

Muessle, Mary; Pace, Patti; Pulley, Deborah; Savoy, Carmel; Speiser, Herald; Taylor, Renee; Temp, GEA; Temp, WCO; Temp, WDM; Wright, Darlene; Wittick, Susan; Sargent, Kimberly; Hayden, Elizabeth; Brenner, Eliot; Powell, Amy; Schmidt, Rebecca

**Subject:** Materials for March 21st Commission Briefing on Japan Event

Attached is the final scheduling note for the March 21st Commission briefing on the Japan Event. Staff slides should be emailed later today by Jim Andersen (OEDO).

Note that Commissioner Magwood goes first with questions.

Below are a few meeting logistics for your information:

- Bill Borchardt will be the only NRC staff member at the table.
- The seats in the well are reserved for DEDOs / Office Directors
- The stadium seating to the Commissioners left will be reserved for designated technical staff (who may be called upon during the meeting) and Commission Office EAs/TAs
- The stadium seating to the Commissioners right will be reserved for Press Corps/OPA
- Some of the stadium seating in front of the Commissioners will be reserved for VIPs (Congressional Office staffers).
- The remaining stadium seats in front of the Commissioners will be open to the public.

Once the available public seats are filled, members of the public will be directed around the back of the building where they will enter the TWFN Auditorium to view the Commission meeting.

Thanks,  
Rich

NNNN/1



# **Briefing on NRC Response to Recent Nuclear Events in Japan**

**Bill Borchardt**  
**Executive Director for Operations**  
**March 21, 2011**

# **Agenda**

- **Event Overview**
- **Immediate NRC Response**
- **Continuing NRC Response**
- **Health Effects of Radiation**
- **Domestic Reactor Safety**
- **Path Forward**

# **Event Overview**

- **Discussion of initiating event**
- **Current status of reactors**
- **Current status of spent fuel pools**

# **Immediate NRC Response**

- **Activated Operations Center**
- **Dispatched NRC experts to Japan**
- **Areas of focus**
- **Extensive outreach to stakeholders**

# **Continuing NRC Response**

- **Operations Center**
- **Support U.S. response**
- **Provide assistance**
- **Mobilize resources**

# **Health Effects of Radiation**

- **Offsite Doses**
- **Radiological Consequences**

# **Domestic Reactor Safety**

- **NRC oversight of U.S. plant safety**
- **Continuous improvement based on operating experience**

# **NRC Activities – Near Term**

- **Inspection Activities**
- **Generic Communications**
- **Immediate regulatory actions**

# **NRC Activities – Longer Term**

- **Lessons learned and recommendations**
- **Regulatory actions, for example, to identify potential:**
  - **Research projects**
  - **Generic issues**
  - **Regulatory enhancements**

# **Conclusion**

**From:** [Ellmers, Glenn](#)  
**To:** [Burnell, Scott](#); [McIntyre, David](#)  
**Subject:** FW: ACTION: all hands  
**Date:** Monday, March 21, 2011 8:34:44 AM  
**Attachments:** [Staff Slides for March 21 Meeting \(Japanese Event\).pptx](#)

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Here's the version with the Notes (not for release).

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**From:** Gratton, Christopher  
**Sent:** Friday, March 18, 2011 12:18 PM  
**To:** Ellmers, Glenn  
**Subject:** RE: ACTION: all hands

Glenn, Here are the most recent slides and talking points. We are still getting info, but they should be close. I don't know about Allen or John, but I haven't had time to review the talking points you developed.

CG

---

**From:** Ellmers, Glenn  
**Sent:** Friday, March 18, 2011 12:08 PM  
**To:** Boska, John; Howe, Allen  
**Cc:** Gratton, Christopher  
**Subject:** RE: ACTION: all hands

I'm meeting with Bill in 20 minutes. Any input? Feedback on my talking points?

---

**From:** Boska, John  
**Sent:** Friday, March 18, 2011 9:13 AM  
**To:** Howe, Allen; Ellmers, Glenn  
**Cc:** Gratton, Christopher  
**Subject:** RE: ACTION: all hands  
**Importance:** High

Glenn, Chris Gratton has the slides and is updating them. We will email you a copy before noon.

John Boska  
Indian Point Project Manager, NRR/DORL  
U.S. Nuclear Regulatory Commission  
301-415-2901  
email: [john.boska@nrc.gov](mailto:john.boska@nrc.gov)

---

**From:** Howe, Allen  
**Sent:** Friday, March 18, 2011 9:10 AM  
**To:** Leeds, Eric  
**Cc:** Ellmers, Glenn; Boska, John; Gratton, Christopher  
**Subject:** RE: ACTION: all hands

Will do

John/Chris – please update Glenn

NNNN/2

---

**From:** Leeds, Eric  
**Sent:** Friday, March 18, 2011 8:16 AM  
**To:** Howe, Allen  
**Cc:** Ellmers, Glenn; Boska, John; Gratton, Christopher  
**Subject:** ACTION: all hands

Allen – could you or one of your team, help Glenn on this. Thanks!

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

---

**From:** Borchardt, Bill  
**Sent:** Friday, March 18, 2011 6:53 AM  
**To:** Ellmers, Glenn; Leeds, Eric  
**Subject:** all hands

Glenn – please get the outline (and talking points in whatever shape they're in) for Monday's comm mtg so that I can use them for the all hands meeting. Also prepare a 1 pager of additional items that you think I should cover such as Darren's note (that I just sent to you), thanking the nrc staff, etc....

I hope to back from the hill around noon



# **Briefing on NRC Response to Recent Nuclear Events in Japan**

**Bill Borchardt**  
**Executive Director for Operations**  
**March 21, 2011**

# **Agenda**

- **Event Overview**
- **Immediate NRC Response**
- **Continuing NRC Response**
- **International perspectives**
- **Assessment of Domestic Reactor Safety**
- **Planned NRC Activities**
- **Impact on Current NRC Activities**

# **Event Overview**

- **Discussion of initiating event**
- **Current status of reactors**
- **Current status of spent fuel pools**
- **NRC Incident Response Center evaluating potential dose impacts within 50 miles of site**
- **Collaborating with DOE to support evaluation of potential impacts on U.S.**

# **Immediate NRC Response**

- **Activated Operations Center**
- **Dispatched 11 NRC experts to Japan**
- **Established support for U.S. Embassy**
- **Opened dialog with Japanese government**
- **Established outreach to stakeholders**

# **Continuing NRC Response**

- **Operations Center manned 24/7**
- **Support NRC personnel in Japan, rotate as necessary**
- **Provide assistance as requested**
- **Mobilize resources as part of U.S. response**

# **International Perspectives**

- **Historical Relationships**
- **Global Nuclear Safety Network**

# **Assessment of Domestic Reactor Safety**

- **Design basis includes natural disasters expected for their locale**
- **Must be able to cope with a loss of all AC power for a designated time period**
- **Guidelines and planning for Beyond-Design-Basis events**

# **Assessment of Domestic Reactor Safety (Cont.)**

- **Improvements to design and operation since initial licensing**
- **The emergency preparedness planning basis for nuclear power plants is valid.**
- **INPO and industry initiatives**
- **NRC confidence in U.S. plants safety**

# **Planned NRC Activities – Near Term**

- **Regulatory Actions evaluation**
  - **Enhanced Inspection Activities**
  - **Generic Communications**
  - **Other regulatory actions**

# **Planned NRC Activities – Longer Term**

- **Develop lessons learned and recommendations**
- **Consider other regulatory actions**

# **Impact on Current NRC Activities**

- **Increased communications with stakeholders**
- **Current licensing action review impacts**
- **Most NRC activities will continue as scheduled**

**From:** OPA Resource  
**To:** Ash, Darren; Barkley, Richard; Batkin, Joshua; Bell, Hubert; Belmore, Nancy; Bergman, Thomas; Bollwerk, Paul; Bonaccorso, Amy; Borchardt, Bill; Bozin, Sunny; Brenner, Eliot; Brock, Terry; Brown, Boris; Bubar, Patrice; Burnell, Scott; Burns, Stephen; Carpenter, Cynthia; Chandrathil, Prema; Clark, Theresa; Collins, Elmo; Couret, Ivonne; Crawford, Carrie; Cutler, Iris; Dacus, Eugene; Dapas, Marc; Davis, Roger; Dean, Bill; Decker, David; Dricks, Victor; Droggitis, Spiros; Flory, Shirley; Franovich, Mike; Gibbs, Catina; Haney, Catherine; Hannah, Roger; Harbuck, Craig; Harrington, Holly; Hasan, Nasreen; Hayden, Elizabeth; Holahan, Gary; Holahan, Patricia; Holian, Brian; Jacobsen, Patricia; Jaczko, Gregory; Jasinski, Robert; Jenkins, Verlyn; Johnson, Michael; Jones, Andrea; Kock, Andrea; Kotzalas, Margie; Ledford, Joey; Lee, Samson; Leeds, Eric; Lepre, Janet; Lew, David; Lewis, Antoinette; Loyd, Susan; Magwood, William; McCrary, Cheryl; McGrady-Finneran, Patricia; McIntyre, David; Mensah, Tanya; Mityng, Viktoria; Monninger, John; Montes, David; Nieh, Ho; Ordaz, Vonna; Ostendorff, William; Owen, Lucy; Powell, Amy; Quesenberry, Jeannette; Reddick, Darani; Regan, Christopher; Reyes, Luis; Riddick, Nicole; RidsSecyMailCenter Resource; Riley (OCA), Timothy; Rohrer, Shirley; Samuel, Olive; Satorius, Mark; Schaaf, Robert; Schmidt, Rebecca; Scott, Catherine; Screnci, Diane; Shaffer, Vered; Shane, Raeann; Sharkey, Jeffrey; Sheehan, Neil; Sheron, Brian; Siurano-Perez, Osiris; Steger (Tucci), Christine; Svinicki, Kristine; Tabatabai, Omid; Tannenbaum, Anita; Taylor, Renee; Temp, WDM; Thomas, Ann; Uhle, Jennifer; Uselding, Lara; Vietti-Cook, Annette; Virgilio, Martin; Virgilio, Rosetta; Walker-Smith, Antoinette; Weaver, Doug; Weber, Michael; Weil, Jenny; Werner, Greg; Wiggins, Jim; Williams, Evelyn; Zimmerman, Roy; Zorn, Jason  
**Subject:** Press Release: Prepared Remarks for Commission Meeting Monday, March 21, 2011  
**Date:** Monday, March 21, 2011 9:36:17 AM  
**Attachments:** 11-054.docx

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For immediate release and posting.

Office of Public Affairs  
US Nuclear Regulatory Commission  
301-415-8200  
opa.resource@nrc.gov

NNNN/B



# NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Telephone: 301/415-8200  
Washington, D.C. 20555-0001

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

No. 11-054

March 21, 2011

## PREPARED REMARKS FOR COMMISSION MEETING MONDAY, MARCH 21, 2011

Good morning. The Commission meets today to discuss the tragic events in Japan and consider possible actions we may take to verify the safety of the nuclear facilities that we regulate in the United States. This meeting will—without a doubt—be one of the most heavily watched meetings in the history of this agency.

People across the country and around the world who have been touched by the magnitude and scale of this disaster are closely following the events in Japan, and the repercussions in this country and in many other countries. I would first like to offer my condolences to all those who have been affected by the earthquake and tsunami in Japan. Our hearts go out to all who have been dealing with the aftermath of these natural disasters, and we are mindful of the long and difficult road they will face in recovering. We know that the people of Japan are resilient and strong, and we have every confidence that they will come through this difficult time and move forward, with resolve, to rebuild their vibrant country.

I believe I speak for all Americans when I say that we stand together with the people of Japan at this most difficult and challenging time. The NRC is a relatively small agency, with approximately 4000 staff, but we play a critical role in protecting the American people and the environment. We have inspectors who work full-time at every nuclear plant in the country, and we are proud to have world-class scientists, engineers and professionals representing nearly every discipline.

Since Friday, March 11, when the earthquake and tsunami struck, the NRC's headquarters Operations Center has been operating on a 24-hour basis to monitor and analyze events at nuclear power plants in Japan. At the request of the Japanese government, and through the United States Agency for International Development (USAID), the NRC sent a team of its technical experts to provide on-the-ground support, and we have been in continual contact with them. And, within the United States, the NRC has been working closely with other Federal agencies as part of our government's response to the situation.

We have a responsibility to the American people to undertake a systematic and methodical review of the safety of our own domestic nuclear facilities, in light of the natural disaster and the resulting nuclear emergency in Japan. Beginning to examine all available

information is an essential part of our effort to analyze the event and understand its impact on Japan and implications for the United States. Our focus is always on keeping plants and radioactive materials in this country safe and secure.

As this immediate crisis in Japan comes to an end, we will look at any information we can gain from the event and see if there are changes we need to make, to further protect the public. Together with my colleagues on the Commission, we will review the current status and identify the steps we will take to conduct that review. In the meantime, we will continue to oversee and monitor plants to ensure that U. S. reactors remain safe.

On behalf of the Commission, I want to thank all of our staff for maintaining their focus on our essential safety and security mission throughout these difficult days. I want to acknowledge their tireless efforts and their critical contributions to the U.S. response to assist Japan. In spite of the evolving situation, the long hours, and the intensity of efforts over the past week, staff has approached their responsibilities with dedication, determination and professionalism, and I am incredibly proud of their efforts.

The American people also can be proud of the commitment and dedication within the Federal workforce, which is exemplified by our staff every day. Before we begin our meeting with Mr. Borchardt's presentation, would any of my fellow Commissioners like to make opening comments?

###

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:** [Burnell, Scott](#)  
**To:** [Harrington, Holly](#); [Brenner, Eliot](#); [Hayden, Elizabeth](#)  
**Cc:** [McIntyre, David](#); [Dricks, Victor](#)  
**Subject:** RE: B5B info from what Chairman said yesterday on C-Span  
**Date:** Monday, March 21, 2011 9:50:46 AM

---

Video's on CSPAN page:

<http://www.cspan.org/Events/Nuclear-Regulators-Give-Update-on-Crisis-in-Japan/10737420375-3/>

Not a transcript, true, but...

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**From:** Harrington, Holly  
**Sent:** Monday, March 21, 2011 9:50 AM  
**To:** Brenner, Eliot; Hayden, Elizabeth  
**Cc:** Burnell, Scott; McIntyre, David; Dricks, Victor  
**Subject:** B5B info from what Chairman said yesterday on C-Span

Victor says it would be helpful to have some Q&As (and perhaps talking points as well) that echo what the Chairman said yesterday regarding fuel pool failure mitigation and B5b. This sounds like a good idea, but I don't have a transcript to pull from. Perhaps we can discuss today after the hubbub about the meeting dies down.

Holly

NNNN/4

**From:** OST03 HOC  
**To:** DOI; DTRA; chardin; rfraass@crccd.org; james.d.lloyd@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:** Real Event: NRC Press Release #11 - Japan Event Earthquake/Tsunami  
**Date:** Monday, March 21, 2011 11:05:56 AM  
**Attachments:** Press Release 11.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.

NNNN/5



# NRC NEWS

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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-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@crocpd.org](#); [james.d.lloyd@nasa.gov](#); [PN Distribution](#); [FDA](#); [State Dept](#); [White House Sit Room](#); [Bernie Beaudin](#); [Canadian Nuclear Safety Commission \(CNSC\)](#); [eoc2@cncs-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 11:06:24 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.

NNNN/6



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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:** [Couret, Ivonne](#)  
**To:** [McIntyre, David](#)  
**Subject:** Media FW: Matthew Huisman - Dallas Morning News  
**Date:** Monday, March 21, 2011 11:53:15 AM

---

Yeah like we need to import more here....

**Ivonne L. Couret**  
Public Affairs Officer  
Office of Public Affairs  
Media Desk  
[opa.resource@nrc.gov](mailto:opa.resource@nrc.gov)  
301-415-8200

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2010-2011 Information Digest - Where you can find NRC Facts at a Glance  
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350/>

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**From:** Ghneim, Munira  
**Sent:** Monday, March 21, 2011 11:34 AM  
**To:** Couret, Ivonne  
**Subject:** Matthew Huisman - Dallas Morning News

Organization – Dallas Morning News  
Contact – Matthew Huisman  
Phone – 202-661-8416  
Email – [mhuisman@dallasnews.com](mailto:mhuisman@dallasnews.com)  
Request – Would like to know if there is any nuclear waste coming out of Japan and if NRC is going to receive that and store it. Would it end up in Texas (Andrews County)?

Thank You  
Munira Ghneim  
Contract Secretary  
Office of Information Services  
301-415-1170

NNNN/7

**From:** [Couret, Ivonne](#)  
**To:** [McIntyre, David](#)  
**Subject:** FW: Eunice Zhu - Caijng Economic Financial Magazine - China  
**Date:** Monday, March 21, 2011 11:54:17 AM

---

Did we respond to this????

**Ivonne L. Couret**  
Public Affairs Officer  
Office of Public Affairs  
Media Desk  
[opa.resource@nrc.gov](mailto:opa.resource@nrc.gov)  
301-415-8200

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<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350/>

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**From:** Ghneim, Munira  
**Sent:** Monday, March 21, 2011 11:38 AM  
**To:** Couret, Ivonne  
**Subject:** Eunice Zhu - Caijng Economic Financial Magazine - China

Organization - Caijng Economic Financial Magazine - China  
Contact - Eunice Zhu  
Phone - 008618601275587  
Email – [yzhi@caijng.com.cn](mailto:yzhi@caijng.com.cn)  
Request – Would like to ask Martin Virgilio what he thinks of Japan's response in technical terms.

Thank You  
Munira Ghneim  
Contract Secretary  
Office of Information Services  
301-415-1170

NNNN/8

**From:** [Munger, Frank](#)  
**To:** [McIntyre, David](#)  
**Subject:** question  
**Date:** Monday, March 21, 2011 12:23:14 PM

---

David,

I know you're probably busy at the moment with all things Japan-related, but if you find the time could you update me please on the EnergySolutions application to import German low-level waste for treatment. Has the NRC made a decision on whether to hold a public hearing on the request and if so what are the details?

Anything else, in regard to the response you've received on that issue, would be helpful.

Thanks, as always, for your help.

Frank Munger

**Frank Munger**

Senior Writer

News Sentinel/Knoxnews.com

[mungerf@knoxnews.com](mailto:mungerf@knoxnews.com)

(865) 342-6329

Blog: [Atomic City Underground](#)

NNNN/9

**From:** McIntyre, David  
**To:** Couret, Ivonne; martin.bricketto@law360.com  
**Subject:** RE: Media Questions - FW: examination of U.S. reactors  
**Date:** Monday, March 21, 2011 1:08:00 PM

---

Martin – the Chairman was referring to our longstanding requirements that Mark 1 plants install hardened hydrogen vents and nitrogen inert containment (to eliminate oxygen and reduce the hydrogen+oxygen=combustion risk.)

