 magnitude earthquake occurred off the eastern Japanese coast.

The licensee reported the Diablo Canyon plant is stable and both units remain on line. The plant is well protected against tsunami conditions as required by NRC regulations. The NRC has staff at the plant keeping track of the plant's response.

Nuclear power plants are built to withstand environmental hazards, including earthquakes and tsunamis. Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster. The NRC requires that safety-significant structures, systems, and components be designed to take into account the most severe natural phenomena historically reported for the site and surrounding area.

In addition to the Diablo Canyon plant, the NRC is also monitoring the San Onofre nuclear power plant, the Humboldt Bay spent fuel storage site and NRC-regulated nuclear materials sites in Hawaii and Alaska to name a few. Site personnel have informed the NRC they are prepared for possible tsunami effects.

###

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No. 11-043

March 11, 2011

## NRC CONTINUES TO TRACK EARTHQUAKE AND TSUNAMI ISSUES

Senior officials at U.S. Nuclear Regulatory Commission headquarters in Rockville, Md., are following events related to the Japanese earthquake and subsequent tsunami. In addition, the agency's regional office in Arlington, Texas, will continue to monitor the Diablo Canyon Power Plant's handling of a notice of unusual event (NOUE) at the site, near San Luis Obispo, Calif., for the duration of the event.

"We offer our condolences to all those in Japan affected by these tragedies," said NRC Chairman Gregory Jaczko. "The NRC is ready to provide whatever assistance we can to our Japanese counterparts, should there be a specific request. We're closely coordinating with other federal agencies."

Friday's tsunami warning, issued after an estimated 8.9 magnitude earthquake occurred off the eastern Japanese coast, prompted Pacific Gas and Electric Co. (PG&E), operator of the Diablo Canyon two-reactor plant, to declare a precautionary NOUE at 4:23 a.m. EST Friday. PG&E has reported both reactors have remained online throughout the event. While PG&E has reported only minor tsunami-related effects, the plant is well-protected against tsunami conditions as required by NRC regulations. NRC staff at the plant are keeping track of the plant's response during the event and remain in close contact with plant operators.

Nuclear power plants are built to withstand environmental hazards, including earthquakes and tsunamis. Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster. The NRC requires that safety-significant structures, systems, and components be designed to take into account the most severe natural phenomena historically reported for the site and surrounding area.

In addition to the Diablo Canyon plant, the NRC is following events at the San Onofre nuclear power plant, the Humboldt Bay spent fuel storage site and NRC-regulated nuclear materials sites in Hawaii and Alaska to name a few. Personnel at all those sites have informed the NRC conditions remain safe.

###

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No. 11-044

March 12, 2011

## **NRC IN COMMUNICATION WITH JAPANESE REGULATORS**

Officials at Nuclear Regulatory Commission headquarters in Rockville, Md., have spoken with the agency's counterpart in Japan, offering the assistance of U.S. technical experts. Should the Japanese want to make use of this expertise, NRC staffers with extensive background in boiling-water reactors are available to assist ongoing efforts.

The NRC is coordinating its actions with other Federal agencies as part of the U.S. government response. The NRC is examining all available information as part of the effort to analyze the event and understand its implications both for Japan and the United States. The NRC's headquarters Operations Center is operating on a 24-hour basis.

U.S. nuclear power plants are built to withstand environmental hazards, including earthquakes and tsunamis. Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster. The NRC requires that safety-significant structures, systems, and components be designed to take into account the most severe natural phenomena historically estimated for the site and surrounding area.

For background information on generic operations at a boiling-water reactor, including an animated graphic, visit the NRC's website at [www.nrc.gov](http://www.nrc.gov).

###

News releases are available through a free *listserv* subscription at the following Web address: <http://www.nrc.gov/public-involve/listservcr.html>. The NRC homepage at [www.nrc.gov](http://www.nrc.gov) also offers a SUBSCRIBE link. E-mail notifications are sent to subscribers when news releases are posted to NRC's website.



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No. 11-045

March 12, 2011

## NRC EXPERTS DEPLOY TO JAPAN AS PART OF U.S. GOVERNMENT RESPONSE

Two officials from the U.S. Nuclear Regulatory Commission with expertise in boiling water nuclear reactors have deployed to Japan as part of a U.S. International Agency for International Development (USAID) team. USAID is the federal government agency primarily responsible for providing assistance to countries recovering from disaster administering.

“We have some of the most expert people in this field in the world working for the NRC and we stand ready to assist in any way possible,” said Chairman Gregory Jaczko.

The NRC has stood up its Maryland-based headquarters Operations Center since the beginning of the emergency in Japan, and is operating on a 24-hour basis.

The NRC will not provide information on the status of that country’s nuclear power plants. Check the NRC web site or blog for the latest information on NRC actions. Other sources of information include:

USAID -- [www.usaid.gov](http://www.usaid.gov)

U.S. Dept. of State -- [www.state.gov](http://www.state.gov)

FEMA -- [www.fema.gov](http://www.fema.gov)

White House -- [www.whitehouse.gov](http://www.whitehouse.gov)

Nuclear Energy Institute --- [www.nei.org](http://www.nei.org)

International Atomic Energy Agency -- [www.iaea.org/press/](http://www.iaea.org/press/)

For background information on generic operations at a boiling-water reactor, including an animated graphic, visit the NRC’s website at [www.nrc.gov](http://www.nrc.gov).

###

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Blog: <http://public-blog.nrc-gateway.gov>

No. 11-046

March 13, 2011

### **NRC SEES NO RADIATION AT HARMFUL LEVELS REACHING U.S. FROM DAMAGED JAPANESE NUCLEAR POWER PLANTS**

The Nuclear Regulatory Commission is coordinating with the Department of Energy and other federal agencies in providing whatever assistance the Japanese government requests as they respond to conditions at several nuclear power plant sites following the March 11 earthquake and tsunami. The NRC has sent two boiling-water reactor experts to Japan as part of a U.S. Agency for International Development team.

In response to nuclear emergencies, the NRC works with other U.S. agencies to monitor radioactive releases and predict their path. All the available information indicates weather conditions have taken the small releases from the Fukushima reactors out to sea away from the population. Given the thousands of miles between the two countries, Hawaii, Alaska, the U.S. Territories and the U.S. West Coast are not expected to experience any harmful levels of radioactivity.

During a nuclear event the NRC has requirements to protect populations around reactors. For instance, the U.S. evacuation standard at 10 miles is roughly equivalent to the 20-kilometer distance recommended in some instances in Japan. The United States also uses sheltering in place and potassium iodide, protective measures also available in Japan.

The NRC will not comment on hour-to-hour developments at the Japanese reactors. This is an ongoing crisis for the Japanese who have primary responsibility.

###

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**Murphy, Andrew**

---

**From:** Murphy, Andrew  
**Sent:** Monday, March 14, 2011 3:09 PM  
**To:** Kammerer, Annie; Case, Michael; Skeen, David; Hiland, Patrick  
**Cc:** Pires, Jose; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer  
**Subject:** RE: Japanese Earthquake Questions

Is there anything that I can do to help the effort?

Andy

---

**From:** Kammerer, Annie  
**Sent:** Monday, March 14, 2011 10:49 AM  
**To:** Case, Michael; Skeen, David; Hiland, Patrick  
**Cc:** Murphy, Andrew; Pires, Jose; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer  
**Subject:** RE: Japanese Earthquake Questions

I have compiled a set of questions from all available sources, which I think are pretty complete. I am organizing them now and I have cliff and jon helping me with some of the answers. I've pulled from the questions we got at kashiwazaki, the questions we have that have come in, the GI-199 com plan, the DCNPP com plan, and other places.

I do have a request from RIV to pull a Q&A list for SONGS. If I brainstorm a list can I get help with answers?

What kind of experts do you have?

---

**From:** Case, Michael  
**Sent:** Monday, March 14, 2011 7:51 AM  
**To:** Skeen, David; Hiland, Patrick  
**Cc:** Murphy, Andrew; Pires, Jose; Kammerer, Annie; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer  
**Subject:** Japanese Earthquake Questions

Hi guys. I don't know where we stand on the seismic related questions after Sunday's day shift activities (I assume Annie was able to continue). Nevertheless, I have access to some more experts here this morning. If there are residual activities, just let me know and we'll get them working.

**From:** [Correia, Richard](#)  
**To:** [Coyne, Kevin](#)  
**Cc:** [Coe, Doug](#)  
**Subject:** RE: ACTION: Assistance to Japanese  
**Date:** Monday, March 14, 2011 5:06:19 PM

---

Thx Kevin. These are interesting times.

---

**From:** Coyne, Kevin  
**Sent:** Monday, March 14, 2011 5:05 PM  
**To:** Correia, Richard  
**Cc:** Coe, Doug  
**Subject:** RE: ACTION: Assistance to Japanese

Rich –

Thanks for the head's up. Brian and Jennifer got the information they needed and were able to provide information to Eric Leeds (see attached) – no one from RES will be going...

-Kevin

---

**From:** Correia, Richard  
**Sent:** Monday, March 14, 2011 7:28 AM  
**To:** Coe, Doug; Coyne, Kevin  
**Subject:** FW: ACTION: Assistance to Japanese

Doug, Kevin,

This is a heads up. I'm sure DRA has very capable folks that could assist here but let's see what Brian and Jennifer find out.

---

**From:** Leeds, Eric  
**Sent:** Monday, March 14, 2011 7:24 AM  
**To:** Dean, Bill; McCree, Victor; Satorius, Mark; Collins, Elmo; Sheron, Brian; Evans, Michele; Zimmerman, Roy; Johnson, Michael  
**Cc:** Holahan, Gary; Campbell, Andy; Correia, Richard; Uhle, Jennifer; Howell, Art; Pederson, Cynthia; Wert, Leonard; Lew, David; Weber, Michael; Virgilio, Martin; Grobe, Jack; Boger, Bruce; HOO Hoc  
**Subject:** ACTION: Assistance to Japanese

Folks –

The Japanese requested the US supply six individuals with knowledge of the BWR 3 & 4 design to assist them in their hour of need. I'd like to discuss potential candidates with you on a conference call today at 9:30 am. I will work through the HOOs to set up a conference call and send you the number. We do not have a lot of details with regard to how long, although we do know these folks will assist in their EOCs at two different locations in Japan. I'll keep you informed as we learn more.

Thanks for your help!

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

NS7R

**From:** OST03 HOC  
**To:** DOI; DTRA; chardin; rfraass@crcpd.org; james.d.lloyd@nasa.gov; PN Distribution; FDA; State Dept; White House Sit Room; Bernie Beaudin; Canadian Nuclear Safety Commission (CNSC); eoc2@cnsc-ccsn.gc.ca; DOEHQEOC@OEM.DOE.GOV; fldr-nrc@comdt.uscg.mil; EOC.EPAHQ@EPAMAIL.EPA.GOV; Lawrence Koleff; SIOC; FEMA-operations-center@dhs.gov; Health Canada Operations Center; IAEA Emergency Response Unit; USDA; Screnci, Diane; Sheehan, Neil; Dricks, Victor; Clifford, James; Gamberoni, Marsha; Heater, Keith; Holian, Brian; Kay Gallagher; Kinneman, John; Lew, David; Nick, Joseph; ODaniell, Cynthia; Powell, Raymond; R1 IRC; Roberts, Darrell; Thompson, Margaret; Davenport, Patricia; McCallie, Karen; Miles, Patricia; Quinones-Navarro, Joylynn; R2 IRC; Rudisail, Steven; R3 IRC; Smith, Desiree; Alferink, Beth; Andrews, Tom; Howell, Linda; R4 IRC  
**Subject:** Real Event: NRC Press Release Japan Event Earthquake/Tsunami  
**Date:** Monday, March 14, 2011 9:32:54 PM  
**Attachments:** [Press Release 6.pdf](#)

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\*\*\*\*\*Event Information is Attached\*\*\*\*\*

The NRC is responding to an event.

Please contact the NRC Executive Support Team if necessary at 301-816-5100 or reply to this e-mail.

N/17



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No. 11-047

March 14, 2011

### **JAPANESE GOVERNMENT ASKS FOR ASSISTANCE WITH REACTOR EVENTS; U.S. GOVERNMENT AND NRC PREPARING RESPONSE**

The Japanese government has formally asked for assistance from the United States as it continues to respond to nuclear power plant cooling issues triggered by an earthquake and tsunami on March 11. As part of a larger U.S. government response, the NRC is considering possible replies to the request, which includes providing technical advice.

Included in a U.S. Agency for International Development (USAID) team dispatched earlier to Japan to assist with the disaster are two boiling-water reactor (BWR) experts from the NRC. They are currently in Tokyo offering technical assistance. USAID is the federal government agency primarily responsible for providing help to countries recovering from a disaster.

The NRC has been monitoring the Japanese reactor events via its Headquarters Operations Center in Rockville, Md., on a 24-hour-a-day basis.

The NRC will not comment on hour-to-hour developments at the Japanese reactors. This is an ongoing crisis for the Japanese who have primary responsibility.

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**Cartwright, William**

---

**From:** Thorp, John  
**Sent:** Monday, March 14, 2011 3:43 PM  
**To:** Thomas, Eric  
**Subject:** FW: Fukushima II unit 1 and unit 2 - status Monday 14/3 afternoon

FYI Eric, some data obtained by Larry Burkhart at OECD.

John

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

**From:** [Lawrence.BURKHART@oecd.org](mailto:Lawrence.BURKHART@oecd.org) [mailto:[Lawrence.BURKHART@oecd.org](mailto:Lawrence.BURKHART@oecd.org)]  
**Sent:** Monday, March 14, 2011 2:01 PM  
**To:** Williams, Donna; Thorp, John  
**Subject:** FW: Fukushima II unit 1 and unit 2 - status Monday 14/3 afternoon

*- Public*

FYI

**From:** GAUVAIN Jean, NEA/SURN  
**Sent:** Monday, March 14, 2011 5:55 PM  
**To:** AMRI Abdallah, NEA/SURN; HUERTA Alejandro, NEA/SURN; NAKOSKI John, NEA/SURN; REHACEK Radomir, NEA/SURN; GRESS Philippe, NEA/SURN; BREEST Axel, NEA/SURN; BURKHART Lawrence, NEA/SURN  
**Subject:** FW: Fukushima II unit 1 and unit 2 - status Monday 14/3 afternoon

*- Public*

FYI

Jean Gauvain - NEA/NSD - Phone +33 1 45 24 10 52 - Mobile +33 6 79 94 81 93

**From:** YOSHIMURA Uichiro, NEA/SURN  
**Sent:** Monday, March 14, 2011 17:50  
**To:** ECHAVARRI Luis, NEA  
**Cc:** REIG Javier, NEA/SURN; STEIN John, NEA/PR; JACKSON Diane, NEA/SURN; GAUVAIN Jean, NEA/SURN; LAMARRE Greg, NEA/SURN  
**Subject:** Fukushima II unit 1 and unit 2

*- Public*

Luis,

Fukushima II unit 1 and unit 3 could reach to cold shut down.  
Below is for your reference, which shows main parameters of plant status.

uichiro

For reference:

Fukushima daiichi

unit

unit 1

*2/18*

unit2

uni3

reactor pressure

Mpa

0.047(a)

0.65

0.183(a)

0.270(b)

0.183(b)

containment structure pressure

KPa

unknown

around 395

335

water level above top of active fuel

mm

out of scale(a)

out of scale(a)

~1900(a)

out of scale(b)

out of scale(b)

~2300(b)

suppression pool water temperature

C

unknwon

under inspection

unknown

suppression pool atmosphere pressure

KPa

unknown

unknown

500

Fukushima daini

unit

unit 1

unit2

uni3

uni4

reactor pressure

Mpa

0.04

0.06

-0.06

0.35

reactor water temp.

C

46

88

32

142

water level above top of active fuel

mm

8785

8530

7636

5096

suppression pool water temperature

C

71

80

45

130

suppression pool atmosphere pressure

KPa

282

253

132

324

cold shut down

cold shut down

cold shut down

---

Uichiro YOSHIMURA  
Deputy Director, Safety and Regulation  
OECD Nuclear Energy Agency  
TEL: +33-1-45-24-10-04  
E-mail: uichiro.yoshimura@oecd.org

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[www.oecd-nea.org](http://www.oecd-nea.org)<<http://www.oecd-nea.org>>

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NSIR

**From:** OST03 HOC  
**To:** DOI; DTRA; PN Distribution; FDA; State Dept; White House Sit Room; Bernie Beaudin; Canadian Nuclear Safety Commission (CNSC); eoc2@cnscccsn.gc.ca; EOC.EPAHQ@EPAMAIL.EPA.GOV; Health Canada Operations Center; IAEA Emergency Response Unit; Holian, Brian; ODaniell, Cynthia; Roberts, Darrell; Lew, David; Clifford, James; Kinneman, John; Nick, Joseph; Kay Gallagher; Heater, Keith; Thompson, Margaret; Gamberoni, Marsha; R1 IRC; Powell, Raymond; Quinones-Navarro, Jovlynn; McCallie, Karen; Davenport, Patricia; Miles, Patricia; R2 IRC; Rudisail, Steven; Smith, Desiree; R3 IRC; Alferink, Beth; Howell, Linda; R4 IRC; Andrews, Tom  
**Subject:** Real Event: NRC Press Release #6 - Japan Event Earthquake/Tsunami  
**Date:** Monday, March 14, 2011 9:31:43 PM  
**Attachments:** Press Release 6.pdf

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March 14, 2011

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NSIR

**From:** [OST03 HOC](#)  
**To:** [DOI](#); [DTRA](#); [chardin](#); [rfraass@crcpd.org](#); [james.d.loyd@nasa.gov](#); [PN Distribution](#); [FDA](#); [State Dept](#); [White House Sit Room](#); [Bernie Beaudin](#); [Canadian Nuclear Safety Commission \(CNSC\)](#); [eoc2@cnsc-ccsn.gc.ca](#); [DOEHQEOC@OEM.DOE.GOV](#); [fldr-nrc@comdt.uscg.mil](#); [EOC.EPAHO@EPAMAIL.EPA.GOV](#); [Lawrence Koleff](#); [SIOC](#); [FEMA-operations-center@dhs.gov](#); [Health Canada Operations Center](#); [IAEA Emergency Response Unit](#); [USDA](#); [Screnci, Diane](#); [Sheehan, Neil](#); [Dricks, Victor](#); [Clifford, James](#); [Gamberoni, Marsha](#); [Heater, Keith](#); [Holian, Brian](#); [Kay Gallagher](#); [Kinneman, John](#); [Lew, David](#); [Nick, Joseph](#); [ODaniell, Cynthia](#); [Powell, Raymond](#); [R1 IRC](#); [Roberts, Darrell](#); [Thompson, Margaret](#); [Davenport, Patricia](#); [McCallie, Karen](#); [Miles, Patricia](#); [Quinones-Navarro, Jovlynn](#); [R2 IRC](#); [Rudisail, Steven](#); [R3 IRC](#); [Smith, Desiree](#); [Alferink, Beth](#); [Andrews, Tom](#); [Howell, Linda](#); [R4 IRC](#)  
**Subject:** Real Event: NRC Press Release #7 - Japan Event Earthquake/Tsunami  
**Date:** Monday, March 14, 2011 9:33:29 PM  
**Attachments:** [Press Release 7.pdf](#)

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\*\*\*\*\*Event Information is Attached\*\*\*\*\*

The NRC is responding to an event.

Please contact the NRC Executive Support Team if necessary at 301-816-5100 or reply to this e-mail.

oe/n



# NRC NEWS

## U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Telephone: 301/415-8200

Washington, D.C. 20555-0001

E-mail: [opa.resource@nrc.gov](mailto:opa.resource@nrc.gov) Site: [www.nrc.gov](http://www.nrc.gov)

Blog: <http://public-blog.nrc-gateway.gov>

No. 11-048

March 14, 2011

### NRC SENDS ADDITIONAL EXPERTS TO ASSIST JAPAN

Acting as part of a U.S. Agency for International Development assistance team, the NRC has dispatched eight additional experts to Tokyo to provide assistance as requested by the Japanese government.

The first members of the team left the United States Monday evening and were due to arrive in Tokyo Wednesday afternoon. The team includes additional reactor experts, international affairs professional staffers, and a senior manager from one of the NRC's four operating regions.

The team members come from the NRC's headquarters in Rockville, Md., and from offices in King of Prussia, Pa., and Atlanta. The team has been instructed to: conduct all activities needed to understand the status of efforts to safely shut down the Japanese reactors; better understand the potential impact on people and the environment of any radioactivity releases; if asked, provide technical advice and support through the U.S. ambassador for the Japanese government's decision making process; and draw on NRC-headquarters expertise for any other additional technical requirements. The team will be in communication with the Japanese regulator, the U.S. Embassy, NRC headquarters, and other government stakeholders as appropriate.

The team is led by Charles A. Casto, deputy regional administrator of the NRC's Center of Construction Inspection, based in NRC's office in Atlanta. Casto has worked in the commercial nuclear power industry at three different nuclear power plants, including Browns Ferry, which has three boiling water reactors, operated by the Tennessee Valley Authority in Alabama. He has also worked as a licensed reactor operator and operator instructor. Casto will provide a single point of contact for the U.S. Ambassador in Japan on nuclear reactor issues.

The two reactor experts sent Saturday to Japan will participate as members of this assistance team.

###

News releases are available through a free *listserv* subscription at the following Web address: <http://www.nrc.gov/public-involve/listserver.html>. The NRC homepage at [www.nrc.gov](http://www.nrc.gov) also offers a SUBSCRIBE link. E-mail notifications are sent to subscribers when news releases are posted to NRC's website.

**Cartwright, William**

*NRC*

**From:** Brown, Frederick  
**Sent:** Monday, March 14, 2011 9:13 AM  
**To:** Thorp, John; Thomas, Eric  
**Subject:** Fw: Fukushima I Unit 2

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

**From:** Cullingford, Michael *NRC*  
**To:** Leeds, Eric; Grobe, Jack; Boger, Bruce; McGinty, Tim; Regan, Christopher; Astwood, Heather; Hopkins, Jon; Quinones, Lauren; Brown, Frederick; Cheok, Michael; Lubinski, John; Ruland, William; Giitter, Joseph; Holian, Brian  
**Sent:** Mon Mar 14 08:31:53 2011  
**Subject:** FW: Fukushima I Unit 2

fyi

**From:** Hidehiko Yamachika [mailto:yamachika-hidehiko@jnes-usa.org]  
**Sent:** Monday, March 14, 2011 7:17 AM  
**To:** 'Hidehiko Yamachika'; Emche, Danielle; Foggie, Kirk; Cullingford, Michael  
**Cc:** aono-kenjiro@jnes-usa.org; Michael W. Chinworth  
**Subject:** RE: Fukushima I Unit 2

I came back.

TEPCO said that they started injection of sea water to unit 2 at 5:20am in EDT, but the injection does not work well. All of fuels seem to be uncovered.

**From:** Hidehiko Yamachika [mailto:yamachika-hidehiko@jnes-usa.org]  
**Sent:** Sunday, March 13, 2011 11:09 PM  
**To:** 'Hidehiko Yamachika'; 'Emche, Danielle'; Foggie, Kirk; Cullingford, Michael  
**Cc:** aono-kenjiro@jnes-usa.org; Michael W. Chinworth  
**Subject:** RE: Fukushima I Unit 3

Staff of TEPCO Fukushima 1 Office announced that parameters show that the containment vessel is sound (fine), but detail is under investigation.

**From:** Hidehiko Yamachika [mailto:yamachika-hidehiko@jnes-usa.org]  
**Sent:** Sunday, March 13, 2011 10:49 PM  
**To:** 'Hidehiko Yamachika'; 'Emche, Danielle'; Foggie, Kirk; Cullingford, Michael  
**Cc:** aono-kenjiro@jnes-usa.org; Michael W. Chinworth

*N/21*

Subject: RE: Fukushima I Unit 3

A Chief Cabinet Secretary, Edano, announced at 10:45pm in EDT that explosion at Unit 3 seems to be same as that of Unit 1, and that a chief of NISA office at Fukushima 1 said that containment vessel seems to be sound.

@yamachika

From: Hidehiko Yamachika [mailto:yamachika-hidehiko@jnes-usa.org]  
Sent: Sunday, March 13, 2011 10:27 PM  
To: 'Hidehiko Yamachika'; 'Emche, Danielle'; Foggie, Kirk; Cullingford, Michael  
Cc: aono-kenjiro@jnes-usa.org; Michael W. Chinworth  
Subject: RE: Fukushima I Unit 3

According to NHK, Japanese TV media at 10:20 pm in EDT, NISA announced there is an hydrogen explosion on unit 3 of Fukushima I at 10:01 pm in EDT.

Steam like white smoke and brown smoke are recognized in the TV.

@yamachika

**Cartwright, William**

*NRM*

**From:** King, Mark  
**Sent:** Monday, March 14, 2011 6:52 AM  
**To:** Garmon-Candelaria, David  
**Cc:** NRR DIRS Distribution  
**Subject:** FW: NISA in English - LATEST INFO ON JAPANESE REACTORS / ON-GOING NUCLEAR EMERGENCY

FYI

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**From:** King, Mark  
**Sent:** Monday, March 14, 2011 6:50 AM  
**To:** Thomas, Eric  
**Subject:** FW: NISA in English - LATEST INFO ON JAPANESE REACTORS / ON-GOING NUCLEAR EMERGENCY

March 14, 2011

**Japanese Nuclear and Industrial Safety Agency (NISA) -**

**An explosion caused by hydrogen at Unit 3 of Fukushima Dai-ichi NPS (the 2nd release) TEPCO reported NISA that there was an explosion at Unit 3 of Fukushima Dai-ichi Nuclear Power Station, NPS, at 14:01. ← (Japan time)**

**According to TEPCO, the containment vessel of the unit was not broken. Detail information is under investigation.**

**The wind condition is calm and the direction of the wind above the station is the west or the southwest. Residents living within the area at least 20 km radius from Fukushima Dai-ichi NPS are requested to shelter in buildings or houses.**

**TEPCO reported to NISA that one person was injured at Fukushima Dai-ichi NPS at this time. TEPCO is preparing to transfer the person to Fukushima Dai-ichi NPS. (Contact Person) Mr. Toshihiro Bannai Director, International Affairs Office, NISA/METI**

**Phone: +81-(0)3-3501-1087**

**SOURCE of above info: <http://www.nisa.meti.go.jp/english/files/en20110314-2.pdf>**

**NOTE: NEWS REPORTS SAY THAT SIX WORKERS WERE INJURED.**

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Source of below: <http://www.nisa.meti.go.jp/english/files/en20110314-1.pdf>

March 14, 2011

Nuclear and Industrial Safety Agency

Seismic Damage Information (the 22th Release)

**(As of 07:30 March 14, 2011)**

**– Japan Time**

Nuclear and Industrial Safety Agency (NISA) confirmed the current situation of Onagawa NPS, Tohoku Electric Power Co., Inc; Fukushima Dai-ichi and Fukushima Dai-ichi NPSs, Tokyo Electric Power Co., Inc. as follows:

1. The status of operation at Power Stations (Number of automatic shutdown units: 10)

*N/22*

○Fukushima Dai-ichi Nuclear Power Station, Tokyo Electric Power Co., Inc.  
(TEPCO)

(Okuma-machi and Futaba-machi, Futaba-gun, Fukushima Prefecture)

(1) The status of operation

Unit 1 (460MWe): automatic shutdown

Unit 2 (784MWe): automatic shutdown

Unit 3 (784MWe): automatic shutdown

Unit 4 (784MWe): in periodic inspection outage

Unit 5 (784MWe): in periodic inspection outage

Unit 6 (1,100MWe): in periodic inspection outage

(2) Readings at monitoring posts

The measurement of radioactive materials in the environmental monitoring area near the site boundary by a monitoring car confirmed the increase in the radioactivity compared to the radioactivity at 19:00, March 13.

MP1 (Monitoring at North End of Site Boundary) :

26 microSv/h(18:30 March 13)

MP2 (Monitoring at north-northwest of Unit1 and northwest of the End of Site Boundary for Unit 1) :

450 microSv/h(20:10 March 13)

→680 microSv/h(3:50 March 14)

MP4 (Monitoring Car at North West Site Boundary for Unit 1)

44.0 microSv/h(19:33 March 13)

→56.4 microSv/h(04:08 March 14)

(Surveyed by MP2 as MP1 is in the top of the cliff)

MP6 (Monitoring at the Main Gate)

5.2microSv/h(19:00 March 13)

→66.3 microSv/h(02:50 March 14)

(3) Wind direction/wind speed (as of 00:01, March 14)

Wind direction: North North West

Wind Speed: 0.3 m/s

(4) Report concerning other malfunction

• No fire report notified to NISA

• TEPCO reported to NISA in accordance with Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi, Units 1,2 and 3. (15:42 March 11)

• TEPCO report to NISA the event in accordance with Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi, Units 1 and 2.(notified to NISA at 16:36 March 11)

• For Unit 1: Sea water is being injected to the Primary Containment Vessel (PCV) via the Fire Extinguishing System Line (Start up 11:55 March 13)

→Interruption of injection (01:10 March 14)

• For Unit 2: Water Injection Function has been sustained. (14:00 March 13)

• For Unit 3: Fresh water is being injected to the PCV via Fire Extinguishing System Line (FESL) (11:55 March 13)

• For Unit 3: Sea water is being injected to the PCV via FESL(13:12

March 13)

• For Unit 1 and Unit 3: Injection of Sea water into PCV is interrupted because of the lack of sea water in pit. (01:10 March 14)

• For Unit 3: Injection of Sea water into PCV is restarted (03:20 March 14)

○ Fukushima Dai-ri Nuclear Power Station (TEPCO)

(Naraha-machi/Tomioka-machi, Futaba-gun, Fukushima pref.)

(1) The status of operation

Unit1 (1,100MWe): automatic shutdown

Unit2 (1,100MWe): automatic shutdown

Unit3 (1,100MWe): automatic shutdown, cold shut down at 12:15, March 12

Unit4 (1,100MWe): automatic shutdown

(2) Readings at monitoring post etc.

MP1 (Monitoring at the North End of Site Boundary)

0.036 microSv/h(19:00 March 13)

→0.038 microSv/h(05:00 March 14)

MP3 (Monitoring at the North/West End of site boundary)

0.038microSv/h(19:00 March 13)

→0.037 microSv/h(05:00 March 14)

MP4 (Monitoring at the North/West End of Site Boundary)

0.036microSv/h(19:00 March 13)

→0.038 microSv/h(05:00 March 14)

MP5 (Monitoring at the West End of Site Boundary)

0.04 microSv/h(19:00 March 13)

→0.042 microSv/h(05:00 March 14)

(3) Direction and velocity of wind (As of 05:00, 14 March)

Direction: South-southwest

Velocity: 0.9 m /s

(4) Report concerning other malfunction

• None of fire report notified to NISA

• TEPCO reported to NISA in accordance with Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ri, Units 1. (18:08 March 11)

• As same as above, TEPCO reported to NISA Fukushima Dai-ri Units 2 and 4.(18:33 March 11)

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• For Unit 1: Due to Recovery of Residual Heat Removal System(RHR), water in suppression pool is started to cool for cold shut down.(01:24 March 14)

c. Onagawa Nuclear Power Station (Onagawa-cho, Oga-gun and Ishinomaki-shi, Miyagi Prefecture)

(1) The status of operation

Unit 1 (524MWe): automatic shutdown, cold shut down at 0:58, March 12

Unit 2 (825MWe): automatic shutdown

Unit 3 (825MWe): automatic shutdown, cold shut down at 1:17, March 12

(2) Readings of monitoring post

Reading of monitoring post : Changed

MP2 (Monitoring at the North End of Site Boundary)

Approx. 10,000 nGy/h (as of 13:09 March 13)

→7,200 nGy/h (07:20 March 14)

(3) Report concerning other malfunction

• Fire Smoke on the first basement of the Turbine Building was confirmed extinguished at 22:55 on March 11th.

• Article 10\* of Act on Special Measures Concerning Nuclear Emergency Preparedness (Unit No. not identified) (13:09 March 13)

2. Action taken by NISA

(March 11)

14:46 Set up of the NISA Emergency Preparedness Headquarters (Tokyo) immediately after the earthquake

15:42: TEPCO reported to NISA in accordance with Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi.

16:36: TEPCO judged the event in accordance with Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi, Units 1 and 2.(notified to NISA at 16:45)

18:08: Unit 1 of Fukushima Dai-ichi notified NISA of the situation of the

Article 10 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

18:33: Units 1,2 and 4 of Fukushima Dai-ichi notified NISA of the situation of the Article 10 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

19:03 : Government declared the state of nuclear emergency (Establishment of Government Nuclear Emergency Response Headquarters and Local Emergency Response Headquarters)

20:50: Fukushima Prefecture's Emergency Response Headquarters issued a direction regarding the accident occurred at Fukushima Dai-ichi Nuclear Power Station, TEPCO, that the residents living in the area of 2km radius from Unit 1 of the Nuclear Power Station must evacuate.(The population of this area is 1,864)

21:23: Directives from Prime Minister to the Governor of Fukushima, Mayor of Oukuma and Mayor of Futaba were issued regarding the accident occurred at Fukushima Dai-ichi Nuclear Power Station, TEPCO, pursuant to Paragraph 3, Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness as follows:

-Residents living in the area of 3km radius from Unit 1 of the Nuclear Power Station must evacuate.

-Residents living in the area of 10km radius from the Unit 1 must take sheltering.

24:00: Mr. Ikeda, Vice Minister of METI, arrived at the Local Emergency Response Headquarters

(March 12)

05:22 Unit 1 of Fukushima Dai-ichi notified NISA of the situation of the Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

05:32 Unit 2 of Fukushima Dai-ichi notified NISA of the situation of the Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

05:44 Residents living in the area of 10km radius from unit 1 of the Nuclear

Power Station must evacuate by the Prime Minister Direction.

06:07 Regarding of Fukushima Dai-ni NPS, TEPCO reported NISA in accordance with Article 15 of Act for Special Measures Concerning

6

Nuclear Emergency Preparedness.

06:50 According to the article 64, 3 of the Nuclear Regulation Act, government order to control the internal pressure in

Fukushima-dai-ichi Units 1 and 2

07:45 Directives from Prime Minister to Governor of Fukushima, Mayors of Hirono, Naraha, Tomioka, Ookuma and Futaba were issued regarding the accident occurred at Fukushima-Dai-ni Nuclear Power Station, TEPCO, pursuant to Paragraph 3, Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness as follows:

-Residents living in the area of 3km radius from Fukushima Dai-ni Nuclear Power Station (NPS) must evacuate.

-Residents living in the area of 10km radius from Fukushima Dai-ni NPS must take sheltering

17:00 Notification pursuant to Article 15 of the Act for Special Measure Concerning Nuclear Emergency Preparedness since the radiation level exceeded the acceptable level of Fukushima Dai-ichi NPS.

17:39 Prime Minister directed evacuation of the residents living within the 10 km radius from the Fukushima-Dai-ni NPS

18:25 Prime Minister directed evacuation of the residents living within the 20km radius from the Fukushima Dai-ichi NPS

19:55 Directives from Prime Minister was issued regarding sea water injection to Unit No.1 of Fukushima Dai-ichi NPS.