**David McIntyre**  
Office of Public Affairs  
U.S. Nuclear Regulatory Commission  
(301) 415-8200

---

**From:** Couret, Ivonne  
**Sent:** Monday, March 21, 2011 11:36 AM  
**To:** McIntyre, David  
**Subject:** Media Questions - FW: examination of U.S. reactors

**Ivonne L. Couret**  
Public Affairs Officer  
Office of Public Affairs  
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301-415-8200

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**From:** Janbergs, Holly **On Behalf Of** OPA Resource  
**Sent:** Monday, March 21, 2011 11:12 AM  
**To:** Couret, Ivonne  
**Subject:** FW: examination of U.S. reactors

---

**From:** Martin Bricketto [mailto:martin.bricketto@law360.com]  
**Sent:** Monday, March 21, 2011 10:59 AM  
**To:** OPA Resource  
**Subject:** examination of U.S. reactors

Hello,

I'm a reporter with Law360, Manhattan-based legal newswire.

NNNN/10

I'm following up on a Wall Street Journal article on remarks by Mr. Jaczko. Citing Mr. Jaczko, the article stated that "the U.S. has already instituted procedures to reduce the risk of mishaps such as those that have deviled Japanese authorities."

Is that accurate and if so what kinds of procedures? Is it accurate that a "top-down examination" of procedures at U.S. nuclear energy facilities is underway?

Also, do you know when an archived version of today's NRC meeting will be available?

Thanks in advance for your help.

Best,

--

Martin Bricketto

Reporter

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New York, New York 10003  
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| Technology Law360 | Top News Law360

**From:** [Jones, Cynthia](#)  
**To:** [McIntyre, David](#); [Harrington, Holly](#); [LIA06 Hoc](#)  
**Subject:** Q&As from EDF for your information and use.....This was widely disseminate  
**Date:** Monday, March 21, 2011 1:54:46 PM  
**Attachments:** [Questions and Answers on Japanese Earthquake - 18 March 2011.pdf](#)

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FYI-

This was widely disseminated amongst all EDF employees. For your info or use,,,,

Cyndi

NNNN/11

## **SAFETY OF UK PLANTS**

### **Could a similar event happen in the UK?**

- The UK does not have the same seismic activity as Japan. Nor do we operate the same type of plants.
- Even if they were hit by the worst earthquake, tsunami or flood that could be expected in 10,000 years, our plants would be safe.
- These measures are detailed in approved safety cases which are tested and agreed with the independent safety authority.
- Further, beyond that design principle, in even more extreme and unlikely scenarios there are back up systems and steps we could take to provide protection.
- Nonetheless, if there are relevant lessons to be learnt from Japan, they will be implemented.

### **What level of seismic activity is credible in the UK?**

- An earthquake the size of the one in Japan is not credible in the UK.
- The largest earthquake in the UK occurred on the Dogger Bank in 1931, 100km into the North Sea with a magnitude of 6.1. The energy from this UK earthquake was 130,000 times smaller than the earthquake which hit Japan on 11 March (8.9 on the Richter scale).
- It caused minor damage along the east coast of England to chimneys and roofs. There is no chance of a tsunami from a British earthquake because they are small and low in energy.
- Earthquakes of the size of the Japanese earthquake can only occur in zones where tectonic plates collide. The UK is located in the middle of a tectonic plate. The nearest place to the UK where plates meet is thousands of kilometres away.
- The largest earthquake ever recorded in Northern Europe was in 1356 (6.5 on the Richter scale).

### **What magnitude of earthquake are UK plants protected against.**

- They are protected against the effects of a 1 in 10,000 years earthquake.
- That means: Even if they were hit by the worst earthquake that could be expected in 10,000 years, our plants would be safe.
- These measures are detailed in approved safety cases which are tested and agreed with the independent safety authority.
- Further, beyond that design principle, in even more extreme and unlikely scenarios there are back up systems and steps we could take to provide protection.
- Because of the different geological conditions at each site that means different magnitudes for each.
- But it means that they are protected against all credible seismic activity in the UK.

### **What level of storm surge/tsunami are UK plants protected against:**

- All the plants are protected against credible storm surge and tsunami events for the UK.
- Even if they were hit by the worst storm or tsunami or flood that could be expected in 10,000 years, our plants would be safe.
- These measures are detailed in approved safety cases which are tested and agreed with the independent safety authority.
- Further, beyond that design principle, in even more extreme and unlikely scenarios there are back up systems and steps we could take to provide protection.

- The levels are different for each plant because of the range of geographical conditions at each.
- For Sizewell as an example, the worst case scenario for extreme high tide and tsunami combining is 2.3m. The plant is designed to withstand a wave of 7.6m – more than 5m higher.
- We have applied similar standards to all the sites, reflecting the local conditions.

### **Is Nuclear power safe?**

- Nuclear power stations are some of the most robust buildings ever built.
- The training and safety culture in the nuclear industry is particularly high.
- It is part of the safety-case licensing programme, overseen by the Nuclear Installations Inspectorate, that all UK nuclear plants are robust to withstand the most extreme conditions including earthquake.
- Emergency arrangements are regularly tested at all UK nuclear plant and local populations are briefed on safety issues and emergency arrangements. Various countermeasures can be taken, including evacuation, sheltering and administering iodine tablets.

### **How does regulation support this?**

- Independent Nuclear and environmental regulation in the UK is extremely stringent.
- Regulation is provided by both the NII and the Environment Agency (SEPA in Scotland).
- The regulator (NII) has said that it is confident that the UK's fleet of nuclear power reactors and operators are prepared appropriately for any seismic activity that could be anticipated in the UK.
- Safety-cases must demonstrate UK nuclear reactors could withstand the most extreme seismic conditions – otherwise they would not be licensed.
- Preparedness for seismic activity is examined and inspected by UK regulators during 10-yearly periodic safety reviews and continuously through the year as required.
- The UK regulator ensures each and every nuclear plant has access to emergency power supplies should connection to the grid fail - and that back-up plans are robust.
- The regulator oversees regular testing of on-site and offsite emergency procedures at each UK nuclear plant. The police, local authorities, emergency services and other agencies are involved and regularly practice such scenarios with the plant operators.
- We learn from every exercise and ensure we enhance safety standards.

### **The latest reactor designs are even safer than previous ones. Does that mean our existing plants are unsafe?**

- No it doesn't. All our plants have very robust safety cases agreed with and tested by the safety authority. One analogy might be - when you buy a new car, it's state of the art.
- However, as time goes on there are constant developments and improvements. This doesn't make the car you have unsafe; it just means that there are now better options on the market.
- In our case every 10 years in a Periodic Safety Review (PSR), we take stock of what better options there are and back fit improvements as necessary.
- To use the car analogy, this doesn't mean you make your old car exactly like a brand new one but, to give some historical examples, you would fit seat belts, ABS brakes, better headlights.
- That's what a PSR is and we have to satisfy the NII with our review.
- Practically this means that, for example on Dungeness B, (our oldest AGR and therefore with the biggest gap in time with newer models) we spent around £100m back fitting systems - additional feed systems, electrical overlay systems, additional fault protection – as part of our first PSR to enhance our safety standards.

- Ongoing investment and improvements take place between PSRs.

### What serious nuclear events have there been in the UK?

- Level 5 on INES scale, Windscale Reactor Fire, October 1957 - a reactor built for plutonium production caught fire releasing substantial amounts of radioactive contamination into the surrounding area. (Windscale was an early experimental reactor owned by United Kingdom Atomic Energy Authority which was completely different to those we have)
- Level 4 on INES scale, Windscale reprocessing plant September 1973 - an exothermic reaction occurred involving accumulated zirconium fines and solvent in a vessel in the Head End Treatment Plant, Building B204. This caused contamination of the plant operating area although nothing to the local environment.
- The highest level incident at one of our plants has been a Level 2.

### How can we guarantee our cooling systems in other situations?

- We assess the nuclear facilities for preparation not just on seismic activities but against a range of possibilities, including direct aeroplane strike, terrorist attack etc. The regulator assesses this.
- The regulator continues to express confidence in our fleet.
- All our plants have access to emergency power supplies should connection to the grid fail.
- EDF Energy and the regulator ensure these back up plans are robust.
- The regulator oversees regular testing of on-site and offsite emergency procedures at each UK nuclear plant. The police, local authorities, emergency services and other agencies are involved and regularly practice such scenarios with the plant operators. These exercises must be successfully demonstrated to the regulator or they can to shut the plant down.

### What if mains power was lost to stations because of the national grid?

- All our stations are designed with the capability to withstand a loss of grid.
- All are equipped with back up generators capable of supplying power to essential equipment.
- These are protected from credible natural events.

### Is Nuclear still needed?

- We always operate our plants with safety at the forefront of our mind.
- The safety case for nuclear plants in the UK is strong and regulation is stringent.
- Britain's need for a diverse energy mix is unchanged.
- What is important is to learn the lessons from the events in Japan and to incorporate any lessons.
- The imperative need for affordable, low carbon power supply remains as strong as ever.

### How much radiation are people exposed to in everyday life? (in millisieverts, which is the standard unit for measuring radiation)

- 0,002 Annual dose received when in the vicinity of a nuclear power plant
- 0,006 Dose received during a dental panoramic radiograph
- 0,03 Dose received during a flight from London to New York
- 0,3 Dose received during a lung/chest radiograph/x-ray
- 0,3 Annual dose received due to radioactivity in food and water
- 2,5 Average annual dose background dose
- 8 Average annual background dose in areas of Cornwall due to the granite rock

**At what level does radiation become harmful?**

- 100 Dose at which the first biological effects appear
- 500 Dose causing long term effects
- 1 000 Dose causing immediate clinical effects
- 4 000 Dose that is lethal if not treated in 50% of cases
- 7 000 Dose that is lethal in a few hours

**Are EDF Energy and the public authorities ready to deal with a nuclear accident?**

- EDF Energy has well-established emergency plans in place for each of its nuclear power stations, to be activated in the unlikely event of emergency.
- These arrangements form part of the emergency response plan and involve a number of different agencies who work together to provide a robust response.
- In conjunction with our regulator, EDF Energy runs a programme of emergency exercises across all of its eight nuclear power stations in the UK. These test how all of the agencies involved in emergency planning would respond in the unlikely event of an emergency being declared at our nuclear sites.

**Are we supporting the international effort to assist the Japanese nuclear operator?**

- EDF Group is monitoring the situation closely. We are preparing to send experts as required through the auspices of the World Association of Nuclear Operators. We are also providing nuclear expertise to the Foreign and Commonwealth Office and other official bodies.
- We are sending 95 tonnes of boric acid to Japan, to put into the water to prevent uncontrolled criticality in the storage ponds.
- We are also making available robots, detection systems and radioprotection equipment to Tepco (the Fukushima plant owners and operators).
- In total 130 tonnes of equipment made available by EDF and Areva will be flown out to Japan this weekend, with the required accompanying personnel.
- Tepco has also asked EDF Group to help them get the networks back up and running as soon as possible. ERDF (the networks division of EDF) is fully involved with these efforts.
- EDF Energy has also provided iodine tablets for the British and Commonwealth Foreign Office (FCO) and stands ready to mobilise additional resources if and when required.

**What actions are we taking in our existing stations following the events in Japan?**

- We are monitoring the situation in Japan carefully.
- As the full facts emerge from Japan we will ensure any appropriate lessons are implemented.
- In our existing stations, as in the whole of EDF Energy, we are ensuring that safety continues to be our top priority.
- We are not complacent. We called a special meeting of the board to initiate an immediate action plan. This included:
  - Immediate check by station directors of back up systems, over and above normal audit process.
  - Refresher training for employees on use of back up systems – in addition to usual training programme
  - Initiate review of the Emergency plan with particular focus on the impact on infrastructure disturbance
  - Establish formal arrangements to ensure that learning from the event are fed into our safety processes.

- In addition, we have sent the list of actions we are talking to WANO to ensure our steps are shared with nuclear operators across the world.

#### **What is WANO?**

- WANO is the World Association of Nuclear Operators. WANO was set up following the Chernobyl accident in order to ensure the highest possible standards of nuclear safety across the World. Every company and country with an operating commercial nuclear power plant is a member. The WANO mission is to maximise the safety and reliability of nuclear power plants worldwide by working together to assess, benchmark and improve performance through mutual support, exchange of information and emulation of best practices. Many EDF Energy people participate in WANO reviews around the World and, in turn, EDF Energy's power stations host nuclear experts from member companies around the world in a bid to share learning and ensure the highest standards of safety.

#### **What action will the UK safety regulator take after this?**

- The Secretary of State, Chris Huhne, has asked the NII, the UK Safety Authority, for a full report on the implications of the Japanese incident. We welcome this.
- We also welcome the fact that this will be done in close cooperation with other regulators internationally.

### **IMPACT ON OUR CUSTOMERS**

#### **Q: Will prices rise as a result of the events in Japan?**

- It is too early to tell.
- There has been an increase in wholesale prices since last Thursday (10th Mar).
- While there is speculation that market prices could increase further it should be remembered that they could also fall.
- We continue to offer some very good deals, including some very competitive fixed prices for those concerned about rising prices.

### **NUCLEAR NEW BUILD**

#### **What does this mean for our Nuclear New Build plans?**

- We welcome the political consensus in the UK on the appropriate response to the events in Japan. It steers the right course.
- There should be no knee jerk reactions and no rush to judgement.
- On new nuclear: On the one hand we need to continue working on our plans.
- On the other, of course, any learning from Japan will be incorporated into our plans in the proper way. We expect this to be achievable.

#### **How does the EPR's safety system differ to the Japanese reactors?**

- EDF reactors in France are pressurised water reactors which do not involve the same technology as that of the Fukushima plant in which boiling water reactors are used, a technology with which EDF is less familiar.
- The EPR is an evolutionary design of pressurised water reactor, taking the best of existing technology and making improvements to enhance safety, efficiency and performance.

**How confident are we in the safety systems of the EPR?**

- The EPR incorporates and builds on over 30 years of experience of operating pressurised water reactors around the world.
- The EPR design combines familiar and proven technology based on the most recent French N4 and German KONVOI reactors.
- A number of technological advances put the EPR reactor at the forefront of reactor safety. These include additional systems to prevent core meltdown and innovation to mitigate its potential consequences as well as technological advances to ensure high resistance to external hazards, in particular airplane crashes and earthquakes.

**From:** [McIntyre, David](#)  
**To:** [Couret, Ivonne](#)  
**Subject:** FAQ Can It Happen Here.docx  
**Date:** Monday, March 21, 2011 2:26:00 PM  
**Attachments:** [FAQ Can It Happen Here.docx](#)

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Here's the corrected version. Also saved in G – Crisis Communication – Japan Quake ...

NNNN/12

## Frequently Asked Questions About the Japan Nuclear Crisis:

### “Can It Happen Here?”

#### **1. Can the Japanese nuclear crisis happen here in the United States?**

The events that have occurred in Japan are the result of a combination of highly unlikely natural disasters. These include the fifth largest earthquake in recorded history and the resulting devastating tsunami. It is highly unlikely that a similar event could occur in the United States.

#### **2. I live near a nuclear power plant similar to the ones having trouble in Japan. How can we now be confident that this plant won't experience a similar problem?**

All 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 reported for the site and surrounding area – even very rare and extreme earthquakes and tsunami. The NRC is confident that the robust design of these plants makes it highly unlikely that a similar event could occur in the United States.

#### **3. How many plants are located in seismic areas?**

Although we often think of the US as having “active” and “non-active” earthquake zones, earthquakes can actually happen almost anywhere. Seismologists typically separate the United States into low-, moderate-, and high-seismicity zones. The NRC requires that every plant be designed for site-specific ground motions that are appropriate for their location. In addition, the NRC has specified a minimum ground shaking level to which the plants must be designed. See our [Fact Sheet](#) on seismic issues for more information.

#### **4. Has this crisis changed your opinion about the safety of U.S. nuclear power plants?**

No. The NRC remains confident that the design of U.S. nuclear power plants ensures the continued protection of public health and safety and the environment.

**5. With all this happening, how can the NRC continue to approve new nuclear power plants?**

It is premature to speculate what, if any, effect the events in Japan will have on the licensing of new nuclear power plants.

**6. What is the NRC doing in response to the situation in Japan?**

The NRC has taken a number of actions:

- a. Since the beginning of the event, the NRC has continuously manned its Operations Center in Rockville, MD in order to gather and examine all available information as part of the effort to analyze the event and understand its implications both for Japan and the United States.
- b. A team of 11 officials from the NRC with expertise in boiling water nuclear reactors have deployed to Japan as part of a U.S. International Agency for International Development (USAID) team.
- c. The NRC has spoken with its counterpart agency in Japan, offering the assistance of U.S. technical experts.
- d. The NRC is coordinating its actions with other Federal agencies as part of the U.S. government response.

**7. What other U.S. agencies are involved, and what are they doing?**

The entire federal family is responding to this event. The NRC is closely coordinating its efforts with the White House, DOE, DOD, USAID, and others. The U.S. government is providing whatever support requested by the Japanese government.

**8. What else can go wrong?**

The NRC is continuously monitoring the developments at the nuclear power plants in Japan. Circumstances are constantly evolving and it would be inappropriate to speculate on how this situation might develop over the coming days.

**9. What is the worst-case scenario?**

In a nuclear emergency, the most important action is to ensure the nuclear fuel in the reactor core and the spent fuel pool is covered with water to provide cooling to remove any heat from the fuel rods. Without adequate cooling, the fuel rods will melt. Should the final containment structure fail, radiation from these melting fuel rods would be released to the atmosphere and additional protective measures may be necessary depending on factors such as prevailing wind patterns.

**10. The United States has troops in Japan and has sent ships to help the relief effort – are they in danger from the radiation?**

The Department of Defense is the appropriate agency to provide information regarding its personnel.

**11. I saw a news report that said my local nuclear power plant ranked high on your list of plants most vulnerable to earthquakes. Is that true?**

The NRC does not rank plants according to seismic risk or vulnerability. This “ranking” was developed by a reporter using partial information and we believe an even more partial understanding of how we evaluate plants for seismic risk. Each plant is evaluated individually according to the geology of its site, not by a “one-size-fits-all” model – therefore such rankings or comparisons are highly misleading.

We are also frequently asked whether Plant A can withstand a quake of magnitude X. This sounds like a yes-or-no question, but again, it’s not that simple. Nuclear plants are designed to withstand a certain level of “ground shaking,” to use a technical term. But the way the ground shakes in an earthquake is a factor of the magnitude and the distance from the epicenter, among other things. So we can’t give a simple answer to such a simple question.