20:05 Based on the directives form Prime Minister and pursuant to Paragraph 3, Article 64 of the Nuclear Regulation Act, the Government issued an order to inject sea water Unit 1 of Fukushima Dai-ichi NPS.

20:20 Fukushima Dai-chi NPS, Unit1 started sea water injection.  
(March 13)

05:38 TEPCO notified NISA of the situation pursuant to the Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness that Unit 3 of Fukushima Dai-ichi NPS is in a loss of all coolant injection function. Recovering efforts of the power source and coolant injection function and work on venting are underway.

09:08 Pressure suppression in the Containment Vessel and fresh water injection started at Unit 3 of Fukushima Dai-ichi NPS.

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09:20 Opening of Pressure vent valve of Unit 3 of Fukushima Dai-ichi NPS.

09:30 NISA directed the Governor of Fukushima Prefecture, the Mayers of Ookuma-machi, Futaba-machi, Tomioka-machi and Namie-machi based on the Act for Special Measures Concerning Nuclear Emergency Preparedness on radioactivity decontamination screening.

09:38 TEPCO notified NISA that Unit 1 of Fukushima Dai-ichi NPS reached a situation specified in Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness.

13:09 Tohoku Electric notified NISA that Onagawa NPS reached a situation specified in Article 10 of the Act for Special Measures Concerning

Nuclear Emergency Preparedness.

13:12 Fresh water injection was switched to sea water injection at Unit 3 of Fukushima Dai-ichi NPS.

14:25 TEPCO notified NISA that Fukushima Dai-ichi NPS reached a situation specified in Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness.

(March 14)

01:10 Sea water injection at unit 1 and unit 3 of Fukushima Dai-ichi NPS were temporary stopped due to decreasing sea water in pool

03:20 Sea water injection at unit 3 of Fukushima Dai-ichi NPS was restarted.

04:24 TEPCO notified NISA that Fukushima Dai-ichi NPS reached a situation specified in Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness.

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<Possible Exposure to Residents>

(1) Case for Travel from Futaba Public Welfare Hospital to Nihonmatsu Man and Woman Symbiosis Center, Fukushima Prefecture

i) No. of persons to be measured: About 60 persons

ii) Measured Result: Not yet

iii) Passage: Exposure could have happened while waiting to be picked up by helicopter at the Futaba high school ground

iv) Other

Prefectural Response Headquarters judged that there were no exposure to 35 persons who traveled from Futaba Public Welfare Hospital to Kawamata Saiseikai Hospital, Kawamata-machi by the private bus provided by Fukushima Prefecture.

(2) Case for Futaba-machi Residents Evacuated by Buses

i) No. of Persons: About 100 persons

ii) Measured Result: 9 persons out of 100 persons

No. of Counts No. of Persons

18,000cpm 1

30,000-36000cpm 1

40,000cpm 1

little less than

40,000cpm\*

1

very small counts 5

\*(This results was measured without shoes, though the first measurement exceeded 100,000cpm)

iii) Passage: Under investigation

iv) Other

Though persons evacuated in different location outside of the Prefecture (Miyagi Prefecture), all destinations are under confirmation.

<Status of Evacuation (As of 04:30 March 14)>

Ookuma-machi: Evacuation of subject evacuees (about 11,000 persons) completed. (Area of Refuge: Tamura Comprehensive Gymnasium, etc.)

9

(Contact Person)

**Cartwright, William**

**From:** King, Mark  
**Sent:** Monday, March 14, 2011 6:50 AM  
**To:** Thomas, Eric  
**Subject:** FW: NISA in English - LATEST INFO ON JAPAN REACTORS / ON-GOING NUCLEAR EMERGENCY

March 14, 2011

Japanese Nuclear and Industrial Safety Agency (NISA) -

An explosion caused by hydrogen at Unit 3 of Fukushima Dai-ichi NPS (the 2nd release)  
TEPCO reported NISA that there was an explosion at Unit 3 of Fukushima Dai-ichi Nuclear Power Station, NPS, at 11:01. ← (Japan time)

According to TEPCO, the containment vessel of the unit was not broken. Detail information is under investigation.

The wind condition is calm and the direction of the wind above the station is the west or the southwest. Residents living within the area at least 20 km radius from Fukushima Dai-ichi NPS are requested to shelter in buildings or houses.

TEPCO reported to NISA that one person was injured at Fukushima Dai-ichi NPS at this time. TEPCO is preparing to transfer the person to Fukushima Dai-ichi NPS. (Contact Person)

Mr. Toshihiro Bannai

Director, International Affairs Office,  
NISA/METI

Phone: +81-(0)3-3501-1087

SOURCE of above info: <http://www.nisa.meti.go.jp/english/files/en20110314-2.pdf>

NOTE: NEWS REPORTS SAY THAT SIX WERE INJURED.

Source of below: <http://www.nisa.meti.go.jp/english/files/en20110314-1.pdf>

March 14, 2011

Nuclear and Industrial Safety Agency

Seismic Damage Information (the 22th Release)

(As of 07:30 March 14, 2011)

– Japan Time

Nuclear and Industrial Safety Agency (NISA) confirmed the current situation of Onagawa NPS, Tohoku Electric Power Co., Inc; Fukushima Dai-ichi and Fukushima Dai-ichi NPSs, Tokyo Electric Power Co., Inc. as follows:

1. The status of operation at Power Stations (Number of automatic shutdown units: 10)

○ Fukushima Dai-ichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (TEPCO)

(Okuma-machi and Futaba-machi, Futaba-gun, Fukushima Prefecture)

(1) The status of operation

Unit 1 (460MWe): automatic shutdown

Unit 2 (784MWe): automatic shutdown

Unit 3 (784MWe): automatic shutdown

Unit 4 (784MWe): in periodic inspection outage  
Unit 5 (784MWe): in periodic inspection outage  
Unit 6 (1,100MWe): in periodic inspection outage

(2) Readings at monitoring posts

The measurement of radioactive materials in the environmental monitoring area near the site boundary by a monitoring car confirmed the increase in the radioactivity compared to the radioactivity at 19:00, March 13.

MP1 (Monitoring at North End of Site Boundary) :

26 microSv/h(18:30 March 13)

MP2 (Monitoring at north-northwest of Unit1 and northwest of the End of Site Boundary for Unit 1) :

450 microSv/h(20:10 March 13)

→680 microSv/h(3:50 March 14)

MP4 (Monitoring Car at North West Site Boundary for Unit 1)

44.0 microSv/h(19:33 March 13)

→56.4 microSv/h(04:08 March 14)

(Surveyed by MP2 as MP1 is in the top of the cliff)

MP6 (Monitoring at the Main Gate)

5.2microSv/h(19:00 March 13)

→66.3 microSv/h(02:50 March 14)

(3) Wind direction/wind speed (as of 00:01, March 14)

Wind direction: North North West

Wind Speed: 0.3 m/s

(4) Report concerning other malfunction

- No fire report notified to NISA
  - TEPCO reported to NISA in accordance with Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi, Units 1,2 and 3. (15:42 March 11)
  - TEPCO report to NISA the event in accordance with Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi, Units 1 and 2.(notified to NISA at 16:36 March 11)
  - For Unit 1: Sea water is being injected to the Primary Containment Vessel (PCV) via the Fire Extinguishing System Line (Start up 11:55 March 13)
  - Interruption of injection (01:10 March 14)
  - For Unit 2: Water Injection Function has been sustained. (14:00 March 13)
  - For Unit 3: Fresh water is being injected to the PCV via Fire Extinguishing System Line (FESL) (11:55 March 13)
  - For Unit 3: Sea water is being injected to the PCV via FESL(13:12 March 13)
  - For Unit 1 and Unit 3: Injection of Sea water injection into PCV is interrupted because of the lack of sea water in pit. (01:10 March 14)
  - For Unit 3: Injection of Sea water into PCV is restarted(03:20 March 14)
- Fukushima Dai-ichi Nuclear Power Station (TEPCO)  
(Naraha-machi/Tomioka-machi, Futaba-gun, Fukushima pref.)

(1) The status of operation

Unit1 (1,100MWe): automatic shutdown  
Unit2 (1,100MWe): automatic shutdown  
Unit3 (1,100MWe): automatic shutdown, cold shut down at 12:15, March 12  
Unit4 (1,100MWe): automatic shutdown

(2) Readings at monitoring post etc.

MP1 (Monitoring at the North End of Site Boundary)

0.036 microSv/h(19:00 March 13)

→0.038 microSv/h(05:00 March 14)

MP3 (Monitoring at the North/West End of site boundary)

0.038microSv/h(19:00 March 13)

→0.037 microSv/h(05:00 March 14)

MP4 (Monitoring at the North/West End of Site Boundary)

0.036microSv/h(19:00 March 13)

→0.038 microSv/h(05:00 March 14)

MP5 (Monitoring at the West End of Site Boundary)

0.04 microSv/h(19:00 March 13)

→0.042 microSv/h(05:00 March 14)

(3) Direction and velocity of wind (As of 05:00, 14 March)

Direction: South-southwest

Velocity: 0.9 m /s

(4) Report concerning other malfunction

- None of fire report notified to NISA
- TEPCO reported to NISA in accordance with Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ri, Units 1. (18:08 March 11)
- As same as above, TEPCO reported to NISA Fukushima Dai-ri Units 2 and 4.(18:33 March 11)

4

- For Unit 1: Due to Recovery of Residual Heat Removal System(RHR), water in suppression pool is started to cool for cold shut down.(01:24 March 14)

c. Onagawa Nuclear Power Station (Onagawa-cho, Oga-gun and Ishinomaki-shi, Miyagi Prefecture)

(1) The status of operation

Unit 1 (524MWe): automatic shutdown, cold shut down at 0:58, March 12

Unit 2 (825MWe): automatic shutdown

Unit 3 (825MWe): automatic shutdown, cold shut down at 1:17, March 12

(2) Readings of monitoring post

Reading of monitoring post : Changed

MP2 (Monitoring at the North End of Site Boundary)

Approx. 10,000 nGy/h (as of 13:09 March13)

→7,200 nGy/h (07:20 March 14)

(3) Report concerning other malfunction

- Fire Smoke on the first basement of the Turbine Building was confirmed extinguished at 22:55 on March 11th.
- Article 10\* of Act on Special Measures Concerning Nuclear Emergency Preparedness (Unit No. not identified) (13:09 March 13)

2. Action taken by NISA  
(March 11)

14:46 Set up of the NISA Emergency Preparedness Headquarters (Tokyo) immediately after the earthquake

15:42: TEPCO reported to NISA in accordance with Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi.

16:36: TEPCO judged the event in accordance with Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi, Units 1 and 2.(notified to NISA at 16:45)

18:08: Unit 1 of Fukushima Dai-ichi notified NISA of the situation of the

Article 10 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

18:33: Units 1,2 and 4 of Fukushima Dai-ichi notified NISA of the situation of the Article 10 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

19:03 : Government declared the state of nuclear emergency (Establishment of Government Nuclear Emergency Response Headquarters and Local Emergency Response Headquarters)

20:50: Fukushima Prefecture's Emergency Response Headquarters issued a direction regarding the accident occurred at Fukushima-Dai-ichi Nuclear Power Station, TEPCO, that the residents living in the area of 2km radius from Unit 1 of the Nuclear Power Station must evacuate.(The population of this area is 1,864)

21:23: Directives from Prime Minister to the Governor of Fukushima, Mayor of Ooka and Mayor of Futaba were issued regarding the accident occurred at Fukushima-Dai-ichi Nuclear Power Station, TEPCO, pursuant to Paragraph 3, Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness as follows:

-Residents living in the area of 3km radius from Unit 1 of the Nuclear Power Station must evacuate.

-Residents living in the area of 10km radius from the Unit 1 must take sheltering.

24:00: Mr. Ikeda, Vice Minister of METI, arrived at the Local Emergency Response Headquarters (March12)

05:22 Unit 1 of Fukushima Dai-ichi notified NISA of the situation of the Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

05:32 Unit 2 of Fukushima Dai-ichi notified NISA of the situation of the Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

05:44 Residents living in the area of 10km radius from unit 1 of the Nuclear Power Station must evacuate by the Prime Minister Direction.

06:07 Regarding of Fukushima Dai-ichi NPS, TEPCO reported NISA in accordance with Article 15 of Act for Special Measures Concerning

Nuclear Emergency Preparedness.

06:50 According to the article 64, 3 of the Nuclear Regulation Act, government order to control the internal pressure in

## Fukushima-dai-ichi Units 1 and 2

07:45 Directives from Prime Minister to Governor of Fukushima, Mayors of Hirono, Naraha, Tomioka, Ookuma and Futaba were issued regarding the accident occurred at Fukushima-Dai-ni Nuclear Power Station, TEPCO, pursuant to Paragraph 3, Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness as follows:

-Residents living in the area of 3km radius from Fukushima Dai-ni Nuclear Power Station (NPS) must evacuate.

-Residents living in the area of 10km radius from Fukushima Dai-ni NPS must take sheltering

17:00 Notification pursuant to Article 15 of the Act for Special Measure Concerning Nuclear Emergency Preparedness since the radiation level exceeded the acceptable level of Fukushima Dai-ichi NPS.

17:39 Prime Minister directed evacuation of the residents living within the 10 km radius from the Fukushima-Dai-ni NPS

18:25 Prime Minister directed evacuation of the residents living within the 20km radius from the Fukushima Dai-ichi NPS

19:55 Directives from Prime Minister was issued regarding sea water injection to Unit No.1 of Fukushima Dai-ichi NPS.

20:05 Based on the directives form Prime Minister and pursuant to Paragraph 3, Article 64 of the Nuclear Regulation Act, the Government issued an order to inject sea water Unit 1 of Fukushima Dai-ichi NPS.

20:20 Fukushima Dai-chi NPS, Unit1 started sea water injection.

(March 13)

05:38 TEPCO notified NISA of the situation pursuant to the Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness that Unit 3 of Fukushima Dai-ichi NPS is in a loss of all coolant injection function. Recovering efforts of the power source and coolant injection function and work on venting are underway.

09:08 Pressure suppression in the Containment Vessel and fresh water injection started at Unit 3 of Fukushima Dai-ichi NPS.

7

09:20 Opening of Pressure vent valve of Unit 3 of Fukushima Dai-ichi NPS.

09:30 NISA directed the Governor of Fukushima Prefecture, the Mayors of Ookuma-machi, Futaba-machi, Tomioka-machi and Namie-machi based on the Act for Special Measures Concerning Nuclear Emergency Preparedness on radioactivity decontamination screening.

09:38 TEPCO notified NISA that Unit 1 of Fukushima Dai-ichi NPS reached a situation specified in Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness.

13:09 Tohoku Electric notified NISA that Onagawa NPS reached a situation specified in Article 10 of the Act for Special Measures Concerning Nuclear Emergency Preparedness.

13:12 Fresh water injection was switched to sea water injection at Unit 3 of Fukushima Dai-ichi NPS.

14:25 TEPCO notified NISA that Fukushima Dai-ichi NPS reached a situation specified in Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness.

(March 14)

01:10 Sea water injection at unit 1 and unit 3 of Fukushima Dai-ichi NPS were temporary stopped due to decreasing sea water in pool

03:20 Sea water injection at unit 3 of Fukushima Dai-ichi NPS was restarted.

04:24 TEPCO notified NISA that Fukushima Dai-ichi NPS reached a situation specified in Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness.

8

<Possible Exposure to Residents>

(1) Case for Travel from Futaba Public Welfare Hospital to Nihonmatsu Man and Woman Symbiosis Center, Fukushima Prefecture

i) No. of persons to be measured: About 60 persons

ii) Measured Result: Not yet

iii) Passage: Exposure could have happened while waiting to be picked up by helicopter at the Futaba high school ground

iv) Other

Prefectural Response Headquarters judged that there were no exposure to 35 persons who traveled from Futaba Public Welfare Hospital to Kawamata Saiseikai Hospital, Kawamata-machi by the private bus provided by Fukushima Prefecture.

(2) Case for Futaba-machi Residents Evacuated by Buses

i) No. of Persons: About 100 persons

ii) Measured Result: 9 persons out of 100 persons

No. of Counts No. of Persons

18,000cpm 1

30,000-36000cpm 1

40,000cpm 1

little less than

40,000cpm\*

1

very small counts 5

\*(This results was measured without shoes, though the first measurement exceeded 100,000cpm)

iii) Passage: Under investigation

iV) Other

Though persons evacuated in different location outside of the Prefecture (Miyagi Prefecture), all destinations are under confirmation.

<Status of Evacuation (As of 04:30 March 14)>

Ookuma-machi: Evacuation of subject evacuees (about 11,000 persons) completed. (Area of Refuge: Tamura Comprehensive Gymnasium, etc.)

9

(Contact Person)

Mr. Toshihiro Bannai

Director, International Affairs Office,

NISA/METI

Phone:+81-(0)3-3501-1087

---

**From:** Wegner, Mary

**Sent:** Saturday, March 12, 2011 4:05 PM

**To:** Beasley, Benjamin; Criscione, Lawrence; King, Mark; Thomas, Eric; Breskovic, Clarence; Bernardo, Robert; Sigmon, Rebecca; Sigmon, Rebecca; Tabatabai, Omid  
**Subject:** NISA in English

<http://www.nisa.meti.go.jp/english/index.html> note you need to **hit refresh** to get the latest info.

**Weaver, Tonna**

---

**From:** Kaizer, Joshua *inRR*  
**Sent:** Monday, March 14, 2011 2:17 PM  
**To:** Mendiola, Anthony  
**Subject:** FW: CAN YOU HELP JOSH OUT  
**Attachments:** Mark 1 Containment and Iso Condenser.pptx

Here is some more info on Mark 1 containments and the Iso condenser. Let me know if you need anything else ... josh

---

**From:** McHugh, James *JH*  
**Sent:** Monday, March 14, 2011 2:09 PM  
**To:** Devercelly, Richard  
**Cc:** Kaizer, Joshua  
**Subject:** RE: CAN YOU HELP JOSH OUT

Josh, what in particular are you looking for? I have attached some basics, let me know if it helps or if you need more.

Jim

---

**From:** Devercelly, Richard  
**Sent:** Monday, March 14, 2011 1:18 PM  
**To:** McHugh, James  
**Cc:** Kaizer, Joshua; Devercelly, Richard  
**Subject:** CAN YOU HELP JOSH OUT

Jimmy:

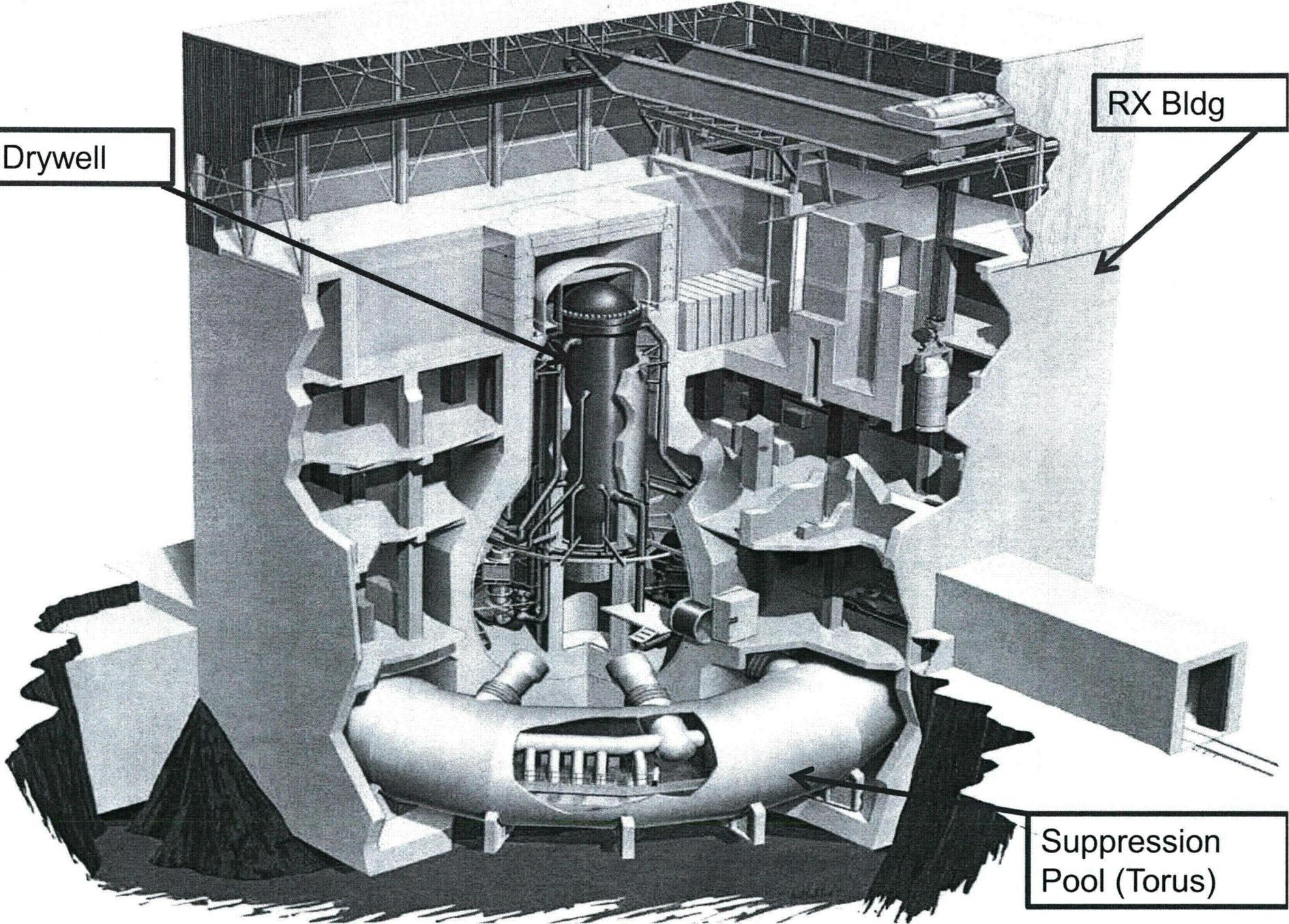
Josh in NRR called this morning for Mark I containment and Iso Condenser Info related to NRR's involvement in the Japan events. Can you help him out?

Richard W. DeVercelly  
BWR Training Branch  
USNRC TTC, Chattanooga, TN  
[richard.devercelly@nrc.gov](mailto:richard.devercelly@nrc.gov)  
423-855-6524

# Mark 1 Containment and Iso Condenser

Drywell

RX Bldg



Suppression Pool (Torus)

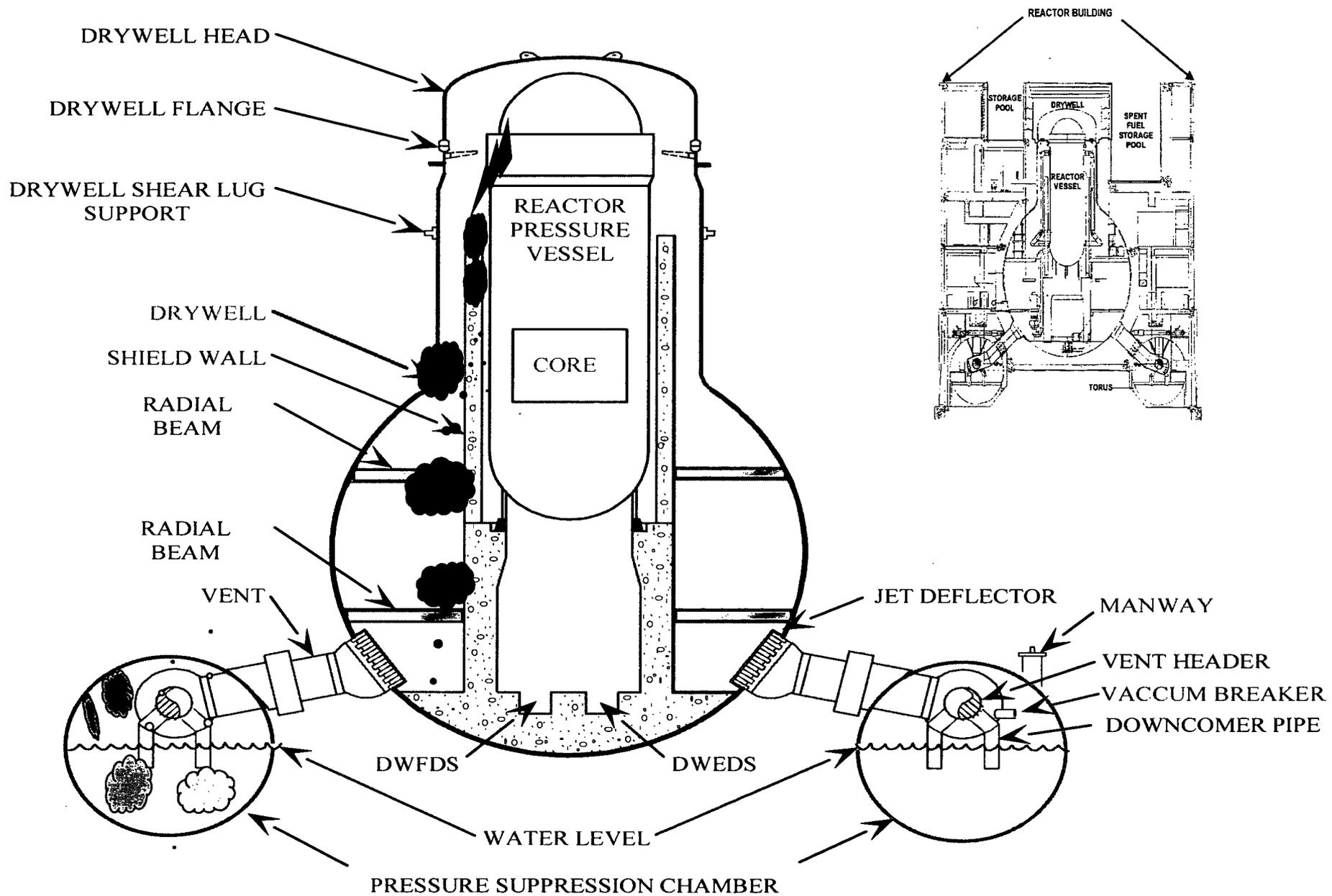
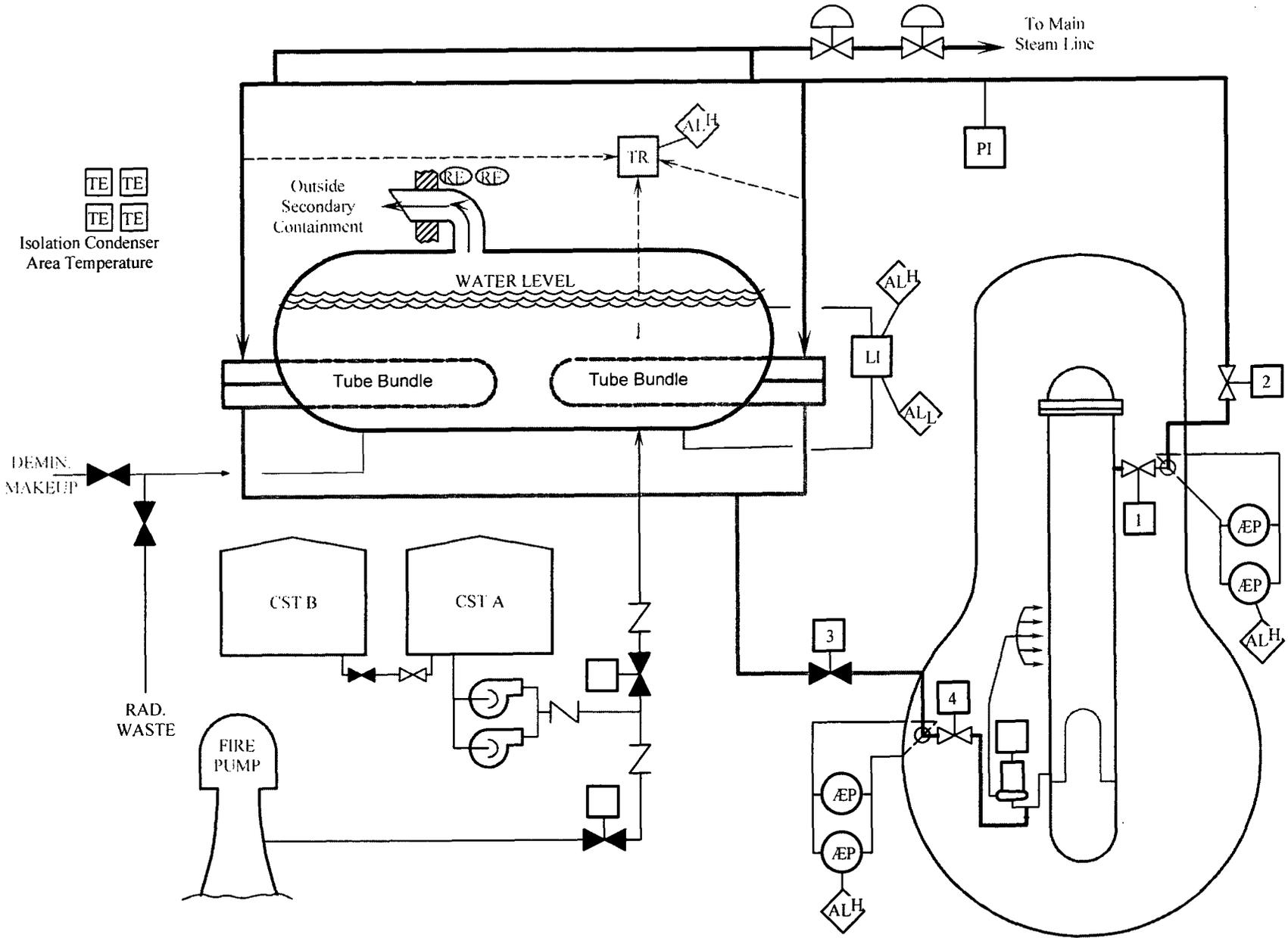


Figure 6.5-1 Mark Containment

	Mark I <sup>®</sup> (BFNP)	Mark II <sup>®</sup> (LaSalle)	Mark III <sup>®</sup> (Perry)
Drywell Material	Steel	Concrete	Concrete
Drywell Thickness (ft)	.17	6	6
Drywell Upper Diameter (ft)	39	31	73
Drywell Lower Diameter (ft)	67	73	73
Drywell Height (ft)	115	91	89
Drywell Free Air Volume (ft <sup>3</sup> )	159,000	209,300	277,685
Drywell Design Internal Pressure (psig)	56	45	30
Drywell Design External Pressure (psig)	2	5	21
Drywell Deck Design d/p (psid)	N/A	25	N/A
Drywell Design Temperature (°F)	281	340	330
Drywell max. Calculated LOCA Pressure (psig)	49.6	34	22.1
Shield above RPV Head	Concrete	Concrete	Water
Suppression Chamber (or Containment ) Thickness (ft)	.17	4	.15
Suppression Chamber (or Containment ) Steel Liner	N/A	.25	N/A
Suppression Chamber (or Containment ) Diameter (ft)	111	87	120
Suppression Chamber (or Containment ) Height (ft)	31	67	183
Suppression Chamber (or Containment ) Free Air	119,000	164,500	1,141,014
Suppression Pool Volume in Drywell (ft <sup>3</sup> )	N/A	N/A	11,215
Total Suppression Pool Volume (ft <sup>3</sup> )	135,000	124,000	129,550
Upper Pool Makeup to Suppression Pool (ft <sup>3</sup> )	N/A	N/A	32,830
Suppression Chamber (or Containment) Design Internal Pressure (psig)	56	45	15
Suppression Chamber (or Containment) Design External Pressure (psig)	2	5	0.8
Suppression Chamber (or Containment) Design	281	275	185
Suppression Chamber (or Containment) max. Calculated	27	28	11.31
Suppression Chamber (or Containment) design Leak Rate (% of vol/Day)	.5	.5	.2
Number of Drywell to Suppression Chamber (or Containment) vents	8	98	120
Total Vent Area (ft <sup>2</sup> )	286	308	512
Drywell Atmosphere	N <sub>2</sub>	N <sub>2</sub>	Air

1 ft<sup>3</sup> = 7.48 gal



6.3-5

Figure 6.3-1 Isolation Condenser System (BWR/2/3)

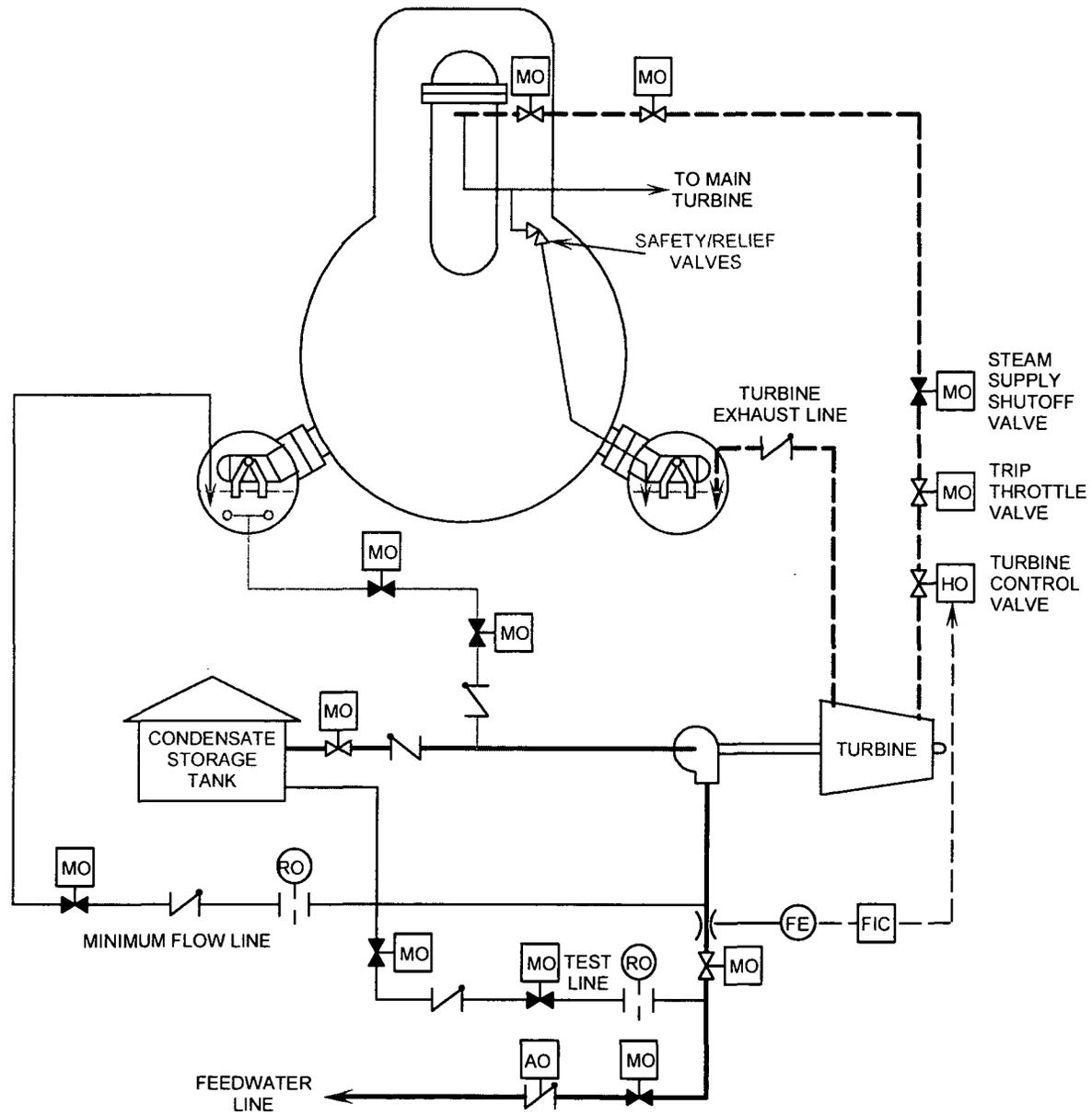


Figure 6.3-2 RCIC System (BWR/3/4)

**Murphy, Andrew**

---

**From:** Hiland, Patrick  
**Sent:** Monday, March 14, 2011 8:14 AM  
**To:** Case, Michael; Skeen, David; McDermott, Brian  
**Cc:** Murphy, Andrew; Pires, Jose; Kammerer, Annie; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer  
**Subject:** RE: Japanese Earthquake Questions

Annie worked on refining her Qs and As during the day yesterday. We were asked by the ET to develop sets of "topical" question banks. When I left we had four topics: 1) Chairman's 15-questions, 2) RST Technical Questions, 3) PMT Technical Questions; and, 4) Research lead on Seismic/Tsunami questions. Not sure where we stand on coordinating these sections, but perhaps the IRC should take lead?

---

**From:** Case, Michael  
**Sent:** Monday, March 14, 2011 7:51 AM  
**To:** Skeen, David; Hiland, Patrick  
**Cc:** Murphy, Andrew; Pires, Jose; Kammerer, Annie; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer  
**Subject:** Japanese Earthquake Questions

Hi guys. I don't know where we stand on the seismic related questions after Sunday's day shift activities (I assume Annie was able to continue). Nevertheless, I have access to some more experts here this morning. If there are residual activities, just let me know and we'll get them working.

**Murphy, Andrew**

---

**From:** Hiland, Patrick  
**Sent:** Monday, March 14, 2011 11:05 AM  
**To:** Kammerer, Annie  
**Cc:** Murphy, Andrew; Pires, Jose; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer; Case, Michael; Skeen, David  
**Subject:** RE: Japanese Earthquake Questions

NRR/DE has Kamal (seismic structures) to review specific questions. I also have several very experienced structural design engineers on staff (George Thomas & Farhead Farzam) If electrical, I have qualified staff and George Wilson that can help.

---

**From:** Kammerer, Annie  
**Sent:** Monday, March 14, 2011 10:49 AM  
**To:** Case, Michael; Skeen, David; Hiland, Patrick  
**Cc:** Murphy, Andrew; Pires, Jose; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer  
**Subject:** RE: Japanese Earthquake Questions

I have compiled a set of questions from all available sources, which I think are pretty complete. I am organizing them now and I have cliff and jon helping me with some of the answers. I've pulled form the questions we got a kashiwazaki, the questions we have that have come in, the GI-199 com plan, the DCNPP com plan, and other places.

I do have a request from RIV to pull a Q&A list for SONGS. If I brainstorm a list can I get help with answers?

What kind of experts do you have?

---

**From:** Case, Michael  
**Sent:** Monday, March 14, 2011 7:51 AM  
**To:** Skeen, David; Hiland, Patrick  
**Cc:** Murphy, Andrew; Pires, Jose; Kammerer, Annie; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer  
**Subject:** Japanese Earthquake Questions

Hi guys. I don't know where we stand on the seismic related questions after Sunday's day shift activities (I assume Annie was able to continue). Nevertheless, I have access to some more experts here this morning. If there are residual activities, just let me know and we'll get them working.

**Cartwright, William**

---

NRC

**From:** Sigmon, Rebecca  
**Sent:** Tuesday, March 15, 2011 2:08 PM  
**To:** Hasselberg, Rick  
**Cc:** King, Mark; Thomas, Eric  
**Subject:** Timelines for Daiichi Units 1 and 4  
**Attachments:** 2011 fukushima daiichi unit 1 timeline.doc; 2011 Fukushim-Daiichi Unit 4 Timeline.docx

Rick,

Attached are timelines for Units 1 and 4. Most of the information for Unit 1 came from the press releases put out by TEPCO and NISA (noted after each comment). One observation – neither TEPCO nor NISA refers to the explosion at Unit 1 as a hydrogen explosion at any point; they initially refer to it as a loud noise and white smoke following an earthquake centered near the plant. Following the explosion at Unit 3 though, the comments about the Unit 3 explosion reference the similar explosion at Unit 1, they just never update any of the previous information about Unit 1.

There wasn't much out there about Unit 4 yet. TEPCO and NISA don't have any press releases out yet about any of this morning's events there, so what I do have is from news sites and nei.org. Hope this meets your needs, let me know if you want me to focus on any area in particular and see what else is out there.

(all times are local (Tokyo) time)

Rebecca Sigmon  
Reactor Systems Engineer  
NRR/DIRS/IOEB  
Operating Experience Branch  
(301) 415-4018  
[Rebecca.Sigmon@nrc.gov](mailto:Rebecca.Sigmon@nrc.gov)

N/27

**Fukushima-Daiichi Unit 1 (all times Tokyo) (source of information)**

**3/11/2011**

**1446** Automatic shutdown due to earthquake, loss of offsite power (TEPCO)

**1541** Loss of emergency AC power, declaration of "1<sup>st</sup> Level Emergency" – Article 10 (TEPCO)

**1636** Declaration of Article 15 due to inability to verify coolant injection. Water level verification temporarily restored, Article 15 re-declared at 1707 (TEPCO)

**2200** Evacuation ordered within 3 km (TEPCO)

**2400** Status Update (TEPCO):

Unit 1 shutdown and cooled by isolation condenser

Possible radiation release due to decreasing water level

**3/12/2011**

**0300** Decision made to reduce containment pressure for units that cannot confirm water injection by RCIC (TEPCO)

**0520** Radiation levels near the main gate have risen from .07 uSv/hr (7 mRem) to (NISA):

MP6 .59 uSv/hr (59 mRem)

MP8 .38 uSv/hr (38 mRem)

**0600** Increasing levels of radiation measured by monitoring car, and one radiation monitoring post shows radiation levels greater than normal (TEPCO)

**0700** Evacuation ordered out to 10 km (TEPCO)

**0700** Status Update (NISA):

Unit 1 is in Article 15 "Nuclear Emergency Situation"

Work in progress to connect electric generating cars to power pumps for water injection

Containment vessel pressure could be as high as 840 kPa (design pressure 400 kPa)

**0755** Radiation levels (NISA):

MP6 5.1 uSv/hr

MP8 2.5 uSv/hr

**0940** Radiation levels (NISA)

MP6 5.1 uSv/hr

MP8 2.9 uSv/hr

**1000** Containment pressure reduction ordered by government (TEPCO)

**1100** Steam release in progress to relieve containment pressure (NISA)

**1100** Status Update (TEPCO):

Reactor was cooled by isolation condenser, but that has since stopped.

Containment pressure increasing  
Containment pressure reduction in progress  
Reactor water level decreasing

**1430** Successful reduction of containment pressure completed (TEPCO)

**1500** One employee reported to have received 100 mSv exposure (10 Rem) (TEPCO)

**1529** Large earth motion due to earthquake with close epicenter caused loud noise and white smoke from unit 1, reading of 500 uSv/hr at site boundary (NISA)\*\*\*

**1536** Explosion noted at Unit 1, mentioned as due to an earthquake very close to the site, 4 personnel injured (TEPCO)\*\*\*

*\*\*\*Neither TEPCO nor NISA refers to this as a hydrogen explosion from Unit 1 in any of their communications at any point. Following the explosion from Unit 3 around 1100 on 3/14 though, both TEPCO and NISA comment that what happened at Unit 3 is similar to what happened at Unit 1*

**1536** Hydrogen explosion in the space between the concrete containment and the reactor's primary system, but the explosion did not damage the containment function or the reactor system (News Conference with Japanese Cabinet Secretary Edano)

**1617** Article 15 "Radiation Disaster Measure" declared due to radiation levels at site boundary exceeding limits (TEPCO)

**1911** Evacuation order extended out to 20 km (TEPCO)

**2005** Radiation levels (NISA):

MP4 (monitoring car at site boundary NW of units)	1015 uSv/hr
MP6 (main gate)	3.25 uSv/hr
MP8 (observation platform)	2.06 uSv/hr

**2020** Injection of seawater into core followed by boric acid (TEPCO)

**2215** Suspension of seawater injection following aftershock and tsunami alert (TEPCO)

**2300** Continuation of containment pressure reduction efforts (TEPCO)

**3/13/2011**

**0200** Seawater/boric acid injection recommenced at some point before 0300 update (TEPCO)

**0400** Radiation levels (NISA):

MP4	40 uSv/hr
MP6	3.1 uSv/hr
MP8	4.5 uSv/hr

**0550** Radiation level (NISA):

MP6	3.2 uSv/hr
-----	------------

**0856** Radiation levels at the site boundary, which had been decreasing, increased again above the limit, causing a renewed declaration of Article 15 "Radiation Disaster Measure" (TEPCO)

**0930** Radiation level (NISA):  
MP6 26 uSv/hr

**1155** Seawater is being injected into containment via fire extinguishing system line (NISA)

**1220** Radiation level (NISA):  
MP4 47.1 uSv/hr

**1500** Coordinating with authorities to determine how to cool spent fuel pool (TEPCO)

**1930** Radiation levels (NISA)  
MP4 44 uSv/hr  
MP6 5.2 uSv/hr

**03/14/2011**

**0110** Interruption of seawater injection to Unit 1 due to lack of seawater in pit (NISA)

**0250** Radiation level (NISA):  
MP6 66.3 uSv/hr

**0408** Radiation level (NISA):  
MP4 56.4 uSv/hr

**1234** Radiation level (NISA)  
MP6 4.2 uSv/hr

**1930** Plant Parameters (NISA)

Reactor Pressure	.047/270 MPa
Primary Containment Pressure	Not Available
Reactor Water Level	Low off scale
Suppression Pool Water Temp	Not Available
Suppression Pool Water Pressure	Not Available

## **Fukushima-Daiichi Unit 4**

Unit was shutdown at the time of the earthquake and tsunami for regular inspection.

All TEPCO updates through 1500 on 3/13/2011 indicate that reactor level is stable, and there is no known reactor coolant leakage into the containment vessel.

All NISA updates through 1930 on 3/14/2011 state that Unit 4 is in periodic inspection outage with no other information on Unit 4. This is the most recent NISA press release available as of 1300 on 3/15/2011.

### **3/13/2011**

**2100** General comment for Daiichi site about coordination to ensure cooling of the spent fuel pools

### **3/15/2011**

**0600** Loud explosion heard on the site. The 4<sup>th</sup> floor rooftop of the Unit 4 reactor building was found to be damaged (TEPCO)

**0600** Fire burning in the Unit 4 spent fuel pool (press conference with Cabinet Secretary Edano)

**0938** Fire reported in Unit 4 reactor building believed to be from a lube oil leak from the recirc pump drive system. Fire fighting efforts were successful, though the roof of the building was damaged (nei.org)

**1100** Radiation level near Unit 4 ~10 Rem/hr, 821 mrem/hr at the site boundary (nei.org)

NSIR

**Murphy, Andrew**

---

**From:** Blahoianu, Andrei [Andrei.Blahoianu@cnscccsn.gc.ca]  
**Sent:** Tuesday, March 15, 2011 2:33 PM  
**To:** Murphy, Andrew  
**Subject:** RE: S1 and S2 definition in Japan

Thanks

They are were we were years ago in Canada: vague definition of DBE/SSE but it was implicit that it is 1 in 1000 years. Could we make an assumption on this also for Japanese?

The new edition of our seismic standard for CANDU plants comes with clear probability definition: 1 in 10,000 years.

Andrei

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

**From:** Murphy, Andrew [<mailto:Andrew.Murphy@nrc.gov>]  
**Sent:** Tuesday, March 15, 2011 2:27 PM  
**To:** Blahoianu, Andrei  
**Subject:** RE: S1 and S2 definition in Japan

Andrei,

I do not believe that the Japanese have established probabilities for these two events, S1 \* S2 earthquakes. They are deterministic and follow the following definition:

the seismic hazard for each nuclear site is defined in terms of two intensities, termed S1 and S2. (See "Status Report on Seismic Re-Evaluation" PDF.) The S1 earthquake, referred to as the "maximum design earthquake," is less intense and determined by historical events and current and past fault activity. The S2 earthquake, called the "extreme design earthquake" and supposedly an impossibility, is derived from seismo-tectonic structures and active faults. These requirements were believed to provide a "sufficient range of earthquakes to assure reactor safety for any potential earthquake shaking."

They have moved to a probabilistic process which is being used for the new ground accelerations that are being quoted for the re-evaluation of existing plants. I do not know/remember the probabilistic frequency limits or the numbers being .

Andy

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

**From:** Blahoianu, Andrei [<mailto:Andrei.Blahoianu@cnscccsn.gc.ca>]  
**Sent:** Tuesday, March 15, 2011 2:05 PM  
**To:** Murphy, Andrew  
**Subject:** S1 and S2 definition in Japan

Andy

What is the probability of exceedance for S2 and S1 in Japan?

Thanks  
Andrei

N/28

\*\*\*\*\*  
\*\*\*\*\*

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\*\*\*\*\*  
\*\*\*\*\*

**Murphy, Andrew**

---

**From:** Kirk, Mark  
**Sent:** Tuesday, March 15, 2011 3:34 PM  
**To:** Murphy, Andrew  
**Subject:** as you were just saying!

---

**From:** Rudland, David  
**Sent:** Tuesday, March 15, 2011 3:27 PM  
**To:** Stevens, Gary; Csontos, Aladar; Kirk, Mark; Focht, Eric; Rathbun, Howard  
**Subject:** FW: BEST WISHES AND HOPE YOUR ARE OK

Guys

Take a look at this animation.... It gives you a feel for the magnitude of the aftershocks that occurred after the Japan earthquake. Just amazing...

[http://www.msnbc.msn.com/id/42037498/ns/world\\_news-asia-pacific/](http://www.msnbc.msn.com/id/42037498/ns/world_news-asia-pacific/)

Dave

NSM

**Murphy, Andrew**

---

**From:** Murphy, Andrew  
**Sent:** Tuesday, March 15, 2011 11:00 AM  
**To:** Ake, Jon  
**Cc:** Case, Michael  
**Subject:** RE: NBC deadline question for NRC on seismic hazard estimates

Jon,

Let me know what assistance you need/

Andy

---

**From:** Ake, Jon  
**Sent:** Tuesday, March 15, 2011 10:11 AM  
**To:** Case, Michael; Murphy, Andrew  
**Cc:** Kammerer, Annie; Uhle, Jennifer; Graves, Herman  
**Subject:** RE: NBC deadline question for NRC on seismic hazard estimates

I'm already developing draft answers, I'll pass a draft by others in a few moments and then to the front office.  
Jon

---

**From:** Case, Michael  
**Sent:** Tuesday, March 15, 2011 8:10 AM  
**To:** Murphy, Andrew  
**Cc:** Ake, Jon; Kammerer, Annie; Uhle, Jennifer; Graves, Herman  
**Subject:** FW: NBC deadline question for NRC on seismic hazard estimates

Andy, I'll be leaving shortly to go get some sleep. Can you take the lead on this, coordinate with Jon and Annie and run the answers thru the front office? Thanks.

---

**From:** Uhle, Jennifer  
**Sent:** Tuesday, March 15, 2011 9:42 AM  
**To:** Ake, Jon; Kammerer, Annie; Murphy, Andrew; Case, Michael  
**Subject:** FW: NBC deadline question for NRC on seismic hazard estimates

Urgent can you look at these and provide answers back to me and Brian. Thanks, J

---

**From:** Hiland, Patrick  
**Sent:** Tuesday, March 15, 2011 9:40 AM  
**To:** Sheron, Brian  
**Cc:** Uhle, Jennifer  
**Subject:** FW: NBC deadline question for NRC on seismic hazard estimates

Brian, I'm on mids tonight so I'm tele-working this morning. I've asked George Wilson to contact cognizant RES and OPA to facilitate a response.

---

**From:** Bill Dedman [<mailto:Bill.Dedman@msnbc.com>]  
**Sent:** Tuesday, March 15, 2011 9:06 AM  
**To:** Manoly, Kamal; Sheron, Brian; Hiland, Patrick; OPA Resource  
**Subject:** NBC deadline question for NRC on seismic hazard estimates

N/30

Good morning,

My name is Bill Dedman. I'm a reporter for NBC News and msnbc.com, writing an article today about:

SAFETY/RISK ASSESSMENT RESULTS FOR GENERIC ISSUE 199, "IMPLICATIONS OF UPDATED PROBABILISTIC SEISMIC HAZARD ESTIMATES IN CENTRAL AND EASTERN UNITED STATES ON EXISTING PLANTS"

I reached out to NRC Public Affairs yesterday but have not heard back, and my deadline is end-of-day today. I'm hoping to get on the phone today with someone from NRC to make sure I'm conveying this information accurately to the public. If nothing else, I'm hoping one of the technical people can help clarify the points below. My telephone number is 203-451-9995.

I've read Director Brian Sheron's memo of Sept. 2, 2010, to Mr. Patrick Hiland; the safety/risk assessment of August 2010; its appendices A through D; NRC Information Notice 2010-18; and the fact sheet from public affairs from November 2010.

I have these questions:

1. I'd like to make sure that I accurately place in layman's terms the seismic hazard estimates. I need to make sure that I'm understanding the nomenclature for expressing the seismic core-damage frequencies. Let's say there's an estimate expressed as "2.5E-06." (I'm looking at Table D-2 of the safety/risk assessment of August 2010.) I believe that this expression means the same as  $2.5 \times 10^{-06}$ , or 0.0000025, or 2.5 divided by one million. In layman's terms, that means an expectation, on average, of 2.5 events every million years, or once every 400,000 years. Similarly, "2.5E-05" would be 2.5 divided by 100,000, or 2.5 events every 100,000 years, on average, or once every 40,000 years. Is this correct?
2. These documents give updated probabilistic seismic hazard estimates for existing nuclear power plants in the Central and Eastern U.S. What document has the latest seismic hazard estimates (probabilistic or not) for existing nuclear power plants in the Western U.S.?
3. The documents refer to newer data on the way. Have NRC, USGS et al. released those? I'm referring to this: "New consensus seismic-hazard estimates will become available in late 2010 or early 2011 (these are a product of a joint NRC, U.S. Department of Energy, U.S. Geological Survey (USGS) and Electric Power Research Institute (EPRI) project). These consensus seismic hazard estimates will supersede the existing EPRI, Lawrence Livermore National Laboratory, and USGS hazard estimates used in the GI-199 Safety/Risk Assessment."
4. What is the timetable now for consideration of any regulatory changes from this research?

Thank you for your help.

Regards,

Bill Dedman

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**Murphy, Andrew**

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**From:** Case, Michael  
**Sent:** Wednesday, March 16, 2011 7:16 AM  
**To:** Graves, Herman; Hogan, Rosemary; Csontos, Aladar; Koshy, Thomas; Lin, Bruce; Boyce, Tom (RES); Ali, Syed; Murphy, Andrew; Tregoning, Robert; Gavrilas, Mirela; Sydnor, Russell; Lorette, Phillip  
**Cc:** Richards, Stuart  
**Subject:** FW: IRC Staffing

Can you all start to think about this and let me know of any potential names by around noon?

---

**From:** Sheron, Brian  
**Sent:** Tuesday, March 15, 2011 5:27 PM  
**To:** Coyne, Kevin; Case, Michael; Coe, Doug; Correia, Richard; Gibson, Kathy; Lui, Christiana; Richards, Stuart; Sangimino, Donna-Marie; Scott, Michael; Uhle, Jennifer; Valentin, Andrea  
**Cc:** Dion, Jeanne  
**Subject:** IRC Staffing

I participated on a conference call with other ODs and led by Michele Evans, acting deputy OD in NSIR at 4 pm today.

The purpose of the conference call was to discuss staffing for the IRC for the near future. The IRC is currently staffed with members of the Reactor safety team, the Protective Measures team, Liaison Team, etc. There is also an ET member there. None of the teams are at their full compliment. What Michele is looking for is people that can staff the IRC and relieve the staff that are currently there. She said they are currently running 3 shifts (11pm-7am, 7am – 3pm, and 3pm to 11 pm). They would like to find staff that can work shifts for 4 days in a row (I think she wants 4 days on, 3 days off). She said the staff do not have to have had IRC training.

Several of us said we would certainly canvas our staff to see who was qualified to work in the IRC and could work there, but we needed to know what technical disciplines they were looking for. Michele did not have a list of needed disciplines, but said she would generate one and send it out. As of 5:15 pm I have not received a list yet.

However, I am assuming they will be looking for staff with expertise in such areas as systems analysis, severe accidents, radiological dose assessment, etc. In anticipation that these are the technical disciplines of interest, can you please start identifying your staff that you believe have some of the requisite skills needed for the IRC, and start asking if they would be available to work shifts in the IRC if asked to. HR said they would be eligible for normal overtime compensation.

Also, they will be looking for staff to go to Japan and relieve the technical staff that recently went there. There were 2 BWR experts that left over the weekend, and a team of 9 more (6 engineers and 3 OIP staff) left yesterday. The thinking is that the staff that recently went over would come back in 2 weeks, which is when they want to send a replacement team over there. So please check to see if you have any staff with the proper technical credentials, are reasonably good communicators, and would be willing to spend about 2 weeks in Japan as part of the team there.

I will forward the list of desired disciplines as soon as I receive them from Michele. Michele said she will be looking for the list of potential IRC replacements by COB tomorrow (3/16/11), thus, I will need your candidates by mid-afternoon.

For the team that will replace the one that was just sent to Japan, she said she would like us to update the list we previously sent by COB 3/17.

NSIR

**From:** [Lubinski, John](#)  
**To:** [Cool, Donald](#); [Reis, Terrence](#); [Holahan, Patricia](#); [Holahan, Vincent](#); [Milligan, Patricia](#); [Sullivan, Randy](#); [Tappert, John](#); [Lui, Christiana](#); [Gibson, Kathy](#); [Coe, Doug](#)  
**Subject:** PMT Director Deputy - Rev 1  
**Date:** Wednesday, March 16, 2011 4:04:58 PM  
**Attachments:** [PMT\\_Director\\_Duty.rev1.docx](#)

---

Thanks for the quick responses. I have made a revision to account for some conflicts that people have identified. These are included in **bold**.

Please let me know by noon tomorrow if ok. I feel very comfortable with the first 4 days so if a problem let me know asap.

N/32

Shift	3/19 Sat	3/20 Sun	3/21 Mon	3/22 Tues	3/23 Wed	3/24 Thurs	3/25 Fri
7a-3p	Lubinski	Lubinski	Lubinski	Lubinski	Reis	Reis	Reis
3p-11p	Cool	Cool	Cool	Cool	P Holahan	P Holahan	P Holahan
11p-7a	Gibson	Gibson	<b>Tappert</b>	<b>Tappert</b>	Sullivan	Sullivan	Sullivan

Shift	3/26	3/27	3/28	3/29	3/30	3/31	4/1
7a-3p	Reis	Cool	Cool	<b>Reis</b>	<b>Reis</b>	Sullivan	Sullivan
3p-11p	P Holahan	V Holahan	V Holahan	V Holahan	V Holahan	Reis	<b>Cool</b>
11p-7a	Sullivan	Tappert	Tappert	<b>Milligan</b>	<b>Milligan</b>	Lui	Lui

Shift	4/2	4/3	4/4	4/5	4/6	4/7	4/8
7a-3p	Sullivan	P Holahan	P Holahan	P Holahan	P Holahan	<b>Coe</b>	<b>Coe</b>
3p-11p	<b>Cool</b>	Milligan	Milligan	Milligan	Milligan	Gibson	Gibson
11p-7a	Lui	Lubinski	Lubinski	Lubinski	Lubinski	V Holahan	V Holahan

Shift	4/9
7a-3p	<b>Coe</b>
3p-11p	Gibson
11p-7a	V Holahan

Available Directors:

Lubinski  
Cool  
Reis  
P Holahan  
Milligan  
Sullivan  
V Holahan  
Tappert  
Lui  
Gibson  
Coe

## Moyer, Carol

---

**From:** Doctor, Steven R [steven.doctor@pnl.gov]  
**Sent:** Wednesday, March 16, 2011 7:36 PM  
**To:** Braatz, Brett G; Cumberidge, Stephen; Prokofiev, Iouri; Moyer, Carol; Harris, Robert V  
**Subject:** Info from Tetsuo Shoji

Got this information from Stephen Bruemmer and thought you might find it informative.

Steve

---

Steven R. Doctor, Ph.D.  
Laboratory Fellow  
Applied Physics/National Security Directorate

---

Pacific Northwest National Laboratory  
902 Battelle Boulevard  
P.O. Box 999, MSIN K5-26  
Richland, WA 99352 USA  
Tel: 509-375-2495  
Fax: 509-375-6497  
[steven.doctor@pnl.gov](mailto:steven.doctor@pnl.gov)  
[www.pnl.gov](http://www.pnl.gov)

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

**From:** Bruemmer, Stephen M  
**Sent:** Wednesday, March 16, 2011 3:58 PM  
**To:** Doctor, Steven R  
**Cc:** Bond, Leonard J  
**Subject:** Re: Sympathy for earthquake in Sendai

Steve - thanks. I was trying to reach several people at Tokoku University including Tetsuo since Friday. Finally made contact on Tuesday with Tetsuo through his home email and found out my friends were OK (as you can be).

Here is part of the most recent message from Tetsuo sent to our ICG-EAC organizing committee early this morning:

Thank you very much for the kind and supportive message. It's a huge tragedy we have never never thought or imagined.

M9 is far above the estimated level and everything can't resist against such a level. I was in the building which is newly constructed last year and shake was so big as I have never experienced in my life and shake last a few minutes, very very long we felt. Tsunami height was more than 20 m in some areas which over flow the tsunami barrier of 10 m height. Everything washed away. Our campus and my home are rather West of Sendai which is far from sea coast and didn't affected by the Tsunami.

My family and my lab. member are all fine and my residence area is now recovered mostly except gas. So my family has no difficulty in living but still a lot of people are living in many evacuated places and at home without electricity, water and gas.

All transportation don't work except some buses. No Shinkansen, no flight.

We have a serious shortage of gas for cars and a lot of cars are waiting the gas supply. A lot of cars are left on the road which raise an another problem that rescues can not effectively move by this traffic jam.

We may need some more weeks to get better condition in life line.

Fukushima NPP is a serious situation of activities confinement because of possible failure of suppression camber with a explosion sound, which no one know the details. RPV and container seem to be maintained

so far and TEPCO is trying to pump sea water in the reactor but still a half of the fuel is above the water line. Let's see what's going on. I hope it cool down soon.

My lab. may start to work next week after the building inspection on Thursday 16, March and electricity supply check. I think it will take a few days to put them back in operation condition for all lab. equipments and working space.

Cheers - Steve

**From:** [Operations Center Bulletin](#)  
**To:** [Operations Center Bulletin](#)  
**Subject:** UPDATE: NRC IS RESPONDING TO JAPANESE EVENTS  
**Date:** Wednesday, March 16, 2011 12:52:30 PM

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**THIS IS NOT A DRILL**

**The Office of Public Affairs is expecting a large volume of calls from media and the general public regarding the latest statements from the State Department and the NRC regarding the situation in Japan. ALL CALLS from media or the general public on this topic must be referred to Regional Public Affairs or the 301-415-8200 number for HQ employees.**

**THIS IS NOT A DRILL**

\*\*\*\*\*Event Information is Attached\*\*\*\*\*

The NRC is responding to an event.

Please contact the NRC Executive Support Team if necessary at 301-816-5100 or reply to this e-mail.

N. R.

**Hogan, Rosemary**

---

**From:** Case, Michael  
**Sent:** Wednesday, March 16, 2011 8:11 AM  
**To:** Murphy, Andrew  
**Cc:** Kammerer, Annie; Ake, Jon; Hogan, Rosemary; Richards, Stuart; Uhle, Jennifer  
**Subject:** FW: Seismic and Tsunami Hazard in PRA

Hi Andy. Can you take the lead for this one in coordination with Annie and Jon? I sort of see an overview of where the agency is seismically and tsunamically (new word!) and how we approach various issues (including PRA). I'd shoot for about a half hour presentation and a half hour for discussion with all the folks Jennifer indicated.

Shoot for early to mid next week?

---

**From:** Uhle, Jennifer  
**Sent:** Monday, March 14, 2011 5:09 PM  
**To:** Coe, Doug; Sheron, Brian; Coyne, Kevin; Case, Michael  
**Cc:** Stutzke, Martin; Sancaktar, Selim  
**Subject:** RE: Seismic and Tsunami Hazard in PRA

Thanks. I am going to ask DE to put together an update on where we are with understanding tsunami hazard due to either seismic or landslide and all on this email should attend. Annie has the lead for tsunami and John Ake has it for GI-199. So, Mike Case, yours, right...

---

**From:** Coe, Doug  
**Sent:** Monday, March 14, 2011 4:59 PM  
**To:** Sheron, Brian; Uhle, Jennifer; Coyne, Kevin; Case, Michael  
**Cc:** Stutzke, Martin; Sancaktar, Selim  
**Subject:** RE: Seismic and Tsunami Hazard in PRA

Hi all,  
My BB doesn't work here, but webmail does, so I'm following the discussions sporadically. GI-199 is based on recent 'best' understanding of seismology throughout the US. The information needed to understand plant-specific risk, last time I discussed with NRR, is expected to be collected from all US licensees, including those on the West Coast. However, GI-199 doesn't specifically address related tsunami impacts, but it probably should for all coastal or near-coastal plants. The generic communication is still being written by NRR with our support, so there is an opportunity to discuss this with NRR, and with DE. Clearly there will be a lot more attention on GI-199.  
Jennifer's restart basis question is a good one. In practice a licensee needs to determine from engineering analysis that the stresses on the plant did not exceed their licensed limits. That would be a very tall order for a plant that experienced a beyond design basis quake, and probably is why it had taken Japan so long to restore the KK plants following the earlier quake.  
Doug

---

**From:** Sheron, Brian  
**Sent:** Monday, March 14, 2011 3:27 PM  
**To:** Uhle, Jennifer; Coyne, Kevin; Case, Michael  
**Cc:** Coe, Doug; Stutzke, Martin; Sancaktar, Selim  
**Subject:** RE: Seismic and Tsunami Hazard in PRA

The question is, did the Japanese also consider an 8.9 magnitude earthquake and resulting tsunami "way too low a probability for consideration"?

N/35

Look at GI-199. It shows we didn't know everything about the seismicity of CEUS. And isn't there a prediction that the West coast is likely to get hit with some huge earthquake in the next 30 years or so? Yet we relicense their plants.....

---

**From:** Uhle, Jennifer  
**Sent:** Monday, March 14, 2011 3:20 PM  
**To:** Sheron, Brian; Coyne, Kevin; Case, Michael  
**Cc:** Coe, Doug; Stutzke, Martin; Sancaktar, Selim  
**Subject:** RE: Seismic and Tsunami Hazard in PRA

I think this highlights our need to get a better handle on external events hazards—ensure that the tsunami hazard is way too low a probability for consideration. I know we are updating our tsunami hazard for the east coast and gulf coast but did not think we were doing recent work on the west coast. Has industry done anything on tsunami hazards? Also, has anyone done work to look at the effect of numerous cycles of low amplitude acceleration following a larger event. I would expect we would have some information because how do we know a plant would be fit to start back up after an event? We cannot possibly do NDE on everything to determine if flaws have propagated to the point where they need to be replaced.

---

**From:** Sheron, Brian  
**Sent:** Monday, March 14, 2011 3:05 PM  
**To:** Coyne, Kevin  
**Cc:** Uhle, Jennifer; Coe, Doug; Stutzke, Martin; Sancaktar, Selim  
**Subject:** RE: Seismic and Tsunami Hazard in PRA

And so the first question is, "Should we make licensees consider a Tsunami coincident with a seismic event that triggers the Tsunami?"

The second question is, How should we consider after-shocks in seismic hazard analyses?

---

**From:** Coyne, Kevin  
**Sent:** Monday, March 14, 2011 2:39 PM  
**To:** Sheron, Brian  
**Cc:** Uhle, Jennifer; Coe, Doug; Stutzke, Martin; Sancaktar, Selim  
**Subject:** Seismic and Tsunami Hazard in PRA

Brian –

You raised a question at the standup meeting this morning regarding (1) the treatment of coupled seismic and tsunami events and (2) treatment of seismic aftershocks. I spoke with Marty Stutzke and Selim Sancaktar - the PRA Standard (ASME/ANS-Ra-Sa2009) does address the technical requirements for both seismic events and tsunamis (tsunami hazard under the technical requirements for external flooding analysis). The standard does note that uncertainties associated with probabilistic analysis of tsunami hazard frequency are large and that an engineering analysis can usually be used to screen out tsunamis. Seismic PRAs do not consider the affect of aftershocks since there are not methods to predict equipment fragility after the first main shock. Although the standard does address both these events, there are not specific requirements that require a PRA to assess a tsunami generated by a local seismic event.

Marty also checked on the Diablo Canyon and San Onofre IPEEEs - based on the Technical Evaluation Reports, Diablo did consider a locally induced tsunami in a limited way (the aux service water pumps were assumed to become flooded following a seismic event) while SONGS did not consider a coupled seismic/tsunami event.

-Kevin

**From:** OST03 HOC  
**To:** DOI; DTRA; chardin; rfraass@crcpd.org; james.d.lloyd@nasa.gov; PN Distribution; FDA; State Dept; White House Sit Room; Bernie Beaudin; Canadian Nuclear Safety Commission (CNSC); eoc2@cnscc-ccsn.gc.ca; DOEHOEOC@OEM.DOE.GOV; fldr-nrc@comdt.uscg.mil; EOC.EPAHQ@EPAMAIL.EPA.GOV; Lawrence Koleff; SIOC; FEMA-operations-center@dhs.gov; Health Canada Operations Center; IAEA Emergency Response Unit; USDA; Screnci, Diane; Sheehan, Neil; Dricks, Victor; Clifford, James; Gamberoni, Marsha; Heater, Keith; Holian, Brian; Kay Gallagher; Kinneman, John; Lew, David; Nick, Joseph; ODaniell, Cynthia; Powell, Raymond; R1 IRC; Roberts, Darrell; Thompson, Margaret; Davenport, Patricia; McCallie, Karen; Miles, Patricia; Quinones-Navarro, Jovlynn; R2 IRC; Rudisail, Steven; R3 IRC; Smith, Desiree; Alferink, Beth; Andrews, Tom; Howell, Linda; R4 IRC  
**Subject:** NRC Press Release #8 (revised) through 10 - Japan Event Earthquake/Tsunami  
**Date:** Wednesday, March 16, 2011 6:18:02 PM  
**Attachments:** [Revised NRC Sends Additional Experts To Assist Japan - Press Release 8.pdf](#)  
[NRC Analysis Continues To Support Japan's Protective Actions - Press Release 9.pdf](#)  
[NRC Provides Protective Action Recommendations Based On U.S. Guidelines Press Release 10.pdf](#)

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\*\*\*\*\*Event Information is Attached\*\*\*\*\*

The NRC is responding to an event.