**12. Are nuclear power plants along the coasts vulnerable to tsunami?**

Large tsunami such as the one that hit Japan typically are caused by “subduction” faults, where one tectonic plate slides under another. There is only one such fault near the U.S. coastline – off the northern part of the West Coast, from northern California up past Oregon and Washington. There are no coastal nuclear power plants in this region. The closest plant, in central California, is the Diablo Canyon nuclear power plant. It is well protected against tsunami.

Along the Gulf Coast and the Atlantic Coast, storm surge from hurricanes generally poses a greater threat to nuclear power plants than tsunami. The plants in these regions are well protected against hurricane storm surge.

**13. Other countries have ordered their nuclear power plants to shut down in the wake of the Japan crisis until they can be determined to be safe. Why isn’t the NRC taking similar action?**

The NRC is confident that U.S. nuclear plants are safe and that there is no need to shut them down. However, events such as the Japan crisis often have lessons to offer that can help us improve our oversight and regulation of the country’s nuclear power plants. As President Obama said on March 17:

*“Our nuclear power plants have undergone exhaustive study, and have been declared safe for any number of extreme contingencies. But when we see a*

*crisis like the one in Japan, we have a responsibility to learn from this event, and to draw from those lessons to ensure the safety and security of our people. That's why I've asked the Nuclear Regulatory Commission to do a comprehensive review of the safety of our domestic nuclear plants in light of the natural disaster that unfolded in Japan."*

The NRC intends to conduct such a review as soon as possible.

**From:** McIntyre, David  
**To:** [rbutta@strategasrp.com](mailto:rbutta@strategasrp.com)  
**Subject:** NRC on events in Japan  
**Date:** Monday, March 21, 2011 2:53:00 PM

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Mr. Butta – Your invitation for NRC staff members to participate in a roundtable discussion on the recent events in Japan was forwarded to the Office of Public Affairs. I am afraid we will be unable to accept.

Regards,  
David McIntyre

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**David McIntyre**  
**Public Affairs Officer**  
**U.S. Nuclear Regulatory Commission**  
(301) 415-8200  
*Protecting People & the Environment*

NNNN/13

**From:** McIntyre, David  
**To:** Gordon, Greg  
**Subject:** RE: Still no answers to any of my questions ...  
**Date:** Monday, March 21, 2011 3:39:00 PM

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Again, I believe the Qs&As we posted over the weekend address the 1800s quakes.

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**From:** Gordon, Greg [mailto:ggordon@mcclatchydc.com]  
**Sent:** Monday, March 21, 2011 3:09 PM  
**To:** McIntyre, David  
**Subject:** RE: Still no answers to any of my questions ...

This helps a lot. Rene was on the call, but she read her notes to me quoting Lyman as saying something to that effect, but I suspect it was more nuanced. Just rushed to get the question to you. We've got an editor pointing us to a massive earthquake in Ohio circa 1854 (I may have the date wrong) and saying it was the biggest on record – in other words, the question is whether the regulations cover the big Enchilada, one like Japan's, even if interior U.S. plants are not in "subduction zones."

Greg Gordon  
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See McClatchy news at <http://news.mcclatchy.com>. Our 30 daily newspapers include the Miami Herald, Sacramento Bee, Ft. Worth Star-Telegram, Kansas City Star, Charlotte Observer, Raleigh News & Observer and others.

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**From:** McIntyre, David [mailto:David.McIntyre@nrc.gov]  
**Sent:** Monday, March 21, 2011 3:04 PM  
**To:** Gordon, Greg  
**Subject:** RE: Still no answers to any of my questions ...

Check the list below. 27 units at 17 sites.

The "seismic scrutiny" new plant applications are undergoing is different from the scrutiny existing plants faced decades ago. That's because risk assessment and seismology have evolved into different disciplines in the meantime. We are using state of the art techniques to analyze new plant applications. If Dr. Lyman is somehow intimating that we are ignoring seismic issues for new plants, as your question inferred, then he is being totally irresponsible.

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**From:** Gordon, Greg [mailto:ggordon@mcclatchydc.com]  
**Sent:** Monday, March 21, 2011 2:58 PM  
**To:** McIntyre, David  
**Subject:** RE: Still no answers to any of my questions ...

NNNN/14

Thanks. We've seen your Japan earthquake FAQs. I'm trying to download the 2006 earthquake memo from ADAMS and having problems. Any advice?

The follow-on question relates to a comment by Ed Lyman of UCS this a.m., when he said at their daily briefing that new plants somehow don't undergo the same seismic scrutiny as the original plants. Is there a grain of truth to that?

The question about the 17 plants relates to a line in a NY Times story last week stating that NRC asked 17 plants to review their ability to withstand earthquakes. The relevant paragraph:

Officials with the Nuclear Regulatory Commission say the site is safe and that its earthquake threat is on the lower end nationally and in the Northeast. But it is one of 17 nuclear sites being asked to review and reassess seismic issues. Still, said Scott Burnell, a commission spokesman, "The N.R.C. continues to believe that all U.S. plants are capable of withstanding the strongest earthquakes that can be expected at any given site."

May we know the identities of the other 16 plants?

Could Rene and I speak to someone at NRC about this whole issue of preparedness for earthquakes?

Also, as to the sea water being pumped into Fukushima, after it gets hot and is drained off, replaced by cooler water ... where does the now-radioactive waste sea water go? Back into the ocean? If so, where would cooling waste water go in the event of a U.S. accident? Into a river or lake? Or how is this covered?

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**See McClatchy news at <http://news.mcclatchy.com>. Our 30 daily newspapers include the Miami Herald, Sacramento Bee, Ft. Worth Star-Telegram, Kansas City Star, Charlotte Observer, Raleigh News & Observer and others.**

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**From:** McIntyre, David [mailto:David.McIntyre@nrc.gov]  
**Sent:** Monday, March 21, 2011 2:44 PM  
**To:** Gordon, Greg  
**Subject:** RE: Still no answers to any of my questions ...

Hi Greg – I apologize for you not getting replies from us. Please realize we have responded to hundreds of media requests daily since the earthquake,

and quite honestly, long laundry lists of questions like these are more difficult for us to respond to.

I'll take a stab at some of these below.

---

**From:** Gordon, Greg [mailto:ggordon@mcclatchydc.com]  
**Sent:** Monday, March 21, 2011 12:16 PM  
**To:** McIntyre, David  
**Subject:** Still no answers to any of my questions ...

Hi Dave,

Hope you got at least some of your weekend. I suspect I'm not alone, but I've yet to get a single answer from NRC since I started work on the Japan nuclear power crisis. Today, we're turning toward earthquakes and sure would like someone to assist us.

In addition to the questions below:

--Could someone send us the list of Mark I plants in the U.S.?

All the plants and their types are listed in Appendix A of our Information Digest.

--Again, which are the 17 plants that are currently under review?

Not sure I understand this question. All US plants will be reviewed as part of the process being worked out by the Commission today. (See below)

--Does the NRC know whether any spent fuel pools at Japan's Tokyo Electric Daiichi plant are leaking? Are any domestic nuclear plants' spent fuel pools leaking? If so, which ones?

We do not know for certain the status of those pools. I'm checking on ours.

--What specific events in Japan's Tokyo Electric Daiichi plant, if any, are most likely to prompt retrofitting of U.S. plants or what is being considered along those lines?

Probably too early to say, as we begin our review.

--Regardless of the events in Japan, has improved knowledge about global seismic activity over the last 40 years prompted your agency to recommend specific design changes to lessen the threat that a major earthquake could knock out power, breach a reactor containment vessel, cause a leak in a spent fuel pool or cause other damage?

We have reviewed recent seismological data for the central and eastern US for how it might affect plants in those areas. We posted a lot of info on seismic questions on our website Saturday. On our Japan Information page linked from our website, there are two other documents on seismic issues linked under "Related Information."

Thanks.

Greg Gordon  
National Correspondent

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**From:** Gordon, Greg

**Sent:** Friday, March 18, 2011 1:21 PM

**To:** David.mcintyre@nrc.gov

**Subject:** questions

Hi Dave,

First, please say hello to Eliot, with whom I worked at UPI many years ago.

I had to huddle with my colleague and an editor to see where we're headed before messaging you.

Here are some questions on behalf of myself and Rene Schoof:

--After the 9/11 attacks, didn't NRC take action to move backup generators away from the power plants? If this is true, could someone provide details? Were the diesel generators situated in a vulnerable position at Fukushima?

Several "mitigating measures" were prescribed, including staging some emergency equipment near, but not at the plant site.

--Aren't the controls for the Fukushima Mark I plants' water pumps in the basements of the plants, and didn't they get flooded by the tsunami? What are the chances they'll work? Is this another design lesson?

This is something we will be looking at in our review of US plants.

--Could someone walk me through all the steps that can be taken to contain the Fukushima radiation leaks? Can they pour sand on the reactors, or would that worsen prospects for an explosion if a meltdown hit the water table and triggered a hydrogen explosion? I think we've seen a number of attempts over the past few days; we are not in a position to critique or otherwise comment on what the Japanese are trying.

What is the worst-case scenario? When projections on potential worst-case radiation are made, do they include more than one reactor melting down, or just a single reactor?

Over the past week, we've been confronted with a number of possible scenarios, including multiple reactor core damage and multiple spent fuel pool loss of cooling.

----Can you please identify or point me to a list of the 17 plants being asked to reassess seismic issues?

The plants currently under review for Generic Issue 199 are:

**Region I**

Indian Point 2  
Indian Point 3  
Limerick 1  
Limerick 2  
Peach Bottom 2  
Peach Bottom 3  
Seabrook 1

**Region II**

Crystal River 3  
Farley 1  
Farley 2  
North Anna 1  
North Anna 2  
Oconee 1  
Oconee 2  
Oconee 3  
Saint Lucie 1  
Saint Lucie 2  
Sequoyah 1  
Sequoyah 2  
Summer  
Watts Bar 1

**Region III**

Dresden 2  
Dresden 3  
Duane Arnold  
Perry 1

**Region IV**

River Bend 1  
Wolf Creek 1

How many and which of those plants are boiling water plants?

--Have there ever been instances in which the understanding of earthquake risks changed and a U.S. plant was reinforced? Can you provide details?

--Is the strength of the reactor core containment vessels an issue in the review of Mark I plants? Can it withstand the pressure of a partial meltdown like Three-Mile Island?

Again, I'd love to have a background briefing on the worst-case scenario

and the backup systems.

Many thanks for your assistance, Dave.

Greg Gordon

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**See McClatchy news at <http://news.mcclatchy.com>. Our 30 daily newspapers include the Miami Herald, Sacramento Bee, Ft. Worth Star-Telegram, Kansas City Star, Charlotte Observer, Raleigh News & Observer and others.**

**From:** Couret, Ivonne  
**To:** Cool, Donald; McIntyre, David  
**Subject:** FW: question about radiation doses from The Wall Street Journal  
**Date:** Monday, March 21, 2011 4:06:44 PM

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Ivonne L. Couret  
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301-415-8200

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<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350/>

---

**From:** Janbergs, Holly **On Behalf Of** OPA Resource  
**Sent:** Monday, March 21, 2011 3:03 PM  
**To:** Couret, Ivonne  
**Subject:** FW: question about radiation doses from The Wall Street Journal

---

**From:** Farbman, Madeline [mailto:Madeline.Farbman@wsj.com]  
**Sent:** Monday, March 21, 2011 3:01 PM  
**To:** OPA Resource  
**Subject:** question about radiation doses from The Wall Street Journal

Good afternoon,

I am working on an interactive graphic for The Wall Street Journal, and trying to figure out if and how it is appropriate to convert nGy/h to Sieverts/hour. The Japanese government is reporting radiation levels in nGy/h -- nano-Grays per hour -- on this website: <http://www.bousai.ne.jp/eng/index.html>

Can we report this as "Sieverts/hour," with a 1:1 conversion of Grays/hour to Sieverts/hour? Or do we need to qualify this in some way?

I contacted the CDC for guidance on this, and they suggested I contact the NRC.

Thank you very much for your help.

Best,  
Madeline

Madeline Farbman  
Multimedia Editor  
The Wall Street Journal/WSJ.com  
1211 Avenue of the Americas  
New York, NY 10036  
212-416-3773  
madeline.farbman@wsj.com

NNNN/15

**From:** [Weber, Michael](#)  
**To:** [Wiggins, Jim](#); [Evans, Michele](#)  
**Cc:** [McDermott, Brian](#); [Morris, Scott](#); [Virgilio, Martin](#); [Borchardt, Bill](#); [Leeds, Eric](#); [Boger, Bruce](#); [Grobe, Jack](#); [Wittick, Brian](#); [Merzke, Daniel](#); [Andersen, James](#); [Muessle, Mary](#); [Moore, Scott](#); [McIntyre, David](#); [Powell, Amy](#); [Schmidt, Rebecca](#)  
**Subject:** FYI - GOVERNMENT EXECUTIVE ARTICLE ON WHO WOULD BE IN CHARGE FOR A U.S. NUCLEAR EMERGENCY  
**Date:** Monday, March 21, 2011 5:34:55 PM

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Interesting perspectives...for for thought for our short-term/long-term review...

## **Senators question U.S. preparedness in wake of Japan's crisis**

By Chris Strohm [National Journal](#) March 18, 2011

Members of the Senate Homeland Security and Governmental Affairs Committee on Thursday questioned which federal agency and individual within the federal government would take the lead in responding to a catastrophe like the one gripping Japan.

"Is it really clear who's responsible for what if, God forbid, we had the kind of multiple catastrophes that Japan is experiencing right now?" the committee's ranking member, Susan Collins, R-Maine, asked the director of the Federal Emergency Management Agency, at a hearing.

There was no clear answer, as FEMA Administrator Craig Fugate said that the response would depend on several factors, such as where the disaster occurred and whether local first responders survived. For example, the Nuclear Regulatory Commission would lead efforts after a disaster at a nuclear-power plant, Fugate said. FEMA, on the other hand, would be responsible for coordinating evacuations around the plant.

Overall, Fugate said, FEMA has made "significant progress" in preparing to deal with a catastrophe, but "we have much work to be done."

But FEMA does not yet have an adequate system to assess what kind of capabilities exist in states and cities across the country to handle disasters, said William Jenkins, the Government Accountability Office's director of homeland-security and justice issues.

The Homeland Security Department and FEMA "have implemented a number of efforts with the goal of measuring preparedness by assessing the capabilities and addressing related challenges, but success has been limited," according to written testimony that Jenkins provided for the hearing.

Homeland Security and Governmental Affairs Chairman Joe Lieberman, I-Conn., and Sen. Scott Brown, R-Mass., also questioned how prepared the U.S. government is to respond to a catastrophe.

If a disaster involving a nuclear-power plant occurred in his state, [Brown](#) said he is not confident the coordination would be good. Fugate said that nuclear-plant operators are required to conduct preparedness drills frequently and face an overall evaluation every two years.

He also said that the tsunami warning system in the Pacific Ocean worked well after the earthquake hit Japan. Fugate said he received a tsunami alert at 2 a.m. last Friday, at which point FEMA acted quickly to prepare for a disaster along the U.S. West Coast that never came.

Mike

NNNN/16

Michael Weber  
Deputy Executive Director for Materials, Waste, Research,  
State, Tribal, and Compliance Programs  
U.S. Nuclear Regulatory Commission

301-415-1705  
Mail Stop O16E15

**From:** Ghneim, Munira  
**To:** Burnell, Scott  
**Cc:** Harrington, Holly; Akstulewicz, Brenda  
**Subject:** Tiffany Demaster - Spectrum Newspaper  
**Date:** Wednesday, March 16, 2011 5:19:45 PM

---

Good Evening,

Tiffany Demaster would like someone to return her call regarding the radioactivity going on in Japan. Tiffany may be reached at 435-674-6231.

Thank You  
Munira Ghneim  
Contract Secretary  
Office of Information Services  
301-415-1170

NNNN/17

**From:** Mehrhoff, Vivian  
**To:** [Ahn, Tae](#); [Albert, Michelle](#); [Alferink, Beth](#); [Andersen, James](#); [Bahadur, Sher](#); [Bailey, Marissa](#); [Bielecki, Jessica](#); [BowdenBerry, Elva](#); [Brach, Bill](#); [Bradbury, John](#); [Brooks, David](#); [Bupp, Margaret](#); [Campbell, Andy](#); [Campbell, Larry](#); [Camper, Larry](#); [Cao, Tiangqing](#); [Cermeno, Andrea](#); [Chang, Kien](#); [Ciocco, Jeff](#); [Coleman, Neil](#); [Collins, Elmo](#); [Comar, Manny](#); [Compton, Keith](#); [Cuadrado, Jose](#); [Damon, Dennis](#); [David Turner, Davis](#); [Jack, Dricks](#); [Victor, Eubanks-White, Darlene](#); [Everett, Vincent](#); [Fedors, Randall](#); [Fetter, Allen](#); [Firth, James](#); [Ford, William](#); [Francis, Karin](#); [Freeman, Denise](#); [Garcia-Santos, Norma](#); [Gendelman, Adam](#); [Glenn, Chad](#); [Gray, Anita](#); [Guttman, Jack](#); [Gwo, Jin-Ping](#); [Hair, Christopher](#); [Hamdan, Latif](#); [Haney, Catherine](#); [Higgs, Gloria](#); [Howell, Art](#); [Hull, John](#); [Jagannath, Banad](#); [John Stamatkos, Johnson, Robert](#); [Kobetz, Timothy](#); [Kokajko, Lawrence](#); [Kotra, Janet](#); [Latta, Robert](#); [Lee, Mike](#); [Leeds, Eric](#); [Lenehan, Daniel](#); [Leslie, Bret](#); [Lewis, Robert](#); [Maier, Bill](#); [Markley, Christopher](#); [Matula, Thomas](#); [McCartin, Timothy](#); [McIntyre, David](#); [McKenney, Christopher](#); [Misenhimer, David](#); [Mohseni, Aby](#); [Mullins, Alicia](#); [Nataraja, Mysore](#); [Ordaz, Vonna](#); [Parker, Nicole](#); [Parrott, Jack](#); [Pineda, Christine](#); [Powell, Amy](#); [Rahimi, Meraj](#); [Rivera, Carmen](#); [Roach, Kevin](#); [Rubenstone, James](#); [Salomon, Stephen](#); [Sampson, Michele](#); [Schlapper, Gerald](#); [Self, Stephen](#); [Silvia, Andrea](#); [Spitzberg, Blair](#); [Stablein, King](#); [StAmour, Norman](#); [Staub, Janet](#); [Sulima, John](#); [Tannenbaum, Anita](#); [Trifiletti, Sue](#); [Uselding, Lara](#); [Valencia, Jennifer](#); [Virgilio, Rosetta](#); [Wastler, Sandra](#); [Waters, Michael](#); [Weaver, Doug](#); [Weber, Michael](#); [Whaley, Sheena](#); [White, Bernard](#); [Willoughby, Leonard](#); [Young, Mitzi](#)  
**Subject:** News Clips - LVRJ, 03/22/2011  
**Date:** Tuesday, March 22, 2011 8:15:23 AM  
**Attachments:** [image001.png](#)

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## **Crisis in Japan will affect U.S. nuclear power industry, experts say**

By [Keith Rogers](#)

LAS VEGAS REVIEW-JOURNAL

Posted: Mar. 21, 2011 | 10:37 p.m.

While elevated radiation levels from Japan's crippled nuclear power reactors probably won't cause health problems in the United States, the U.S. nuclear power industry will see effects from lessons learned as a result of the March 11 earthquake and tsunami that devastated the island nation, UNLV experts said Monday night.

The impacts might include more stringent requirements for 20-year license extensions of more than 40 U.S. reactors under review.

A push also will be made to centralize storage of used nuclear fuel that is currently kept in pools and above-ground casks at reactor sites, said Paul Seidler, manager of a nuclear research program at UNLV's Harry Reid Center for Environmental Studies.

Yucca Mountain, 100 miles northwest of Las Vegas, was studied for such centralized storage of nuclear reactor waste, but federal funding for the project has been terminated.

"There will be significant implications from this event," said Seidler, a former Nuclear Energy Institute official and executive director of the Nevada Alliance for Defense, Energy and Business.

"There will be impacts on new nuclear reactors. The biggest impact on the policy side will be re-licensing," he said.

On a global scale, Seidler said he wouldn't be surprised if some reactors in areas of high seismic activity are eventually closed.

"Frankly we don't know what's happening fully in Japan. We will learn a lot of lessons ...

NNNN/18

good things that will improve technology," he said.

More than 100 people attended Monday night's forum, sponsored by the Reid Center for Environmental Studies. It featured five experts at the University of Nevada, Las Vegas' Barrick Museum Auditorium.

Denis Beller, a nuclear engineering research professor at UNLV, said more upgrades for U.S. reactors "are certainly coming" as a result of the crisis in Japan.

However, nuclear power reactors in California, particularly the San Onofre plant near San Clemente, are in a better position to withstand a tsunami as big as the one that wiped out power and backup systems for cooling nuclear fuel at the Fukushima Dai-ichi complex in Japan.

The San Onofre plant is 50 feet above sea level and has a 30-foot seawall that's 5 feet taller than the tsunami wave that pounded Japan's coast after the 9.0-magnitude earthquake.

"Even if it came over the seawall, it couldn't hit the backup generator," Beller said.

Panel member Steve Curtis, a health physicist, said radioactive materials that were injected into the atmosphere by explosions and venting of the disabled Japanese reactors will cause "no significant radiation danger to citizens of the United States."

Radiation is 100 times above naturally occurring background levels outside the Fukushima plant and 2,000 times natural background radiation inside the complex.

"That sounds really bad, but you need levels 10 million times background" for lethal doses, Curtis said.

Beller added that the dose rate per hour at the Fukushima plant is "very, very low. These values are tiny compared to the dangerous dose."

He added, "Japan radiation levels, although elevated, are not deadly."

UNLV chemistry professor Ken Czerwinski said isotopes of krypton and xenon escaped when the coolant loss allowed nuclear fuel to heat up and melt the metal casing that encased the uranium fuel pellets at the Japanese plant.

But the accident in Japan wasn't as contaminating as the 1986 Chernobyl disaster in the former Soviet Union that ignited graphite control rods and caused them to burn "more like a volcano," he said.

Contact reporter Keith Rogers at [krogers@reviewjournal.com](mailto:krogers@reviewjournal.com) or 702-383-0308.

**COMMENTS:** 2 Reader Comment(s)

**LINK:** <http://www.lvrj.com/news/crisis-in-japan-will-affect-u-s-nuclear-power-industry-experts-say-118412734.html>

*Vivian L Mehrhoff*

Administrative Assistant  
Division of Reactor Safety  
Region IV - Arlington, Texas 76011  
817-860-8166



*"Death is not the greatest loss in life. The greatest loss is what dies inside us while we live." ...Norman Cousins*

**From:** [Harrington, Holly](#)  
**To:** [Burnell, Scott](#); [McIntyre, David](#)  
**Subject:** FW: EPZ Question  
**Date:** Tuesday, March 22, 2011 9:17:34 AM  
**Attachments:** [Emergency Planning Zones.pdf](#)

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**From:** LIA12 Hoc  
**Sent:** Tuesday, March 22, 2011 8:54 AM  
**To:** Harrington, Holly  
**Subject:** FW: EPZ Question

Holly,

I believe this is the information you were looking for. Let us know if it is not the right document. Reviewing the press release from March 16, NRC Provides Protective Action Recommendations... there are two sets of calculations: for a hypothetical single reactor site and for a hypothetical four reactor site. That may supplement your argument.

---

**From:** LIA07 Hoc  
**Sent:** Tuesday, March 22, 2011 8:50 AM  
**To:** LIA12 Hoc  
**Subject:** FW: EPZ Question

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**From:** LIA07 Hoc  
**Sent:** Tuesday, March 22, 2011 8:49 AM  
**To:** LIA08 Hoc  
**Subject:** FW: EPZ Question

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**From:** LIA07 Hoc  
**Sent:** Friday, March 18, 2011 10:26 PM  
**To:** Decker, David  
**Cc:** Mroz (Sahm), Sara  
**Subject:** EPZ Question

The attached document was developed by FEMA and NSIR regarding EPZs ...

I hope that this might provide more insight for your Congressional staffer inquiry. I find it hard to believe that a county within a 50 mile EPZ would not know about it. They are required to participate in FEMA evaluated exercises. She

Please let me know if you need anything else. If she has more questions or would like to talk to somebody, let me know and I can arrange something.

I'm on shift in the Ops Center tomorrow 3-11pm and Monday-Saturday of next week 3-11pm, so my communications are coming at weird times ...

-Sara

NNNN/19

Sara Mroz  
Communications and Outreach  
Office of Nuclear Security and Incident Response  
US Nuclear Regulatory Commission  
Sara.Mroz@nrc.gov

## EMERGENCY PLANNING ZONES

### EPZs in Brief

Federal Emergency Management Agency (FEMA) and Nuclear Regulatory Commission (NRC) emergency preparedness planning guidance provides for two emergency planning zones (EPZs) for U.S. commercial nuclear power plants (NPPs):

- **Plume** Exposure Pathway (apx. 10 Miles in radius)
  - Designed to safeguard the population most at risk from **direct exposure** to radiation levels in excess of Environmental Protection Agency Protective Action Guidelines (PAGs)
- **Ingestion** Exposure Pathway (apx. 50 Miles in radius)
  - **Designed to protect** the public from **secondary exposure** to radiation through the food chain or public water supplies

The planning zones are intended to be scalable over time to account for changing conditions that could possibly extend outside the initial EPZ.

Specifically, NUREG-0654/FEMA-REP-1 states: "In a particular emergency, protective actions might well be restricted to a small part of the planning zone. On the other hand, for the worst possible accidents, protective actions would need to be taken outside the planning zones" (I.D., p.11) **i.e., the EPZs are the base areas requiring emergency planning – they are designed to be expanded (beyond the base of 10, 50 miles), as necessary, during emergencies.**

**Note:** The 10 & 50 mile EPZs are the Federally required minimum. FEMA and NRC regulations state that the exact size and shape of the EPZs shall be determined by the State and local governments – in consultation with FEMA and the NRC, taking into account such local conditions as demography, topography, land characteristics, access routes and local jurisdiction boundaries.(44 CFR § 350.7).

### EPZ Evacuations

FEMA affirms that evacuation of the public is the preferred initial protective action in the event of a severe (core damage) emergency occurring (or likely to occur) at NPPs. Federal requirements for NPPs include the establishment of EPZs at 10 and 50-mile distances surrounding the site that detail evacuation routes. Evacuation planning includes the development and incorporation of periodic evacuation time estimate studies to inform evacuation strategies such that prompt and effective actions can be taken by offsite response organizations to protect the public in the event of a radiological emergency. This includes accounting for both permanent and transient populations, persons with disabilities and access/functional needs, those whose mobility may be impaired because of institutional or other confinement as well as provisions for the monitoring, decontamination and congregate care of evacuees, as necessary.

Where immediate evacuation of an affected population within the EPZ is not practical due to impediments (e.g., debris blocking evacuation routes, severe weather, etc.) or where evacuation could pose a greater potential health risk, temporary sheltering-in-place of the public is the preferred protective action. State, Tribal and local evacuation plans and

procedures for NPP communities are reviewed and approved by FEMA. While actual evacuations of the public are not required in biennial FEMA evaluations, appropriate demonstrations by State, Tribal and local response agencies to direct and control a public evacuation is assessed.

### **EPZs in Detail**

The Emergency Planning Zone (EPZ) is the area surrounding an commercial nuclear power plant (NPP) for which plans/procedures have been made to ensure that prompt and effective actions are taken to protect the health and safety of the public in case of an incident at the NPP. The Federal Emergency Management Agency (FEMA) recognizes two types of EPZs for planning purposes: the plume exposure pathway EPZ and the ingestion exposure pathway EPZ. The characteristics of these two types of EPZs are summarized in Exhibit I. Each EPZ is a roughly circular area, with the NPP at the center.

The EPZs sizes represent a technical judgment based on the type and quantity of hazardous materials present (source term) and the potential risks where detailed planning is needed to ensure adequate response to an emergency. An EPZ may include more than one State. "Split" jurisdictions (i.e., part of the jurisdiction is included in the EPZ and part is not) also exist. In these cases, EPZ boundaries are determined based on consultation with all parties involved, including OROs, FEMA, and the NRC. In some cases, a conservative option is taken and the entire jurisdiction is included in the EPZ.

**Exhibit I: Plume and Ingestion EPZ Characteristics**

<b>Type of EPZ</b>	<b>Exposure Sources</b>	<b>Size</b>
<b>Plume Exposure Pathway</b>	<ul style="list-style-type: none"> <li>• Whole-body external exposure to gamma radiation from the passing plume and from deposited material</li> <li>• Thyroid exposure through inhalation from the passing plume</li> <li>• Committed effective dose equivalent exposure to other critical organs through inhalation</li> </ul>	Approximately 10-mile radius
<b>Ingestion Exposure Pathway</b>	<ul style="list-style-type: none"> <li>• Ingestion of contaminated water or foods, such as milk, fresh vegetables, and aquatic foodstuffs, may result in increased risk of radiation-induced cancer to the thyroid, bone marrow, and other organs</li> </ul>	Approximately 50-mile radius

The size of the **plume exposure pathway** EPZ, about 10 miles in radius, is based on the following considerations from NUREG-0654/FEMA-REP-1:

- Projected doses from traditional design-basis accidents/incidents would not exceed the Environmental Protection Agency Protective Action Guideline (PAG) levels outside the zone;
- Projected doses from most core damage sequences would not exceed PAG levels outside the zone;
- For the worst-case core damage sequences, immediate life-threatening doses would generally not occur outside the zone; and

- **Detailed planning within approximately 10 miles would provide a substantial base for expansion of response efforts to a larger area, if necessary.**

The size of the **ingestion exposure pathway** EPZ, about 50 miles in radius, including the 10-mile radius plume exposure pathway EPZ, is based on the following considerations:

- The downwind range within which contamination may potentially exceed the PAGs is limited to about 50 miles from an NPP because of wind shifts during the release and travel periods;
- Atmospheric iodine (i.e., iodine suspended in the atmosphere for long periods) may be converted to chemical forms that do not readily enter the ingestion pathway; and
- Much of the particulate material in a radioactive plume would have been deposited on the ground within about 50 miles from the NPP.

The likelihood of exceeding ingestion exposure pathway PAG levels at 50 miles is comparable to the likelihood of exceeding plume exposure pathway PAG levels at 10 miles.

**From:** Harrington, Holly  
**To:** Brenner, Eliot; Burnell, Scott; Couret, Ivonne; Hayden, Elizabeth; McIntyre, David; Chandrathil, Prema; Dricks, Victor; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Screnci, Diane; Sheehan, Neil; Uselding, Lara  
**Subject:** Transcript for yesterday's meeting  
**Date:** Tuesday, March 22, 2011 9:33:59 AM  
**Attachments:** CommissionMeetingTranscript.pdf

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And available here: <http://www.nrc.gov/reading-rm/doc-collections/commission/recent/2011/>

NW N W / 20

UNITED STATES OF AMERICA  
U.S. NUCLEAR REGULATORY COMMISSION

BRIEFING ON NRC RESPONSE TO RECENT NUCLEAR  
EVENTS IN JAPAN

MARCH 21, 2011

9:00 A.M.

TRANSCRIPT OF PROCEEDINGS

Public Meeting

Before the U.S. Nuclear Regulatory Commission:

Gregory B. Jaczko, Chairman

Kristine L. Svinicki, Commissioner

George Apostolakis, Commissioner

William D. Magwood, IV, Commissioner

William C. Ostendorff, Commissioner

**NRC Staff:**

**Bill Borchardt**  
**Executive Director for Operations**

## 1 PROCEEDINGS

2 CHAIRMAN JACZKO: Good morning everyone. The Commission  
3 meets today to discuss the tragic events in Japan and to begin to consider  
4 possible actions we may take to verify the safety of the nuclear facilities that we  
5 regulate here in the United States. People across the country and around the  
6 world who have been touched by the magnitude and the scale of this disaster are  
7 closely following the events in Japan and the repercussions in this country and  
8 many other countries.

9 Before we begin, I would like to offer my sincere condolences to all  
10 of those who have been affected by the earthquake and the tsunami in Japan.  
11 Our hearts go out to all who have been dealing with the aftermath of these  
12 natural disasters and we are mindful of the long and difficult road they will face in  
13 recovering. We know the people of Japan are resilient and strong and we have  
14 every confidence that they will come through this difficult time and move forward  
15 with resolve to rebuild their vibrant country. I believe I speak for all Americans  
16 when I say that we stand together with the people of Japan at this most difficult  
17 and challenging time.

18 The NRC is a relatively small agency with just about 4,000 staff, but  
19 we play a critical role in protecting the American people and the environment  
20 when it comes to the use of nuclear materials. We have our inspectors who work  
21 full time at every nuclear plant in the country and we are proud to have world-  
22 class scientists, engineers, and professionals representing nearly every  
23 discipline.

1            Since Friday, March 11, when the earthquake and tsunami struck,  
2 the NRC's headquarter operation center has been operating on a 24-hour basis  
3 to monitor and analyze events at nuclear power plants in Japan. At the request  
4 of the Japanese government and through the United States Agency for  
5 International Development, the NRC sent a team of its technical experts to  
6 provide an on the ground support, and we have been in continual contact with  
7 them since they deployed.

8            And within the United States, the NRC has been working closely  
9 with other federal agencies as part of the U.S. Government's response to the  
10 situation. Here in the United States we have an obligation to the American  
11 people to undertake a systematic and methodical review of the safety of our own  
12 domestic nuclear facilities in light of the natural disaster and resulting nuclear  
13 situation in Japan. Beginning to examine all available information is an essential  
14 part of our effort to analyze the event and understand its impacts on Japan and  
15 implications for the United States. Our focus will always be on keeping plants  
16 and radioactive materials in this country safe and secure.

17            As the immediate crisis in Japan comes to an end we will look at  
18 any information we can to gain experience from the event and see if there are  
19 any changes we need to make to further protect public health and safety.  
20 Together with my colleagues on the Commission, we will review the current  
21 status and identify the steps we will take to conduct that review. In the meantime  
22 we will continue to oversee and monitor plants to ensure that U.S. reactors  
23 remain safe.

24            On behalf of the Commission I want to thank all of our staff for  
25 maintaining their focus on our essential safety and security mission throughout

1 these difficult days. I want to acknowledge their tireless efforts and their critical  
2 contributions to the U.S. response to assist Japan. In spite of the evolving  
3 situation, the long hours, and the intensity of efforts over the past week, the staff  
4 has approached their responsibilities with dedication, determination, and  
5 professionalism, and we are all incredibly proud of their efforts. The American  
6 people can also be proud of the commitment and dedication within the federal  
7 workforce, which is exemplified by our staff every day. And again, I want to  
8 reiterate certainly on behalf of the Commission and all of us here in this room our  
9 sympathy with the crisis and the difficult situation for our friends and colleagues  
10 in Japan, and we look forward to continuing our efforts to provide them with  
11 assistance as they continue to deal with a very challenging situation, not only  
12 with the nuclear facilities but with many of the other impacts from this natural  
13 disaster in Japan. I would like to offer Commissioner Svinicki an opportunity to  
14 make some comments.

15           COMMISSIONER SVINICKI: Thank you Mr. Chairman. I want to  
16 add my voice to that of others regarding the great sympathy we feel over the loss  
17 and devastation due to the earthquake and tsunami in Japan. The dramatic  
18 images of the events at Fukushima, images that have riveted so many of us over  
19 the course of the past week, have an added dimension for us as a community of  
20 nuclear safety professionals because for us these images are not an abstraction.  
21 Many of us have traveled to Japan; we have toured the facilities of our Japanese  
22 colleagues. We have worked alongside them in support of the shared goal of  
23 advancing nuclear safety. The sense of anguish we feel as we desire so  
24 desperately to do something, anything we can, to help our friends and colleagues  
25 in Japan has been so clearly evident on the faces of the men and women

1 working here at NRC. We are heartsick over this tragedy. Some may  
2 characterize that our faith in this technology is shaken, but nuclear safety has not  
3 been and cannot be a matter of faith; it is and must continue to be a matter of  
4 fact. So today we continue the systematic evaluation of facts of what we know  
5 about what happened and what we don't know but will piece together in the  
6 coming months. Our objective is to confirm that our approach to the regulation of  
7 nuclear power in this country is comprehensive and correct while applying any  
8 lessons learned we can from these events. In taking the systematic and  
9 deliberate approach to this review that you have called for, Mister Chairman, I'm  
10 certain the Commission will achieve this objective. Thank you.

11 CHAIRMAN JACZKO: Thank you. Commissioner Apostolakis.

12 COMMISSIONER APOSTOLAKIS: I join the Chairman and  
13 Commissioner Svinicki in expressing my condolences to the people of Japan and  
14 I also second the Chairman's comments on commending the staff for its  
15 response to this accident. Thank you, Mr. Chairman.