Please contact the NRC Executive Support Team if necessary at 301-816-5100 or reply to this e-mail.



# NRC NEWS

## U.S. NUCLEAR REGULATORY COMMISSION

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Blog: <http://public-blog.nrc-gateway.gov>

No. 11-048R

March 14, 2011

### REVISED: NRC SENDS ADDITIONAL EXPERTS TO ASSIST JAPAN

The NRC has sent nine additional experts to Tokyo to provide assistance as requested by the Japanese government. Acting as part of a U.S. Agency for International Development assistance team, the NRC has dispatched the experts to Tokyo to provide assistance as requested by the Japanese government.

The first members of the team left the United States Monday evening and were due to arrive in Tokyo Wednesday afternoon. The team includes additional reactor experts, international affairs professional staffers, and a senior manager from one of the NRC's four operating regions.

The team members come from the NRC's headquarters in Rockville, Md., and from offices in King of Prussia, Pa., Chattanooga, Tenn., and Atlanta. The team has been instructed to: conduct all activities needed to understand the status of efforts to safely shut down the Japanese reactors; better understand the potential impact on people and the environment of any radioactivity releases; if asked, provide technical advice and support through the U.S. ambassador for the Japanese government's decision making process; and draw on NRC-headquarters expertise for any other additional technical requirements. The team will be in communication with the Japanese regulator, the U.S. Embassy, NRC headquarters, and other government stakeholders as appropriate.

The team is led by Charles A. Casto, deputy regional administrator of the NRC's Center of Construction Inspection, based in NRC's office in Atlanta. Casto has worked in the commercial nuclear power industry at three different nuclear power plants, including Browns Ferry, which has three boiling water reactors, operated by the Tennessee Valley Authority in Alabama. He has also worked as a licensed reactor operator and operator instructor. Casto will provide a single point of contact for the U.S. Ambassador in Japan on nuclear reactor issues.

The two reactor experts sent Saturday to Japan will participate as members of this assistance team.

Note To Editors: Revision reflects an additional team member, there are now a total of 11 NRC staffers on the assistance team.

###

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No. 11-049

March 15, 2011

### **NRC ANALYSIS CONTINUES TO SUPPORT JAPAN'S PROTECTIVE ACTIONS**

NRC analysts overnight continued their review of radiation data related to the damaged Japanese nuclear reactors. The analysts continue to conclude the steps recommend by Japanese authorities parallel those the United States would suggest in a similar situation.

The Japanese authorities Monday recommended evacuation to 20 kilometers around the affected reactors and said that persons out to 30 kilometers should shelter in place.

Those recommendations parallel the protective actions the United States would suggest should dose limits reach 1 rem to the entire body and 5 rem for the thyroid, an organ particularly susceptible to radiation uptake. The currently reported Japanese radiation measurements are well below these guidelines.

A rem is a measure of radiation dose. The average American is exposed to approximately 620 millirems, or 0.62 rem, of radiation each year from natural and manmade sources.

###

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# NRC NEWS

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Blog: <http://public-blog.nrc-gateway.gov>

No. 11-050

March 16, 2011

### **NRC PROVIDES PROTECTIVE ACTION RECOMMENDATIONS BASED ON U.S. GUIDELINES**

Under the guidelines for public safety that would be used in the United States under similar circumstances, the NRC believes it is appropriate for U.S. residents within 50 miles of the Fukushima reactors to evacuate.

Among other things, in the United States protective actions recommendations are implemented when projected doses could exceed 1 rem to the body or 5 rem to the thyroid. A rem is a measure of radiation dose. The average American is exposed to approximately 620 millirems, or 0.62 rem, of radiation each year from natural and manmade sources.

In making protective action recommendations, the NRC takes into account a variety of factors that include weather, wind direction and speed, and the status of the problem at the reactors.

Attached are the results of two sets of computer calculations used to support the NRC recommendations.

In response to nuclear emergencies, the NRC works with other U.S. agencies to monitor radioactive releases and predict their path. All the available information continues to indicate Hawaii, Alaska, the U.S. Territories and the U.S. West Coast are not expected to experience any harmful levels of radioactivity.

###

News releases are available through a free *listserv* subscription at the following Web address: <http://www.nrc.gov/public-involve/listserv.html>. The NRC homepage at [www.nrc.gov](http://www.nrc.gov) also offers a SUBSCRIBE link. E-mail notifications are sent to subscribers when news releases are posted to NRC's website.

**From:** [Sangimino, Donna-Marie](#)  
**To:** [Case, Michael](#)  
**Cc:** [Sheron, Brian](#); [Uhle, Jennifer](#); [Gibson, Kathy](#); [Coe, Doug](#); [Valentin, Andrea](#); [Dion, Jeanne](#); [Grancorvitz, Teresa](#); [Kardaras, Tom](#); [Eisenberg, Wendy](#)  
**Subject:** NRC travel to Japan  
**Date:** Wednesday, March 16, 2011 1:50:03 PM

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Mike,

Per your inquiry at the 845 meeting today, we spoke with Charlotte Abrams, Chief, International Cooperation and Assistance Branch/OIP, and inquired as to Agency guidelines on upcoming travel to Japan by NRC staff. Charlotte indicated that an Agency Announcement would be issued this week providing guidance on this question, but early indications are that "routine" travel to Japan (**not** including travel associated with the ongoing emergency) will be curtailed for the next several weeks.

We have only a few RES travelers slated to attend routine meetings in Japan over the next several weeks. I suggest we hold their travel until that announcement comes out, and then the IPT will work with the traveler to formulate an appropriate response to our international counterpart conducting the meeting.

*Donna-Marie Sangimino*

International Programs Team Leader  
US Nuclear Regulatory Commission  
Office of Nuclear Regulatory Research (RES)

[Donna-Marie.Sangimino@nrc.gov](mailto:Donna-Marie.Sangimino@nrc.gov)  
(+1) 301-251-7673

N/37

**From:** [Sheron, Brian](#)  
**To:** [Coe, Doug](#); [Coyne, Kevin](#); [Correia, Richard](#); [Uhle, Jennifer](#)  
**Subject:** RE: IRC Staffing  
**Date:** Wednesday, March 16, 2011 7:45:46 AM

---

Thanks.

---

**From:** Coe, Doug  
**Sent:** Tuesday, March 15, 2011 8:10 PM  
**To:** Sheron, Brian; Coyne, Kevin; Correia, Richard; Uhle, Jennifer  
**Subject:** RE: IRC Staffing

Brian,  
Kevin is canvassing DRA staff per your request, but upon my return on Monday I will be available for duty in any capacity needed. I have RST experience in the IRC and willing to work nights. Also willing to travel.  
Doug

---

**From:** Sheron, Brian  
**Sent:** Tuesday, March 15, 2011 5:27 PM  
**To:** Coyne, Kevin; Case, Michael; Coe, Doug; Correia, Richard; Gibson, Kathy; Lui, Christiana; Richards, Stuart; Sangimino, Donna-Marie; Scott, Michael; Uhle, Jennifer; Valentin, Andrea  
**Cc:** Dion, Jeanne  
**Subject:** IRC Staffing

I participated on a conference call with other ODs and led by Michele Evans, acting deputy OD in NSIR at 4 pm today.

The purpose of the conference call was to discuss staffing for the IRC for the near future. The IRC is currently staffed with members of the Reactor safety team, the Protective Measures team, Liaison Team, etc. There is also an ET member there. None of the teams are at their full compliment. What Michele is looking for is people that can staff the IRC and relieve the staff that are currently there. She said they are currently running 3 shifts (11pm-7am, 7am – 3pm, and 3pm to 11 pm). They would like to find staff that can work shifts for 4 days in a row (I think she wants 4 days on, 3 days off). She said the staff do not have to have had IRC training.

Several of us said we would certainly canvas our staff to see who was qualified to work in the IRC and could work there, but we needed to know what technical disciplines they were looking for. Michele did not have a list of needed disciplines, but said she would generate one and send it out. As of 5:15 pm I have not received a list yet.

However, I am assuming they will be looking for staff with expertise in such areas as systems analysis, severe accidents, radiological dose assessment, etc. In anticipation that these are the technical disciplines of interest, can you please start identifying your staff that you believe have some of the requisite skills needed for the IRC, and start asking if they would be available to work shifts in the IRC if asked to. HR said they would be eligible for normal overtime compensation.

Also, they will be looking for staff to go to Japan and relieve the technical staff that recently went there. There were 2 BWR experts that left over the weekend, and a team of 9 more

(6 engineers and 3 OIP staff) left yesterday. The thinking is that the staff that recently went over would come back in 2 weeks, which is when they want to send a replacement team over there. So please check to see if you have any staff with the proper technical credentials, are reasonably good communicators, and would be willing to spend about 2 weeks in Japan as part of the team there.

I will forward the list of desired disciplines as soon as I receive them from Michele. Michele said she will be looking for the list of potential IRC replacements by COB tomorrow (3/16/11), thus, I will need your candidates by mid-afternoon.

For the team that will replace the one that was just sent to Japan, she said she would like us to update the list we previously sent by COB 3/17.

**From:** [Operations Center Bulletin](#)  
**To:** [Operations Center Bulletin](#)  
**Subject:** UPDATE: NRC IS RESPONDING TO JAPANESE EVENTS  
**Date:** Wednesday, March 16, 2011 10:40:30 AM

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## **THIS IS NOT A DRILL**

**The Office of Public Affairs is expecting a large volume of calls from media and the general public regarding the latest statements from the State Department and the NRC regarding the situation in Japan. ALL CALLS from media or the general public on this topic must be referred to the 301-415-8200 number.**

The NRC is coordinating its actions with other Federal agencies as part of the U.S. government response to the events in Japan. The NRC is examining all available information as part of the effort to analyze the event and understand its implications both for Japan and the United States. The NRC's Headquarters Operations Center in Rockville, MD has been stood up since the beginning of the emergency in Japan and is operating on a 24-hour basis.

NRC Incident Responders at Headquarters have spoken with the agency's counterpart in Japan and offered the assistance of U.S. technical experts. NRC representatives with expertise on boiling water nuclear reactors have deployed to Japan as part of a U.S. International Agency for International Development (USAID) team. USAID is the Federal government agency primarily responsible for providing assistance to countries recovering from disasters.

U.S. nuclear power plants are built to withstand environmental hazards, including earthquakes and tsunamis. Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster. The NRC requires that safety significant structures, systems, and components be designed to take in account the most severe natural phenomena historically estimated for the site and surrounding area.

The NRC will **not** provide information on the status of Japan's nuclear power plants. For the latest information on NRC actions see the NRC's web site at [www.nrc.gov](http://www.nrc.gov) or blog at <http://public-blog.nrc-gateway.gov>.

### **Two important reminders:**

It is possible that some of us will be requested by colleagues in another country to provide technical advice and assistance during this emergency. It is essential that all such communications be handled through the NRC Operations Center. Any assistance to a foreign government or entity must be coordinated through the NRC Operations Center and the U.S. Department of State (DOS). If you receive such a request, contact the NRC Operations Officer (301-816-5100 or via the NRC Operator) immediately.

If you receive information regarding this or any emergency (foreign or domestic) and you are not certain that the NRC's Incident Response Operations Officer is already aware of that information,

you should contact the NRC Operations Officer (301-816-5100 or via the NRC Operator) and provide that information.

-

**Other Sources of Information:**

USAID – [www.usaid.gov](http://www.usaid.gov)

U.S. Department of State – [www.state.gov](http://www.state.gov)

FEMA – [www.fema.gov](http://www.fema.gov)

White House – [www.whitehouse.gov](http://www.whitehouse.gov)

Nuclear Energy Institute – [www.nei.org](http://www.nei.org)

International Atomic Energy Agency – [www.iaea.org/press](http://www.iaea.org/press)

No response to this message is required.

**THIS IS NOT A DRILL**

NSIR

**Murphy, Andrew**

**From:** Crosson, Jonathan  
**Sent:** Wednesday, March 16, 2011 4:25 PM  
**To:** Billings, Sally; Kozal, Jason; Guynn, Milton F. (INPO); 'Lemke, Mark S. (INPO)'; Reed, Elizabeth; Andrews, Tom; Aucott, John; Bonser, Brian; Brandon, Lou; Collins, Frank; Dalzell-Bishop, Jennifer; Dickson, Billy; Dudek, Michael; Eberst, William; Wright, Lisa (Gibney); Gott, William; Grant, Jeffery; Harrington, Holly; Hasselberg, Rick; Howell, Linda; Jabbour, Andy N; Jackson, Karen; Jolliffe, Richard; Kammerer, Annie; Khan, Omar; Kowalczyk, Jeffrey; Liang, Rachel; Lojek, Anne; Marshall, Jane; McDermott, Brian; McKinley, Raymond; Morris, Scott; Munson, Clifford; Murphy, Andrew; OLaughlin, Colleen; Rudisail, Steven; Stone, Rebecca; Stransky, Robert; Susan PERKINS-GREW; Sweeney, Daniel W; Temple, Jeffrey; White, John; David Short (DAVID.W.SHORT@saic.com); Hinson, Felicia  
**Subject:** RE: National Level Exercise 2011 NRC Mid-Term Planning Conference  
**Importance:** High

**PLEASE NOTE THAT DUE TO ONGOING ACTIVITIES WITHIN THE NRC OPERATIONS CENTER IN RESPONSE TO THE EARTHQUAKE EVENT, THIS MEETING WILL BE RESCHEDULED.**

**I AM UNABLE TO REMOVE THIS MEETING INVITE FROM YOUR CALENDAR, BUT IF YOU DID NOT REMOVE IT IN RESPONSE TO THE BELOW MESSAGE SENT ON MONDAY, PLEASE REMOVE THIS MEETING FROM YOUR CALENDARS.**

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**From:** Billings, Sally  
**Sent:** Monday, March 14, 2011 7:21 AM  
**To:** Kozal, Jason; Guynn, Milton F. (INPO); 'Lemke, Mark S. (INPO)'; Reed, Elizabeth; Andrews, Tom; Aucott, John; Bonser, Brian; Brandon, Lou; Collins, Frank; Crosson, Jonathan; Dalzell-Bishop, Jennifer; Dickson, Billy; Dudek, Michael; Eberst, William; Wright, Lisa (Gibney); Gott, William; Grant, Jeffery; Harrington, Holly; Hasselberg, Rick; Howell, Linda; Jabbour, Andy N; Jackson, Karen; Jolliffe, Richard; Kammerer, Annie; Khan, Omar; Kowalczyk, Jeffrey; Liang, Rachel; Lojek, Anne; Marshall, Jane; McDermott, Brian; McKinley, Raymond; Morris, Scott; Munson, Clifford; Murphy, Andrew; OLaughlin, Colleen; Rudisail, Steven; Stone, Rebecca; Stransky, Robert; Susan PERKINS-GREW; Sweeney, Daniel W; Temple, Jeffrey; White, John; David Short (DAVID.W.SHORT@saic.com); Hinson, Felicia  
**Subject:** RE: National Level Exercise 2011 NRC Mid-Term Planning Conference

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-----Original Appointment-----

**From:** Kozal, Jason (NSIR)  
**Sent:** Tuesday, March 01, 2011 3:28 PM  
**To:** Kozal, Jason; Billings, Sally; Guynn, Milton F. (INPO); 'Lemke, Mark S. (INPO)'; Reed, Elizabeth; Andrews, Tom; Aucott, John; Bonser, Brian; Brandon, Lou; Collins, Frank; Crosson, Jonathan; Dalzell-Bishop, Jennifer; Dickson, Billy; Dudek, Michael; Eberst, William; Wright, Lisa (Gibney); Gott, William; Grant, Jeffery; Harrington, Holly; Hasselberg, Rick; Howell, Linda; Jabbour, Andy N; Jackson, Karen; Jolliffe, Richard; Kammerer, Annie; Khan, Omar; Kowalczyk, Jeffrey; Liang, Rachel; Lojek, Anne; Marshall, Jane; McDermott, Brian; McKinley, Raymond; Morris, Scott; Munson, Clifford; Murphy, Andrew; OLaughlin, Colleen; Rudisail, Steven; Stone, Rebecca; Stransky, Robert; Susan PERKINS-GREW; Sweeney, Daniel W; Temple, Jeffrey; White, John; David Short (DAVID.W.SHORT@saic.com); Hinson, Felicia  
**Subject:** National Level Exercise 2011 NRC Mid-Term Planning Conference  
**When:** Thursday, March 17, 2011 9:30 AM-11:30 AM (GMT-05:00) Eastern Time (US & Canada).  
**Where:** O-4B6



N/41

When: Thursday, March 17, 2011 9:30 AM-11:30 AM (GMT-05:00) Eastern Time (US & Canada).

Where: O-4B6

Note: The GMT offset above does not reflect daylight saving time adjustments.

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Colleagues,

Please join us for the NRC National Level Exercise 2011 (NLE 2011) Mid-Term Planning Conference (MPC) on Thursday March 17<sup>th</sup> from 9:30 AM to 11:30 AM. This conference will provided updated information about NLE 2011 participation for NRC and its stakeholders. The MPC will be held at the NRC HQ in Rockville, MD in room O-4B6. The MPC will also be broadcast by webinar or Go-To Meeting with a conference bridge for those not able to attend in person.

When you RSVP please indicate how you plan on attending, via web or in person, and if you require any logistical information. Personnel without an NRC badge will require escorts. More detailed information will be provided on which web conferencing system will be used and how to access it.

If you have any questions please contact Jason Kozal [jason.kozal@nrc.gov](mailto:jason.kozal@nrc.gov) 301-415-6231, or Sally Billings [sally.billings@nrc.gov](mailto:sally.billings@nrc.gov) 301-415-6412.

I look forward to seeing you there.

Jason Kozal



**Murphy, Andrew**

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**From:** Sydnor, Russell  
**Sent:** Wednesday, March 16, 2011 11:59 AM  
**To:** Case, Michael; Graves, Herman; Hogan, Rosemary; Csontos, Aladar; Koshy, Thomas; Lin, Bruce; Boyce, Tom (RES); Ali, Syed; Murphy, Andrew; Tregoning, Robert; Gavrilas, Mirela; Lorette, Phillip  
**Cc:** Richards, Stuart  
**Subject:** RE: IRC Staffing

Mike, I do not think DICB has the primary areas of expertise needed, but the following people expressed a desire to help out;

Milton Concepcion  
 Leroy Hardin  
 Karl Sturzebecher  
 Luis Betancourt  
 Paul Rebstock  
 Yaguang Yang

Russell Sydnor  
 Branch Chief  
 NRC/RES/DE/DICB  
 301-251-7405  
[Russell.Sydnor@nrc.gov](mailto:Russell.Sydnor@nrc.gov)

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**From:** Case, Michael  
**Sent:** Wednesday, March 16, 2011 7:16 AM  
**To:** Graves, Herman; Hogan, Rosemary; Csontos, Aladar; Koshy, Thomas; Lin, Bruce; Boyce, Tom (RES); Ali, Syed; Murphy, Andrew; Tregoning, Robert; Gavrilas, Mirela; Sydnor, Russell; Lorette, Phillip  
**Cc:** Richards, Stuart  
**Subject:** FW: IRC Staffing

Can you all start to think about this and let me know of any potential names by around noon?

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**From:** Sheron, Brian  
**Sent:** Tuesday, March 15, 2011 5:27 PM  
**To:** Coyne, Kevin; Case, Michael; Coe, Doug; Correia, Richard; Gibson, Kathy; Lui, Christiana; Richards, Stuart; Sangimino, Donna-Marie; Scott, Michael; Uhle, Jennifer; Valentin, Andrea  
**Cc:** Dion, Jeanne  
**Subject:** IRC Staffing

I participated on a conference call with other ODs and led by Michele Evans, acting deputy OD in NSIR at 4 pm today.

The purpose of the conference call was to discuss staffing for the IRC for the near future. The IRC is currently staffed with members of the Reactor safety team, the Protective Measures team, Liaison Team, etc. There is also an ET member there. None of the teams are at their full compliment. What Michele is looking for is people that can staff the IRC and relieve the staff that are currently there. She said they are currently running 3 shifts (11pm-7am, 7am – 3pm, and 3pm to 11 pm). They would like to find staff that can work shifts for 4 days in a row (I think she wants 4 days on, 3 days off). She said the staff do not have to have had IRC training.

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of needed disciplines, but said she would generate one and send it out. As of 5:15 pm I have not received a list yet.

However, I am assuming they will be looking for staff with expertise in such areas as systems analysis, severe accidents, radiological dose assessment, etc. In anticipation that these are the technical disciplines of interest, can you please start identifying your staff that you believe have some of the requisite skills needed for the IRC, and start asking if they would be available to work shifts in the IRC if asked to. HR said they would be eligible for normal overtime compensation.

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I will forward the list of desired disciplines as soon as I receive them from Michele. Michele said she will be looking for the list of potential IRC replacements by COB tomorrow (3/16/11), thus, I will need your candidates by mid-afternoon.

For the team that will replace the one that was just sent to Japan, she said she would like us to update the list we previously sent by COB 3/17.

NSIR

**Murphy, Andrew**

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**From:** Operations Center Bulletin  
**Sent:** Wednesday, March 16, 2011 12:51 PM  
**To:** Operations Center Bulletin  
**Subject:** UPDATE: NRC IS RESPONDING TO JAPANESE EVENTS

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**THIS IS NOT A DRILL**

\*\*\*\*\*Event Information is Attached\*\*\*\*\*

The NRC is responding to an event.

Please contact the NRC Executive Support Team if necessary at 301-816-5100 or reply to this e-mail.

N/43

**Murphy, Andrew**

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**From:** Kammerer, Annie  
**Sent:** Wednesday, March 16, 2011 5:29 PM  
**To:** RES Distribution  
**Subject:** sharepoint site where latest and greatest seismic Q&As can be found moving forward

Please see the file that contains the latest document at...

<http://portal.nrc.gov/edo/nrr/NRR%20TA/FAQ%20Related%20to%20Events%20Occuring%20in%20Japan/Forms/AllItems.aspx>

We will be updating this daily or almost daily in the foreseeable future. So please go to this site if you'd like to see the latest.

The site gives RES the credit since we're the lead and started it; but there is a big team supporting this that includes staff from RES, NRO, NRR and the regions.

Annie

**Weaver, Tonna**

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**From:** Ordaz, Vonna  
**Sent:** Thursday, March 17, 2011 12:39 PM  
**To:** Dudes, Laura; Ruland, William; McIntyre, David  
**Cc:** Dorman, Dan; Haney, Catherine; Einziger, Robert; Rahimi, Meraj  
**Subject:** Proposal to handle dried Spent fuel pool.docx  
**Attachments:** Proposal to handle dried Spent fuel pool.docx

Laura,

I understand that you are on duty as the RST Director today. From our shift last night, Bill Ruland and the RST staff were discussing various approaches to address the potentially dry SFP. One of our Senior Materials Experts, Bob Einziger has prepared the attached proposal to offer support on how to handle a dry SFP. He is available, if needed, and can be reached at 301-492-3283.

Thanks,  
Vonna

## Proposal to handle dried spent fuel pool

RE Einziger, Ph.D.  
SFST/MNSS/NRC

Credential: I have over 30 yrs experience at National Laboratories studying the behavior of Spent Fuel rods in an Oxidizing Atmosphere.

The spent fuel consists of UO<sub>2</sub> fuel inside a Zircaloy-2 cladding covered with a Zirconium oxide layer and a layer of CRUD. If the pool goes dry, the rods will heat up until the rate of heat production is balanced by the rate of heat removal by conduction, convection, and radiation. As the rod is heating up the gas inside the rod will be stressing the cladding, that has a lower yield strength and thus the cladding will expand. The expansion will cause the CRUD to flake off and break up to particulate in the 1-10 micron range as it hits the pool floor. This CRUD, with a main radioactive component as Co-60 may become airborne

Somewhere between 600 and 1000C the Zircaloy cladding that has a high concentration of zirconium hydrides on the outer surface may catch on fire. Zirconium hydride is pyrophoric but the ignition temperature is not an intrinsic properties but is dependent on many features including the surface to volume ratio of the cladding.. Concurrently the pressure in the rod will continue to rise until ~750C when the rod will burst, ejecting fission gases and volatiles in the gap including Cs and I compounds. Some fuel particulate will also be ejected.

As these temperatures the exposed fuel will rapidly oxidize to U<sub>3</sub>O<sub>8</sub> with a ~32% volume expansion. This expansion will split the cladding from end to end in a relatively short time. The fuel, now in grain size articulate (~10-15 micron) will stay in the cladding as a compact until it experiences a mild physical force at which time it will fall to the bottom of the pool.

Of primary important is to prevent the oxidation of the UO<sub>2</sub> fuel that contains the preponderance of the radionuclides. Unless you can cover the fuel completely with water the fuel will oxide. When water is sprayed on the fuel, steam is formed which further oxidizes the fuel. A better choice would be to put liquid Argon in the pool if it is available. In not then use liquid N<sub>2</sub>. The benefits of these gases are that they have a large, (~1000 times) volume expansion when they vaporize thus a small volume has to be put in the pool then the volume of water and more importantly, both will displace the oxygen and prevent the further oxidation of the fuel. (note that this is more effective for the Argon than the N<sub>2</sub>). Once the oxygen is displaced, both the fire, if it occurs, and fuel oxidation will stop. At this point it would be best to fill the pool with sand and glass formers and let the fuel melt into a glass. Since the assemblies are ~ 50% dense, and the pool is about 1/2 to 2/3 full (at least it was when I was there in November). The glass layer would be about 3-5 feet high. The molten glass could then be quenched to solidify it. One has to be aware though, if the fuel is allowed to melt into a glass, most of the fission gases, and volatiles trapped in the fuel pellets would escape.

Any success of this plan would be dependent on the availability of liquid gases in Japan, and ability to deliver them. That is out of my range of expertise.

Just a suggestion.

**Murphy, Andrew**

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**From:** Dehn, Jeff  
**Sent:** Thursday, March 17, 2011 10:56 AM  
**To:** Nicholson, Thomas; Ali, Syed; Murphy, Andrew; Sangimino, Donna-Marie  
**Subject:** FW: Request from Canada (CNSC) for Seismic/Geotechnical Expert Input

All,  
 Per email below, please consider Canada's request on-hold – no action necessary. Before reacting or responding to any future request from them, it will need to come in through OIP.  
 Thank you,  
 Jeff

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**From:** English, Lance  
**Sent:** Thursday, March 17, 2011 10:44 AM  
**To:** Dehn, Jeff  
**Subject:** FW: Request from Canada (CNSC) for Seismic/Geotechnical Expert Input

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**From:** McLellan, David [David.McLellan@cnscccsn.gc.ca]  
**Sent:** Thursday, March 17, 2011 9:19 AM  
**To:** English, Lance  
**Subject:** RE: Request from Canada (CNSC) for Seismic/Geotechnical Expert Input

Hello Lance,  
 I contacted Mike Rinker. For the present, please put his request on hold. It appears for now that CNSC is managing these exchanges of info with the NRC through CNSC's Emergency Operations Centre.  
 Canada's offer of assistance to Japan ([http://www.international.gc.ca/humanitarian-humanitaire/japan\\_earthquake\\_japon\\_seisme.aspx?lang=eng](http://www.international.gc.ca/humanitarian-humanitaire/japan_earthquake_japon_seisme.aspx?lang=eng)) includes "chemical, biological, radiological and nuclear (CBRN) technical expertise and equipment" but to my knowledge the Japanese authorities have not taken this offer up.  
 Best regards,  
 David

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**From:** English, Lance [mailto:Lance.English@nrc.gov]  
**Sent:** Thursday, March 17, 2011 6:41 AM  
**To:** McLellan, David  
**Subject:** FW: Request from Canada (CNSC) for Seismic/Geotechnical Expert Input

Good morning David,

Apologies for not responding to your e-mail last week regarding OIP briefs to Commissioners at public meetings...I am checking on this. Also, our Canadian guests were very well behaved!

I wanted to send you an e-mail I received from our office of Research (see below). Could you contact Mr. Rinker and inquire about specific questions he needs answers to?

Also, as you are well aware we are working very hard regarding the tragic events in Japan, so I may not be quick to respond to e-mails or phone calls. We have two folks from our office, and 9 others from NRC in Tokyo supporting the efforts there. I was wondering if the CNSC was considering providing any assistance to Japan?

Best regards,

Lance

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**From:** Dehn, Jeff  
**Sent:** Wednesday, March 16, 2011 6:23 PM  
**To:** English, Lance  
**Cc:** Nicholson, Thomas; Sangimino, Donna-Marie; Ali, Syed; Murphy, Andrew  
**Subject:** Request from Canada (CNSC) for Seismic/Geotechnical Expert Input

Lance,

A senior RES staff member (Tom Nicholson) received a call from a senior regulator (Mike Rinker) in Canada's CNSC asking for some possible NRC contacts with expertise in the geotechnical/seismic areas. We have not received any specific questions. Before engaging, or submitting any names, I was hoping you could either make contact with Mr. Rinker, or CNSC, requesting a more specific scope for his inquiry, or provide other guidance.

Of course RES has such subject matter experts, as do other program offices. Once we hear back from you/CNSC, we can then get the request "in-the-box" and flowing from the top down as management sees fit.

Michael Rinker  
Canadian Nuclear Safety Commission  
Director, Environmental Risk Assessment Division  
613-943-9935  
[Michael.Rinker@cnsccsn.gc.ca](mailto:Michael.Rinker@cnsccsn.gc.ca)

Thank you,  
Jeff

Jeff Dehn

International Relations Specialist  
Office of Nuclear Regulatory Research (RES)  
US Nuclear Regulatory Commission  
[jeff.dehn@nrc.gov](mailto:jeff.dehn@nrc.gov)  
301-251-7672  
C-6D22

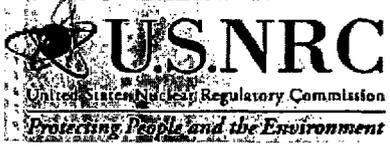
\*\*\*\*\*  
The information contained in this e-mail is intended solely for the use of the named addressee. Access, copying, or re-use of the e-mail or any information contained therein by any other person is not authorized. If you are not the intended recipient, please notify us immediately by returning the e-mail to the originator.

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\*\*\*\*\*

NSIR

Murphy, Andrew

From: EDO Update [nrc.announcement@nrc.gov]  
Sent: Thursday, March 17, 2011 4:08 PM  
To: Taylor, Renee  
Subject: EDO Update



## EDO Update

Thursday, March 17, 2011



The situation at the Fukushima reactor site in Japan continues to be very serious and dynamic. The NRC has responded quickly and effectively to an incredibly challenging situation. We have staffed the Operations Center 24/7 since last Friday and we have a team of 11 individuals who are in Japan to 1) provide support to the U.S. ambassador and the embassy, 2) interface with the Japanese regulator and licensee, and 3) help to facilitate coordination of the U.S. Government response. The Chairman was on Capitol Hill yesterday to brief committees of both the House and Senate on what is happening and how the NRC is responding. The quality of the work done by the NRC staff is clearly recognized and appreciated by all of our stakeholders.

Given the available information, we continue to be very concerned about the condition of three reactor cores and two spent fuel pools. Based on calculations performed by NRC experts for the situation as a whole, we now believe that it is appropriate for U.S. residents within 50 miles of the Fukushima reactors to evacuate. Our recommendation is based on NRC guidelines for public safety that would be used in the U.S. under similar circumstances. At the same time, however, we do not expect any part of the U.S. or its territories to experience any harmful levels of radioactivity, given the great distances involved. We continue to do analyses to verify our understanding of this issue. The NRC is working closely with our federal partners to monitor radiation releases from the Japanese nuclear power plants.

We will continue to place emphasis on communication activities. The agency is being flooded with phone calls from the media, stakeholders, and the general public. Once again, thank you to everyone who is pitching in to help deal with this volume of activity.

Given the dynamic situation, there will be an All-Hands meeting tomorrow at 2:00 p.m. in the One White Flint auditorium, with VTC to the regions, Technical Training Center, and headquarters satellite offices. Overflow seating will be available in the TWFN Exhibit Area as

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well as the Commission Hearing Room. (There will also be a bridge line: 888-820-8960; pass code: 8690842.) I will give you an update on what we know, and answer any questions to the best of my ability. In addition, we are expecting to have a Commission meeting early next week. We will provide a link to the briefing materials as soon as possible. Finally, you may find these documents prepared by the Office of Nuclear Reactor Regulation to be of interest:  
<http://portal.nrc.gov/edo/nrr/default.aspx>.

---

*Bill*

Bill Borchardt, EDO

**Murphy, Andrew**

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**From:** uchiyama-yuichi@jnes.go.jp  
**Sent:** Thursday, March 17, 2011 9:09 PM  
**To:** Alejandro.HUERTA@oecd.org; Murphy, Andrew; Ali, Syed  
**Cc:** okano-kenta@jnes.go.jp; kobayashi-koichi@jnes.go.jp; yamazaki-hiroaki@jnes.go.jp  
**Subject:** Appology of absence of JNES in IAGE meeting

Dear Mr.Huerta, Dr. Murphy, Dr. Ali,

This is Uchiyama, in JNES.

As you know, we have a very big trouble in Japan.

All people relating nuclear safety are struggling to contain this situation.

Because of this, the management of JNES decided to prohibit participations in oversea meetings.

I and Mr. Okano, who is in charge of EQ observation in deep bore hole project, were planning to participate in Seismic and Concrete Sub-group meetings from the Seismic Safety Department of JNES. But we cannot participate because of the reason above. Moreover, it is thought that the greater part of possible participants from Japan will be absent too.

Please understand this situation.

But I want to make an effort to deliver the electronic file about the draft report of the workshop on earthquake observation in deep borehole.

Truly yours,  
18 Mar., 2010  
Y. Uchiyama, JNES

From:  
To:

Davidson, Lawrence

Abraham, Susan; Abrams, Charlotte; Ader, Charles; Akstulewicz, Frank; Albert, Ronald; Allwein, Russell; Alston, Timothy; Andersen, James; Anderson, Joseph; Armentrout, Deborah; Ash, Darren; Ash, Melissa; Astwood, Heather; Auluck, Rajender; Austin, Joseph; Ayres, David; Bahadur, Sher; Bailey, Marissa; Bailey, Stewart; Baker, Pamela; Banas, Paul; Bars, Dan; Bartlett, Bruce; Bartley, Jonathan; Bartley, Mallion; Batkin, Joshua; Baum, Robin; Bavliff, Shirley; Beardsley, James; Beasley, Benjamin; Bell, Hubert; Bell, Marvin; Bellamy, Ronald; Bellinger, Alesha; Benjamin, Jamie; Benner, Eric; Benney, Brian; Bergman, Thomas; Biggins, James; Bladey, Cindy; Blamey, Alan; Bloom, Steven; Bloomer, Tamara; Blount, Tom; Boger, Bruce; Boland, Anne; Bolduc, Angela; Bonser, Brian; Borchardt, Bill; Borden, William; Bouling, Ramona; Bower, Fred; Bower, Phyllis; Boyce, Tom (RES); Boyce, Thomas (OIS); Brady, Joseph; Brenner, Eliot; Brezovec, Michael; Broaddus, Doug; Brooks, Kenneth; Brown, Frederick; Brown, Tony; Brown, Milton; Brown, Rohn; Bubar, Patrice; Buchholz, Jeri; Buckley, Michael; Bumpass, Sheila; Burns, Stephen; Burritt, Arthur; Burton, Stephen; Burton, William; Bush-Goddard, Stephanie; Cain, Chuck; Caldwell, Robert; Calle, Joselito; Cameron, James; Campbell, Andy; Campbell, Larry; Campbell, Stephen; Campbell, Vivian; Camper, Larry; Caniano, Roy; Cardenas, Daniel; Carlson, Robert; Carpenter, Cynthia; Case, Michael; Casto, Chuck; Casto, Greg; Cataldo, Paul; Catts, Michelle; Champion, Bryan; Chang, Helen; Chang, Lydia; Cheok, Michael; Chernoff, Harold; Chernoff, Margaret; Chokshi, Nilesh; Christensen, Harold; Clark, Jeff; Clay, Earnestine; Clayton, Brent; Clifford, James; Cobey, Eugene; Cochrum, Steven; Coe, Doug; Cohen, Miriam; Cohen, Ronald; Cohen, Stephen; Colaccino, Joseph; Coleman, Judy; Collins, Daniel; Collins, Elmo; Conte, Richard; Cook, Christopher; Corbett, James; Cordes, John; Correia, Richard; Costello, Ralph; Coyne, Kevin; Croteau, Rick; Crowe, Eddy; Cruz, Jeffrey; Csontos, Aladar; Cubbage, Amy; Cubellis, Louis; Cullison, David; Curtis, David; Daley, Robert; Daly, Jill; Dambly, Jan; Daniel, Susan; Danna, James; Dapas, Marc; Davis, Henry; Davis, Jack; Davis, Marlone; Dean, Michael; Dean, Bill; Dehn, Janine; Delligatti, Mark; Dembek, Stephen; Demoss, Gary; Dennig, Robert; Dentel, Glenn; Desai, Binoy; Dias, Antonio; Diaz-Toro, Diana; Dickson, Billy; Dingbaum, Stephen; DiPaolo, Eugene; Dixon, John; Dixon-Herrity, Jennifer; Doane, Margaret; Dodmead, James; Doerflein, Lawrence; Donaldson, Leslie; Donnell, Tremaine; Donoghue, Joseph; Doornbos, Roger; Dorman, Dan; Dorsey, Jervill; Dosch, William; Dreisbach, Jason; Droggitis, Spiros; Dudes, Laura; Dumbacher, David; Duncan, Eric; Dwyer, James; Dyer, Jim; Eads, Johnny; Easson, Pamela; Egan, Dennis; Egl, Richard; Einberg, Christian; Elkins, Scott; Ellegood, John; Elliott, Robert; Ellsbury, Richard; Erlanger, Craig; Ernestes, Michael; Brown, Cris; Evans, Carolyn; Michele.ca@nrc.gov; Farnholtz, Thomas; Felts, Russell; Fenton, Darlene; Ferdas, Marc; Ferrell, Kimberly; Ficks, Ben; Fields, Leslie; Finney, Patrick; Fitch, Karen; Flanders, Scott; Flynn, Sean; Foster, Jack; Franke, Mark; Franovich, Rani; Fredericks, Carl; Freeman, Scott; Fretz, Robert; Frumkin, Daniel; Frye, Timothy; Fuller, Michael; Gaddy, Vincent; Gallo, Jenny; Galloway, Melanie; Gartman, Michael; Gavrilas, Mirela; Giantelli, Adelaide; Gibson, Kathy; Giessner, John; Giltter, Joseph; Givvines, Mary; Gody, Tony; Golder, Jennifer; Golshan, KG; Gorham, Tajuan; Gott, William; Graham, Thorne; Grancorvitz, Teresa; Grant, Jeffery; Graser, Dan; Gray, Mel; Greene, Kathryn; Grice, Thomas; Griffin, Steven; Grobe, Jack; Hawkins, Kimberly; Gusack, Barbara; Guthrie, Eugene; Guttmann, Jack; Haag, Robert; Habighorst, Peter; Hackett, Edwin; Haeg, Lucas; Haire, Mark; Hall, Donald; Hall, Patricia; Hamzehee, Hossein; Hanev, Catherine; Hansell, Samuel; Harris, Tim; Harrison, Donnie; Hatchett, Gregory; Hawkens, Roy; Hay, Michael; Hayden, Elizabeth; Hays, Myra; Heck, James; Heck, Jared; Helton, Shana; Henderson, Pamela; Hickey, James; Hiland, Patrick; Hills, David; Hilton, Nick; Hiltz, Thomas; Hirsch, Patricia; Hoeg, Tim; Hogan, Rosemary; Holahan, Gary; Holahan, Patricia; Holian, Brian; Holland, Crystal; Holody, Daniel; Holonich, Joseph; Holt, BJ; Hopper, George; Howard, Patrick; Howe, Allen; Howell, Art; Howell, Linda; Hoxie, Chris; Hsia, Anthony; Hsu, Caroline; Hsueh, Kevin; Huber, Deborah; Hudson, Jody; Humerick, David; Hunegs, Gordon; Hunter, James; Huth, Virginia; Hutto, Andy; Huvck, Doug; Imboden, Andy; Itzkowitz, Marvin; Jackson, Deborah; Jackson, Donald; Jackson, Terry; James, Lois; Jankovich, John; Janney, Margie; Jarvis, Rodney; Jenkins, Ronaldo; Jernell, Eleni; Johns, Nancy; Johnson, Michael; Johnson, Clay; Johnson, Robert; Jolicoeur, John; Jones, Bradley; Jones, Evan; Jones, William; Josey, Jeffrey; Joustra, Judith; Julian, Emile; Jung, Ian; Junge, Michael; Kahler, Robert; Kaplan, Michele; Karas, Rebecca; Kellar, Ray; Kelley, Corenthis; Kemerer, Myron; Kemker, Brian; Kennedy, Kriss; Kennedy, Silas; Kerben, Valerie; Kern, David; Khanna, Meena; Kim, Yung; Kimble, Daniel; King, Donald; King, Michael; Kinneman, John; Kirkland, John; Kirkwood, Sara; Klein, Alex; Knutson, Ed; Kobetz, Timothy; Kokaiko, Lawrence; Kolaczyk, Kenneth; Konzman, Carl; Koshy, Thomas; Kowal, Mark; Kramer, John; Krohn, Paul; Krsek, Robert; Krupnick, David; Kulesa, Gloria; Kulp, Jeffrey; Kunowski, Michael; Lam, Donna; Lambert, Kenneth; Landau, Mindy; Langan, Scott; Lankford, Jeffrey; Lantz, Ryan; Lara, Julio; Larkin, Grant; Laura, Richard; Layton, Michael; Le, Hong; Lee, Bert; Lee, David; Lee, Richard; Lee, Samson; Lee, Samuel; Leeds, Eric; Lennartz, Jay; Lesser, Mark; Lew, David; Lewis, Robert; Lipa, Christine; Lombard, Mark; Long, Chris; Lopez, Joseph; Lorson, Raymond; Louden, Patrick; Lubinski, John; Luehman, James; Lui, Christiana; Lukes, Robert; Lund, Louise; Lupold, Timothy; Lyons-Burke, Kathy; Ma, May; Madden, Patrick; Madison, Wil; Magruder, Stewart; Mamish, Nader; Markley, Michael; Marshall, Jane; Marshfield, Mark; Martin, Gillian; Masnik, Michael; Masse, Todd; Matheson, Mary; Mathew, Roy; Matthews, David; Mattingley, Joel; Maxin, Mark; Mayfield, Michael; McCann, Carrie; McConnell, Keith; McCoppin, Michael; McCoy, Gerald; McCrary, Cheryl; McCree, Victor; McDermott, Brian; McGhee, James; McGill, Clinton; McGinty, Tim; McGowan, Anna; McHale, John; McKelvey, Harold; McKenna, Eileen; McKenney, Christopher; McKirgan, John; McMillan, Joseph; McMurtray, Anthony; Mendiola, Anthony; Mever, David; Michalak, Paul; Miller, Charles; Miller, Chris; Miller, Geoffrey; Miller, Marie; Miller, Mark; Miller, Michael; Miotla, Sherri; Mitchell, Matthew; Mitchell, Reggie; Mohseni, Aby; Monk, Robert; Monninger, John; Montgomery, Jack; Moore, Scott; Moore, Thomas; Moorman, James; Morris, Eddie; Morris, James; Morris, R. Michael; Morris, Scott; Morrissey, Thomas; Moulding, Patrick; Moy, Romena; Mrowca, Lynn; Muessle, Mary; Munday, Joel; Murphy, Jerome; Murphy, Martin; Musser, Randy; Narick, Marianne; Nazario, Tomy; Nease, Rebecca; Neff, Deborah; Nelson, Robert; Nichols, Russell; Nieh, Ho; Norato, Michael; Norris, Michael; Nute-Blackshear, Lora; OBrien, Kenneth; OBryan, Phil; O'Donohue, Kathleen; Offutt, David; Ogle, Chuck; OKeefe, Neil; Oklesson, Edward; Ordaz, Vonna; Orth, Steven; O'Sullivan, Kevin; Ott, William; Ousley, Elizabeth; Owens, Janice; Paradiso, Karen; Partlow, Benjamin; Pascarelli, Robert; Peck, Michael; Pederson, Cynthia; Pelke, Patricia; Pellet, John; Pelton, David; Peralta, Juan; Perry, Jamila; Perry, Neil; Persinko, Andrew; Peters, Sean; Peterson, Gordon; Peterson, Hironori; Pham, Bo; Phillips, Charles; Piccone, Josephine; Pool, Stephen; Poole, Brooke; Powell, Amy; Powell, Dawn; Powell, Raymond; Prescott, Peter; Pretzello, Andrew; Price, Georgette; Pruett, Troy; Pstrak, David; Pulliam, Timothy;

Quay, Theodore; Quichocho, Jessie; Rabideau, Peter; Rahimi, Meraj; Raione, Richard; Rainic, Cecilia; Ramirez, Frances; Rasmussen, Richard; Rasouli, Houman; Raspa, Rossana; Rayland, Andrew; Raymond, William; Reckley, William; Reddick, Darani; Reece, James; Regan, Christopher; Reis, Terrence; Remsburg, Kristy; Reynolds, Steven; Revnoso, John; Rheau, Cynthia; Ricci, John; Rich, Daniel; Rich, Thomas; Richards, Stuart; Ricketts, Paul; Riemer, Kenneth; Ring, Mark; Roach, Edward; Roach, Gregory; Roberts, Darrell; Rodgers, Felecia; Rogge, John; Rosenberg, Stacey; Ross, Thierry; Ross-Lee, MaryJane; Rothschild, Trip; Rough, Richard; Rowhani, Bahman; Royal, Judith; Rubenstone, James; Rubic, Mark; Ruiz, Robert; Ruland, William; Rule, David; Rutkowski, John; Rutledge, Steven; Rzepka, Robert; Sabisch, Andrew; Safford, Carrie; Salgado, Nancy; Salley, MarkHenry; Salter, Susan; Sanchez, Alba; Sanchez, Alfred; Sangimino, Donna-Marie; Santiago, Patricia; Santos, Cayetano; Sargent, Kimberly; Satorius, Mark; Schaaf, Robert; Schaeffer, James; Schmidt, Rebecca; Schneider, Max; Schnetzler, Bonnie; Schoenmann, Sandra; Schroeder, Daniel; Schum, Constance; Scott, Catherine; Scott, Michael; Sealing, Donna; Segala, John; Serepca, Beth; Seymour, Deborah; Shaeffer, Scott; Shaffer, Steve; Shannon, Mel; Shannon, Michael; Sharkey, Jeffrey; Shay, Jason; Shear, Gary; Shehee, James; Sheron, Brian; Shields, James; Shoop, Undine; Shuaibi, Mohammed; Silva, Patricia; Simms, Sophonia; Skeen, David; Skokowski, Richard; Smith, Arthur; Smith, Brian; Smith, Galen; Smith, Rich; Smith, Tuwanda; Solorio, Dave; Sosa, Belkys; Sotiropoulos, Dina; Spencer, Mary; Spindler, David; Spitzberg, Blair; StAmour, Norman; Stablein, King; Stapleton, Bernard; Stetson, Kathleen; Stewart, Scott; Stewart, Sharon; Stoedter, Karla; Stone, AnnMarie; Suber, Gregory; Subosits, Stephen; Sullivan, Allen; Swain, Karol; Sydnor, Russell; Sykes, Marvin; Szyperski, Bill; Tailleart, Don; Talley, Sandra; Tappert, John; Tate, Travis; Taylor, Robert; Tenaglia, Mickey; Terao, David; Terry, Leslie; Thaggard, Mark; Thomas, Brian; Thomas, Christopher; Thorp, John; Tonacci, Mark; Tracy, Glenn; Tran, Tu; Trapp, James; Travick, Vanette; Trent, Glenn; Tschiltz, Michael; Turner, Joseph; Turtill, Richard; Uhle, Jennifer; Ulses, Anthony; Usilton, William; Valentin, Andrea; Vogel, Anton; Vias, Steven; Vietti-Cook, Annette; Virgilio, Martin; VonTill, Bill; Voytko, Victoria; Walker, Tracy; Walker, Wayne; Wall, Scott; Warnick, Greg; Wastler, Sandra; Waters, Michael; Watson, Bruce; Weaver, Doug; Webber, Robert; Weber, Michael; Weerakkody, Sunil; Welling, Blake; Werkheiser, David; Werner, Greg; Wert, Leonard; West, Garmon; West, Steven; Westreich, Barry; Whetstone, Jack; White, Duncan; White, Darrell; Whited, Ryan; Whitten, Jack; Widdup, Joseph; Widmann, Malcolm; Wiggins, Jim; Williams, Barbara; Williams, Evelyn; Williams, Kevin; Williams, Michael; Williams, Mona; Williams-Johnson, Patrice; Williamson, Edward; Wilson, Ernest; Wilson, George; Wilson, Peter; Wood, Gene; Wood, Kent; Wright, Lisa (Gibney); Wrona, David; Wunder, George; Yerokun, Jimi; Young, Cale; Young, Mitzi; Zane, Steven; Zeiler, John; Zimmerman, Jacob; Zimmerman, Roy; Zabler, Marian

**Cc:** Scott, Tracy; Tallarico, Alison; Thoman, Raymond; Jones, Jackie; Blair, Tina; Chin, Allison; Dean, Vivian; Evans(HR), Marilyn; Himmelberg, Jude; Jackson, Briana; Jaigobind, Savi; Silberfeld, Dafna; Watson, Madonna; Williams, Michelle; Atkinson, Jeanne; Broadwater, Lynne; Brown, Keisa; Hicks, Beverly; Hicks, Valencia; Jonsson, Dawn; Lindsay, Sandy; Marziale, Riqueza; ORourke, Christine; Reeves, Gloria; Scott, Mary; Thomas-Richards, Karen; Todd, Colleen

**Date:** Thursday, March 17, 2011 2:06:48 PM

**Attachments:** Work Schedule and Premium Pay Guidance for Japan Response 3.docx

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Managers, supervisors, team leaders, and T&L Coordinators,

Attached for your information is a document that addresses, in detail, work schedules and premium pay for individuals who serve in and support the NRC Operations Center or work in Japan, in response to the current, serious nuclear power plant issues in that country. NSIR and the NRC Japanese support team leader will provide the document to all participants.

T&L Coordinators, please note that participants in your organization may contact you to request a change in their HRMS workgroups for pay periods in which they perform emergency response work.

Participants should contact me if they have any questions on work schedules or premium pay.

Larry Davidson  
Office of Human Resources  
Nuclear Regulatory Commission  
301-492-2286; [lawrence.davidson@nrc.gov](mailto:lawrence.davidson@nrc.gov)

## **WORK SCHEDULE AND PREMIUM PAY GUIDANCE FOR RESPONSE TO EVENTS IN JAPAN**

Please first review this document and contact Larry Davidson of the Office of Human Resources (301-492-2286 or [lawrence.davidson@nrc.gov](mailto:lawrence.davidson@nrc.gov)) for any needed assistance.

### **Work Schedules**

One or more types of work schedules may be appropriate during a pay period in which you serve in and support the NRC Operations Center or work in Japan, in response to the current, serious nuclear power plant issues in that country. You are authorized to select the type of work schedule you will work during the pay period depending on:

- Your specific workdays and work clock hours in the Operations Center or in Japan, as well as any flexibility you have to choose those workdays and clock hours;
- Your entitlement to premium pay for work in the Operations Center or Japan;
- Your performance, if any, of regular duties outside of the Operations Center/Japan during the pay period; and,
- Your loss of earned credit hours if you switch from NEWFlex to another type of work schedule.

Possible work schedules include:

- Compressed work schedule – Appropriate if, during the entire pay period, your workdays and work clock hours are fixed (i.e., you do not have any flexibility to choose either) and there are fewer than ten nonovertime workdays in the pay period (at least one nonovertime workday contains more than eight nonovertime hours). Note that restrictions on nonovertime work clock hours and weekend workdays have been lifted for the pay period. An Expanded-Compressed Work Schedule may be appropriate (see the Yellow Announcement at <http://www.internal.nrc.gov/announcements/yellow/2003/2003-032.html> and Article 6.10.3 of the Collective Bargaining Agreement).
- NEWFlex - Appropriate if, during at least a portion of the pay period, you have some discretion to select your workdays and/or work clock hours (for example, if/when performing regular duties outside of the Operations Center or Japan). Note that restrictions on nonovertime work clock hours and weekend workdays have been lifted for the pay period.
- First-40 – Appropriate if it is impracticable to prescribe a regular schedule of definite hours of duty for each workday of the workweek (likely not appropriate).

Note that you must advise your T&L coordinator to change your HRMS workgroup if you change the type of schedule you work, e.g., if you normally work CWS and change to NEWFlex for the pay period in which you serve in and support the NRC Operations Center or work in Japan. Also note that if you switch from NEWFlex to another type of work schedule, you will lose and will be paid for any accumulated credit hours.

Also note that if you work fewer than 80 hours serving in and supporting the NRC Operations Center or working in Japan, your “home” supervisor will allow you discretion, to the extent possible, to decide how/when to cover any missing time.

### **Premium Pay**

Cap on Combined Salary Plus Premium Pay –The biweekly cap on premium pay has been lifted and will be applied on an annual basis during any pay period in which you serve in and support the NRC Operations Center or work in Japan (the annual cap will benefit you if you are paid a salary below the GG-15 step 10 salary rate). Your organization has been advised to contact CFO with employee names and dates of work.

Overtime pay or regular comp time – Overtime (limited to the higher of: your regular rate; or, 150% of GG-10 step 10) is paid for your work in excess of your full-time work schedule during the pay period. You may choose to be compensated via regular compensatory time off instead (limited to a 40-hour pay period carryover) if your overtime work was not scheduled in advance of the workweek, or regardless of when it was scheduled if you are on NEWFlex.

TRCs – Use “OT” for overtime pay and “COMPE” for regular comp time.

Night premium (10%) –This premium is paid for your *nonovertime* work between 6:00 p.m. and 6:00 a.m. the following morning, and for your *overtime* work during these clock hours if the work was scheduled in advance of the week in which you performed it. Also, this premium is paid for your periods of paid leave, if any, during night clock hours if, during the pay period, you have fewer than 8 hours of total paid leave inclusive of both night and day work.

TRC – NDIFF (hours must also be recorded under another TRC such as REG or OT).

Sunday premium (25%) – This premium is paid for your *nonovertime* work performed on a shift(s), any part(s) of which falls on a Sunday (e.g., a shift from Saturday at 6:00 p.m. to Sunday at 6:00 a.m.). Sunday premium is not payable for periods of nonwork, including leave, holidays not worked, and excused absence.

TRC – SUNP (hours must also be recorded under another TRC such as REG).

Standby status - You are eligible for special overtime pay if you are restricted by official order to a designated post of duty and assigned to be in a state of readiness to perform work, versus actually performing work, with limitations on your activities so substantial that you cannot use

your time effectively for your own purposes. We do not anticipate that any employee will be in a standby status.

### **Miscellaneous**

#### **Employee Assistance Program (EAP)**

Free, confidential counseling is available to you and your family members to address emotional issues, work problems, substance abuse, stress, crisis, marital/family concerns, financial matters, legal issues, eldercare resources, and childcare referrals. Call 1-800-869-0276 or check [www.eapconsultants.com](http://www.eapconsultants.com).

#### **Travel**

If you travel to/from Japan:

- Keep a log of specific travel times and work clock hours to help NRC compute your entitlement to compensation.
- Consider enrolling in the Smart Traveler Enrollment Program or STEP) to make it easier for the Embassy/Consulates to contact you in case of an emergency. You may enroll at <https://travelregistration.state.gov>, or if you have no internet access, directly at the U.S. Embassy or U.S. Consulates.
- If you are paid a salary below the GG-15 step 10 salary rate, you are entitled to overtime pay (limited to higher of: your regular rate; or, 150% of GG-10 step 10) for travel to/from Japan, and if the travel is during night hours (6:00 p.m. to 6:00 a.m.) and scheduled in advance of the workweek, you are also entitled to night premium pay. You may substitute regular compensatory time off (limited to a 40-hour pay period carryover) for overtime pay if your travel was not scheduled in advance of the workweek, or regardless of when it was scheduled if you are on NEWFlex.

TRCs – Use “OT” for overtime pay, “COMPE” for regular comp time, and “NDIFF” for night premium pay.

NSU/2

**Murphy, Andrew**

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**From:** Kammerer, Annie  
**Sent:** Thursday, March 17, 2011 7:52 PM  
**To:** Sheron, Brian; Case, Michael; Richards, Stuart; Ake, Jon; Murphy, Andrew  
**Cc:** Weber, Michael  
**Subject:** RE: Seismic regulations summarization

I have sent the Q&As.

Unfortunately, there's not much on our regs in the Q&As yet. However, Jon and I had already discussed the need for a fact sheet on seismic regulation in the "additional information" section of the document because we are starting to get some questions.

Jon will lead the work to put together the information for Steve tonight. As you note, it's important to run it by NRR (and NRO). So, we'll send it to Meena, Kamal, Niles and Goutam tomorrow so that they can all review. If anyone else comes to mind, please let us know. I hope that the deadline of "tomorrow" is COB, instead of first thing.

Also, just FYI, we have been asked by NRR/DORL and OPA to pull a subset of Q&As together for a public release. This is to support several public meetings in the regions next week. We have to get it to OPA by COB tomorrow so that they can bless it. Those poor guys in the regions are getting pummeled.

Cheers,  
Annie

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**From:** Sheron, Brian  
**Sent:** Thursday, March 17, 2011 6:51 PM  
**To:** Case, Michael; Richards, Stuart; Kammerer, Annie; Ake, Jon; Murphy, Andrew  
**Cc:** Weber, Michael  
**Subject:** Seismic

- 1.) Secretary Chu at DOE is scheduled to be interviewed on 5 talk shows Sunday morning. He has requested a 1 page summary of our seismic regulatory requirements. I gave him the 3/16 version of your seismic Q&A package and suggested his staff could screen it and perhaps pull out pertinent info on our regs, however, I haven't read it yet and don't know to what extent it does or doesn't discuss our regulatory requirements. Can you quickly pull together a 1-2 page summary of our seismic regulatory requirements, run them by NRR if possible, and then e-mail them to Pete Lyons at DOE ([peter.lyons@nuclear.energy.gov](mailto:peter.lyons@nuclear.energy.gov)). He needs them tomorrow. Please CC me. Remember, he is just looking for a high level summary sufficient to answer likely questions he might get during the interviews.
- 2.) Can you please e-mail the latest version of your seismic Q&As to Mike Weber.

Thanks.

N/50

NSIR

**From:** [Kammerer, Annie](#)  
**To:** [RES Distribution](#)  
**Subject:** sharepoint site where latest and greatest seismic Q&As can be found moving forward  
**Date:** Wednesday, March 16, 2011 5:29:24 PM

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Please see the file that contains the latest document at...

<http://portal.nrc.gov/edo/nrr/NRR%20TA/FAQ%20Related%20to%20Events%20Occuring%20in%20Japan/Forms/AllItems.aspx>

We will be updating this daily or almost daily in the foreseeable future. So please go to this site if you'd like to see the latest.

The site gives RES the credit since we're the lead and started it; but there is a big team supporting this that includes staff from RES, NRO, NRR and the regions.

Annie

N/40

**From:** Coyne, Kevin  
**Sent:** Thursday, March 17, 2011 6:59 PM  
**To:** Santiago, Patricia  
**Cc:** Helton, Donald; Kuritzky, Alan; Scott, Michael; Coe, Doug; Gibson, Kathy  
**Subject:** Severe Accident Research in DRA

Pat -

We do have one key project in Level 2 PRA that you might want to include in the EDO Q&As. Here's a quick description:

*Research is being conducted to develop advanced risk assessment modeling techniques (e.g., dynamic probabilistic risk assessment (PRA) using simulation based methods) to improve the state-of-the practice in PRA severe accident modeling. Key goals of this research include increased analysis realism, reduced reliance on modeling simplification, and improved the treatment of human interactions with the reactor plant system.*

Please let me know if you need anything additional, have questions, or need additional support with Commission meeting slides.

Kevin

**From:** [Lubinski, John](#)  
**To:** [OST02 HOC](#); [Reis, Terrence](#); [Reis, Terrence](#); [Holahan, Patricia](#); [Tappert, John](#); [Cool, Donald](#); [Milligan, Patricia](#); [Lui, Christiana](#); [Sullivan, Randy](#); [Holahan, Vincent](#); [Coe, Doug](#); [Gibson, Kathy](#)  
**Cc:** [Evans, Michele](#); [Jones, Cynthia](#)  
**Subject:** RE: Staffing Ops Center 24/7  
**Date:** Thursday, March 17, 2011 12:01:53 PM  
**Attachments:** [PMT Director Duty.rev2.docx](#)

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All,

Attached is the schedule through 4/9 for PMT directors. Thanks for your assistance in developing. If you need to change your day, please work with another director to swap with you and keep OST02 HOC informed.

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**From:** OST02 HOC  
**Sent:** Tuesday, March 15, 2011 6:25 PM  
**To:** Jones, Cynthia; Lubinski, John; Reis, Terrence; Reis, Terrence; Holahan, Patricia; Tappert, John; Cool, Donald; Milligan, Patricia; Lui, Christiana; Sullivan, Randy; Holahan, Vincent  
**Cc:** Evans, Michele  
**Subject:** Staffing Ops Center 24/7  
**Importance:** High

#### PMT Directors:

Per EDO direction we plan to staff the Ops Center 24/7 while we have staff dispatched in Japan. And we are currently planning to identify a second team to send to Japan in about 2 weeks, with the idea that they may stay there for an additional two weeks. That would take us out to April 10 or so.

Staffing in the IRC will remain at the current levels for potentially another week. Possibly we will be able to scale back somewhat at that point. The intent is to develop a schedule through April 10 at this point. The immediate focus is to staff for the first week, starting Saturday March 19.

We'd like to have a little more consistency in the staffing of most positions. So we'd like to staff the PMT director in 4 day blocks, three shifts each day, starting March 19.

[Fred Brown](#)/[Tim McGinty](#)/[John Lubinski](#) has offered to take the lead to coordinate among the potential PMT Directors to fill the schedule. Please work with him and provide at least the schedule for the first four day block by COB Wednesday March 16.

*Michele*

Shift	3/19 Sat	3/20 Sun	3/21 Mon	3/22 Tues	3/23 Wed	3/24 Thurs	3/25 Fri
7a-3p	Lubinski	Lubinski	Lubinski	Lubinski	Reis	Reis	Reis
3p-11p	Cool	Cool	Cool	Cool	P Holahan	P Holahan	P Holahan
11p-7a	Gibson	Gibson	<b>Tappert</b>	<b>Tappert</b>	Sullivan	Sullivan	Sullivan

Shift	3/26	3/27	3/28	3/29	3/30	3/31	4/1
7a-3p	Reis	Cool	Cool	<b>Reis</b>	<b>Reis</b>	Sullivan	Sullivan
3p-11p	P Holahan	V Holahan	V Holahan	V Holahan	V Holahan	Reis	<b>Cool</b>
11p-7a	Sullivan	Tappert	Tappert	<b>Milligan</b>	<b>Milligan</b>	Lui	Lui

Shift	4/2	4/3	4/4	4/5	4/6	4/7	4/8
7a-3p	Sullivan	P Holahan	P Holahan	P Holahan	P Holahan	<b>Coe</b>	<b>Coe</b>
3p-11p	<b>Cool</b>	Milligan	Milligan	Milligan	Milligan	Gibson	Gibson
11p-7a	Lui	Lubinski	Lubinski	Lubinski	Lubinski	V Holahan	V Holahan

Shift	4/9
7a-3p	<b>Coe</b>
3p-11p	Gibson
11p-7a	V Holahan

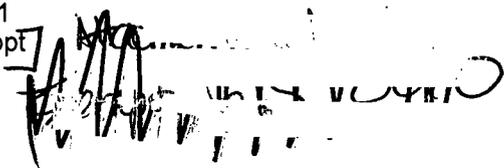
Available Directors:

Lubinski  
Cool  
Reis  
P Holahan  
Milligan  
Sullivan  
V Holahan  
Tappert  
Lui  
Gibson  
Coe

**Greenwood, Carol**

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**From:** Gibson, Kathy  
**Sent:** Thursday, March 17, 2011 8:49 AM  
**To:** Santiago, Patricia; Tinkler, Charles; Schaperow, Jason  
**Subject:** Fw: Fukushima No. 1  
**Attachments:** [3-16-11-Fukushima.ppt]



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**From:** Gibson, Kathy  
**To:** Sheron, Brian; Uhle, Jennifer  
**Sent:** Thu Mar 17 08:48:09 2011  
**Subject:** Fw: Fukushima No. 1

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**From:** Lee, Richard  
**To:** Gibson, Kathy; Scott, Michael  
**Sent:** Thu Mar 17 08:39:25 2011  
**Subject:** Fukushima No. 1

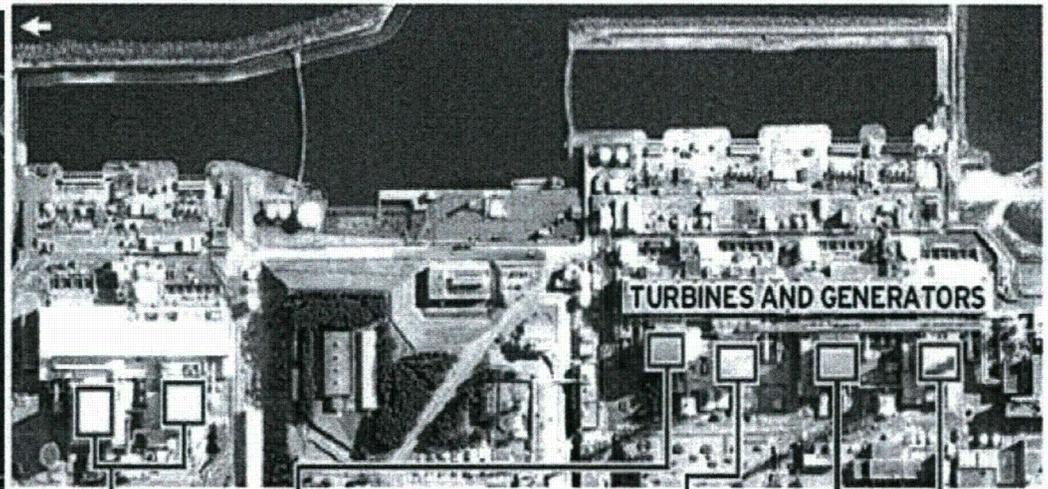
Kathy & Mike:

Attached is VGs received from Prof. Mike Corradini yesterday.

Richard

# Fukushima Daiichi Nuclear Station

- Six BWR units at the Fukushima Nuclear Station:
  - Unit 1: 439 MWe BWR, 1971 (unit was in operation prior to event)
  - Unit 2: 760 MWe BWR, 1974 (unit was in operation prior to event)
  - Unit 3: 760 MWe BWR, 1976 (unit was in operation prior to event)
  - Unit 4: 760 MWe BWR, 1978 (unit was in outage prior to event)
  - Unit 5: 760 MWe BWR, 1978 (unit was in outage prior to event)
  - Unit 6: 1067 MWe BWR, 1979 (unit was in outage prior to event)



**Reactors 5 and 6**  
Had been stopped for regular maintenance.

**Reactor 1**  
Explosion occurred near here about 3:40pm on Saturday, damaging exterior walls. Engineers flooding the core with seawater to keep it from overheating.