16 CHAIRMAN JACZKO: Commissioner Magwood.

17 COMMISSIONER MAGWOOD: Thank you, Chairman. This is in  
18 many ways a very personal tragedy for me. I have many friends and colleagues  
19 in Japan. I have been in touch with several of them over the last week and a  
20 half. I've heard from friends in Tokyo worried about radiation and others in the  
21 North who are dealing with food shortages and gasoline shortages. Everyone in  
22 Japan is enduring continuing aftershocks, anxiety about the Fukushima and  
23 Daiichi plant, and difficulties in communicating with friends and neighbors, and a  
24 lot of uncertainty about what will happen next. I have one friend Emito who lost  
25 all her utilities for several days after the earthquake and is still waiting for water to

1 be restored. But in the aftermath of the earthquake, she is making new friends  
2 as people bond together to help each other and comfort each other and make the  
3 best of a difficult situation. Fortunately she found a kind neighbor who has a well,  
4 and so she has been able to get water and take it to her apartment on a daily  
5 basis.

6 I'm sure there's thousands of examples of people who are reaching  
7 out to each other, bonding as a community, and showing the kind of resilience  
8 that is going to be necessary to move forward. The scale of the tragedy is  
9 staggering and the toll on life and property has been terrible, but Japan will  
10 recover. But Japan will not stand alone and has not stood alone over the last  
11 week and a half. We in the U.S. are close friends to the Japanese people and  
12 I'm very, very proud of how our country has responded to this crisis and  
13 particularly proud of how the Nuclear Regulatory Commission Staff has  
14 responded as well. The staff has demonstrated both the expertise and the  
15 selflessness over the last 10 days and I applaud their outstanding efforts.

16 Today the Commission will receive an update on the nuclear  
17 situation in Japan, our response and our efforts to understand what has  
18 happened. There will be important lessons learned from the events at the  
19 Fukushima/Daiichi plant. It's essential that we identify them correctly and  
20 respond to them effectively. This meeting, I expect, will be the first of many  
21 Commission meetings as we engage to understand the issues and address  
22 those issues to ensure the safety of U.S. nuclear power plants. And I look  
23 forward to working with my partners on the Commission to do so. Thank you.

24 CHAIRMAN JACZKO: Thank you, Commissioner Magwood.  
25 Commissioner Ostendorff.

1                   COMMISSIONER OSTENDORFF: Thank you, Mr. Chairman. This  
2 is a vitally important meeting for the Commission and the country. I want to join  
3 my colleagues in extending my personal sympathies to the people of Japan. The  
4 consequences and loss of life in the earthquake and tsunami are simply  
5 devastating. Our thoughts and prayers are with all. I'd like to commend the  
6 Chairman, the Executive Director for Operations and the NRC staff for their  
7 efforts to date in supporting the NRC's monitoring assistance associated with  
8 these events. I appreciate the hard work ongoing 24/7 at the Op Center for the  
9 last 11 days. Along with my other colleagues here at this table, I've been very  
10 impressed with the technical competence and professionalism demonstrated by  
11 the NRC staff. I'm also grateful for the highly competent team of NRC detailees  
12 dispatched to Japan. While dismayed by this tragedy as a Commissioner, I am  
13 also extraordinarily proud of the commitment and professionalism of our team.  
14 The events that have unfolded at the Daiichi plant over the last 11 days are stark.  
15 On one hand, I believe that our existing licensing and oversight activities assure  
16 us that our commercial nuclear power plants in this country are safe. On the  
17 other hand, I know that we must, and that we most certainly will, conduct a  
18 thoughtful and rational examination of the NRC's regulatory framework with the  
19 information and lessons learned resulting from the incidence in Japan. As we  
20 head down this path together, I know this Commission will stay mindful of the  
21 challenges that face us. As stated by Chairman Jaczko several times in the last  
22 week and again today as echoed by the Commissioners, I fully support his call  
23 for a systematic and methodical review. We must also do this in a way that  
24 clearly communicates to the American people what this review means and what it  
25 implies for the safety of our existing nuclear power plants. Thank you.

1           CHAIRMAN JACZKO: Well thank you everyone. With that, we will  
2 turn it to Bill Borchardt, the Executive Director for Operations for the presentation.

3           MR. BORCHARDT: Thank you, and good morning. I would like to  
4 join in your expressions of condolences to the people of Japan. I and many of  
5 my colleagues on the NRC staff have had many years of very close and personal  
6 interaction with our regulatory counterparts and we would like to extend our  
7 condolences to them.

8           We are mindful of our primary responsibility to ensure the public  
9 health and safety of the American people. We have been very closely monitoring  
10 the activities in Japan and reviewing all available information to allow us to  
11 conclude that the U.S. plants continue to operate safely. There has been no  
12 reduction in the licensing or oversight function of the NRC as it relates to any of  
13 the U.S. licensees. Contributors to the conclusion that the current fleet of  
14 reactors and materials licensees continue to protect the public health and safety  
15 are based on a number of principles, including the Defense in Depth.

16           *The fact that every reactor in this country is designed for natural*  
17 *events based upon the specific site that that reactor is located, that there are*  
18 *multiple fission product barriers, and that there are a wide range of diverse and*  
19 *redundant safety features in order to provide that public health and safety*  
20 *assurance. We have a long regulatory history of conservative decision-making.*  
21 *We've been intelligently using risk insights to help inform our regulatory process,*  
22 *and we have never stopped to make improvements to the plant design as we*  
23 *learn from operating experience over the more than 35 years of civilian nuclear*  
24 *power in this country. Some have been derived from lessons learned from*  
25 *previous significant events, such as Three Mile Island. We have severe accident*

1 management guidelines, revisions to the emergency operating procedures,  
2 procedures and processes for dealing with large fires and explosions, regardless  
3 of the cause. We have a station blackout rule. We have a hydrogen rule for  
4 reactors and many others which I'll go into in a little more detail later.

5           But all of these relate in one way or another to the tragic events in  
6 Japan. In addition to all that we've done in the NRC and over the last week and  
7 a half and over the many years as I alluded to on rulemaking type activities, the  
8 industry is also performing many verification activities at this time to verify that all  
9 of these processes and procedures and rules that have been implemented are  
10 still valid. From a very high level, the NRC response centered from the  
11 Operations Center here in Rockville as well as the NRC team that's in Japan  
12 focuses on three major areas. The first is to support the Japanese government  
13 and our regulatory counterpart, NISA. Second is to gather information and  
14 assess that information for implications on the U.S. facilities. And the third is to  
15 support the U.S. ambassador in Japan with a level of nuclear expertise that the  
16 NRC is perfectly positioned to do. We are in fact mobilized to support the US  
17 government in responding to this event.

18           Notwithstanding the very high level of support, we continue to  
19 maintain our focus on our domestic responsibilities. And finally as my last point  
20 of introduction, we do not expect the releases of radioactive material that have  
21 occurred in Japan to have any effect on the health and safety of the U.S.  
22 population.

23           The next slide shows the agenda for this meeting. Given the time  
24 constraints, it'll be a relatively high overview of activities but the room has a  
25 healthy number of NRC staff that are available to explore any questions and

1 answers that you may have later. I'll now move to, let's say, a brief overview of  
2 the events.

3           On Friday, March 11th an earthquake hit Japan, resulting in the  
4 shutdown of more than 10 reactors. To our understanding, the reactors'  
5 response to the earthquake went according to design. There is no known  
6 problems to our knowledge with the response to that event. The ensuing  
7 tsunami, however, caused the loss of emergency AC power to six units at the  
8 Fukushima Daiichi site; and it's those six units that have received the majority of  
9 our attention since that time. Units One, Two, and Three, at that six unit site,  
10 were in operation at the time. Units Four, Five, and Six were in previously  
11 scheduled outages.

12           Immediately after the tsunami, there appeared that there was no  
13 injection capability into the reactor vessels on Units One, Two, and Three. On  
14 Saturday, March 12th, a hydrogen explosion occurred in Unit One; and then the  
15 following Monday, March 14th, a hydrogen explosion in Unit Three. On the 15th  
16 of March, on Tuesday, there were explosions in Unit Two and in Unit Four from  
17 hydrogen originating from, we believe, overheated fuel in the spent fuel pool.

18           At this time, it's our assessment that it's likely that Units One, Two,  
19 and Three have experienced some degree of core damage. Today, all three  
20 units appear to be in a stable condition, with seawater injection being used to  
21 keep the reactors cool. Containment integrity for all three units is also believed  
22 to have been -- is currently maintained. Grey smoke has emitted from Unit  
23 Three, which is the cause of the site evacuation that's been reported this  
24 morning. The source of that smoke is unknown, although there is indication that  
25 there's been no increase in temperature or in radioactivity.

1           On a sign of some promising news, TEPCO has been able to bring  
2           offsite power onto the site from a nearby transmission line. It is now essentially  
3           at the border of Units One and Two. There's early indications that there may be  
4           cabling problems -- electrical cabling problems within the units. So I understand  
5           that they're now in the process of laying some temporary cables to some of the  
6           pumps and valves inside of Units One and Two. Over the next day or two they'll  
7           be doing the same thing for Units Three and Four. There's two diesel generators  
8           that are currently running and supplying power to Units Five and Six.

9           Moving to the NRC response: Shortly after 4:00 in the morning on  
10          Friday, March 11th, the NRC Operations Center made the first call, informing  
11          NRC management of the earthquake and the potential impact on U.S. plants.  
12          We went into the monitoring mode at the Operations Center and the first concern  
13          for the NRC was possible impacts of the tsunami of U.S. plants on the West  
14          Coast.

15          On that same day, Friday, March 11th, we dispatched two experts  
16          to Japan to help at the embassy and begin interactions with our Japanese  
17          regulatory counterparts. By Monday, we had dispatched a total of 11 staff to  
18          Japan. As I said, the areas of focus for this team of 11 is to support the  
19          Japanese government and respond to requests from our regulatory counterpart,  
20          NISA, to support the U.S. ambassador and his understanding of the nuclear  
21          impacts of this event, and then third to help the information flow from Japan to  
22          the U.S. NRC so that we could assess the implications on the U.S. fleet in as  
23          timely a manner as possible.

24          We've had an extensive range of stakeholders that we've had  
25          constant interaction with, ranging from the White House, Congressional staff, our

1 state regulatory counterparts, a wide range of other federal agencies, and of  
2 course the international regulatory bodies around the world.

3 Our ongoing NRC response is that the NRC Operations Center  
4 remains in a 24/7 posture. This has involved the efforts of over 250 NRC staff on  
5 a rotating basis. In addition to the people that are staffing the Operations Center,  
6 there is hardly a person amongst the 4,000 people in this agency that aren't in  
7 one way or another contributing to the response, whether it's through information  
8 technology needs for the people in Japan, or the Region IV staff in Texas, which  
9 is backing up for the operations officers in our Operations Center to help maintain  
10 an information flow on the currently operating reactors in this country. The entire  
11 agency is coordinating and pulling together in response to this event so that we  
12 can provide the assistance in Japan and not miss any of our normal activities  
13 regarding domestic responsibilities.

14 In addition, we remain aware of U.S. industry efforts to provide  
15 assistance with their counterparts in TEPCO in Japan.

16 The U.S. Government has an extensive network of radiation  
17 monitors across the country. EPA's system has not identified any radiation levels  
18 of concern in this country. In fact, natural background from things like the rock --  
19 from rocks, sun, buildings, is 100,000 times more than any level that has been  
20 detected to date. We feel confident in our conclusion that there is no reason for  
21 concern in the United States regarding radioactive releases from Japan.

22 I'd like to focus for a few more minutes on the factors that go into  
23 assuring us of domestic reactor safety. We have, since the beginning of the  
24 regulatory program in the United States, used a philosophy of Defense-in-Depth,  
25 which recognizes that the nuclear industry requires the highest standards of

1 design, construction, oversight, and operation, but even with that we will not rely  
2 on any one level of protection for the entire purposes of protecting public health  
3 and safety. So the designs for every single reactor in this country take into  
4 account the specific site that that reactor is located and does a detailed  
5 evaluation for any natural event such as earthquakes, tornadoes, hurricanes,  
6 floods, tsunami, and many others.

7           In addition, there are multiple physical barriers to fission product  
8 release at every reactor design. And then in addition to that, there are both  
9 diverse and redundant safety systems that are required to be maintained  
10 operable and frequently tested by NRC regulations that ensure that the plant is in  
11 a high condition of readiness to respond to any scenario.

12           As I mentioned earlier, we've taken advantage of the lessons  
13 learned from previous operating experience, one of the most significant in this  
14 country, of course, being the Three Mile Island accident in the late 1970s. As a  
15 result of those lessons learned, we've significantly revised the emergency  
16 planning, the emergency operating procedures. Many human factors issues as it  
17 relates to how control room operators operate the plant. We added new  
18 requirements for hydrogen control to help prevent explosions inside of  
19 containment and we also created requirements for enhanced indication of pumps  
20 and valves.

21           We have a post-accident sampling system that requires -- or that  
22 allows -- for the monitoring of radioactive material release and possible fuel  
23 degradation. And of course one of the most significant changes is after Three  
24 Mile Island we created the Resident Inspector Program, which has at least two

1 full time NRC inspectors on site that have unfettered access to all licensees'  
2 activities 24 hours a day, seven days a week.

3           Also as a result of operating experience and ongoing research  
4 programs, we have developed requirements for severe accident management  
5 guidelines. These are programs that perform the "what if" scenario. What if all of  
6 this careful design work, all of these important procedures and practices and  
7 instrumentation, what if that all failed? What procedures and policies and  
8 equipment should be in place to deal with the extremely unlikely scenario of a  
9 severe accident? Those have been in effect for many years and are frequently  
10 evaluated by the NRC inspection program.

11           As a result of the events of September 11, 2001, we did a similar  
12 evaluation, and identified important pieces of equipment that, if, regardless of the  
13 cause of a significant fire or explosion at a plant, we would have pre-staged  
14 equipment, procedures, and policies to help deal with that situation. All of these  
15 things are directly applicable to the kinds of very significant events that are taking  
16 place in Japan. Over the last 15 or 20 years, there's been a number of new  
17 rulemakings that directly relate to Japan. There's a station blackout rule that has  
18 required every plant in the country to analyze what the plant response would be if  
19 it were to lose all alternating current so that it could respond using batteries for a  
20 while, and then have procedures and arrangements in place in order to restore  
21 alternating current to the site, and provide cooling to the core.

22           As I mentioned earlier, there's a hydrogen rule, which requires  
23 modifications to reduce the impacts of hydrogen generated for beyond-design  
24 basis events and core damage. There's equipment qualification rules that  
25 require equipment, indication equipment, as well as pumps and valves, to remain

1 operable under the kinds of environmental temperature, radiation conditions that  
2 you would see under a design basis accident. And then, going directly to the  
3 type of containment design that the plants in Japan of highest interest have,  
4 we've had a Mark I Containment Improvement Program since the very late  
5 1980s, which had installed hardened vent systems for the containment cooling  
6 and fission product scrubbing for all BWR Mark I's, as well as enhanced reliability  
7 of the automatic depressurization system.

8 I also mentioned earlier that we have emergency preparedness and  
9 planning requirements that provide ongoing training, and testing, and evaluations  
10 of emergency preparedness programs, in coordination with our federal partner,  
11 FEMA. And that entails extensive interaction with state and local governments,  
12 as those programs are evaluated and tested on a yearly basis.

13 Over the near term, the NRC activities are -- we will -- concurrent  
14 with the event evaluation that we're doing through the Operations Center and the  
15 team that's in Japan, we will be enhancing inspection activities through  
16 temporary instructions to our inspection staff, including the resident inspectors  
17 and the region-based inspectors in our four Regional offices, to look at the  
18 readiness to deal with both the design basis accidents and the beyond-design  
19 basis accidents.

20 We've already issued an information notice to the licensees to  
21 make them aware of the events, and what kinds of activities we believe they  
22 should be engaged in, to verify their readiness. And then we, every single day,  
23 assess whether or not there is some additional regulatory action that needs to be  
24 taken immediately, in order to address the information that we have, to date. The  
25 temporary inspection I've referred to is verifying that the capabilities to mitigate

1 conditions that result from severe accidents, including the loss of significant  
2 operational and safety systems, are in effect and operational. They're verifying  
3 the capability to mitigate a total loss of electric power to the nuclear plant.  
4 They're verifying the capability to mitigate problems associated with flooding, and  
5 the impact of floods on systems both inside and outside of the plant. And they're  
6 identifying the equipment that's needed for the potential loss of equipment due to  
7 seismic events appropriate for the site, because each site has its own unique  
8 seismic profiles.

9           The information that we gather from this temporary inspection will  
10 be used to evaluate the industry's readiness for similar events, and aid in our  
11 understanding of whether additional regulatory actions need to be taken in the  
12 immediate term. For a near term effort, we are beginning, very soon, a 90 day  
13 effort, that will evaluate all of the currently available information from the  
14 Japanese event, and look at it to evaluate our 104 operating reactors' ability to  
15 protect against natural disasters, to evaluate the response to station blackouts,  
16 severe accidents and spent fuel accident progression, look at radiological  
17 consequence analysis, and also look at severe accident management issues  
18 regarding equipment.

19           I expect that, coming out of this, we'll have the development of  
20 some recommendations for generic communications, either to make sure that the  
21 industry has a broad understanding of the events and the issues, as best we  
22 understand them. But also, as I mentioned earlier, that we would evaluate  
23 whether or not some regulatory action, perhaps in the framework of an order,  
24 would be required, in order to require the licensees to take some actions that  
25 they have not already done. I expect that this 90 day effort will include a Quick

1 Look 30 day report to the Commission, and of course we stand ready to brief the  
2 Commission as you desire.

3           In order to accomplish this Quick Look report, I think we will have  
4 limited stakeholder involvement in this activity, and that it will be done  
5 independent of industry efforts that might be ongoing. The idea is to just get a  
6 quick snapshot of the regulatory response and the condition of the U.S. fleet  
7 based on whatever information we have available. You know, I recognize that  
8 we have limited information now. More and more information will become  
9 available to us as we go along. But we wanted to do at least this Quick Look  
10 report, beginning very soon. And of course, consistent with the Commission's  
11 practices, the results of this report will be made public.