**Reactor 2**  
Engineers adding water to reactor.

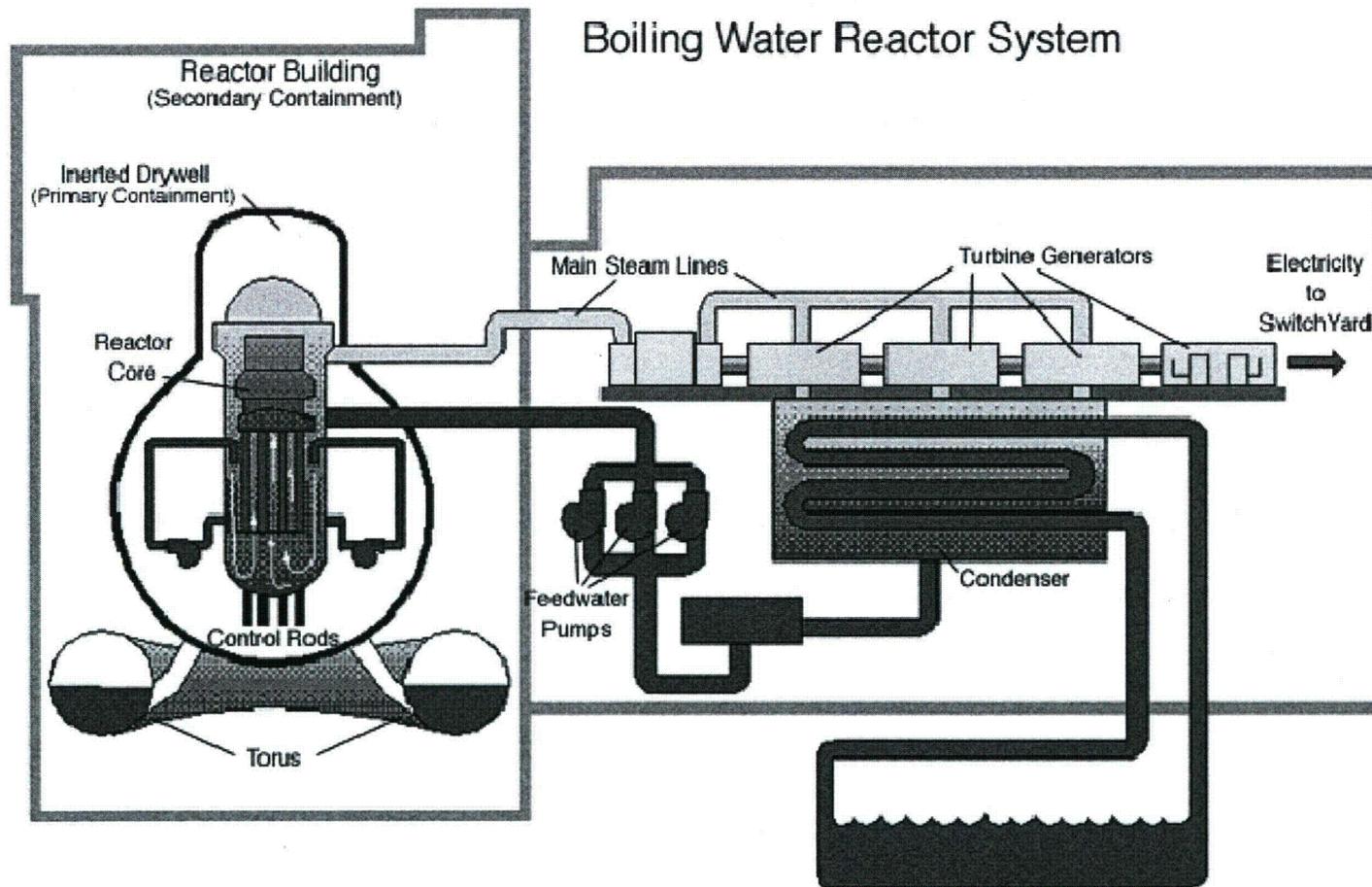
**Reactor 3**  
In partial meltdown. Engineers are flooding core with seawater to keep it from overheating.

**Reactor 4**  
Had been stopped for regular maintenance.

SOURCES: NYT; TOKYO ELECTRIC POWER; SATELLITE IMAGE BY DIGITAL GLOBE VIA GOOGLE EARTH

# Fukushima Daiichi Unit 1

- Typical BWR 3 and 4 Reactor Design
- Some similarities to Duane Arnold Power Plant in Iowa



# Fukushima Daiichi Unit 1

## ■Mechanism of Boiling Water Reactor Power Station

### Primary Containment Vessel(Dry Well)

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

### Reactor Pressure Vessel

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

### Primary Recirculation pump

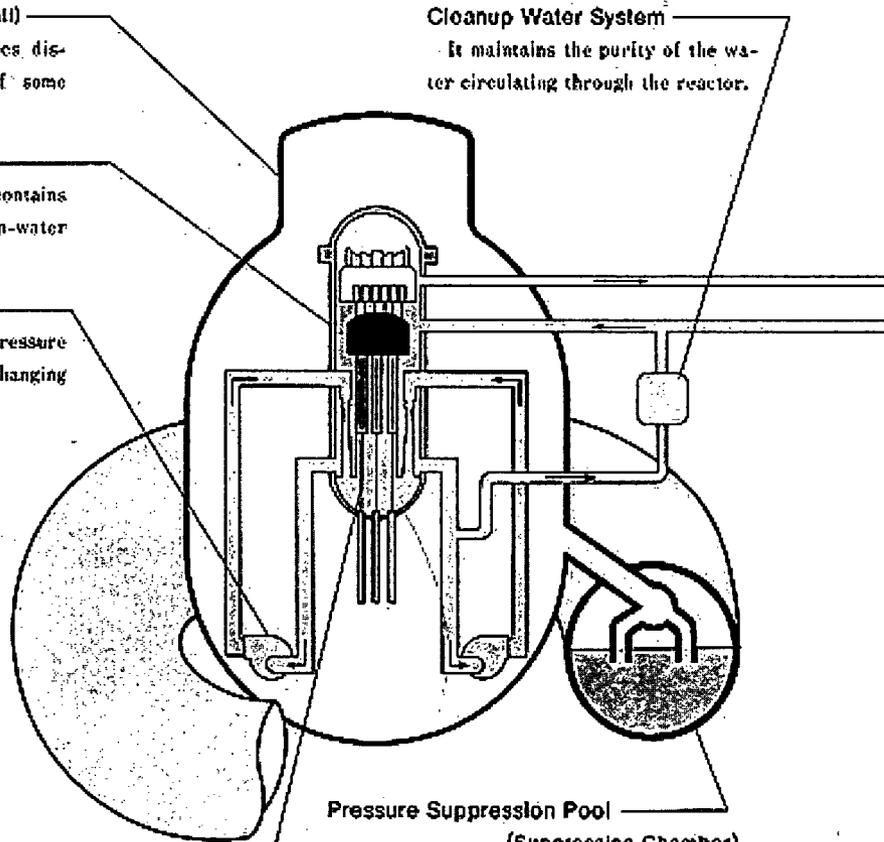
It circulates water in the reactor pressure vessel and changes reactor power by changing water quantity.

### Control Rods

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

### Cleanup Water System

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



### Pressure Suppression Pool

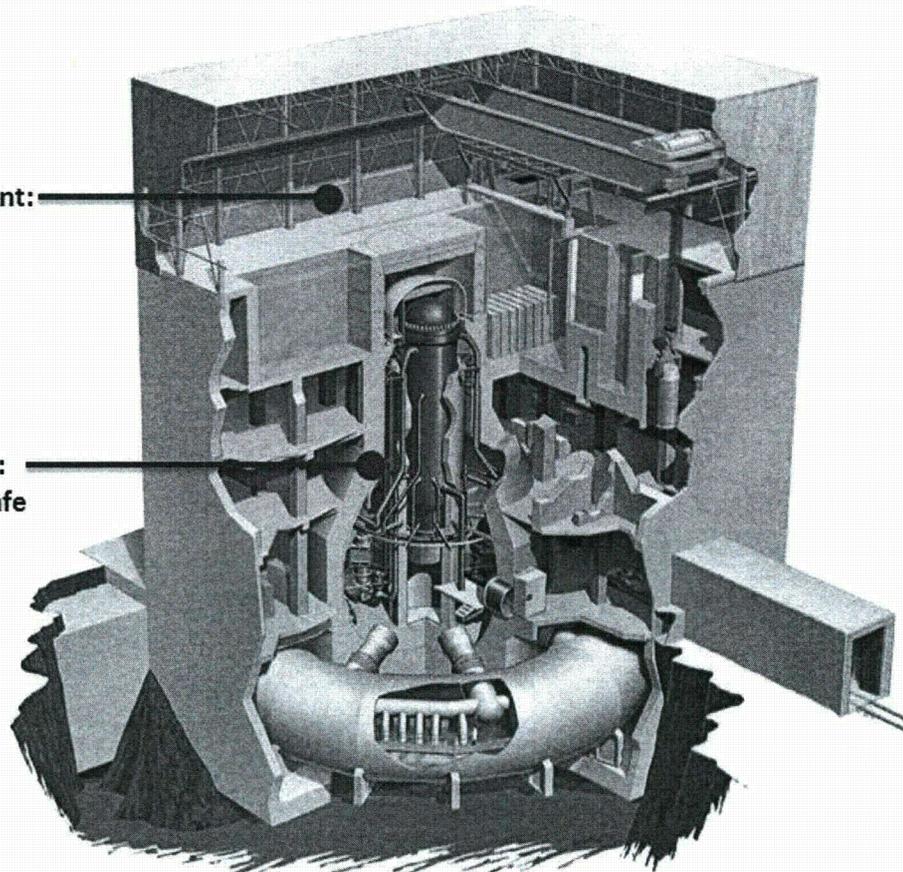
#### (Suppression Chamber)

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

# Fukushima Daiichi Unit 1

**Secondary containment:**  
Area of explosion at  
Fukushima Daiichi 1

**Primary containment:**  
Remains intact and safe



**Boiling Water Reactor Design**

# Event Initiation

- The Fukushima nuclear facilities were damaged in a magnitude 9 earthquake on March 11 (Japan time), centered offshore of the Sendai region, which contains the capital Tokyo.
  - Plant designed for magnitude 8.2 earthquake. An 9 magnitude quake is much greater in magnitude.
- Serious secondary effects followed including a significantly larger tsunami, significant aftershocks and a major fire at a fossil fuel installation.



By Janet Loehrke, USA TODAY



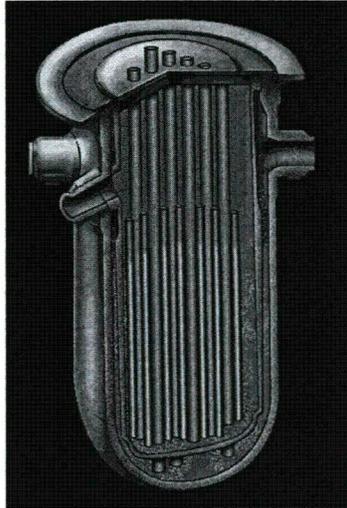
# Initial Response

- Nuclear reactors were shutdown automatically. Within seconds the control rods were inserted into core and nuclear chain reaction stopped.
- Cooling systems were placed in operation to remove the residual heat. The residual heat load is about 3% of the heat load under normal operating conditions decreasing to much less than 1% after days.
- Earthquake resulted in the loss of offsite power which is the normal supply to a plant when it is shutdown.
- Emergency Diesel Generators started and powered station emergency cooling systems.
- One hour later, the station was struck by the tsunami. The tsunami was larger than what the plant was designed for (20ft waves). The tsunami took out all multiple sets of the backup Emergency Diesel generators and likely damaged the service water pumps which provide cooling from the sea.
- Reactor operators were able to utilize emergency battery power to provide power for cooling the core for 8 hours.
- Operators followed abnormal operating procedures and emergency operating procedures.

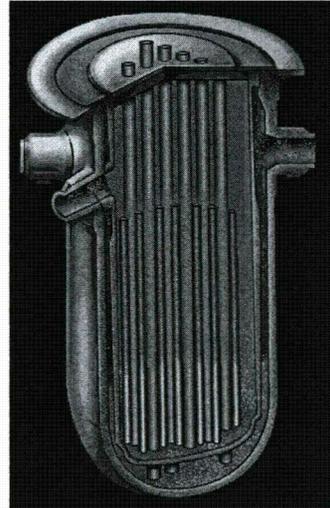
# Loss of Makeup

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

# Core Damage Sequence



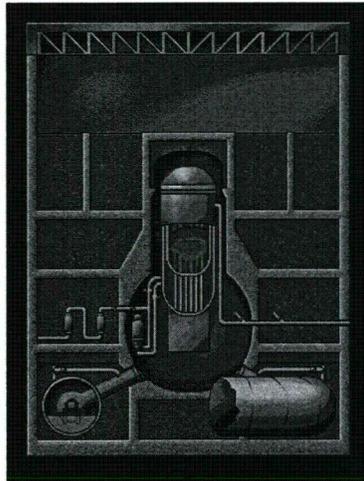
Core Uncovered



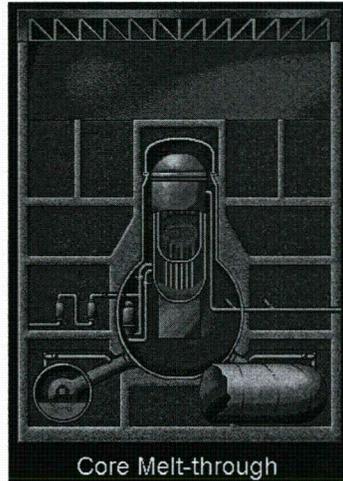
Fuel Overheating



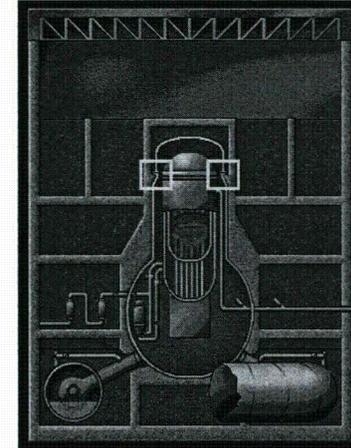
Fuel melting - Core Damaged



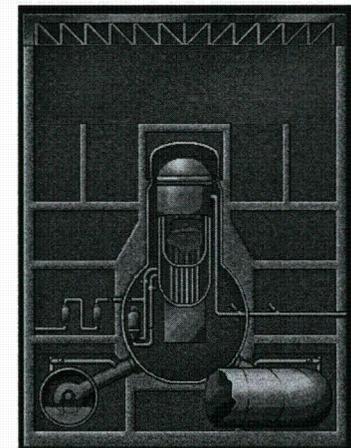
Core Damaged but retained in vessel



Core Melt-through  
Some portions of core melt into lower RPV head



Containment pressurizes.  
Leakage possible at drywell head



Releases of hydrogen into secondary containment

# Hydrogen Detonation at Unit 1

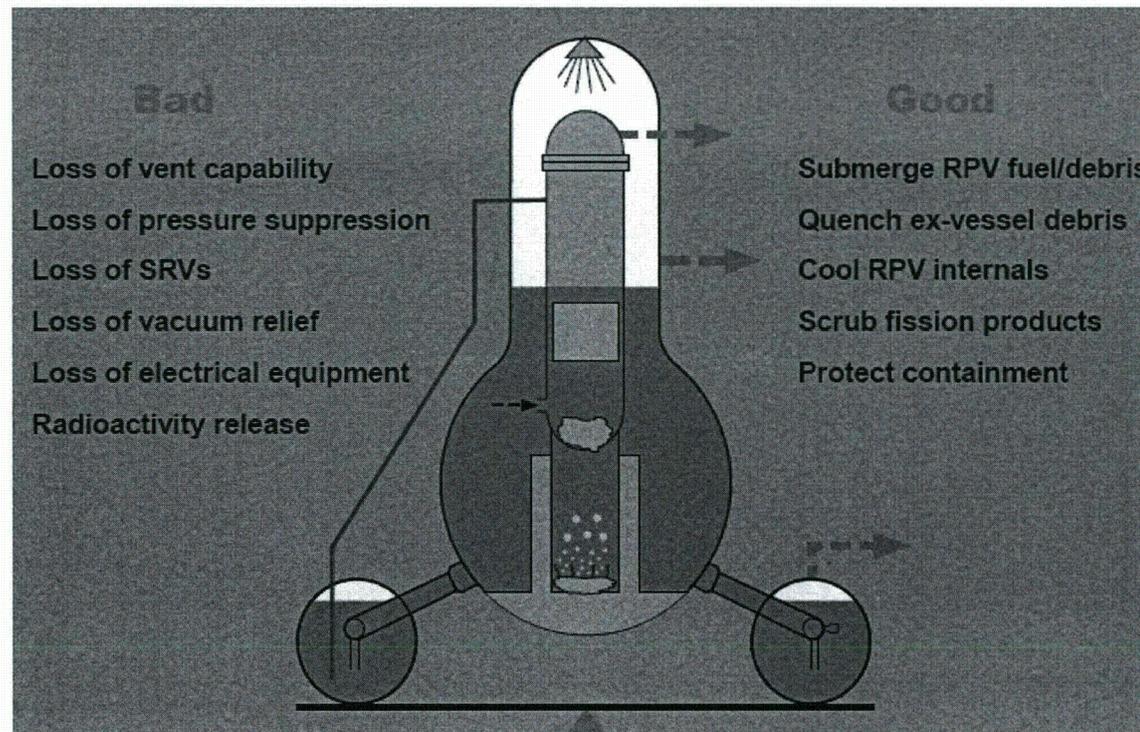


**Reactor Building**

# Mitigating Actions

- The station was able to deploy portable power generators and utilize portable fire pumps to inject sea water into the reactor and primary containment.
- Station operators began flooding the reactor vessel
- Reports suggest that pumps were also injecting water into the containment – but it's unclear
- Boric acid was added to the seawater used for injection. Boric acid is “liquid control rod”. The boron captures neutrons and speeds up the cooling down of the core. Boron also reduces the release of iodine by buffering the containment water pH.

## Containment Flooding Effects



# Emergency Response

- Equivalent of General Emergency declared to the initial events in Unit 1 on Friday.
- Evacuation of public performed within 20 km (13 miles) of plant; approximately 200,000 people evacuated and sheltering in place within 30km (20 miles).
- Similar hydrogen detonation subsequently occurred at Unit 3 late on Sunday, March 14<sup>th</sup> (Japan time). Primary containment appears to remain intact at Unit's 1 and 3 throughout the accident. There was considerable damage to the secondary containment (reactor building). A similar scenario occurred in Unit 2 on Tuesday.
- Recorded radiation levels have spiked after each event (above) at the Fukushima Daiichi site (140-800mrem/hr). Radiation levels were subsequently reduced to a few millirem after the after cooling was restored. The NRC's radiation dose limit for the public is 100 millirem per year and natural background is about 300 mrem per year.
- Several injured workers were reported at the plant with radiation exposure of ~10rem.
- Authorities distributed Potassium-iodide tablets to protect the public from potential health effects of radioactive isotopes of iodine that could potentially be released. This is quickly taken up by the body and its presence prevents the take-up of iodine-131 should people be exposed to it.
- Over 300 after shocks have occurred and continue to challenge station response.
- THE SITUATION FOR SPENT FUEL POOLS HAS NOT BEEN ADDRESSED HERE

NS7R

**Hogan, Rosemary**

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**From:** Pires, Jose  
**Sent:** Friday, March 18, 2011 11:42 AM  
**To:** Anooshehpoor, Rasool; Ake, Jon; Kammerer, Annie  
**Cc:** Graves, Herman; Hogan, Rosemary; Candra, Hernando; Munson, Clifford  
**Subject:** RE: Japanese Earthquake Questions -= Table of BWRs Mark I

Rasool,  
You forwarded it to me and I was looking for it and could not find it. It seems that inadvertently you attached a map of the stations instead of the document.

In your comments to the pdf, which I forwarded to Annie, you already had a paragraph summarizing that document.

Thanks,  
Jose.

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

**From:** Anooshehpoor, Rasool  
**Sent:** Friday, March 18, 2011 11:33 AM  
**To:** Ake, Jon; Kammerer, Annie; Pires, Jose  
**Cc:** Graves, Herman; Hogan, Rosemary; Candra, Hernando; Munson, Clifford  
**Subject:** RE: Japanese Earthquake Questions -= Table of BWRs Mark I

Jon,

This is actually the document that John Anderson sent to me on Monday and I forwarded it to Jose. I used it earlier to add some comments to the Q&A. John Anderson also sent me another Japanese link where there are plots of the recorded main shock at select stations. FYI, I will forward that link to you shortly.

I am in Reno and plan to see Jim Brune and John Anderson. Since John has close contacts with Japanese colleagues, I suspect he will have more updated information. However, per NRC instruction is it still OK to discuss scientific aspect of the earthquake with them?

Rasool

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

**From:** Ake, Jon  
**Sent:** Friday, March 18, 2011 11:12 AM  
**To:** Anooshehpoor, Rasool; Kammerer, Annie; Pires, Jose  
**Cc:** Graves, Herman; Hogan, Rosemary; Candra, Hernando; Munson, Clifford  
**Subject:** RE: Japanese Earthquake Questions -= Table of BWRs Mark I

rasool-

here is good info---

[http://www.k-net.bosai.go.jp/k-net/topics/TohokuTaiheiyo\\_20110311/nied\\_kyoshin1e.pdf](http://www.k-net.bosai.go.jp/k-net/topics/TohokuTaiheiyo_20110311/nied_kyoshin1e.pdf)

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**From:** Anooshehpoor, Rasool  
**Sent:** Friday, March 18, 2011 10:59 AM  
**To:** Kammerer, Annie; Pires, Jose

N/S4

Cc: Graves, Herman; Hogan, Rosemary; Candra, Hernando; Munson, Clifford; Ake, Jon  
Subject: RE: Japanese Earthquake Questions -= Table of BWRs Mark I

Annie,

I am in Reno and won't be back in my office until Wed (March 23). I think that would be too late. However, I have my laptop with me and can work on it today and hopefully send something to you today or first thing on Monday. Please let me know if that would work.

Rasool

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

From: Kammerer, Annie  
Sent: Wednesday, March 16, 2011 6:20 PM  
To: Pires, Jose; Anooshehpour, Rasool  
Cc: Graves, Herman; Hogan, Rosemary; Candra, Hernando; Munson, Clifford; Ake, Jon  
Subject: RE: Japanese Earthquake Questions -= Table of BWRs Mark I

We're missing a one or 2 (or more if necessary) page summary of the earthquake from a seismological perspective. If Rasool could develop that it would be great. Something (perhaps with some nice pictures) that we can put in the "additional information" section would be good. There is actually a placeholder on page 44 of the 3/15 3 am version, but Jon hasn't gotten to it today because of more stuff coming in.

If Rasool can do it, we would be appreciative and will reassign to him.

Annie

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

From: Pires, Jose  
Sent: Tuesday, March 15, 2011 11:32 AM  
To: Kammerer, Annie; Ake, Jon  
Cc: Graves, Herman; Hogan, Rosemary; Candra, Hernando; Munson, Clifford  
Subject: RE: Japanese Earthquake Questions -= Table of BWRs Mark I

We will do. We had a project review meeting at NSIR this morning but will start with this now. We will coordinate among ourselves to avoid sending you scattered information.

If you happen to need strong motion information, please let me know. Rasool has been looking at that with a few seismologists that he knows and is getting information (some of it a bit different from ShakeCast).

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

From: Kammerer, Annie  
Sent: Tuesday, March 15, 2011 11:23 AM  
To: Pires, Jose; Ake, Jon  
Cc: Graves, Herman; Hogan, Rosemary; Candra, Hernando; Munson, Clifford  
Subject: RE: Japanese Earthquake Questions -= Table of BWRs Mark I

Jose et al:

Can you guys look at some of the engineering questions and help us out. We got back the responses from the folks tasked with helping and they answered 70% of the questions.. "see GDC 2" not very helpful.

Please just look at the unanswered questions and pick the ones most suited to you (and especially those which Cliff, Jon and I would be challenged to answer).

Please provide 2 responses (1) high level answer for the public (2) additional technical or sensitive info for in-house staff only. There are some examples in the document.

Track changes and please email to cliff and me whatever you can produce today. We are doing a daily update.

Thanks,  
Annie

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

From: Pires, Jose  
Sent: Tuesday, March 15, 2011 8:44 AM  
To: Ake, Jon; Kammerer, Annie  
Cc: Graves, Herman; Hogan, Rosemary; Candra, Hernando  
Subject: RE: Japanese Earthquake Questions -= Table of BWRs Mark I

We are going to compare this with another database that we have (for all reactors not just BWRs).

By the way, not all Mark 1 reactors at Fukushima are BWR-3. Only unit 1 was a BWR-3. The other units are BWR-4. It may not be useful at this stage to separate the Mark 1 reactors in the 3, 4, 5 categories.

I would like to read the current version of the Q&As after a meeting this morning with NSIR.

Thanks,

Jose.

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

From: Ake, Jon  
Sent: Monday, March 14, 2011 11:06 PM  
To: Pires, Jose; Kammerer, Annie  
Cc: Graves, Herman; Hogan, Rosemary; Candra, Hernando  
Subject: RE: Japanese Earthquake Questions -= Table of BWRs Mark I

Jose et al.,

here is a another sheet to have if needed, it has summary of CEUS plants with OBE, SSE, IPEEE review level spectra etc,

cheers-  
jon

---

From: Pires, Jose  
Sent: Monday, March 14, 2011 3:46 PM  
To: Pires, Jose; Kammerer, Annie; Ake, Jon  
Cc: Graves, Herman; Hogan, Rosemary; Candra, Hernando  
Subject: RE: Japanese Earthquake Questions -= Table of BWRs Mark I

Herman told me that of all the BWR Mark I reactors only 6 are like the ones in Fukushima, the BWR-3 version. Attached is the table with two tabs: one with the 5 US BWR-3 Mark I and the other with all of them. Millstone 1 is closed. Even the BWR-3 may differ from those in Japan (for example, security upgrades).

From: Pires, Jose  
Sent: Monday, March 14, 2011 3:32 PM  
To: Pires, Jose; Kammerer, Annie; Ake, Jon  
Cc: Graves, Herman; Hogan, Rosemary; Candra, Hernando  
Subject: RE: Japanese Earthquake Questions -= Table of BWRs Mark I

With the table.

From: Pires, Jose  
Sent: Monday, March 14, 2011 3:28 PM  
To: Pires, Jose; Kammerer, Annie; Ake, Jon  
Cc: Graves, Herman; Hogan, Rosemary; Candra, Hernando  
Subject: RE: Japanese Earthquake Questions -= Table of BWRs Mark I

Annie,

Hernando prepared this table of BWR Mark I reactors in the US. It includes various information including dates of OLs and CPs as well OBE and SSE information as well as design pressure and accident pressure capacity.  
Thanks,

Jose.

From: Pires, Jose  
Sent: Monday, March 14, 2011 2:29 PM  
To: Kammerer, Annie; Ake, Jon  
Cc: Graves, Herman; Hogan, Rosemary  
Subject: RE: Japanese Earthquake Questions

Annie,

Attached is some information on the design for some of the affected Japanese plants.

Slide 2 says that for Fukushima 1 (unit 1) the PGA was 0.17 g. The National Bureau of Standards damage report for the 1978 Miyagiken-Oki earthquake, NBS SP 592, says that the design basis for that reactor was 0.18 g (and it used the Taft record from the 1952 Kern County earthquake response spectra – design was by Blume's company - an author of the NBS report is Peter lanev who worked for John Blume at the time of the NBS report).

Slide 10 has values for the seismic design basis loads for other plants (Onagawa, Fukushima 1 and 2 included). It went up since the 1965 design for unit 1. I do not know if unit 1 was upgraded (meaning the mechanical and electrical equipment because the buildings tend to be strong enough).

Slide 30. The first sentence on slide 30 is interesting. It says that the greatest impact of seismic requirements is on mechanical and electrical equipment. I tend to agree with that.

We will try to corroborate the information above with other sources. A comparison of these with PGA's from SHAKECAST may show that the 0.48 g covers the recorded PGA at some sites and not be far from those at other sites.

We are getting a list of US BWR Mark I reactors with their locations and some design parameters (design pressure, OBE and SSE).

Thanks,

Jose,

From: Kammerer, Annie  
Sent: Monday, March 14, 2011 12:20 PM  
To: Hiland, Patrick  
Cc: Murphy, Andrew; Pires, Jose; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer; Case, Michael; Skeen, David; Munson, Clifford; Ake, Jon  
Subject: RE: Japanese Earthquake Questions

Pat,

I currently have about 17 pages of questions that we should have pulled together in a pretty useful form later today.

Attached, please see a list of unanswered engineering type questions that I pulled from the larger Q&A document. If you can get your guys working on these it would be very helpful. I am hoping to publish a version at about 4 or 5 today. So, if I can get something on these by perhaps 3 or 4, that would be great. Otherwise, we will note that we are working on it.

FYI, Jon Ake and Cliff Munson are working on a separate set of the seismic questions.

Also, I don't have any questions on Seismic PRA, which is a hot topic with industry lately (as evidenced by the recent letter from NEI asserting that SPRA is too undeveloped). I have asked Nilesh to develop some Q&As that we may see coming from industry to us as a result of all of this. Those are not likely to make it into the version I want to get out today, but we can add later.

Annie

From: Hiland, Patrick  
Sent: Monday, March 14, 2011 11:05 AM  
To: Kammerer, Annie  
Cc: Murphy, Andrew; Pires, Jose; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer; Case, Michael; Skeen, David  
Subject: RE: Japanese Earthquake Questions

NRR/DE has Kamal (seismic structures) to review specific questions. I also have several very experienced structural design engineers on staff (George Thomas & Farhead Farzam) If electrical, I have qualified staff and George Wilson that can help.

From: Kammerer, Annie  
Sent: Monday, March 14, 2011 10:49 AM  
To: Case, Michael; Skeen, David; Hiland, Patrick  
Cc: Murphy, Andrew; Pires, Jose; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer  
Subject: RE: Japanese Earthquake Questions

I have compiled a set of questions from all available sources, which I think are pretty complete. I am organizing them now and I have cliff and jon helping me with some of the answers. I've pulled from the questions we got a kashiwazaki, the questions we have that have come in, the GI-199 com plan, the DCNPP com plan, and other places.

I do have a request from RIV to pull a Q&A list for SONGS. If I brainstorm a list can I get help with answers?

What kind of experts do you have?

From: Case, Michael  
Sent: Monday, March 14, 2011 7:51 AM

To: Skeen, David; Hiland, Patrick

Cc: Murphy, Andrew; Pires, Jose; Kammerer, Annie; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer

Subject: Japanese Earthquake Questions

Hi guys. I don't know where we stand on the seismic related questions after Sunday's day shift activities (I assume Annie was able to continue). Nevertheless, I have access to some more experts here this morning. If there are residual activities, just let me know and we'll get them working.

**Greenwood, Carol**

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**From:** Gibson, Kathy  
**Sent:** Friday, March 18, 2011 10:10 AM  
**To:** Lee, Richard; Wagner, Katie  
**Cc:** Scott, Michael; Tinkler, Charles; Schaperow, Jason  
**Subject:** Re: GE request for NRC materials

Well done Richard thanks!

Richard, Katie - Charlie says that Sandia can email encrypted files and this may be the fastest way to transmit them to GE. If we don't have copies of the docs, please take this opportunity to get copies for NRC too. Thx

---

**From:** Lee, Richard  
**To:** Wagner, Katie  
**Cc:** Gibson, Kathy; Scott, Michael; Tinkler, Charles; Schaperow, Jason  
**Sent:** Fri Mar 18 10:05:18 2011  
**Subject:** GE request for NRC materials

REF: Marquino, Wayne (GE) e-mail to Tinkler, Charles on March 17, 2011 requesting SNL reports.

Dear Katie:

This morning I spoke to Norm St. Amor of OIG on this matter because I could not get hold of Catherine Holzle. Norm said OOU materials can be released and asked me to consult with Russel Nichols (415-6874) or Donna Sealing (415-5804) of OIS on this matter.

I called Russel, and told him about GE requests for OOU materials to assist TEPCO (Japan) in responding and managing the crisis at Fukushima. He said once NRC made a determination on there is a need to know in carrying our official function, we can release the materials to GE.

Hence, we should proceed to instruct SNL to release the materials to GE.

Richard

**Greenwood, Carl**

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**From:** Gibson, Kathy  
**Sent:** Friday, March 18, 2011 3:36 PM  
**To:** Sheron, Brian; Scott, Michael; Tinkler, Charles; Lee, Richard  
**Cc:** Uhle, Jennifer; Salay, Michael  
**Subject:** Re: Effects of salt deposition on cooling of BWR fuel assemblies

Richard Lee and Mike Salay are the cognizant staff for this issue.

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

**From:** Sheron, Brian  
**To:** Gibson, Kathy; Scott, Michael; Tinkler, Charles  
**Cc:** Uhle, Jennifer  
**Sent:** Fri Mar 18 15:29:50 2011  
**Subject:** FW: Effects of salt deposition on cooling of BWR fuel assemblies

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

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

Per: we have started. Please call me.

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

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

Pete and John,

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

N/SZ

available experimental data could be helpful in reducing our uncertainty about the risks posed by salt in the Unit 3 pool.

My intuition is that the heat generation rates for fuel that is over one year past removal from the core are much lower than for freshly discharged fuel, which is the usual focus for analysis experiments.

Because all of the fuel in the Unit 3 pool is old, it is possible that air cooling of the outside of the shrouds around the assemblies may be able to prevent heating of pins in the center of the assembly to the temperature needed to initiate zirconium oxidation.

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

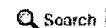
Some expert judgement on whether this could be the case could be very helpful.

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

-Per

--

-----  
Per F. Peterson  
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## Press Releases

### Press Release (Mar 30,2011) Implementation Plan of Rolling Blackouts on and after March 31, 2011

Due to the tight power supply-demand balance, TEPCO has been implementing rolling blackouts since Monday, March 14. We sincerely regret causing anxiety and inconvenience to our customers and the society. We appreciate your cooperation in conserving electricity consumption. For customers who will be subject to rolling blackouts, please be prepared for the announced blackout periods. Also, for the customers who are not subject to blackouts, we would appreciate your continuous cooperation in reducing electricity usage by turning off unnecessary lightings and electrical appliances.

We will inform the implementation plan of rolling blackouts on and after March 30, 2011 as follows:

◦ Implementation plan of rolling blackout on March 31 (Thu.)

On March 31, Thursday, no rolling blackout will be implemented in any time periods based on the today's power demand, the weather forecast on March 31 and the trend of the power supply. Because of your cooperation in conserving electricity, we can avoid the rolling blackout for tomorrow. We appreciate your continuous cooperation

◦ Implementation plan of rolling blackouts on April 1 (Fri)-  
April 6 (Wed)

Please refer to the appendix for details.

- The actual blackout period for each Group is planned to be maximum about 3 hours during the relevant scheduled time period.
- Each blackout period for each Group differs every day and starting and ending time of blackout periods may slightly differ.
- Depending on the supply-demand balance of the day, planned blackouts may not be carried out. In case the electricity supply-demand balance becomes tighter than expected, we will reconsider the rolling blackout plan and inform you accordingly before we implement the revised plan.
- A blackout may occur in the adjacent areas where the planned blackouts are carried out

[Others]

- In order to prevent fires, please make sure to switch off electric appliances such as hair driers when you leaving home.
- Please carefully pay attention to the traffic at the crossings in case the traffic lights are suddenly turned off.
- As for the buildings and apartments, please be aware that equipments and facilities such as elevators, automatic doors, automatic locks, and multilevel parking lots will not function. In particular, please avoid using elevators during the scheduled blackouts.

<Reference>

◦Prediction of demand and supply on March 30  

Estimated Demand	34,000 MW (18:00-19:00)
Supply Capacity	38,000 MW

◦Prediction of demand and supply on March 31  

Estimated Demand	34,000 MW (18:00-19:00)
Supply Capacity	38,000 MW

\*Prediction of demand

According to the weather forecast, the temperature tomorrow on March 31 will be normal. We assume the estimated peak demand on March 31 will be 34,000MW, equal to the estimated demand today on March 30.

\*Estimated demand and supply capacity may change depending on the situation of the day.

Appendix:Weekly Rolling Blackout Tentative Plan from Mar 31(Thu)

To: April 6 (Wed) (PDF 17.3KB)

[Back to page top](#)

**Greenwood, Carol**

**From:** Gibson, Kathy  
**Sent:** Friday, March 18, 2011 3:35 PM  
**To:** Lee, Richard  
**Subject:** Fw: Effects of salt deposition on cooling of BWR fuel assemblies

**Importance:** High

Is this consistent with what we said?

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

**From:** Sheron, Brian  
**To:** Gibson, Kathy; Scott, Michael; Tinkler, Charles  
**Cc:** Uhle, Jennifer  
**Sent:** Fri Mar 18 15:27:51 2011  
**Subject:** FW: Effects of salt deposition on cooling of BWR fuel assemblies

More "help."