12           On the longer term, we'll be developing lessons learned that are  
13 somewhat dependent on when we begin to get a better understanding of the  
14 events and the results of the earthquake and tsunami in Japan. So, to some  
15 degree, it's difficult to precisely state when the start date for this longer-term  
16 review will begin. The review may include the involvement of other federal  
17 agencies, but it will certainly include interaction with those other federal agencies,  
18 because there's, obviously, the issue of emergency preparedness is a prime  
19 example of where we would interact with FEMA to have an effective review. And  
20 we would identify the lessons learned that need to be incorporated into any  
21 ongoing, long term agency action.

22           We'll evaluate all the technical and policy issues to identify  
23 additional research, or generic communications, changes to our reactor oversight  
24 program, potential new rulemakings, adjustments to the regulatory framework  
25 that should be conducted by the NRC. As I said, we'll evaluate inter-agency

1 issues, and also look for applicability to non-operating reactor facilities. I expect  
2 this longer-term report to have substantial stakeholder involvement, and the  
3 outcomes are likely to be along the lines of generic letters, bulletins, and potential  
4 rulemakings. So, in conclusion, I want to make it clear that we continue to make  
5 our domestic responsibilities of licensing and oversight of the U.S. licensees our  
6 top priority. There is an immediate short term and long term evaluations that are  
7 beginning, and that they will be influenced by our understanding of the events in  
8 Japan. With that, that concludes my presentation. I'm ready to answer any  
9 questions.

10           CHAIRMAN JACZKO: Well, thank you, Bill, for that very thorough  
11 presentation. We have a proposal in front of the Commission now to consider  
12 the options for the short term and the long term reviews, so we'll take a look at  
13 that and provide response in fairly short order. I would, again, just want to  
14 reiterate my thanks to the work that you and your team have done over the last  
15 several days, to deal with this situation, and the -- emphasize the importance of a  
16 systematic and methodical review, so that we do make sure that we approach  
17 these issues, and really get the facts, and make sure that we don't move in a  
18 direction that is based on early information, which often tends to be confusing,  
19 and sometimes conflicting. So I appreciate the work that you've done to this  
20 point. And I don't have any specific questions, at this time, but I would turn to  
21 Commissioner Svinicki to begin with some questions and comments.

22           COMMISSIONER SVINICKI: Thank you, Mr. Chairman, and thank  
23 you, Bill. I second the Chairman's comments about the tremendous efforts that  
24 you and all of the NRC staff members have made in supporting the agency's  
25 reaction to this event. There is a lot that we don't yet know, and so that becomes

1 a context, really, for the types of questions that we're able to ask about this event  
2 today. Very generally, I would ask you, in the staff's expert assessment, this  
3 morning, do you believe that the events occurring at Fukushima have stabilized,  
4 or is it reasonable to expect that events there will continue to be dynamic in the  
5 days and weeks to come?

6 MR. BORCHARDT: In my view, the fact that off-site power is close  
7 to being available for use of plant equipment is, perhaps, the first optimistic sign  
8 that we've had, that things could be turning around. We believe that the spent  
9 fuel pools on Units Three and Four, which had been two components that were  
10 of significant safety concern, that the situation there is stabilizing, that the  
11 containment in three, all three Units One, Two, and Three appear to be  
12 functional, and that there's water being injected into the reactor vessels in Units  
13 One, Two, and Three.

14 So I would say optimistically, things appear to be on the verge of  
15 stabilizing. This has been a very challenging event for us to understand the  
16 exact situation, because, as was alluded to, the information is sometimes  
17 conflicting, it's certainly not at the level that any engineer would like to have in  
18 order to do a thorough analysis, so we've spent a lot of the time trying to piece  
19 together our best understanding. But that would be my personal assessment of  
20 the situation on site now.

21 COMMISSIONER SVINICKI: Is it fair to say from that, then, that,  
22 based on what we understand now of the needs that most urgently need to be  
23 addressed there at the site, that those are being addressed, and that they have  
24 the status that you just described to me? Those are, of course, the items of  
25 highest interest. But it sounds also like, in the days and weeks to come, we will

1 certainly discover other conditions and things at the site, of perhaps a lower level  
2 of priority that we just don't know about right now.

3 MR. BORCHARDT: Yes. The radiation releases and the dose  
4 rates that we've seen on site, I think, were primarily influenced by the condition of  
5 the Units Three and Four spent fuel pools. And the water inventory questions of  
6 whether or not there was some fuel that was uncovered in the spent fuel pool  
7 was of significant concern. TEPCO, the licensee, and the Government of Japan  
8 have been making a concerted effort to address those issues. So that we're  
9 aware of.

10 I don't believe we have anywhere near a clear understanding of  
11 what the plant conditions are like within the reactor buildings. So, what kinds of  
12 electrical cabling has been damaged, what kinds of pumps and valves remain  
13 operable, is a significant unknown right now.

14 COMMISSIONER SVINICKI: Okay, thank you. You gave a very  
15 high level chronology of the events that occurred, as we know them. And it really  
16 ends up being a narrative of three events that are related to each other. First, of  
17 course, being the earthquake, the seismic event. Second, the tsunami, or, as we  
18 might have it in the United States, a flood surge, or some other flooding event,  
19 followed by the loss of power.

20 In terms of what we know now, and given that there are these three  
21 events in succession, do you think that our regulatory focus right now, for the  
22 review we're doing, is where it needs to be?

23 MR. BORCHARDT: Yes, I'm quite confident. We've looked at all of  
24 the information that we're getting from Japan. We've looked at the design basis  
25 for the U.S. reactors. We continue with the inspection program, and we have a

1 high degree of confidence that the 104 currently operating reactors, there's an  
2 adequate basis to assure adequate protection.

3 COMMISSIONER SVINICKI: Thank you. There's been some  
4 discussion of what we call Generic Safety Issue 199. And Generic Safety Issues,  
5 that's a program that we have at NRC for the continual evaluation of various  
6 safety-relevant issues. Could you talk a little bit about the ongoing nature, this is,  
7 Generic Safety Issue 199, was ongoing prior to the event in Japan. Could you  
8 talk about what was occurring there, and how the events in Japan may alter how  
9 we approach that generic safety issue, going forward?

10 MR. BORCHARDT: Occasionally, I think it's every five years or so,  
11 the USGS does a review of information which impacts the U.S. Government's  
12 understanding of seismic frequencies and issues associated with seismic.  
13 Recently they put out a report that talked about the seismic information for the  
14 East, the Central and Eastern United States. That information has been given to  
15 the industry. There's now both industry and NRC evaluation of that information  
16 to see if this new information, and in some places it's an increase in the  
17 frequency, expected frequency of a seismic event, would cause us to have to  
18 change the seismic design basis for the plants.

19 We did a, as we do every time we get any kind of new information,  
20 seismic or otherwise, we do a quick look to make sure that we don't believe  
21 there's any immediate information or any immediate need to take any regulatory  
22 action. If there was, we would certainly do that through the immediate imposition  
23 of new operating guidelines, or new systems, or potentially, even, requirement to  
24 shut the reactor down, until the issue was addressed.

1           In this case, we did that review. We found no reason to take any  
2 immediate regulatory action. And so this is an ongoing review. I don't believe  
3 that what we've learned from Japan would cause a different type of analysis. It  
4 certainly puts a broader, brighter spotlight on the work we're doing, and that  
5 follow-up. But I'm confident that the approach we've been on is the right  
6 approach.

7           COMMISSIONER SVINICKI: You described our role in the inter-  
8 agency response, and NRC-specific actions. Are we cognizant of, and working  
9 to understand and make sure that our efforts do not conflict with, any industry-to-  
10 industry systems that is going on? I'm not aware of Tokyo Electric Power  
11 reaching out to the U.S. nuclear industry, or nuclear utilities, since this is a  
12 technology that we have in the United States. Do we maintain a cognizance of  
13 that so that we can make sure that all efforts are coordinated?

14           MR. BORCHARDT: We are aware that the industry-to-industry  
15 interaction has been ongoing at one level. Of course, there's many vendors and  
16 companies in the United States that have had ongoing business relationships  
17 with TEPCO, and the other generating companies in Japan. So at the working  
18 level, it has been going on ever since the event, and prior to the event.

19           At a higher, coordinated industry-level, I would say we are still in  
20 the formulative stages of that interaction. We have had some discussions with  
21 the industry, U.S. industry, it's still evolving. So we're cognizant of what's going  
22 on, and trying to help, in a U.S. government role, facilitate the contacts, if you  
23 will, between the U.S. and the Japanese companies, in any way that we can.  
24 Because we think it would certainly be a potential benefit to TEPCO.

1           COMMISSIONER SVINICKI: Thank you. And my last question to  
2 you is that, you mentioned our ability to issue very rapidly various types of  
3 generic communications to the industry, and in your prepared remarks you talked  
4 about the fact that we had already issued, I believe last week, an information  
5 notice. Could you describe generally, in that notice, what are we alerting the  
6 U.S. reactors to?

7           MR. BORCHARDT: Well, the main purpose, from my perspective,  
8 and I might ask NRR to supplement my answer if I'm not quite complete, was to  
9 have a regulatory follow-up on the activities that we understand the industry has  
10 taken on their own to verify that the plant procedures and equipment for severe  
11 accidents, for the types of things I discussed that came out of the 9/11 event: that  
12 all of those pieces of equipment, temporary hoses, fittings, procedures, that all  
13 those things are, in fact, still in place, that the operators are cognizant of them,  
14 that they've been trained for whatever reason, to make sure that they haven't  
15 fallen into disuse because they haven't been used.

16           So it was really a regulatory verification that the industry's initiatives  
17 on this front have, in fact, been taken, and that we will be following up on the  
18 results of those assessments, and doing our own sampling check, as we always  
19 do.

20           COMMISSIONER SVINICKI: Okay, and so those were the items,  
21 based on what we know now, that we identified as being of the highest interest,  
22 at least in the immediate term, okay?

23           MR. BORCHARDT: Yes.

24           COMMISSIONER SVINICKI: Thank you. Thank you, Mr.  
25 Chairman.

1 CHAIRMAN JACZKO: Did you have any other questions?

2 Commissioner Apostolakis.

3 COMMISSIONER APOSTOLAKIS: Thank you, Mr. Chairman. Bill,  
4 you mentioned that the -- well, first of all, we know that there is a number of Mark  
5 I BWRs in the United States, which is the same design as those in Fukushima.  
6 But you also said that in the recent past we hardened the venting valves of the  
7 containment. Have the Japanese done this?

8 MR. BORCHARDT: That, we're not clear on. I'm not sure; I can't  
9 really answer that question.

10 COMMISSIONER APOSTOLAKIS: I guess the question is, if they  
11 had done it, would that have affected the accident? And in what way?

12 MR. BORCHARDT: Well, it would not have affected the loss of off-  
13 site power, which is, right, the initiator. The hydrogen explosion aspect, though,  
14 possibly, is where the hardened vent would happen. There's two vent paths off  
15 of the U.S. Mark I containments. The preferred vent path takes suction, if you  
16 will, or has a release path from the airspace above a pool of water that's in the  
17 basement, it's in the torus of the Mark I containment, and that would allow for the  
18 steam that went into the torus to be scrubbed of fission products, so you would  
19 have a release; it would relieve the pressure, which is the main objective of the  
20 vent, is, you want to maintain the containment integrity. And it's preferable to  
21 vent it on purpose to get the pressure so that you don't have a catastrophic  
22 failure of the containment.

23 And so that release path is exterior to the plant. So it's at least my  
24 belief that you wouldn't have the hydrogen accumulation in the upper levels of  
25 the reactor building, which we believe is the cause of the explosions. Now, the

1 spent fuel pools on these designs are also on that same level, on the upper level  
2 of the reactor building. So it's, the hardened vent wouldn't do anything to help  
3 hydrogen that came from the spent fuel pool

4 COMMISSIONER APOSTOLAKIS: I see, okay. Now you also  
5 mentioned that we have extra equipment for beyond-design basis accidents that  
6 were installed, so-called B.5.b that were installed after the September 11  
7 attacks. Did the Japanese have any of those?

8 MR. BORCHARDT: Again, I'm not sure. I -- really, we're trying to  
9 get information, but I am not personally aware of the situation in Japan.

10 COMMISSIONER APOSTOLAKIS: Okay. Thank you. Some  
11 people are asking why did the Germans shut down their plants, or some plants,  
12 after the accident, and we did not? Are we less prudent than the Germans?

13 MR. BORCHARDT: No, I am not aware of the basis for the  
14 German decision to do that. I'm 100 percent confident in the review that we've  
15 done, and we continue to do every single day, that we have a sufficient basis to  
16 believe, to conclude that the U.S. plants continue to operate safely. So I -- we've  
17 asked ourselves the question every single day: Should we take a regulatory  
18 action based upon the latest information? And, because of the kinds of things  
19 that I outlined in my presentation, we have not reached the conclusion.

20 COMMISSIONER APOSTOLAKIS: Thank you. Now, of course,  
21 the seismic risk is at the forefront of the news. And we hear that -- well, first of  
22 all, our press releases emphasize that the seismic design is based on the  
23 horizontal ground acceleration at the plant. But, of course, most people think in  
24 terms of the Richter scale. And also we hear that the earthquake of magnitude 9  
25 at Fukushima had not been anticipated.

1           Now, we say that in the United States, we design the plants by  
2 looking at the historical record, and then by, we add margins. Now I understand,  
3 or believe, that the strongest earthquakes in the United States have occurred  
4 east of the Rocky Mountains in the 1800s, and the magnitude was between 7  
5 and 7.7 on the Richter scale, something like that. So immediately you get the  
6 question, then, yeah, okay, you design against those, but look at Japan: What if  
7 you had an earthquake of magnitude 9? How does one answer that question? I  
8 mean, you can always ask, what if an earthquake of 9 and a half occurred. I  
9 mean, is there a rational way of addressing that?

10           MR. BORCHARDT: Well, my explanation is one that I know you  
11 understand this, but we look at faults around the U.S., we have that information.  
12 We look at the historical record, look at what the maximum earthquake has been,  
13 and then, as with everything we do, we add margins. But we also look at the  
14 specific location in relation to the fault, and consider the kinds of soil and rock  
15 formations that are between the fault location and the site, and do an analysis to  
16 see what is the ground motion that would actually be seen at this site. And we  
17 design for an earthquake of a certain size, or a, you know, I'm falling into the trap  
18 of saying "an earthquake of a certain size", of a ground motion of a certain  
19 magnitude.

20           But then, having said that, all of these other things: severe accident  
21 management guidelines, the B.5.b procedures, we have programs in place,  
22 equipment in place, that says, even if we were wrong, and the plants suffered  
23 this kind of serious event, we have, in fact, the activities, the equipment, ready,  
24 and practiced to respond to protect public health and safety. So I don't know if I

1 should throw a seismic lifeline here, if you wanted to get into any more detail on  
2 seismic issues.

3 CHAIRMAN JACZKO: And just say your name.

4 ANNIE KAMMERER: Thank you. My name is Dr. Annie  
5 Kammerer, I'm in the Office of Research. I think I'd like to make a couple of  
6 points. The first point is related to the ground motion in Japan. Recently, starting  
7 in 2006, the Japanese regulatory agency performed a study in which they looked  
8 at increased hazard, perception of hazard at the plants. And recently themselves  
9 did a reevaluation of the impact that potential increased hazard at the facilities,  
10 and actually were in the middle of this when this event occurred. As a result, a  
11 number of modifications were made to the plants.

12 At this point, it's not clear exactly what modifications the Fukushima  
13 plant had already had implemented. However, the ground motions for which the  
14 plant was reevaluated, is about .62G; the original design basis was about .37G.  
15 Based on the preliminary information that we have, .62G is in the range of the  
16 ground motions that were actually experienced by the plant, although they came  
17 from a different earthquake than was anticipated. The ground motions that, for  
18 which the plant was assessed, was a 7.1, very close to the plant. That's what  
19 produced the ground motions of 6.2.

20 So, one thing that we believe is that the ground motions at the  
21 plant, even though it was a different event, were not out of the range that they  
22 had already considered. It's less clear with regard to the tsunami. Currently, the  
23 Japanese Society of Civil Engineers is finalizing guidance, probabilistic tsunami  
24 hazard assessment guidance for Japan. And it was anticipated that the  
25 Japanese regulator would do a similar study for a tsunami hazard assessment at

1 the plants once that was completed. Unfortunately, because the guidance has  
2 not yet completed, it's not believed that they initiated that work.

3           So just to clarify, that even though this particular event was larger  
4 on the subduction zone than was anticipated, it probably didn't greatly exceed the  
5 ground motions. The one exception to that may be in the long period range.  
6 Because if you have a larger amount farther away, you get more long period  
7 content than would be anticipated from a 7.1 close in. The second question, or  
8 the second point is in regard to a seismic hazard in the United States. As was  
9 mentioned, we are undertaking a program, Generic Issue 199, which is looking at  
10 the potential impact to assess risk, given a perceived increase in the ground  
11 motion hazard in the Central and Eastern U.S., which was initiated by the new  
12 USGS seismic hazard mapping work that was done. And it's important to note  
13 that when the modern analysis techniques that are used are probabilistic  
14 techniques, those are the basis of the maps, and they account for basically all  
15 sources and the potential for all the different magnitudes that are capable of  
16 those sources, up to and including maximum magnitude events which, in many  
17 cases, exceed that which we have seen in the historic record. It was mentioned  
18 that the largest, the most widely-felt earthquakes in the U.S. were the 1811-1812  
19 New Madrid events, which we currently believe were about a magnitude 7. And  
20 yet, we do look at, particularly in portions of the crust of a potential for exceeding  
21 that. Of course, we also account for the likelihood that that event occurs. And  
22 that also accounts for background seismicity, which is common in the east, which  
23 is seismicity which cannot be attributed to a specific fault.

24           In fact, it's important to note that seismicity in the Central and  
25 Eastern U.S. tends to be in what we call seismic zones, which are not directly

1 attributable to a fault. And we account for all of the hazard in the seismic zones.  
2 One of the questions which has come up repeatedly is, how many plants are  
3 near faults? Or, how many plants are in moderate or high seismicity regions?  
4 And that's a very challenging question to answer, because these seismic zones  
5 are not well-defined boundaries. The faults that were the causative faults in the  
6 1811 and 1812 earthquakes have never been identified, in part because they're  
7 under a very deep -- the very deep sediments in the Mississippi region. And so  
8 we have to account for the uncertainty in the location, we have to account for the  
9 uncertainty involved in the maximum magnitudes. And all of that is incorporated  
10 in the hazard analyses that we undertake.

11           The Generic Issue Program is using the most state-of-the-art types  
12 of analyses, which do look at earthquakes, and include earthquakes beyond the  
13 design basis. So, in that way, we directly account for those potential sources and  
14 those potential earthquakes, which are not under our current licensing basis.  
15 And we're currently assessing the risk from the possible beyond-design basis  
16 events.