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

**From:** Per F. Peterson [<mailto:peterson@nuc.berkeley.edu>]  
**Sent:** Friday, March 18, 2011 12:22 PM  
**To:** Lyons, Peter; Kelly, John E (NE)  
**Cc:** SCHU; Adams, Ian; Aoki, Steven; Bob Budnitz; Sheron, Brian; DAgostino, Thomas; Dick Garwin; Dick Garwin; Grossenbacher, John (INL); Hurlbut, Brandon; John Holdren; Koonin, Steven; McFarlane, Harold; Owens, Missy; Per Peterson; Phil Finck; Poneman, Daniel; Rolando Szilard; Steve Fetter  
**Subject:** Effects of salt deposition on cooling of BWR fuel assemblies  
**Importance:** High

Pete and John,

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

My intuition is that the heat generation rates for fuel that is over one year past removal from the core are much lower than for freshly discharged fuel, which is the usual focus for analysis experiments.

Because all of the fuel in the Unit 3 pool is old, it is possible that air cooling of the outside of the shrouds around the assemblies may be able to prevent heating of pins in the center of the assembly to the temperature needed to initiate zirconium oxidation.

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

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

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

-Per

--

---

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Greenwood, Carol

**From:** Gibson, Kathy  
**Sent:** Friday, March 18, 2011 3:55 PM  
**To:** Lee, Richard  
**Subject:** Fw: core in-vessel coolability under sea water

---

**From:** Sheron, Brian  
**To:** Gibson, Kathy; Scott, Michael; Tinkler, Charles  
**Sent:** Fri Mar 18 15:27:09 2011  
**Subject:** FW: core in-vessel coolability under sea water

FYI, the pundits have arrived.

---

**From:** Bob Budnitz [mailto:rjbudnitz@lbl.gov]  
**Sent:** Friday, March 18, 2011 11:55 AM  
**To:** SCHU; jholdren@ostp.eop.gov  
**Cc:** Per F. Peterson; Richard L Garwin; Hurlbut, Brandon; Doug Burns; Adams, Ian; Grossenbacher, John (INL); Lyons, Peter; Phillip J Finck; rgarwin@ostp.eop.gov; Aoki, Steven; Steven\_A.\_Fetter@ostp.eop.gov; Steven.Koonin@science.doe.gov; Sheron, Brian; johnekelly@nuclear.energy.gov; JohnE.Kelly@nuclear.energy.gov; Harold McFarlane  
**Subject:** core in-vessel coolability under sea water

TO: Distribution  
FROM: Bob Budnitz, LBNL

#### FUEL COOLABLE GEOMETRY IN THE PRESENCE OF SEA WATER

I was worried in yesterday's meeting, and remain worried, about the **effect on core cooling of the salt** in the reactor vessel(s). Let us suppose that some of the upper fuel in a given vessel is damaged, has melted, has slumped, has partially oxidized, or some combination, but the remaining lower fuel is still roughly intact in its correct geometrical configuration, namely fuel assemblies. (This assumption of partial core melting but partial core still intact is probably a correct description for all 3 of the damaged cores, Units 1, 2, and 3.) It is a major objective that this lower fuel not melt and slump! And I am worried that dense, briny, salt water down there could impede heat transfer, possibly gum up the channels, and interfere with what we call the "coolable geometry" that keeps a core assembly intact. I think that the chemistry of the brine is not necessarily that of NaCl, although it is mostly NaCl, but even minor other constituents in sea water could be a problem with coating the fuel cladding surfaces, etc.

In my view, DOE and NRC together ought to be able to identify the experts on fuel behavior and water chemistry who might know what the issues are. I could suggest starting with DON OLANDER, UC-Berkeley professor of nuclear engineering emeritus. Per Peterson is his colleague. Don at home in Berkeley is at 510-526-2418. I know of no more knowledgeable fuels person in the US, frankly. But DOE at INL has some really top people too! Ditto elsewhere, like at Argonne and Oak Ridge and Sandia.

I am also worried a lot about the coolability of whatever fuel has slumped down to the bottom of the vessel. Cooling it through its upper surface, or cooling it as it contacts the lower metal vessel, is another major objective, because lower head vessel integrity is vital. (The BWRs also have a problem of all those control-rod-drive penetrations through the lower head which are locations of weakness. These were studied 3 decades ago, after TMI, in the NRC and IDCOR-industry programs of that time.) I'd ask Bob Henry or Hans Fauske of

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Fauske and Associates on that melted-core-coolability issue -- the best we have on that subject, 630-323-8750. Or Dana Powers at Sandia, a member of the NRC's ACRS.

Bob Budnitz

+++++

On 3/18/2011 11:15 AM, Per F. Peterson wrote:

Also, if the pool is leaking, switching to fresh water spray can flush away any salt that has accumulated.

This is pretty urgent, in my assessment. Do any of the Navy ships have sufficient desalination capacity to support the Unit 3 and 4 pool spray effort? They will get contaminated, but this is sufficiently urgent that this could be a warranted impact. Alternatively any commercial ships with desalination capacity.

I would think that this warrants prompt action. Salt deposition is much more problematic for disable passive cooling by air than it is for water, so much less salt deposition is needed to cause problems.

Per

Date: Fri, 18 Mar 2011 08:07:32 -0700

To: Richard L Garwin <rlg2@us.ibm.com>, SCHU <SCHU@hq.doe.gov>

From: "Per F. Peterson" <peterson@nuc.berkeley.edu>

Subject: Re: "What if the storage pools leak?" from Matt Bunn.

Cc: "Hurlbut, Brandon" <Brandon.Hurlbut@hq.doe.gov>, Doug Burns

<douglas.burns@inl.gov>, "Adams, Ian" <Ian.Adams@hq.doe.gov>,

"jholdren@ostp.eop.gov" <jholdren@ostp.eop.gov>, "Grossenbacher, John (INL)"

<john.grossenbacher@inl.gov>, "peterson@nuc.berkeley.edu"

<peterson@nuc.berkeley.edu>, "Lyons, Peter" <Peter.Lyons@Nuclear.Energy.gov>,

Phillip J Finck <Phillip.Finck@inl.gov>, "rgarwin@ostp.eop.gov"

<rgarwin@ostp.eop.gov>, "Dick Garwin" <RLG2@us.ibm.com>,

"RJBudnitz@lbl.gov" <RJBudnitz@lbl.gov>, "Aoki, Steven"

<Steven.Aoki@nnsa.doe.gov>, "Steven A. Fetter@ostp.eop.gov"

<Steven A. Fetter@ostp.eop.gov>, Steven.Koonin@science.doe.gov

Bcc:

X-Attachments:

If the spent fuel pools are leaking, then the large question is whether the spent fuel will stabilize in a coolable geometry or not.

If material like borated sand is dumped on top, it will assure that the geometry becomes uncoolable, and then temperatures will rise sufficiently for zirconium oxidation to accelerate and for melt and release of fission products to occur.

Given the amount of debris that is on top of the pools, it is unlikely solid materials like sand can be spread uniformly enough to be effective in capturing and filtering volatiles released from degraded fuel (the flow will take the path of least resistance where there are gaps in coverage).

With the low density packing, the fuel so far appears to be coolable by air, at least all of the fuel that was off-loaded more than a year ago (with the fresh off load in Unit 4 being the problem). If the fuel is air coolable, then this is an acceptable intermediate condition.

If the pool is leaking, it might be counterproductive to spray sea water, because we know that the build up of salt will eventually make the fuel geometry uncoolable by air. So it may be better to delay any action to fill the pools until fresh water is available, and depend upon air cooling.

The two variables in assessing whether the pools are likely leaking, rather than are simply boiling off, is how much water sloshed out, and what their individual pool heat loads are that have driven boil off. But the fact that the fuel has been exposed much more rapidly in Unit 3 (and 4, but it has over double the heat load of 1, 2, and 3) makes the potential for pool leakage to be real.

The other major question is at what elevation in the pool the leak would be at. I would postulate that it would be at one of the bottom or side corners where there are stress concentrations, but the truth is that the construction of storage pools is complex and one would want to be able to look at the detailed design.

The main issue is that injecting sea water may be a bad choice if the pool is leaking. Having fresh water supply would reduce greatly the risk of doing something counterproductive.

-Per

Important question here.

----- Forwarded by Richard L Garwin/Watson/Contr/IBM on 03/18/2011 09:23 AM -----

*From: "Bunn, Matthew" <matthew\_bunn@Harvard.Edu> To: John Ahearne <ahearne@sigmaxi.org>, Richard L Garwin/Watson/Contr/IBM@IBMUS, Robert Budnit- <RJBudnit-@lbl.gov>, "Heinonen, Olli" <Olli\_Heinonen@hks.harvard.edu> Date: 03/18/2011 07:47 AM Subject: What if the pools won't hold water?*

---

*To all:*

*It seems to me there's a real possibility that either the pool at unit 3 or the pool at unit 4 or both may be cracked, and the water may be leaking out as the Japanese hose it in.*

*What could be done about such a situation? Should we be thinking about dropping borated sand on the top of the pools (as they dropped on the core at Chernobyl) and then hosing water onto that? Some kind of viscous mud? Some form of slurry of bentonite clay? Would covering it with sand help smother a potential fire before it started, or cause even more intense hot-spot heating? Are there products that might be used that would tend to block up whatever leaks may exist? Any thoughts?*

*Also, a couple of days ago NEI put out a release claiming that a DOE study had concluded that a fire in zirconium tubing was virtually impossible - and then they put out an "updated" version that removed that statement, saying they had been informed that "new data" suggested that wasn't necessarily the case. Anybody have any idea what DOE study or new data they are referring to? I would think under these circumstances, it would be highly desirable for the technical community to have full information about any studies that have been done on zirconium fire initiation.*

Best regards,

Matt

One possibility would be to add shredded plastic bags or sheet, that would be horrific if one were actually trying to drain a space. We need to diagnose, prescribe, and test.

What is the longevity of which plastics in the radiation environment at the floor of the spend-fuel pool?

Dick Garwin

-----  
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Professor and Chair  
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**Greenwood, Carol**

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**From:** Gibson, Kathy  
**Sent:** Saturday, March 19, 2011 8:06 AM  
**To:** Bowman, Gregory  
**Subject:** Re: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)

I already did :-)

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

**From:** Bowman, Gregory  
**To:** Gibson, Kathy  
**Sent:** Sat Mar 19 07:44:35 2011  
**Subject:** RE: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)

Thanks. I forwarded this to Dan Merzke. He'll be acting for me until Tuesday.

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

**From:** Gibson, Kathy  
**Sent:** Saturday, March 19, 2011 7:39 AM  
**To:** Bowman, Gregory  
**Cc:** Uhle, Jennifer; Scott, Michael; Zigh, Ghani; Sheron, Brian; Santiago, Patricia; Tinkler, Charles; Schaperow, Jason; Lee, Richard; Wagner, Katie  
**Subject:** Re: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)

Greg,  
I believe this information was requested by Commissioner Magwood's office.

Ghani Zigh is the RES staff contact if there are questions.

Thanks,  
Kathy

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

**From:** Zigh, Ghani  
**To:** Sheron, Brian; Santiago, Patricia  
**Cc:** Uhle, Jennifer; Gibson, Kathy; Scott, Michael  
**Sent:** Sat Mar 19 07:09:11 2011  
**Subject:** RE: NEW URGENT REQUEST -- SNL BWR tests - (OUO-Privileged Information)

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

for the BWR, the following results were found:

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

The age of the fuel assembly as function of power is as follows for the BWR assembly:

N/60

310 days old is 2.7 kWatt  
117 days is 5 kWatt  
25 days is 10 kWatt  
20 days is 10.3 kWatt

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

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

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

Rebecca,

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

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

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

Thanks  
Pat

**Greenwood, Carol**

**From:** Gibson, Kathy  
**Sent:** Saturday, March 19, 2011 6:36 PM  
**To:** Sheron, Brian; Lee, Richard; Scott, Michael  
**Cc:** Uhle, Jennifer  
**Subject:** Re: Proposal to handle dried Spent fuel pool.docx

That's the hope!

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

**From:** Sheron, Brian  
**To:** Gibson, Kathy; Lee, Richard; Scott, Michael  
**Cc:** Uhle, Jennifer  
**Sent:** Sat Mar 19 17:53:11 2011  
**Subject:** RE: Proposal to handle dried Spent fuel pool.docx

The TV shows them spraying tons of water on the pools. The issue may be moot.

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

**From:** Gibson, Kathy  
**Sent:** Saturday, March 19, 2011 1:11 PM  
**To:** Lee, Richard; Scott, Michael  
**Cc:** Sheron, Brian; Uhle, Jennifer  
**Subject:** Re: Proposal to handle dried Spent fuel pool.docx

Good work, guys! Thanks

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

**From:** Lee, Richard  
**To:** Gibson, Kathy; Scott, Michael  
**Sent:** Sat Mar 19 10:39:26 2011  
**Subject:** FW: Proposal to handle dried Spent fuel pool.docx

fyi

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

**From:** Lee, Richard  
**Sent:** Saturday, March 19, 2011 9:03 AM  
**To:** Voglewede, John; Clifford, Paul  
**Cc:** Blumberg, Mark  
**Subject:** RE: Proposal to handle dried Spent fuel pool.docx

At yesterday 1:30 pm, Charlie Tinkler, Hossein Esmaili (at the Op Center) and I participated in a conference call with the Op Center with a large group of external stakeholders (EPRI, Naval reactors, KAPL, Bettis,...), Bob brought up the idea of using liquid Ar. Charlie Tinkler mentioned that after the SNL BWR Zr-fire finished, SNL used Ar to cool those bundles, it took them 3 days to do it. It is very slow. The purpose of yesterday conference call was to formulate options paper on dealing with cooling SFP in Fukushima, and provide it to the NRC team at the U.S. Embassy in Tokyo. The position paper has been formulated after the conference call.

Using water to cool a hot intact, partial intact or debris bed will initially generate a lot of steam and most likely FP release, but it removes a lot of heat and subsequently scrubbing the FPs. LOFT FPT2 reflooding of the bundle, showed an initial pressure rise and additional FPs release.

N/61

If I understood what the Japanese TV is showing this morning (US EST), large amount of water was been sprayed at the unit.

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From: Voglewede, John  
Sent: Saturday, March 19, 2011 8:01 AM  
To: Clifford, Paul  
Cc: Blumberg, Mark  
Subject: RE: Proposal to handle dried Spent fuel pool.docx

It is an interesting proposal but it presumes that the damage is still in the process of being done..

At a minimum, I think we should assume that the leak tightness of most of the fuel rods is gone, and that most of the rod-like geometry is also gone. The result is a rubble much like Three Mile Island. The evidence for this is the long uncover periods and the presence of cesium and iodine outside the plant.

The question at the moment is how much zirconium metal-water reaction has taken place (not just zirconium hydride reaction) because it provides most (but not all) of the heat source. If there is much zirconium metal left, it is prudent to cool it rather than inert it because even a little water provides additional oxidizing agent. If there is little zirconium metal left, it is prudent to seal the containment leakage paths rather than inert it because there is only decay heat to worry about.

From: Clifford, Paul  
Sent: Friday, March 18, 2011 10:21 AM  
To: Voglewede, John; Blumberg, Mark  
Subject: FW: Proposal to handle dried Spent fuel pool.docx

John: Your thoughts on Bob's proposal.

Mark: While Bob's proposal would maintain the fuel, it does not provide the scrubbing that water does. Your thoughts on pros/cons of Argonne w.r.t. dose.

From: Ruland, William  
Sent: Thursday, March 17, 2011 12:52 PM  
To: Clifford, Paul  
Cc: Attard, Anthony; Bahadur, Sher; Mendiola, Anthony  
Subject: FW: Proposal to handle dried Spent fuel pool.docx

A realistic proposal given the current situation?

Bill

From: Ordaz, Vonna  
Sent: Thursday, March 17, 2011 12:39 PM  
To: Dudes, Laura; Ruland, William; McIntyre, David  
Cc: Dorman, Dan; Haney, Catherine; Einziger, Robert; Rahimi, Meraj  
Subject: Proposal to handle dried Spent fuel pool.docx

Laura,

I understand that you are on duty as the RST Director today. From our shift last night, Bill Ruland and the RST staff were discussing various approaches to address the potentially dry SFP. One of our Senior Materials Experts, Bob Einziger has prepared the attached proposal to

offer support on how to handle a dry SFP. He is available, if needed, and can be reached at 301-492-3283.

Thanks,  
Vonna

NSIR

**From:** [OST03 HOC](#)  
**To:** [DOI](#); [DTRA](#); [chardin](#); [rfraass@crcpd.org](#); [james.d.lloyd@nasa.gov](#); [PN Distribution](#); [FDA](#); [State Dept](#); [White House Sit Room](#); [Bernie Beaudin](#); [Canadian Nuclear Safety Commission \(CNSC\)](#); [eoc2@cnsc-ccsn.gc.ca](#); [DOEHQEOC@OEM.DOE.GOV](#); [fldr-nrc@comdt.uscg.mil](#); [EOC.EPAHQ@EPAMAIL.EPA.GOV](#); [Lawrence Koleff](#); [SIOC](#); [FEMA-operations-center@dhs.gov](#); [Health Canada Operations Center](#); [IAEA Emergency Response Unit](#); [USDA](#); [Screnci, Diane](#); [Sheehan, Neil](#); [Dricks, Victor](#); [Clifford, James](#); [Gamberoni, Marsha](#); [Heater, Keith](#); [Holian, Brian](#); [Kay Gallagher](#); [Kinneman, John](#); [Lew, David](#); [Nick, Joseph](#); [ODaniell, Cynthia](#); [Powell, Raymond](#); [R1 IRC](#); [Roberts, Darrell](#); [Thompson, Margaret](#); [Davenport, Patricia](#); [McCallie, Karen](#); [Miles, Patricia](#); [Quinones-Navarro, Joylynn](#); [R2 IRC](#); [Rudisail, Steven](#); [R3 IRC](#); [Smith, Desiree](#); [Alferink, Beth](#); [Andrews, Tom](#); [Howell, Linda](#); [R4 IRC](#)  
**Subject:** Real Event: NRC Press Release #12 - Japan Event Earthquake/Tsunami  
**Date:** Monday, March 21, 2011 11:06:26 AM  
**Attachments:** [Press Release 12.pdf](#)

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\*\*\*\*\*Event Information is Attached\*\*\*\*\*

The NRC is responding to an event.

Please contact the NRC Executive Support Team if necessary at 301-816-5100 or reply to this e-mail.

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# NRC NEWS

**U.S. NUCLEAR REGULATORY COMMISSION**

Office of Public Affairs Telephone: 301/415-8200

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Blog: <http://public-blog.nrc-gateway.gov>

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No. 11-053

March 19, 2011

## **NRC POSTS UPDATED SEISMIC QUESTIONS AND ANSWERS**

The Nuclear Regulatory Commission has posted a series of updated seismic and tsunami questions and answers on its website. The Q&A provides basic information on earthquakes and tsunamis, details on U.S. nuclear power plant seismic design and an explanation of NRC's recent study on earthquake risk. The document is available at <http://www.nrc.gov/japan/faqs-related-to-japan.pdf>, and other NRC information related to the March 11 earthquake and tsunami is available at <http://www.nrc.gov/japan/japan-info.html>.

###

News releases are available through a free *listserv* subscription at the following Web address: <http://www.nrc.gov/public-involve/listserver.html>. The NRC homepage at [www.nrc.gov](http://www.nrc.gov) also offers a SUBSCRIBE link. E-mail notifications are sent to subscribers when news releases are posted to NRC's website.

**From:** OST03 HOC  
**To:** DOI; DTRA; chardin; rfraass@crcpd.org; james.d.lloyd@nasa.gov; PN Distribution; FDA; State Dept; White House Sit Room; Bernie Beaudin; Canadian Nuclear Safety Commission (CNSC); eoc2@cnsc-ccsn.gc.ca; DOEHQEOC@OEM.DOE.GOV; fldr-nrc@comdt.uscg.mil; EOC.EPAHQ@EPAMAIL.EPA.GOV; Lawrence Koleff; SIOC; FEMA-operations-center@dhs.gov; Health Canada Operations Center; IAEA Emergency Response Unit; USDA; Screnci, Diane; Sheehan, Neil; Dricks, Victor; Clifford, James; Gamberoni, Marsha; Heater, Keith; Holian, Brian; Kay Gallagher; Kinneman, John; Lew, David; Nick, Joseph; ODaniell, Cynthia; Powell, Raymond; R1 IRC; Roberts, Darrell; Thompson, Margaret; Davenport, Patricia; McCallie, Karen; Miles, Patricia; Quinones-Navarro, Joylynn; R2 IRC; Rudisail, Steven; R3 IRC; Smith, Desiree; Alferink, Beth; Andrews, Tom; Howell, Linda; R4 IRC  
**Subject:** Real Event: NRC Press Release #11 - Japan Event Earthquake/Tsunami  
**Date:** Monday, March 21, 2011 11:05:58 AM  
**Attachments:** [Press Release 11.pdf](#)

---

\*\*\*\*\*Event Information is Attached\*\*\*\*\*

The NRC is responding to an event.

Please contact the NRC Executive Support Team if necessary at 301-816-5100 or reply to this e-mail.



# NRC NEWS

**U.S. NUCLEAR REGULATORY COMMISSION**

Office of Public Affairs Telephone: 301/415-8200

Washington, D.C. 20555-0001

E-mail: [opa.resource@nrc.gov](mailto:opa.resource@nrc.gov) Site: [www.nrc.gov](http://www.nrc.gov)

Blog: <http://public-blog.nrc-gateway.gov>

No. 11-051

March 18, 2011

## **NRC INFORMS U.S. NUCLEAR POWER PLANTS ON JAPAN EARTHQUAKE'S EFFECTS**

The Nuclear Regulatory Commission has issued an Information Notice to all currently operating U.S. nuclear power plants, describing the effects of the March 11 earthquake and tsunami on Japanese nuclear power plants.

The notice provides a brief overview of how the earthquake and tsunami are understood to have disabled several key cooling systems at the Fukushima Daiichi nuclear power station, and also hampered efforts to return those systems to service. The notice is based on the NRC's current understanding of the damage to the reactors and associated spent fuel pools as of Friday, March 18.

The notice reflects the current belief that the combined effects of the March 11 earthquake and tsunami exceeded the Fukushima Daiichi plant's design limits. The notice also recounts the NRC's efforts, post-9/11, to enhance U.S. plants' abilities to cope with severe events, such as the loss of large areas of a site, including safety systems and power supplies.

The NRC expects U.S. nuclear power plants will review the entire notice to determine how it applies to their facilities and consider actions, as appropriate.

###

News releases are available through a free *listserv* subscription at the following Web address: <http://www.nrc.gov/public-involvc/listserver.html>. The NRC homepage at [www.nrc.gov](http://www.nrc.gov) also offers a SUBSCRIBE link. E-mail notifications are sent to subscribers when news releases are posted to NRC's website.

**From:** [Kammerer, Annie](#)  
**To:** [Beasley, Benjamin](#); [Karas, Rebecca](#)  
**Cc:** [Bensi, Michelle](#); [Coe, Doug](#)  
**Subject:** RE: Use of Shelby Bensi from 3-6pm for seismology Q&A support in ops center  
**Date:** Monday, March 21, 2011 3:17:01 PM

---

Thanks so much!!! It will be a huge help, particularly as long as Jon is gone. I'm barely keeping it together, so I really appreciate the support.

Annie

---

**From:** Beasley, Benjamin  
**Sent:** Monday, March 21, 2011 8:38 AM  
**To:** Kammerer, Annie; Karas, Rebecca  
**Cc:** Bensi, Michelle; Coe, Doug  
**Subject:** Re: Use of Shelby Bensi from 3-6pm for seismology Q&A support in ops center

Annie and Becky,

Thanks for all the long hours and hard work you are putting in. Shelby is willing to help and I will make her available for as much time as you need. If you need her more than 3 hours a day, that is fine. Shelby has expressed a willingness to work an evening shift.

Regards,  
Ben Beasley

Benjamin Beasley  
Sent from an NRC Blackberry.

---

**From:** Bensi, Michelle  
**To:** Kammerer, Annie  
**Cc:** Beasley, Benjamin  
**Sent:** Sun Mar 20 22:30:14 2011  
**Subject:** RE: Use of Shelby Bensi from 3-6pm for seismology Q&A support in ops center

Hi Annie,  
I just got your email. I will plan to talk with you tomorrow morning.  
I have also copied Ben on this email.  
Shelby

---

**From:** Kammerer, Annie  
**Sent:** Saturday, March 19, 2011 9:14 PM  
**To:** ET02 Hoc; Bensi, Michelle; Uhle, Jennifer  
**Cc:** OST01 HOC; OST02 HOC  
**Subject:** RE: Use of Shelby Bensi from 3-6pm for seismology Q&A support in ops center

Thanks Becky! I really appreciate your support and assistance. This is going to really help me out in terms of keeping the Q&As organized...that is the task that is killing me.

I'll touch base with Shelby separately.

Annie

**From:** ET02 Hoc  
**Sent:** Saturday, March 19, 2011 9:03 PM  
**To:** Bensi, Michelle; Kammerer, Annie; Uhle, Jennifer  
**Cc:** OST01 HOC; OST02 HOC  
**Subject:** Use of Shelby Bensi from 3-6pm for seismology Q&A support in ops center

Annie,

I just got Brian Sheron to approve use of Shelby from 3-6pm as you requested. I had OST schedule her for M-F at those times for this upcoming week. Shelby, if there are any problems with those times, please call into the Ops Center and ask to speak with the OST scheduler. 301-816-5100.

Becky Karas

**Greenwood, Carol**

---

**From:** Gibson, Kathy  
**Sent:** Monday, March 21, 2011 7:38 AM  
**To:** Uhle, Jennifer; 'sypicke@sandia.gov'; Rivers, Joseph; Lee, Richard  
**Cc:** Zigh, Ghani; Wagner, Katie; Scott, Michael; Elkins, Scott  
**Subject:** Re: need help wrt sharing information

Richard Lee and Katie Wagner will have the lead to advise Sandia on what can be released to whom. As I understand previous guidance from our OGC is that we can share OUO but we (NRC) must first determine a need to know (barring other restrictions such as international agreements etc.

Susan, please send the requests to Richard and Katie and they will advise you on what can be released to whom. Each decision will have to be made case-by-case.

Thanks,  
Kathy

---

**From:** Uhle, Jennifer  
**To:** Pickering, Susan Y <[sypicke@sandia.gov](mailto:sypicke@sandia.gov)>; Rivers, Joseph  
**Cc:** Gibson, Kathy; Zigh, Ghani  
**Sent:** Mon Mar 21 07:21:23 2011  
**Subject:** RE: need help wrt sharing information

Hi Susan.

You can share anything with others provided it is not proprietary or OUO. I would ask the individual PM to verify its classification. Spent fuel pool tests under OECD cannot be shared with others outside of the program. Please check with Ghani about the classification of the earlier BWR tests- whether or not they are OUO. I believe they are so that prevents sharing it. The Peach Bottom decks contain proprietary information, I believe. Please talk to Kathy about source terms because right now that may be a sensitive subject and she is on the Protective Measures Team and will have the best information.

Jennifer

---

**From:** Pickering, Susan Y [<mailto:sypicke@sandia.gov>]  
**Sent:** Friday, March 18, 2011 11:36 PM  
**To:** Uhle, Jennifer; Rivers, Joseph  
**Subject:** need help wrt sharing information

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**From:** Susan Pickering [<mailto:huntwine@gmail.com>]  
**Sent:** Friday, March 18, 2011 09:25 PM  
**To:** Pickering, Susan Y  
**Subject:** need help wrt sharing information

Jennifer and Joe,

We are receiving many requests for information, much of it for NRC-funded studies. For example:

- GE Hitachi, GE Power & Water, GE Emergency Ops Center, spent fuel fires
- IRSN, source term estimates for Japan

- DOE NE, source term validation (similar to MACCs calcs we are running right now)
- INL, Peach Bottom source term
- ORNL, spent fuel pools, MELCOR decks
- OECD on behalf of GRS, SOARCA Peach Bottom model
- UK HSE Emergency Ops, general background
- Swedish Emergency Ops, spent fuel pool

We have shared some information w/ DOE NE. We are responding to many requests from the NRC, e.g., Charlie Tinkler. All of the media requests we receive we refer to the Sandia media relations group.

Will you please help me find a way that would allow Sandia to share important information about Japan to organizations with a legitimate need? We could set up controls, e.g., they could only use the information in-house, I would provide you listings of the requester, what was provided, and intended use.

This puts us in a very difficult situation and may interfere w/ important work. I'd appreciate any help you can provide.

syp

NS/R

**From:** Coyne, Kevin  
**To:** Demoss, Gary; Xing, Jing; Salley, MarkHenry; Wood, Jeffery; Beasley, Benjamin; Ott, William  
**Cc:** Peters, Sean; Coe, Doug  
**Subject:** Support for Japan Response  
**Date:** Monday, March 21, 2011 7:24:17 PM

---

The agency has lifted overtime restrictions for folks supporting the Japan incident response. In order to ensure that HRMS will accept time correctly, PMDA needs to know who might be charging overtime/comp time for the recent events in excess of the normal limits. Please let me know if you have any folks so involved and we'll pass the information onto PMDA. I currently have the following possible names:

- Dave Stroup
- Felix Gonzalez
- Mark Salley
- Don Marksberry
- Don Helton

Let me know who I've missed...

Thanks!

Kevin

N/66

**From:** [Lewis, Robert](#)  
**To:** [Johnson, Michael](#); [Grobe, Jack](#); [Boger, Bruce](#); [Holahan, Gary](#); [Moore, Scott](#); [Muessle, Mary](#); [Coe, Doug](#); [Mamish, Nader](#); [Ordaz, Vonna](#); [Weber, Michael](#); [Evans, Michele](#); [Wiggins, Jim](#); [Morris, Scott](#); [Andersen, James](#); [Carpenter, Cynthia](#)  
**Cc:** [Uhle, Jennifer](#); [Virgilio, Martin](#); [Miller, Charles](#); [Zimmerman, Roy](#); [McDermott, Brian](#); [McGinty, Tim](#); [Ross-Lee, MaryJane](#); [Miller, Chris](#); [Holahan, Patricia](#)  
**Subject:** RE: ACTION: JAPAN RESPONSE EXIT CRITERIA  
**Date:** Tuesday, March 22, 2011 6:22:23 AM  
**Attachments:** [Japanese Response Exit Criteria.docx](#)

---

Jim and Michele

Overnight in the ops center we did some brainstorming around the subject and drafted the attached, for your consideration.

We also suggest Chuck and the site team be consulted on what "mission accomplished" looks like for them.

We've added to cc, several upcoming names from the watch bill, for awareness

- Rob

---

**From:** Wiggins, Jim  
**Sent:** Monday, March 21, 2011 10:44 PM  
**To:** Johnson, Michael  
**Subject:** FW: ACTION: JAPAN RESPONSE EXIT CRITERIA

---

**From:** Wiggins, Jim  
**Sent:** Monday, March 21, 2011 9:45 PM  
**To:** Virgilio, Martin  
**Subject:** FW: ACTION: JAPAN RESPONSE EXIT CRITERIA

Here is my answer

---

**From:** Wiggins, Jim  
**Sent:** Monday, March 21, 2011 3:47 PM  
**To:** Evans, Michele  
**Cc:** ET07 Hoc  
**Subject:** RE: ACTION: JAPAN RESPONSE EXIT CRITERIA

I think we could use more granularity on Exit criteria A and B...tied to both the plants and the dose assessment....

e.g. cores in U1,2,3 are covered. Spent fuel in the units not further degrading based on rad levels. etc... Dose assessment – stable or decreasing results, field data available that corrects models, reentry criteria met for relaxing the 50 mile evac to something around XX miles....maybe keyhole...

Should split site team from Ops Ctr team and provide for scale-back options then stand-down.

---

**From:** Evans, Michele  
**Sent:** Monday, March 21, 2011 3:30 PM  
**To:** Wiggins, Jim  
**Cc:** Uhle, Jennifer; Grobe, Jack; Boger, Bruce; Holahan, Gary; Moore, Scott; Andersen, James; Muesle, Mary; Coe, Doug; Mamish, Nader; Ordaz, Vonna  
**Subject:** RE: ACTION: JAPAN RESPONSE EXIT CRITERIA

Jim,

Attached is an outline of what we discussed in the meeting today among the deputies regarding exit criteria for you to consider. I can further discuss with you tomorrow morning including thoughts on how to implement this criteria.

There was a lot of discussion, but the view is that our exit would be gradual over time. Over time, the teams would get smaller, could work from location outside of Ops Center, and potentially could be on call.

I've copied those who were in the meeting today, and haven't seen this summary yet, in case they want to provide any individualized input.

Michele

---

**From:** Wiggins, Jim  
**Sent:** Saturday, March 19, 2011 8:03 AM  
**To:** Evans, Michele  
**Cc:** Uhle, Jennifer; Grobe, Jack; Boger, Bruce; Holahan, Gary; Moore, Scott; Virgilio, Martin; Weber, Michael; Andersen, James  
**Subject:** ACTION: JAPAN RESPONSE EXIT CRITERIA

QUIETLY.....w/o fanfare or notice.....

Plz get with the other Big 5 Deputies (with Dan D out of pocket and Cathy on tvl, will have to decide on NMSS's contributor) to put together sets of criteria that would need to be met for us to stand-down at the Ops Ctr and for the site team in Japan to be recalled.

## Japanese Response Exit Criteria

**Goal: Specify, in the context of NRC's original objectives, the conditions that enable NRC to: (a) exit NRC monitoring response mode for the HQ Ops Center; and (b) deactivate most Japan site team support to a longer term level of 1-2 staff members to advise the Embassy.**

### **(a) Exiting monitoring mode for the HQ Ops Center**

- **RST -**
  - Plant parameters are known and no longer indicate a potential or actual emergency
  - Reactor and SNF pool conditions are predictable
  - Reactor heat sink is available and operating
  - Integrity of power supplies and electrical equipment is sustainable
  - Operable instrumentation for plant status and radiation monitoring exists
- **PMT -**
  - Plant parameters are known and no longer indicate a potential or actual emergency
  - Radioactivity releases have been terminated and the source of radioactivity release is under control
  - Confidence that changes to protective actions are unlikely for both US citizens in Japan and for U.S. territories.
- **LT -**
  - Plant parameters are known and no longer indicate a potential or actual emergency
  - Quick-turnaround advice from the interagency to the Embassy and Japanese Government is no longer urgently needed.

### **(b) Reducing NRC Japan on-site team presence**

- Support to Japanese response and recovery actions
  - NRC's commitments to USAID Team in Japan have been met.
  - USA consortium Established and fully functioning to support TEPCO (NRC facilitating, but lead role to be transferred - e.g., to another Government agency or INPO).
  - Confidence that changes to protective actions for US citizens in Japan are unlikely.