17           CHAIRMAN JACZKO: Well, thank you for that, Annie.  
18 Commissioner Apostolakis, did you have additional comments or questions?

19           COMMISSIONER APOSTOLAKIS: Yeah, I'd like to make one  
20 comment and then ask my last question. Annie mentioned several times,  
21 probabilities, even after we do the probabilistic analysis, we still have Defense in  
22 Depth in mind, which is the current way of looking at things. So it's not just, what  
23 is the most likely event that we anticipate, we always ask that question that Mr.  
24 Borchardt mentioned: what if we are wrong? And we take additional measures.

1 So I think that's very important, for people to understand it. Because, you know,  
2 probabilities, sometimes, are easy to attack.

3 One last question, thank you Annie. As you mentioned, the  
4 damage in Fukushima was not really caused by the earthquake; it was the  
5 tsunami that came afterwards. So the question now is: when we license our  
6 plants here, are we considering this one-two punch? Are we considering an  
7 earthquake followed by a tsunami, as appropriate? Or a major fire, or a flood,  
8 because tanks holding water fail? Because this secondary event seems to be,  
9 now, very important, and we have to account for it. So how are we approaching  
10 this issue in the United States?

11 MR. BORCHARDT: Well, the design basis includes many different  
12 analyses. I would just say one thing about the earthquake in Japan. We don't  
13 know what the impacts of the earthquake are inside of the reactor buildings,  
14 specifically, that's where most of the equipment of interest to us would be  
15 located. It may have survived perfectly well, and stayed perfectly functional, or  
16 there may be damage that we just don't know about. So we need to see what  
17 the inspection results are, once they have access to the plant.

18 But our reviews for the U.S. include, it's always very site-specific.  
19 So, you know, for earthquakes, if they are in a very soft soil environment, there's  
20 not a very challenging review that's required, or analysis that's required on  
21 earthquakes. But it might be that you need a storm surge for a hurricane, or a  
22 storm surge for a tsunami. But there are multiple -- you don't take every possible  
23 current event and pile them all together into one event. So it's done more on an  
24 event by event basis, so I don't know if --

25 COMMISSIONER APOSTOLAKIS: [inaudible] or something else?

1           CHAIRMAN JACZKO: Well, I think that, and Eric, maybe you could  
2 just answer the question. I think it's, more generally, how do we -- do we  
3 consider separate design basis events -- do we consider design basis events  
4 separately, or do we consider all design basis events simultaneously on a plant?

5           MR. LEEDS: Eric Leeds, Director of the Office of Nuclear Reactor  
6 Regulation. As Bill mentioned, we take into account whatever natural  
7 phenomena could occur at a particular site, whether it's a hurricane, a tsunami,  
8 an earthquake, a tornado, what have you. And we have them analyzed site-  
9 specifically. Now, I'm not exactly sure if I understand the question directly. Are  
10 you asking, a seismic event followed by a tsunami? Well, I know that we  
11 analyzed for a tsunami, we analyzed for the maximum storm surge, as Mr.  
12 Borchardt mentioned, and also what kind of a run-out would happen. Typically,  
13 tsunamis are triggered by an earthquake. So, one or the other, we would  
14 analyze for that. And we've done that for our plants on the coast.

15           COMMISSIONER APOSTOLAKIS: Thank you, Mr. Chairman.

16           CHAIRMAN JACZKO: And I would just echo, I think, Bill's  
17 comments. We are at a very early stage now, too, and detailed information, it's  
18 probably going to be some time until we have it. And so exactly the impacts of  
19 the tsunami and/or the earthquake and what their effects on the plant were will  
20 probably still take some time to understand. Commissioner Magwood?

21           COMMISSIONER MAGWOOD: Thank you. Good morning, Bill.

22           MR. BORCHARDT: Good morning.

23           COMMISSIONER MAGWOOD: Did you get some sleep this  
24 weekend.

25           MR. BORCHARDT: Not much.

1           COMMISSIONER MAGWOOD: Not much? I'm sorry. You'll get  
2 there at some point. There's been a lot of discussion in the media about -- that  
3 compares what's happening in Japan to Three Mile Island. And I, as I look at  
4 this, and again, we're so early in this, I tend not to think as much about Three  
5 Mile Island as I do 9/11. And one reason I think about that is because it seems  
6 to me that there are, certainly, a lot of lessons learned, a lot of technical details  
7 we'll have to sort out over time. But I wondered, also, whether, as in the case of  
8 9/11, is there a major conceptual "Ah-ha!" that's sitting out there in front of us?  
9 And I want to make sure we don't miss that forest while we're looking at all these  
10 trees.

11           And in the case of 9/11, it wasn't just simply, you know, that we  
12 need to do a better job protecting, you know, airplane cockpits, and lots of other  
13 security upgrades. It was a conceptual "Ah-ha!" that the threat is a lot different  
14 than we thought it was. Do you, as you look at this at this early stage, do you  
15 see a bigger message out there that we should be thinking about?

16           MR. BORCHARDT: I don't see a significant weakness now, but  
17 that's why we need to do this Quick Look review. And my personal view is that  
18 what we need to do is take some very experienced people that are both within  
19 the staff, and maybe take some even recently retired people that have expertise  
20 in the broad areas of design review and licensing, and let them just focus on the  
21 question of, is there something here that causes us to question these, the way  
22 we've applied Defense in Depth, and being risk-informed, and the various  
23 barriers of radiation release protection, and those kinds of things, and evaluate  
24 whether or not there's something different that needs to be done.

1           It hasn't actually occurred to me, if anything, it's given me a bit of a  
2 confidence, if you will, that all of those redundancies, and all of our processes,  
3 are paying off. I mean, it was maybe in the view of some stakeholders overly  
4 conservative, the way we've approached it, but I think we're seeing the value and  
5 the benefit of that approach that we've used for the last 35 years.

6           COMMISSIONER MAGWOOD: I appreciate that, and I agree with  
7 it. Let me give you some, just sort of, thoughts about where I think there might  
8 be some larger issues to think about. And that is, in looking at, as we've  
9 described them, again, we don't know all the details yet. But we do have the  
10 sense that the plant seemed to survive the earthquake. And we do have the  
11 sense that the tsunami's disabling of the backup power systems led to the  
12 situation that followed. But even beyond that, there's the fact that there was so  
13 much difficulty in bringing resources to the plant to recover from that situation.

14           When you look at our plants, we certainly have done things in B.5.b  
15 and other things to upgrade our ability to recover from site blackout; and we're  
16 going to be looking at those issues. But if you lose a lot of infrastructure, if you  
17 lose the ability to get to a site, if you lose hundreds of miles of transmission line,  
18 if you lose the ability to have rail transport, to move equipment around, that's  
19 something I don't know that there's been a lot of thought about.

20           And I wonder if you could reflect on that for a moment, because  
21 when I look at this event, I see a significant struggle over -- especially over the  
22 early part of this, to get the right resources to the plant to be able to recover from  
23 this accident. And even today, we still are struggling to hook up the AC power to  
24 Units One and Two, as you've described. When you think about this, and again  
25 we'll look at this in great detail as we go forward, do we even have the regulatory

1 scope to cover all the ground that needs to be covered, to assure that the  
2 infrastructure's in place to be able to recover from an accident like this?

3 MR. BORCHARDT: I think there's a couple levels that maybe I'd  
4 like to touch on in response to that question. The first is, and I have no idea what  
5 the situation is in Japan regarding their regulations and what they have in place,  
6 so I'm not implying whether they had it or didn't have these kind of things. But in  
7 the United States, I mentioned the station blackout rule, which is a rule that  
8 requires an analysis of what would happen at a plant and its coping strategy for  
9 dealing with a complete loss of all AC power. So that assumes that the diesels  
10 don't -- that you'd lose the transmission lines and the diesels don't start, and then  
11 they have to do an evaluation and it's a coping study, how they would be able to  
12 restore the plant. That has resulted in various approaches at different sites.  
13 Some have a gas turbine that is on the site that could be very quickly hooked up  
14 into the grid -- not into the grid, into the plant. There's others that have non-  
15 safety-related diesel generators. There are plants that have diesel fire-pumps so  
16 that there is a backup to a backup to a backup way to inject water into the core  
17 and into the spent fuel pool. So there's a regulatory construct that's required and  
18 mandated that type of activity.

19 From a U.S. Government perspective, coming out of 9/11, we had  
20 the Department of Homeland Security, which is positioned to orchestrate the  
21 entire federal response to an event of magnitude that, you know, you might be  
22 suggesting, that would happen so that the full resources of the U.S. Government  
23 would be able to use different resources to get temporary equipment to a site in  
24 order to provide electrical power, temporary diesel generators, that kind of thing.

25 And then the backstop for all of that, and I'm now leaving the kind of

1 federal regulatory requirement perspective, is that the U.S. industry, I think, is  
2 unique in the world, but also within industry in this country in that while on the  
3 one hand they're competitors, on the other hand they share operating  
4 experience, they have programs that they all contribute to, and they have an  
5 inventory of spare parts and equipment that can be very quickly brought to bear  
6 in responding to this kind of an event. So this is outside the regulatory purview, I  
7 want to make clear, but that is yet another backstop that would help a site that  
8 had a similar kind of problem respond to it in a quick and effective manner.

9           COMMISSIONER MAGWOOD: I appreciate that, and let me also  
10 echo your somewhat positive words about the industry. I think in this particular  
11 instance, actually, I think the industry in the U.S. and internationally has  
12 responded very, very well to this. I particularly congratulate INPO's efforts,  
13 through WANO, to work with international partners and also to take positive  
14 action here in the United States. I think they've done a good job, and I think NEI  
15 and others have worked together and I think individual companies have done a  
16 lot, so I congratulate the industry for reacting that way.

17           Let me move on to a little bit different subject. We've talked a little  
18 bit about hydrogen already this morning, and the measures we have to deal with  
19 hydrogen. Is it your understanding that all the hydrogen that led to the  
20 explosions came from the spent fuel?

21           MR. BORCHARDT: I wouldn't want to hazard a guess. It was  
22 certainly a likely source; whether it was all of it or not, I couldn't guess.

23           COMMISSIONER MAGWOOD: You've talked about this a little bit,  
24 but I want to give you a chance to sort of give a little bit more of a holistic

1 response to this. What measures are in place to prevent hydrogen from  
2 collecting and exploding in U.S. plants? Mark I's or others.

3 MR. BORCHARDT: Well, the hardened vent, of course -- the U.S.  
4 design approach is to protect the containment. It's to ensure the integrity of the  
5 containment, and if you can do that, even if you have fuel damage, then you can  
6 prevent the uncontrolled release of radioactive materials into the environment.  
7 And so this is -- Three Mile Island, for example, had core damage, a significant  
8 amount of core damage, yet the radiological releases were very limited from  
9 Three Mile Island, so there was negligible health effect from that accident. So  
10 hardened vents will allow the primary containment to stay intact and that's  
11 probably the single most important thing.

12 The other thing to maintain the containment is, for this particular  
13 design of containment, we've required, I think since the late 80s again, inerting of  
14 the containment. So it's filled with nitrogen, so if you don't have oxygen in the  
15 containment, even if you did have hydrogen in there, you're not going to have an  
16 explosion or a fire. So I think those are the two, probably the biggest ones, and I  
17 don't know if there's anything that we need to add.

18 COMMISSIONER MAGWOOD: Appreciate that. One more  
19 question, Mr. Chairman. Also to just give you a chance to clarify. I know there's  
20 a lot of chatter in the press over the weekend about the impact of 50-mile  
21 evacuation zones around U.S. nuclear plants. Could you sort of give the NRC's  
22 position on what the emergency planning requirements are, and why we're  
23 confident in what we have today? Can you please elaborate?

24 MR. BORCHARDT: We have, as part of the emergency  
25 preparedness construct in this country, a 10-mile emergency planning zone that

1 completely encircles every reactor plant in the country. That, in coordination with  
2 FEMA, who has an offsite emergency-preparedness role throughout the country,  
3 is routinely practiced. We have models that would do an analysis of what the  
4 release paths are; we take into account the meteorological conditions; and the  
5 NRC, I should be clear, the NRC does not make the recommendations regarding  
6 evacuation or any other protective action guidelines; that's the responsibility of  
7 the state government, so it would be the governor that would ultimately be  
8 making that decision. But we're in a position to provide independent assessment  
9 and advice to the governor in those kinds of circumstances.

10           The situation that led to the 50-mile guidance in Japan was based  
11 upon what we understood and still believe had existed, that there was degraded  
12 conditions in two spent fuel pools at the site, and in all likelihood some core  
13 damage in three of the reactor units. Based on the situation as we understood it  
14 at that time, we thought it was prudent to provide the recommendation to the  
15 ambassador to evacuate out to 50 miles in Japan. It was not based on the  
16 existing radiological conditions, but what at that time was a possibility. And so  
17 we thought it was the prudent, conservative suggestion. If those conditions  
18 existed in the United States, we would have made the exact same  
19 recommendation. But the idea that there might be some misunderstanding, that  
20 because we have a 10-mile EPZ, that would be the extent for what we would  
21 consider and what our emergency planning recommendations would be limited  
22 to, is not true at all. We would have done the exact same kind of analysis and  
23 gone through the same thought process to consider extending evacuation or  
24 whatever protective measures we thought were appropriate.

1 COMMISSIONER MAGWOOD: Thank you. Thank you, Mr.  
2 Chairman.

3 CHAIRMAN JACZKO: Commissioner Ostendorff.

4 COMMISSIONER OSTENDORFF: Thank you, Mr. Chairman. Bill,  
5 again I thank you for your leadership in this effort, and for the hard work and  
6 professionalism of your teams. It was helpful in your opening statement, where  
7 you talked about the history of the NRC post-Three Mile Island, post-9/11, as to  
8 what steps or additional measures were considered or in fact implemented; and  
9 so I think that history is very relevant to the near-term and longer-term efforts.  
10 Certainly there's Hurricanes: Andrew, Katrina that this country has faced. Also  
11 provide data points for various steps taken, whether they be specific to the  
12 nuclear field or external to the nuclear field. Does any of the experience from  
13 your career at NRC, do you have any significant lessons learned from the  
14 process, not the substantive technical details, but the process that was employed  
15 following these other significant events that would help inform the task force  
16 execution of its mission?

17 MR. BORCHARDT: Well I think it's very important that the task  
18 force keep the broad perspective of the regulatory framework that exists within  
19 the NRC, and the legal framework that exists within the United States. Because  
20 there is a temptation to, I think, try to pile in every good idea that exists into  
21 something that becomes unmanageable, and in the ultimate could actually end  
22 up being counterproductive to safety.

23 There was a degree of that, in my opinion -- this is only speaking  
24 my personal opinion -- after Three Mile Island, because when I started with the  
25 agency in 1983, we were still in the midst of following up the actions from the

1 Three Mile Island action plan. It was a NUREG-0737, and anybody who started  
2 in the NRC has that number burned into their brain because we spent enormous  
3 amounts of resources following up on those activities. Some of those fixes that I  
4 alluded to were absolutely instrumental in improving the safety in this country.  
5 Some were, I believe, if we had carried them all out, might have actually been  
6 counterproductive in a way, just not contributed to safety. They might have been  
7 a good idea in somebody's mind. So there needs to be -- after you go through  
8 the brainstorming and identification of all possible things to change, I think there  
9 needs to be a good evaluation, thorough evaluation, of what's the right thing to  
10 do, and in what kind of sequence and in what kind of timing.

11           COMMISSIONER OSTENDORFF: Okay. Well I'll just make two  
12 comments on that. One thing, just for information, you may be aware of this, but  
13 about a year ago the National Academies undertook a significant study for about  
14 9 or 10 federal agencies, to look at disaster resilience in this country, specifically  
15 from the context of inter-agency coordination, roles and responsibilities. But  
16 nothing there was, or to my knowledge is currently nuclear-specific. The extent  
17 of interagency coordination for various types of events in this country is a prime  
18 subject of that study. There may be some value in looking at that.

19           And refer to Commissioner Magwood's questioning on the  
20 transportation logistics support, which I completely agree have been issues here  
21 so far, in this particular response. One might take note of the Department of  
22 Defense's efforts, since the loss of the U.S.S. Thresher back in 1963. There's  
23 been a very operationally ready deep-submergence rescue vehicle, DSRV, on  
24 standby close to airplanes on the East and West Coast of the United States to  
25 provide a response. So other agencies, the point is, have gone through similar

1 analogues in looking at how they might deal with particular responses, and that's  
2 something just to note.

3           Also, kind of maybe staying a little bit on the big-picture historical  
4 nature of some of the prior NRC responses to these big events, it also strikes me  
5 that perhaps the audience or the recipients of these reports will be representing a  
6 broader cross-section than typical Commission meetings. Certainly we have  
7 nuclear industry, we have many of the same stakeholders from issue to issue,  
8 but in my personal opinion is that this is one where how we communicate to John  
9 Q. Public, the person that doesn't have a stake in the industry or is not part of  
10 one of the normal stakeholder groups, but also deserves and needs to receive a  
11 reply that they can understand, is really essential. Is there anything from your  
12 prior experience here at the NRC, either 9/11 or Davis-Besse or the 2003  
13 blackout, that you think would be in your initial thoughts on how we communicate  
14 so that people in the American public understand what the results are of these  
15 near-term and longer-term efforts?

16           MR. BORCHARDT: Well, and again this is just my view, my  
17 assessment, I think that especially in the long-term review that we do, we need to  
18 build in a meaningful engagement with all the stakeholders. They have an  
19 enormous capability to understand the most technical issues. Sometimes we  
20 think that capability doesn't exist, but it's in fact not true. And we have had  
21 enormously valuable input from a wide range of stakeholders. This is a little bit  
22 off of event response, but when we established the reactor oversight program --  
23 we did it 10 or 12 years ago -- we used just that kind of an approach. We  
24 brought in all kinds of different stakeholders from all different perspectives, and it  
25 was a very impressive end result that had everyone's buy-in. People who came

1 from pro-nuclear, anti-nuclear, and they all agreed that this was a good approach  
2 to perform regulatory oversight. I think the same kind of mindset is important to  
3 enter into this long-term activity, and start at the beginning. Where we get into  
4 trouble as a regulator is when we have our mind made up, or even if we don't  
5 have our mind made up, there's a perception we already have our mind made  
6 up, and then we begin the engagement. So I think we need to do it right from the  
7 very beginning, have it be a very open and transparent process.