**From:** [Coe, Doug](#)  
**To:** [Beasley, Benjamin](#)  
**Cc:** [Coyne, Kevin](#); [Stutzke, Martin](#); [Case, Michael](#); [Richards, Stuart](#)  
**Subject:** FW: Funding Needs for Japan Follow-up - Resent to provide Attachment (Important Update)  
**Date:** Tuesday, March 22, 2011 7:01:00 AM  
**Importance:** High

---

Ben – the question below (see first email) about the possibility of accelerating GI-199 review will come up again. In part NRR will need to answer for the generic communication process, but we will also need to think about how our part might be accelerated, possibly using contractors to assist. The critical path as I understand it, is developing a method to evaluate SMA plants without a SPRA.

---

**From:** RidsResPmdaMail Resource  
**Sent:** Tuesday, March 22, 2011 6:46 AM  
**To:** Case, Michael; Richards, Stuart; Coe, Doug; Coyne, Kevin; Scott, Michael; Gibson, Kathy; Elkins, Scott  
**Cc:** Rini, Brett; Hudson, Daniel; Armstrong, Kenneth; Rivera-Lugo, Richard; Ibarra, Jose; Sheron, Brian; Uhle, Jennifer; Valentin, Andrea; Grancorvitz, Teresa  
**Subject:** FW: Funding Needs for Japan Follow-up - Resent to provide Attachment (Important Update)  
**Importance:** High

Good Morning!

Please review the message below. (No action required at this time)

Thanks

Kevin

One Team/One Goal

Kevin D. Johnson  
 Research Information Specialist  
 Office of Nuclear Regulatory Research  
 RES/PMDA/HCCB  
 Email: [Kevin.Johnson@nrc.gov](mailto:Kevin.Johnson@nrc.gov)  
 O6AO6a  
 Office: 301-251-7665

---

**From:** Jacobs-Baynard, Elizabeth  
**Sent:** Monday, March 21, 2011 5:44 PM  
**To:** Kasputys, Clare; RidsNroOd Resource; RidsNrrOd Resource; RidsNsirOd Resource; RidsResOd Resource; RidsFsmeOd Resource; RidsNmssOd Resource; RidsOgcMailCenter Resource; RidsCsoMailCenter Resource; RidsRgn1MailCenter Resource; RidsRgn2MailCenter Resource; RidsRgn3MailCenter Resource; RidsRgn4MailCenter Resource; RidsOipMailCenter Resource  
**Cc:** RidsNrrPmda Resource; RidsNroPmda Resource; RidsNsirPmda Resource; RidsResPmdaMail Resource; RidsFsmePbpaFmb Resource; RidsNmssTa Resource; Golder, Jennifer; Smolik, George; Muessle, Mary; Andersen, James; Allwein, Russell; Peterson, Gordon; Peterson, Gordon; Virgilio, Martin; Virgilio, Martin; Weber, Michael; Weber, Michael; Ash, Darren; Ash, Darren; Jacobs-Baynard, Elizabeth  
**Subject:** RE: Funding Needs for Japan Follow-up - Resent to provide Attachment

**Importance:** High

**Recalling e-mail.** At this time, there is no need for offices to respond to the requested e-mail. OCFO has come up with rough estimates of the associated costs for near-term and long term tasks. Please be informed that there may be additional assistance requested from offices at a later date. Thanks for your support and cooperation.

Liz

---

**From:** Kasputys, Clare

**Sent:** Monday, March 21, 2011 4:18 PM

**To:** RidsNroOd Resource; RidsNrrOd Resource; RidsNsirOd Resource; RidsResOd Resource; RidsFsmeOd Resource; RidsNmssOd Resource; RidsOgcMailCenter Resource; RidsCsoMailCenter Resource; RidsRgn1MailCenter Resource; RidsRgn2MailCenter Resource; RidsRgn3MailCenter Resource; RidsRgn4MailCenter Resource; RidsOipMailCenter Resource

**Cc:** RidsNrrPmda Resource; RidsNroPmda Resource; RidsNsirPmda Resource; RidsResPmdaMail Resource; RidsFsmePbpaFmb Resource; RidsNmssTa Resource; Golder, Jennifer; Smolik, George; Muesle, Mary; Andersen, James; Jacobs-Baynard, Elizabeth; Allwein, Russell; Peterson, Gordon; Peterson, Gordon; Virgilio, Martin; Virgilio, Martin; Weber, Michael; Weber, Michael; Ash, Darren; Ash, Darren

**Subject:** Funding Needs for Japan Follow-up - Resent to provide Attachment

Resent to provide the Attachment

All,

The Chairman has requested for the NRC to conduct a Near-term (90 day effort) and a longer-term review (as discussed by Bill B at the Commission meeting today) of regulatory issues affecting U.S. operating reactors based on the events in Japan. The Chairman is interested in seeking supplemental funding to support our efforts for the above effort, in addition to NRC's costs associated with emergency response and technical experts sent to Japan. OCFO is preparing cost data associated with emergency response and technical support to Japan.

On Friday, the OCFO requested some initial estimates to support the reviews (see attached). At this time, we are requesting the offices to review these initial estimates and include some information concerning the work that is envisioned to support these reviews. Listed below are some initial thoughts about the scope of the near-term and long-term reviews. Also, consider what on-going efforts related to the development of our regulatory program could benefit with supplemental funding. For example, it was mentioned in the Commission meeting that NRC is currently working on GSI-199. Should funding be accelerated for this effort and others of this nature.

**Near Term Review (90 day effort):**

- Evaluate currently available technical and operational information from the Japan event to identify near-term (or immediate) operational or regulatory issues affecting U.S. operating reactors of all designs in areas such as protection against earthquakes, tsunami, flooding, hurricanes, station blackout and a degraded ability to restore power; severe accident mitigation and emergency preparedness
- Develop recommendations for generic communications, orders, changes to inspection procedures and licensing review guidance, etc.
- Possibly prepare a 30 day quick look report

Longer-Term Review (Following obtaining sufficient technical information from the Japan event)

- Evaluate all technical and policy issues related to the event to identify additional research, generic issues, changes to the reactor oversight process, rulemakings and adjustments to the regulatory framework that should be conducted by the NRC.
- Evaluate interagency issues such as emergency preparedness.
- Applicability of the lessons learned to non-operating reactor and non-reactor facilities.

It is recognized that the full scope of the reviews has yet to be determined or the size of the group that will be conducting the analysis. Therefore, we are looking only for rough cost estimates. You are requested to send the level of funding (dollars and FTE) that is anticipated that could be obligated in FY 2011 for both the near-term and long-term efforts. We are asking the business line leads to coordinate with supporting offices and submit a response by business line and by office. Please send your responses to me and Liz Jacobs-Baynard and copy Jennifer Golder and George Smolik, OCFO NLT than Noon on Tuesday.

If you have any questions, please let me know.

Thank you for your support.

NSIR  
w/  
attach

**From:** Sheron, Brian  
**To:** Rini, Brett; Case, Michael; Richards, Stuart; Coe, Doug; Coyne, Kevin; Scott, Michael; Gibson, Kathy; Elkins, Scott  
**Cc:** Uhle, Jennifer; Valentin, Andrea; Grancorvitz, Teresa; Rivera-Lugo, Richard; Armstrong, Kenneth; Ibarra, Jose; Hudson, Daniel; RidsResPmdaMail Resource  
**Subject:** RE: QUERY: Funding Needs for Japan Follow-up  
**Date:** Monday, March 21, 2011 4:49:57 PM

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I just got off the phone with Mike Weber and begged for some additional time. The information is apparently needed for some congressional hearings next week. As usual, if you start from this Friday as the time the Commission needs to be comfortable with the material, then the Commission needs to get it Thursday, which means the EDO needs to see it Wednesday, which means the EDO staff needs to assemble it Tuesday afternoon/Wednesday morning. Hence, the Tuesday, noon deadline.

I explained that we were running low on management, and if we could have until COB tomorrow, that would help immensely. He said he would see what he could do.

---

**From:** Rini, Brett  
**Sent:** Monday, March 21, 2011 4:44 PM  
**To:** Case, Michael; Richards, Stuart; Coe, Doug; Coyne, Kevin; Scott, Michael; Gibson, Kathy; Elkins, Scott  
**Cc:** Sheron, Brian; Uhle, Jennifer; Valentin, Andrea; Grancorvitz, Teresa; Rivera-Lugo, Richard; Armstrong, Kenneth; Ibarra, Jose; Hudson, Daniel; RidsResPmdaMail Resource  
**Subject:** QUERY: Funding Needs for Japan Follow-up  
**Importance:** High

Division Directors,

We have received a quick turnaround OEDO request to estimate resources (\$ and FTE) required for a near term effort and longer term review related to the recent events in Japan. Brian brainstormed a list of possible research areas that I've listed below, and I will reach out to our customer offices to find out in what areas they anticipate asking us for help. Please review the list below, think about what areas of research you anticipate for your division, and estimate how much effort these projects will require.

- Spent fuel analyses – SFPs vs ISFSIs?
- Severe accident analyses
- Exceeding seismic design basis
- Response to aftershocks following a design or beyond-design basis earthquake
- Tsunami/storm surge impacts
- Protection from hurricane winds, tornadoes, etc.

Please send me your inputs by noon tomorrow, and I will review the list with Brian before responding to OEDO. We weren't given much time to reply, so a rough estimate is all that's required at this time. I appreciate your help during this time of significant competing priorities.

Thanks,

Brett

N/69

**From:** Kasputys, Clare  
**Sent:** Monday, March 21, 2011 4:18 PM  
**To:** RidsNroOd Resource; RidsNrrOd Resource; RidsNsirOd Resource; RidsResOd Resource; RidsFsmeOd Resource; RidsNmssOd Resource; RidsOgcMailCenter Resource; RidsCsoMailCenter Resource; RidsRgn1MailCenter Resource; RidsRgn2MailCenter Resource; RidsRgn3MailCenter Resource; RidsRgn4MailCenter Resource; RidsOipMailCenter Resource  
**Cc:** RidsNrrPmda Resource; RidsNroPmda Resource; RidsNsirPmda Resource; RidsResPmdaMail Resource; RidsFsmePbpaFmb Resource; RidsNmssTa Resource; Golder, Jennifer; Smolik, George; Muessle, Mary; Andersen, James; Jacobs-Baynard, Elizabeth; Allwein, Russell; Peterson, Gordon; Peterson, Gordon; Virgilio, Martin; Virgilio, Martin; Weber, Michael; Weber, Michael; Ash, Darren; Ash, Darren  
**Subject:** Funding Needs for Japan Follow-up - Resent to provide Attachment

Resent to provide the Attachment

All,

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- Evaluate interagency issues such as emergency preparedness.
- Applicability of the lessons learned to non-operating reactor and non-reactor

facilities.

It is recognized that the full scope of the reviews has yet to be determined or the size of the group that will be conducting the analysis. Therefore, we are looking only for rough cost estimates. You are requested to send the level of funding (dollars and FTE) that is anticipated that could be obligated in FY 2011 for both the near-term and long-term efforts. We are asking the business line leads to coordinate with supporting offices and submit a response by business line and by office. Please send your responses to me and Liz Jacobs-Baynard and copy Jennifer Golder and George Smolik, OCFO NLT than Noon on Tuesday.

If you have any questions, please let me know.

Thank you for your support.

**Murphy, Andrew**

---

**From:** uchiyama-yuichi@jnes.go.jp  
**Sent:** Tuesday, March 22, 2011 1:57 AM  
**To:** Murphy, Andrew; Alejandro.HUERTA@oecd.org; Ali, Syed  
**Cc:** okano-kenta@jnes.go.jp; kobayashi-koichi@jnes.go.jp; uchiyama-yuichi@jnes.go.jp; yamazaki-hiroaki@jnes.go.jp  
**Subject:** Re: Appology of absence of JNES in IAGE meeting

Dear Andy,

Thanks for your kind words.

Regarding Quake information, please take a look  
[http://outreach.eri.u-tokyo.ac.jp/eqvolc/201103\\_tohoku/eng](http://outreach.eri.u-tokyo.ac.jp/eqvolc/201103_tohoku/eng)

It is better if I could summarize the information but I can not.  
You can catch EQ and tsunami information from this page.

Regards,  
Y. Uchiyama

>Dear Mr. Uchiyama,

>  
>We can all appreciate why you and your colleagues are unable to attend  
>the WGIAGE meetings at OECD this year. I thank you for letting us know about your travel  
>plans. Again any effort on your part to prepare material on the Workshop on Seismic  
>Observations from Deep Borehole are appreciated; I will be pleased to present them. If it  
>is difficult for you to prepare this material, I can offer comments on the progress of this  
>effort from my own knowledge of the Workshop.

>  
>I am pleased to hear through Dr Ali that the whole JNES team was able  
>to return to Tokyo safely. My thoughts and prayers for all of Japan adversely affected by  
>the earthquakes and tsunami with special prayers for our colleagues and counterparts in  
>nuclear regulation and the nuclear power industry.

>  
>Stay well and let us know would we can support you.

>  
>Andrew Murphy

>  
>-----Original Message-----  
>From: [uchiyama-yuichi@jnes.go.jp](mailto:uchiyama-yuichi@jnes.go.jp) [<mailto:uchiyama-yuichi@jnes.go.jp>]  
>Sent: Thursday, March 17, 2011 9:09 PM  
>To: [Alejandro.HUERTA@oecd.org](mailto:Alejandro.HUERTA@oecd.org); Murphy, Andrew; Ali, Syed  
>Cc: [okano-kenta@jnes.go.jp](mailto:okano-kenta@jnes.go.jp); [kobayashi-koichi@jnes.go.jp](mailto:kobayashi-koichi@jnes.go.jp);  
>[yamazaki-hiroaki@jnes.go.jp](mailto:yamazaki-hiroaki@jnes.go.jp)  
>Subject: Appology of absence of JNES in IAGE meeting

>  
>Dear Mr.Huerta, Dr. Murphy, Dr. Ali,

>  
>This is Uchiyama, in JNES.  
>As you know, we have a very big trouble in Japan.  
>All people relating nuclear safety are struggling to contain this situation.

>  
>Because of this, the management of JNES decided to prohibit participations in oversea  
>meetings.

>  
>I and Mr. Okano, who is in charge of EQ observation in deep bore hole  
>project, were planning to participate in Seismic and Concrete Sub-group meetings from the  
>Seismic Safety Department of JNES. But we cannot participate because of the reason above.  
>Moreo ver, it is thought that the greater part of possible participants from Japan will be  
>absent too.

>  
>Please understand this situation.  
>But I want to make an effort to deliver the electronic file about the draft report of the  
>workshop on earthquake observation in deep borehole.

>  
>Truly yours,  
>18 Mar., 2010  
>Y. Uchiyama, JNES

**From:** [Ibarra, Jose](#)  
**To:** [Peters, Sean](#); [Xing, Jing](#); [Coe, Doug](#)  
**Cc:** [Beasley, Benjamin](#)  
**Subject:** Near Term and Long Term Lessons Learned From Japan  
**Date:** Tuesday, March 22, 2011 7:50:11 AM

---

Doug, Jing, and Sean,

I notice that the initial list of projects compiled by RES did not include any projects on Communications and Safety Culture/Human Factors. The communications on this event has been dismal and I believe that Safety Culture will be an issue once we get more information on the event. It would be prudent to include Communication and Safety Culture/Human Factors in the near term and long term Lessons Learned from the Japan accident. Note that the initial information that was requested today has been delayed. Thanks. Jose

NSUR

**Murphy, Andrew**

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**From:** Richards, Stuart  
**Sent:** Tuesday, March 22, 2011 3:15 PM  
**To:** RES\_DE; Boyce, Tom (RES); Csontos, Aladar; Gavrilas, Mirela; Hogan, Rosemary; Koshy, Thomas; Sydnor, Russell  
**Cc:** Rivera-Lugo, Richard; Case, Michael  
**Subject:** RE: Spreadsheet

If you are working to support the agency response to the events in Japan, please provide the information requested below by noon tomorrow to Richie Rivera-Lugo.

Thanks  
Stu

---

**From:** Valentin, Andrea  
**Sent:** Tuesday, March 22, 2011 3:02 PM  
**To:** Case, Michael; Richards, Stuart; Gibson, Kathy; Coe, Doug; Coyne, Kevin; Kardaras, Tom  
**Cc:** Sheron, Brian  
**Subject:** Spreadsheet  
**Importance:** High

Hello All,

I am collecting the names and dates to send to CFO for work being done in support of the Japan response. CFO needs this info since HRMS may not allow the employee to enter time worked unless some changes are made to the system. The memo dated 3/16 said that they need this information ASAP to avoid difficulties processing the appropriate payments.

I plan to submit this interim list by COB tomorrow so CFO can get started on what they need to do. I can always send additional names later. Please remember to send me both names and dates worked (or planned schedule if it has not occurred yet).

Thanks,  
Andrea

N/72

**Murphy, Andrew**

---

**From:** Ali, Syed  
**Sent:** Tuesday, March 22, 2011 9:02 AM  
**To:** uchiyama-yuichi@jnes.go.jp; Murphy, Andrew; Alejandro.HUERTA@oecd.org  
**Cc:** okano-kenta@jnes.go.jp; kobayashi-koichi@jnes.go.jp; yamazaki-hiroaki@jnes.go.jp  
**Subject:** RE: Appology of absence of JNES in IAGE meeting

Dear Uchiyama San:

I want to echo the words of Murphy San that our thoughts and prayers go for you and all Japanese along with their families in this very difficult time. We know very well that Japan will recover from this disaster because of the courage , dedication and efforts of its great people.

I also want to inform you that NRC is sending another team of 10-12 people this week to Japan and I will be part of that team. I will be leaving on March 24. My understanding is that we will be in Tokyo working at the U.S. embassy and do whatever work is necessary to assist the embassy which is cooperating with various Japanese organizations. Therefore, I will not be attending the CSNI meeting also as NRC has determined that the work at Japan takes precedence over all other work. Depending upon my duties there, I may or may not contact you, I am not sure. I know that you are extremely busy also at this critical time. Good luck to you.

With best regards,  
Syed

\*\*\*\*\*

Dr. Syed A. Ali, P.E.  
Senior Technical Advisor for Civil/Structural Engrg Issues Division of Engineering (DE)  
Office of Nuclear Regulatory Research United States Nuclear Regulatory Commission

Phone: 301-251-7658  
Email: [Syed.Ali@nrc.gov](mailto:Syed.Ali@nrc.gov)

Mailing Address:  
Syed A. Ali  
M/S CS-5A24M  
US Nuclear Regulatory Commission  
Washington, DC 20555-0001

\*\*\*\*\*

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

From: [uchiyama-yuichi@jnes.go.jp](mailto:uchiyama-yuichi@jnes.go.jp) [<mailto:uchiyama-yuichi@jnes.go.jp>]  
Sent: Tuesday, March 22, 2011 1:57 AM  
To: Murphy, Andrew; [Alejandro.HUERTA@oecd.org](mailto:Alejandro.HUERTA@oecd.org); Ali, Syed  
Cc: [okano-kenta@jnes.go.jp](mailto:okano-kenta@jnes.go.jp); [kobayashi-koichi@jnes.go.jp](mailto:kobayashi-koichi@jnes.go.jp); [uchiyama-yuichi@jnes.go.jp](mailto:uchiyama-yuichi@jnes.go.jp); [yamazaki-hiroaki@jnes.go.jp](mailto:yamazaki-hiroaki@jnes.go.jp)  
Subject: Re: Appology of absence of JNES in IAGE meeting

Dear Andy,

Thanks for your kind words.

Regarding Quake information, please take a look  
[http://outreach.eri.u-tokyo.ac.jp/eqvolc/201103\\_tohoku/eng](http://outreach.eri.u-tokyo.ac.jp/eqvolc/201103_tohoku/eng)

It is better if I could summarize the information but I can not.

You can catch EQ and tsunami information from this page.

Regards,  
Y. Uchiyama

>Dear Mr. Uchiyama,

>

>We can all appreciate why you and your colleagues are unable to attend  
>the WGIAGE meetings at OECD this year. I thank you for letting us know about your travel  
plans. Again any effort on your part to prepare material on the Workshop on Seismic  
Observations from Deep Borehole are appreciated; I will be pleased to present them. If it  
is difficult for you to prepare this material, I can offer comments on the progress of this  
effort from my own knowledge of the Workshop.

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nuclear regulation and the nuclear power industry.

>

>Stay well and let us know would we can support you.

>

>Andrew Murphy

>

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>Sent: Thursday, March 17, 2011 9:09 PM

>To: [Alejandro.HUERTA@oecd.org](mailto:Alejandro.HUERTA@oecd.org); Murphy, Andrew; Ali, Syed

>Cc: [okano-kenta@jnes.go.jp](mailto:okano-kenta@jnes.go.jp); [kobayashi-koichi@jnes.go.jp](mailto:kobayashi-koichi@jnes.go.jp);

>[yamazaki-hiroaki@jnes.go.jp](mailto:yamazaki-hiroaki@jnes.go.jp)

>Subject: Appology of absence of JNES in IAGE meeting

>

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>

>Truly yours,

>18 Mar., 2010

>Y. Uchiyama, JNES

**From:** [RidsResPmdaMail Resource](#)  
**To:** [Case, Michael](#); [Richards, Stuart](#); [Coe, Doug](#); [Coyne, Kevin](#); [Scott, Michael](#); [Gibson, Kathy](#); [Elkins, Scott](#)  
**Cc:** [Rini, Brett](#); [Hudson, Daniel](#); [Armstrong, Kenneth](#); [Rivera-Lugo, Richard](#); [Ibarra, Jose](#); [Sheron, Brian](#); [Uhle, Jennifer](#); [Valentin, Andrea](#); [Grancorvitz, Teresa](#)  
**Subject:** FW: Funding Needs for Japan Follow-up - Resent to provide Attachment (Important Update)  
**Date:** Tuesday, March 22, 2011 6:45:41 AM  
**Importance:** High

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Good Morning!

Please review the message below. (No action required at this time)

Thanks

Kevin

One Team/One Goal

Kevin D. Johnson  
Research Information Specialist  
Office of Nuclear Regulatory Research  
RES/PMDA/HCCB  
Email: [Kevin.Johnson@nrc.gov](mailto:Kevin.Johnson@nrc.gov)  
O6AO6a  
Office: 301-251-7665

---

**From:** Jacobs-Baynard, Elizabeth  
**Sent:** Monday, March 21, 2011 5:44 PM  
**To:** Kasputys, Clare; RidsNroOd Resource; RidsNrrOd Resource; RidsNsirOd Resource; RidsResOd Resource; RidsFsmeOd Resource; RidsNmssOd Resource; RidsOgcMailCenter Resource; RidsCsoMailCenter Resource; RidsRgn1MailCenter Resource; RidsRgn2MailCenter Resource; RidsRgn3MailCenter Resource; RidsRgn4MailCenter Resource; RidsOipMailCenter Resource  
**Cc:** RidsNrrPmda Resource; RidsNroPmda Resource; RidsNsirPmda Resource; RidsResPmdaMail Resource; RidsFsmePbpaFmb Resource; RidsNmssTa Resource; Golder, Jennifer; Smolik, George; Muessle, Mary; Andersen, James; Allwein, Russell; Peterson, Gordon; Peterson, Gordon; Virgilio, Martin; Virgilio, Martin; Weber, Michael; Weber, Michael; Ash, Darren; Ash, Darren; Jacobs-Baynard, Elizabeth  
**Subject:** RE: Funding Needs for Japan Follow-up - Resent to provide Attachment  
**Importance:** High

**Recalling e-mail.** At this time, there is no need for offices to respond to the requested e-mail. OCFO has come up with rough estimates of the associated costs for near-term and long term tasks. Please be informed that there may be additional assistance requested from offices at a later date. Thanks for your support and cooperation.

Liz

---

**From:** Kasputys, Clare  
**Sent:** Monday, March 21, 2011 4:18 PM  
**To:** RidsNroOd Resource; RidsNrrOd Resource; RidsNsirOd Resource; RidsResOd Resource; RidsFsmeOd Resource; RidsNmssOd Resource; RidsOgcMailCenter Resource; RidsCsoMailCenter Resource; RidsRgn1MailCenter Resource; RidsRgn2MailCenter Resource; RidsRgn3MailCenter Resource; RidsRgn4MailCenter Resource; RidsOipMailCenter Resource

N/74

**Cc:** RidsNrrPmda Resource; RidsNroPmda Resource; RidsNsirPmda Resource; RidsResPmdaMail Resource; RidsFsmePbpaFmb Resource; RidsNmssTa Resource; Golder, Jennifer; Smolik, George; Muessle, Mary; Andersen, James; Jacobs-Baynard, Elizabeth; Allwein, Russell; Peterson, Gordon; Peterson, Gordon; Virgilio, Martin; Virgilio, Martin; Weber, Michael; Weber, Michael; Ash, Darren; Ash, Darren

**Subject:** Funding Needs for Japan Follow-up - Resent to provide Attachment

Resent to provide the Attachment

All,

The Chairman has requested for the NRC to conduct a Near-term (90 day effort) and a longer-term review (as discussed by Bill B at the Commission meeting today) of regulatory issues affecting U.S. operating reactors based on the events in Japan. The Chairman is interested in seeking supplemental funding to support our efforts for the above effort, in addition to NRC's costs associated with emergency response and technical experts sent to Japan. OCFO is preparing cost data associated with emergency response and technical support to Japan.

On Friday, the OCFO requested some initial estimates to support the reviews (see attached). At this time, we are requesting the offices to review these initial estimates and include some information concerning the work that is envisioned to support these reviews. Listed below are some initial thoughts about the scope of the near-term and long-term reviews. Also, consider what on-going efforts related to the development of our regulatory program could benefit with supplemental funding. For example, it was mentioned in the Commission meeting that NRC is currently working on GSI-199. Should funding be accelerated for this effort and others of this nature.

Near Term Review (90 day effort):

- Evaluate currently available technical and operational information from the Japan event to identify near-term (or immediate) operational or regulatory issues affecting U.S. operating reactors of all designs in areas such as protection against earthquakes, tsunamis, flooding, hurricanes, station blackout and a degraded ability to restore power; severe accident mitigation and emergency preparedness
- Develop recommendations for generic communications, orders, changes to inspection procedures and licensing review guidance, etc.
- Possibly prepare a 30 day quick look report

Longer-Term Review (Following obtaining sufficient technical information from the Japan event)

- Evaluate all technical and policy issues related to the event to identify additional research, generic issues, changes to the reactor oversight process, rulemakings and adjustments to the regulatory framework that should be conducted by the NRC.
- Evaluate interagency issues such as emergency preparedness.
- Applicability of the lessons learned to non-operating reactor and non-reactor facilities.

It is recognized that the full scope of the reviews has yet to be determined or the size of the group that will be conducting the analysis. Therefore, we are looking only for rough cost estimates. You are requested to send the level of funding (dollars and FTE)

that is anticipated that could be obligated in FY 2011 for both the near-term and long-term efforts. We are asking the business line leads to coordinate with supporting offices and submit a response by business line and by office. Please send your responses to me and Liz Jacobs-Baynard and copy Jennifer Golder and George Smolik, OCFO NLT than Noon on Tuesday.

If you have any questions, please let me know.

Thank you for your support.

NSIR

**From:** [Beasley, Benjamin](#)  
**To:** [Coyne, Kevin](#)  
**Cc:** [Coe, Doug](#)  
**Subject:** RE: Support for Japan Response  
**Date:** Tuesday, March 22, 2011 6:44:14 AM

---

Please add the following OEGIB staff that have / are supporting the Ops Center:

Michelle Bensi  
John Kauffman  
John Lane

Refer

---

**From:** Coyne, Kevin  
**Sent:** Monday, March 21, 2011 7:24 PM  
**To:** Demoss, Gary; Xing, Jing; Salley, MarkHenry; Wood, Jeffery; Beasley, Benjamin; Ott, William  
**Cc:** Peters, Sean; Coe, Doug  
**Subject:** Support for Japan Response

The agency has lifted overtime restrictions for folks supporting the Japan incident response. In order to ensure that HRMS will accept time correctly, PMDA needs to know who might be charging overtime/comp time for the recent events in excess of the normal limits. Please let me know if you have any folks so involved and we'll pass the information onto PMDA. I currently have the following possible names:

Dave Stroup  
Felix Gonzalez  
Mark Salley  
Don Marksberry  
Don Helton

Let me know who I've missed...

Thanks!

Kevin

N/75

100?

**From:** Correia, Richard  
**To:** Sheron, Brian; Uhle, Jennifer; Wiggins, Jim; Evans, Michele  
**Cc:** Layton, Michael; Caldwell, Robert; Coe, Doug  
**Subject:** Ops center coverage  
**Date:** Tuesday, March 22, 2011 7:07:28 AM

---

All,

I will be working in the Ops Center as Liaison Team Director mid shift (3 – 11) starting Wed. thru Sat.

N/76

NSIR

**From:** [Valentin, Andrea](#)  
**To:** [Case, Michael](#); [Richards, Stuart](#); [Gibson, Kathy](#); [Coe, Doug](#); [Coyne, Kevin](#); [Kardaras, Tom](#)  
**Cc:** [Sheron, Brian](#)  
**Subject:** Spreadsheet  
**Date:** Tuesday, March 22, 2011 3:03:29 PM  
**Attachments:** [emergency premium work.xlsx](#)  
**Importance:** High

---

Hello All,

I am collecting the names and dates to send to CFO for work being done in support of the Japan response. CFO needs this info since HRMS may not allow the employee to enter time worked unless some changes are made to the system. The memo dated 3/16 said that they need this information ASAP to avoid difficulties processing the appropriate payments.

I plan to submit this interim list by COB tomorrow so CFO can get started on what they need to do. I can always send additional names later. Please remember to send me both names and dates worked (or planned schedule if it has not occurred yet).

Thanks,  
Andrea

N/27

**Office of Nuclear R**

<b>Name</b>	<b>Division</b>	<b>Days Worked</b>
Brett Rini	Front Office	March 12, 2011 March 13, 2011 March 14, 2011
Tia Pope		March 12, 2011 March 14, 2011 (ended 7 a.m. Tuesday, March 15th) March 16, 2011 (ended 7 a.m. Thursday, March 17)  March 17, 2011 (ended 7 a.m. Friday, March 18th)
Sapna Hurd		March 11, 2011 March 12, 2011 March 13, 2011 March 15 2011 March 17, 2011 March 18, 2011 March 19, 2011 March 20, 2011 March 21, 2011 March 22, 2011 March 24, 2011
Amy Bonaccorso		March 15, 2011 – Half Day March 16, 2011 March 17, 2011 March 18, 2011 March 21, 2011

## Regulatory Research

**From:** [Xing, Jing](#)  
**To:** [Ibarra, Jose](#)  
**Cc:** [Beasley, Benjamin](#); [Peters, Sean](#); [Coe, Doug](#)  
**Subject:** RE: Near Term and Long Term Lessons Learned From Japan  
**Date:** Tuesday, March 22, 2011 9:53:19 AM

---

Agree with Jose. Apparently lessons learned in communication and safety culture from the accident should be included. Back to some years ago the agency has done some great work in HF/communication. I have been thinking if somehow we should revisit the work and foster its application in new reactor Construction and Inspection.

A number of HF issues have been revealed in the Japan accident. Among those operator performance under degraded I&C is intruding. HFRB has done some preliminary work in this area and user offices have indicated desires for more work.

I did not see the email that requested for initial information. Could you please forward me the email if there is action required for BCs.

Thanks,

Jing

---

**From:** Ibarra, Jose  
**Sent:** Tuesday, March 22, 2011 7:50 AM  
**To:** Peters, Sean; Xing, Jing; Coe, Doug  
**Cc:** Beasley, Benjamin  
**Subject:** Near Term and Long Term Lessons Learned From Japan

Doug, Jing, and Sean,

I notice that the initial list of projects compiled by RES did not include any projects on Communications and Safety Culture/Human Factors. The communications on this event has been dismal and I believe that Safety Culture will be an issue once we get more information on the event. It would be prudent to include Communication and Safety Culture/Human Factors in the near term and long term Lessons Learned from the Japan accident. Note that the initial information that was requested today has been delayed.  
Thanks. Jose

**From:** [Beasley, Benjamin](#)  
**To:** [Coyne, Kevin](#)  
**Cc:** [Coe, Doug](#); [Hudson, Daniel](#); [Stutzke, Martin](#)  
**Subject:** RE: Japan Response Impacts for DRA  
**Date:** Wednesday, March 23, 2011 11:18:47 AM

---

Kevin,

It is possible (likely) that the activities on GI-199 will be accelerated / expedited. That will affect OEGIB some, but Marty to a greater extent. Is cloning technology perfected yet?

OEGIB will do what it can to aid Marty with John, Shelby and Lauren. Is it possible for Nathan to pick up some of the GI-199 and/or Level 3 work?

Ben

---

**From:** Coyne, Kevin  
**Sent:** Wednesday, March 23, 2011 10:54 AM  
**To:** Sheron, Brian  
**Cc:** Uhle, Jennifer; Coe, Doug; Hudson, Daniel; Salley, MarkHenry; Beasley, Benjamin; Stutzke, Martin  
**Subject:** Japan Response Impacts for DRA

Brian –

The biggest impact to DRA in supporting the Japanese response is on the Level 3 SECY paper. Although we can meet the accelerated schedule proposed by the EDO's office, loss of much more of Marty Stutzke's time to addressing GI-199 issues will adversely impact our ability to meet the schedule (Marty has a key role in developing the paper). The information requests on GI-199 and fire have also impacted our fire research and generic issues program, but to a more limited extent. In fact, the fire research staff minimized the impact to core research by working over the weekend to develop Q&A's for the Monday Commission briefing. Obviously, new requests for information or new research needs as a result of the event will add to our work load and have additional impacts.

Let me know if you need any additional information or have questions-

Kevin

**From:** [Coyne, Kevin](#)  
**To:** [Valentin, Andrea](#)  
**Cc:** [Coe, Doug](#); [Beasley, Benjamin](#); [Demoss, Gary](#); [Salley, MarkHenry](#); [Ott, William](#); [Xing, Jing](#); [Peters, Sean](#); [Wood, Jeffery](#)  
**Subject:** RE: Spreadsheet  
**Date:** Wednesday, March 23, 2011 2:49:25 PM

---

Andrea –

DRA has the following names to add to your list of people providing support for the NRC's Japan response:

- Michelle Bensi
- Felix Gonzalez
- Don Helton
- John Kauffman
- John Lane
- Don Marksberry
- Mark Salley
- Dave Stroup
- Marty Stutzke

Since the situation is dynamic, and some of these folks are not in the office right now, just put the dates worked as March 13-26, 2011 for all the DRA folks.

-Kevin

---

**From:** Valentin, Andrea  
**Sent:** Tuesday, March 22, 2011 3:02 PM  
**To:** Case, Michael; Richards, Stuart; Gibson, Kathy; Coe, Doug; Coyne, Kevin; Kardaras, Tom  
**Cc:** Sheron, Brian  
**Subject:** Spreadsheet  
**Importance:** High

Hello All,

I am collecting the names and dates to send to CFO for work being done in support of the Japan response. CFO needs this info since HRMS may not allow the employee to enter time worked unless some changes are made to the system. The memo dated 3/16 said that they need this information ASAP to avoid difficulties processing the appropriate payments.

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