8           COMMISSIONER OSTENDORFF: Thank you. I know as the  
9 Chairman indicated in his comments earlier, there's much we don't know.  
10 There'll be significant periods of time before we have full granularity, a lot of the  
11 details of what happened at Fukushima, but there's one area, if you'll just bear  
12 with me, that I do want to ask you about. I've been here not quite one year; I've  
13 spent very little time looking at spent fuel pools. When I go visit a plant, I'll go  
14 see the pool, and on some of these visits -- I've probably seen four, I think, in the  
15 last year. But I certainly don't have much background at all in the spent fuel  
16 pools. And recognizing that's been the focus of a lot of the concerns over the  
17 last 10 days, and that perhaps compared to our discussions, we have an  
18 emergency core cooling systems and GSI-191 and other issues that we don't  
19 spend a lot of time, as a Commission, really talking about that.

20           Is there any initial area of U.S. reactor plant spent-fuel configuration  
21 or operation that comes to your mind as warranting particular exploration in this  
22 task force?

23           MR. BORCHARDT: Well clearly, it's a very simple problem. All  
24 you have to do is keep water in the pool. The pool is an open vessel, and the  
25 only objective is to keep water in it. Even if, in a bad situation, it were to heat up

1 and you had boiling in there, as long as you kept the fuel covered with water,  
2 you're going to prevent the high radiological release. So I think what the task  
3 force needs to do is to go down the specifics of what happened in Japan, and  
4 then evaluate that to make sure that in fact, these things that we put into place  
5 after 9/11, for example, really would work under that scenario.

6 We have thought about things like making sure that the equipment  
7 you're going to use wouldn't be damaged in the event that caused the first  
8 problem, so you can't have everything staged exactly where it's ready to be  
9 used. There has to be some staging areas. But for example, on the tsunami or a  
10 flooding issue you wouldn't want the equipment now stored outside, right?  
11 Because it would be swept away. So you know, it's yet another "what if" to really  
12 help us explore and probe what the various scenarios are being, and make sure  
13 we have the highest probability of success. I think that's really the box we need  
14 people to be thinking in.

15 COMMISSIONER OSTENDORFF: That's very helpful. Thank you.  
16 Thank you, Mr. Chairman.

17 CHAIRMAN JACZKO: I'd ask at this point if there are any other  
18 questions that any of my colleagues have.

19 MR. BORCHARDT: Well at this point, can I just --

20 CHAIRMAN JACZKO: Sure, Bill.

21 MR. BORCHARDT: Can I just -- I'm not going to ask you a  
22 question.

23 [laughter]

24 CHAIRMAN JACZKO: I'm not sure I'd have answered it for you if  
25 you did.

1 [laughter]

2 MR. BORCHARDT: I do want to just take a moment and thank all  
3 the NRC staff that have responded to this event, all the people that are in the  
4 Ops Center -- we're doing our best to have a rotation of people in and out of  
5 there, but they're working very hard, very long hours. They're still doing their real  
6 job too, like I said, that's got to be our first priority. But I want to just make  
7 special note of the team of people that volunteered to go to Japan on no notice,  
8 that have been there working incredibly long, hard hours, working in a way that  
9 there is no operating procedure to operate. They have had to develop it on the  
10 go. So Chuck Casto happens to be the team leader, but there are many people  
11 that have worked very hard. We have sent another person over to help Chuck in  
12 that team-leader role, and there is the next wave of NRC employees that have  
13 volunteered, and they'll be leaving beginning, I think it's tomorrow. And then the  
14 last element of that group on Thursday. So I just want to make special note of  
15 their commitment and professionalism. Thank you.

16 CHAIRMAN JACZKO: Well thanks for that, Bill. I appreciate that,  
17 and your work as well, I think, as I've noted. At this point I would just offer that  
18 we do have a proposal that's been circulated that I think captures at a high level  
19 some of these ideas for a path forward, and I would certainly encourage that we  
20 move on that as promptly as possible. But I thought I'd offer at this time an  
21 opportunity, if anybody wants to make comments on that or any of the other  
22 issues that we have in front of us. Commissioner Ostendorff?

23 COMMISSIONER OSTENDORFF: I just thank you for convening  
24 this meeting today. I think it's been very helpful, and I know that we're all ready  
25 to move forward to take the actions we need to take.

1                   CHAIRMAN JACZKO: Okay. Well again I want to thank everybody  
2 for their efforts so far, and again, I just want to reiterate as we close that as many  
3 people on this side of the table have indicated, we have had, many of us, very  
4 close and personal relationships with colleagues in Japan, and our hearts go out  
5 to them as they continue to deal with this very difficult event, and we will continue  
6 to work to provide our colleagues and counterparts in Japan with assistance as  
7 they need it, to deal with the situation. And I think as Commissioner Magwood  
8 indicated, this is likely the first of many discussions we will have on this topic, and  
9 I look forward to continuing the discussion and continuing our focus on our  
10 important health and safety mission. With that, we are adjourned. Thank you.

11                   [Whereupon the proceedings were concluded]

**From:** [Harrington, Holly](#)  
**To:** [Brenner, Eliot](#); [Burnell, Scott](#); [Courret, Ivonne](#); [Hayden, Elizabeth](#); [McIntyre, David](#); [Chandraithil, Prema](#); [Dricks, Victor](#); [Hannah, Roger](#); [Ledford, Joey](#); [Mitlyng, Viktoria](#); [Screnci, Diane](#); [Sheehan, Neil](#); [Uselding, Lara](#)  
**Subject:** FW: Information on emergency planning in the U.S.  
**Date:** Tuesday, March 22, 2011 11:39:02 AM  
**Attachments:** [Information on emergency planning in the US.docx](#)

---

FYI – might be helpful to folks

---

**From:** PMT03 Hoc  
**Sent:** Tuesday, March 22, 2011 10:54 AM  
**To:** Harrington, Holly  
**Cc:** Hoc, PMT12  
**Subject:** Information on emergency planning in the U.S.

Holly:

Per your request to Kathryn Brock (PMT), attached is the subject information. Should you have questions, please contact Kathryn at [PMT12.hoc@nrc.gov](mailto:PMT12.hoc@nrc.gov), or 301-816-5415.

Prosanta Chowdhury  
PMT Coordinator  
301-816-5407

NNNN/21

### **Information on emergency planning in the U.S.**

- For domestic events, licensees are responsible for making protective action recommendations (PAR) based on plant conditions and/or dose projection, and emergency plans in place. The State then makes a protective action decision (PAD) to either use the licensee's PAR or to make their own decision. NRC monitors the PAR and the PAD.
- Each licensee has their own emergency procedures; however, most start with a 2-mile radius and 5-mile downwind evacuation. Some licensees recommend initial evacuation out to 10 miles, depending on plant conditions. Dose projections requiring PARs beyond 10 miles are provided to the States for PADs beyond 10 miles. Emergency planning zones are meant to be expanded, as necessary, depending on plant conditions. NRC believes this emergency preparedness basis is appropriate.
- In the US, the NRC has access to plant data via the ERDS network and can easily obtain plant data that may be used in RASCAL calculations to make evaluations of realistic protective actions. In addition, NRC has a detailed understanding of plant design for US plants and would not have to make assumptions, as was done for the Japanese plants and spent fuel pools.
- On March 16<sup>th</sup> the NRC recommended that American residents within 50 miles of the Fukushima reactors in Japan evacuate. This was based on extremely limited data from Japan that was used to develop two dose assessments using RASCAL. As discussed in the press release, this was based on system conditions for a hypothetical single reactor site (source terms were combined) and is not representative of an actual release.
- If these exact conditions occurred in the US, the State would have made a PAD and the NRC would have expected it to be similar to the PAR issued by NRC in this event. However, if this event were in the US, the NRC would have realistic data from the licensee and would not have to rely on hypothetical and overly conservative assumptions.

**From:** [Cathy Hawes](#)  
**To:** [McIntyre, David](#)  
**Subject:** REVISED IN 2011-05 (ML110760432)  
**Date:** Tuesday, March 22, 2011 1:04:48 PM  
**Attachments:** [ML110760432.pdf](#)

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REVISED version of IN 2011-05. The revision are adding Nuclear Reactor of Operations to the Title on the first page and adding MShuaibi to the signature and concurrence pages indicating that he signed for LDudes.

Attached is an PDF version Information Notice 2011-05, Tohoku-Taiheiyou-Okai Earthquake Effects On Japanese Nuclear Power Plants, dated March 18, 2011, (ML110760432), that has been posted to the NRR GCC Web, along with the URL for Web access to generic communications files on the NRC Homepage:

<http://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/2011/>.

To subscribe or unsubscribe send an email to [lyris@nrc.gov](mailto:lyris@nrc.gov) , no subject, and use one of the following commands in the message portion:

subscribe gc-nrr (first and last name)

unsubscribe gc-nrr (first and last name)

thanks  
Cathy

NNNN/22

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION  
WASHINGTON, DC 20555-0001

March 18, 2011

NRC INFORMATION NOTICE 2011-05: TOHOKU-TAIHEIYOU-OKI EARTHQUAKE  
EFFECTS ON JAPANESE NUCLEAR POWER  
PLANTS

## ADDRESSEES

All holders of or applicants for operating licenses for nuclear power reactors under the provision of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

All holders of or applicants for a standard design certification, standard design approval, manufacturing license, limited work authorization, early site permits or combined license issued under 10 CFR Part 52, "Licenses, Certifications and Approvals for Nuclear Power Plants."

## PURPOSE

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice (IN) to inform addressees of effects of the Tohoku-Taiheiyou-Oki Earthquake on nuclear power plants in Japan. The NRC expects that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. Suggestions contained in this IN are not NRC requirements; therefore, no specific action or written response is required.

## DESCRIPTION OF CIRCUMSTANCES

The following summary of events is provided based on the best information available at this time. The situation in Japan regarding recovery efforts for the Fukushima Daiichi Nuclear Power Station continues to evolve on an hourly basis.

On March 11, 2011, the Tohoku-Taiheiyou-Oki Earthquake occurred near the east coast of Honshu, Japan. This magnitude 9.0 earthquake and the subsequent tsunami caused significant damage to at least four of the six units of the Fukushima Daiichi nuclear power station as the result of a sustained loss of both the offsite and on-site power systems. Efforts to restore power to emergency equipment have been hampered or impeded by damage to the surrounding areas due to the tsunami and earthquake.

ML110760432

Units 1 through 3, which had been operating at the time of the earthquake, scrambled automatically, inserting their neutron absorbing control rods to ensure immediate shutdown of the fission process. Following the loss of electric power to normal and emergency core cooling systems and the subsequent failure of back-up decay heat removal systems, water injection into the cores of all three reactors was compromised, and reactor water levels could not be maintained. Tokyo Electric Power Company (TEPCO), the operator of the plant, resorted to injecting sea water and boric acid into the reactor vessels of these three units, in an effort to cool the fuel and ensure the reactors remained shutdown. However, the fuel in the reactor cores became partially uncovered. Hydrogen gas built up in Units 1 and 3 as a result of exposed, overheated fuel reacting with water. Following gas venting from the primary containment to relieve pressure, hydrogen explosions occurred in both units and damaged the secondary containments. It appears that primary containments for Units 1 and 3 remain functional, but the primary containment for Unit 2 may be damaged. TEPCO cut a hole in the side of the Unit 2 secondary containment to prevent hydrogen buildup following a sustained period when there was no water injection into the core.

In addition, Units 3 and 4 have low spent fuel pool (SFP) water levels. Efforts continue to supply seawater to the SFPs for Units 1 through 4 using various methods. At this time, the integrity of the SFPs for Units 3 and 4 is unknown.

Fukushima Daiichi Units 4 through 6 were shutdown for refueling outages at the time of the earthquake. The fuel assemblies for Unit 4 had been offloaded from the reactor core to the SFP. The SFPs for Units 5 and 6 appear to be intact, but the temperature of the pool water appears to be increasing. Emergency power is available to provide cooling water flow through the SFPs for Units 5 and 6.

The Japanese Government ordered an evacuation out to 20 km for the area surrounding Fukushima Daiichi. Residents out to 30 km were ordered to shelter in place.

The damage to Fukushima Daiichi nuclear power station appears to have been caused by initiating events outside of the design basis for the facilities.

## **BACKGROUND**

10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," General Design Criterion (GDC) 2, "Design Bases for Protection against Natural Phenomena," or similar appropriate requirements in the licensing basis for a reactor facility, requires that structures, systems, and components (SSCs) important to safety be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions. The design bases for these SSCs reflect: (1) appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated, (2) appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena, and (3) the importance of the safety functions to be performed.

As a result of the terrorist events of September 11, 2001, the NRC issued EA-02-026, "Order for Interim Safeguards and Security Compensatory Measures" (the ICM Order) dated February 25, 2002. The ICM Order, which is designated as Safeguards Information (SGI), modified then-operating licenses for commercial power reactor facilities to require compliance with specified interim safeguards and security compensatory measures. Section B.5.b of the ICM Order requires licensees to adopt mitigation strategies using readily available resources to maintain or restore core cooling, containment, and SFP cooling capabilities to cope with the loss of large areas of the facility due to large fires and explosions from any cause, including beyond-design-basis aircraft impacts.

By letter, dated February 25, 2005, the NRC staff provided guidance for implementing Section B.5.b of the ICM Order. This guidance, designated as SGI, included best practices for mitigating losses of large areas of the plant and measures to mitigate fuel damage and minimize releases. Following issuance of the B.5.b Phase 1 Guidance, the NRC staff conducted inspections at operating reactor sites using Temporary Instruction (TI) 2515/164 (SGI) and subsequently TI 2515/168 (SGI) to ensure compliance with Section B.5.b of the ICM Order.

In December 2006, the Nuclear Energy Institute (NEI) issued NEI 06-12, Revision 2, "B.5.b Phase 2 & 3 Submittal Guideline." NEI 06-12 is designated for Official Use Only – Security Related Information (OUO-SRI). The NRC endorsed NEI 06-12, Revision 2, by letter dated December 22, 2006, also designated OUO-SRI, as an acceptable means for developing and implementing the mitigation strategies requirement in Section B.5.b of the ICM Order. NEI 06-12, Revision 2, provides guidance for implementing a set of strategies intended to maintain or restore core cooling, containment, and SFP cooling capabilities under the circumstances associated with the loss of a large area of the plant due to explosions or fire. NEI 06-12 provides guidance in the following areas:

- Adding make-up water to the SFP,
- Spraying water on the spent fuel,
- Enhanced initial command and control activities for challenges to core cooling and containment, and
- Enhanced response strategies for challenges to core cooling and containment.

The specific strategies covered in NEI 06-12, Revision 2, were developed based on the results of assessments conducted at currently licensed power reactor facilities for the purpose of enhancing plant specific mitigation capability for damage conditions caused by a large explosion or fire. These assessments identified a wide spectrum of potential plant specific strategies. NEI 06-12, Revision 2, specifies one set of strategies applicable to all pressurized-water reactors and another set applicable to all boiling-water reactors. Both sets are derived from the results of the plant specific assessments.

The B.5.b Phase 1 Guidance and NEI 06-12, Revision 2, were used by each licensee in preparing information submitted to the NRC that describes a plant specific approach to implementing mitigating strategies and supports each plant specific license condition. The NRC staff has completed its review of the information submitted by each licensee, as well as information obtained during prior NRC inspections, and has issued an OUO-SRI safety

evaluation (SE) that documents the bases for its approval of the license condition for each facility. The SE issued for each licensee includes regulatory guidance in Section 3.0 of Appendix A, "Phase 1 Assessment," that recites the generic B.5.b Phase 1 Guidance of Reference 3, as clarified in TI 2515/168, in a form that is designated OUO-SRI rather than SGI.

By publishing new requirements in the *Federal Register* dated March 27, 2009 (74 FR 13926), the NRC amended 10 CFR Part 50, 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," and 10 CFR Part 73, "Physical Protection of Plants and Materials." This rulemaking added paragraph (i) to 10 CFR 50.34, "Contents of Applications; Technical Information," and paragraph (d) to 10 CFR 52.80 "Contents of Applications; Additional Technical Information," to require submittal of a "description and plans for implementation of the guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities under the circumstances associated with the loss of large areas of the plant due to explosions or fire as required by § 50.54(hh)(2) of this chapter." This rulemaking also added 10 CFR 50.54(hh)(2) to impose the same mitigating strategies requirements on all reactor applicants and licensees as those imposed by the ICM Order and associated license conditions. The Statement of Considerations for this rulemaking specifically noted that the requirements in 10 CFR 50.54(hh) are intended to address certain events that are the cause of large fires and explosions that affect a substantial portion of the nuclear power plant and are not limited or directly linked to an aircraft impact. In addition, the rule contemplates that the initiating event for such large fires and explosions could be any number of beyond-design basis events. Such events include natural phenomena such as those described in GDC 2 (i.e., earthquakes, tornadoes, floods, tsunamis, and seiches), without regard to the GDC 2 provisions governing the severity of natural phenomena.

NRC regulations at 10 CFR 50.63, "Loss of All Alternating Current Power," require that light-water-cooled nuclear power plants be capable of withstanding for a specified duration and recovering from a station blackout.

## **DISCUSSION**

The nuclear power industry has taken the actions listed below at each licensed reactor site. Additional information is available in the NEI Fact Sheet, "Industry Taking Action to Ensure Continued Safety at U.S. Nuclear Energy Plants," dated March 16, 2011, available at [www.nei.org](http://www.nei.org).

1. verification of the capability to mitigate conditions that result from severe adverse events, including the loss of significant operational and safety systems due to natural events, fires, aircraft impact and explosions
2. verification of the capability to mitigate a total loss of electric power to a nuclear power plant
3. verification of the capability to mitigate flooding and the impact of floods on systems inside and outside the plant
4. identification of the potential for loss of equipment functions during seismic events appropriate for the site and the development of mitigating strategies to address potential vulnerabilities

NRC assessment of the implications of beyond design-basis natural phenomena is continuing as more information becomes available. The NRC staff is currently developing a TI to guide staff in performing independent assessments of nuclear power plant readiness to address beyond design-basis natural phenomena under the Reactor Oversight Process. The NRC is considering additional generic communications and additional action including requesting operating plants to provide specific information relating to their facilities to enable the NRC staff to complete a regulatory assessment of beyond design basis phenomena.

## **PAPERWORK REDUCTION ACT STATEMENT**

This Information Notice does not contain any information collections and, therefore, is not subject to the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.).

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## **CONTACTS**

This information notice requires no specific action or written response. Please direct any questions about this matter to the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

**/RA/**

Laura A. Dudes, Director  
Division of Construction Inspection,  
and Operational Programs  
Office of New Reactors

**/RA/**

Timothy J. McGinty, Director  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Technical Contact: Eric E. Bowman, NRR  
301-415-2963  
e-mail: [Eric.Bowman@nrc.gov](mailto:Eric.Bowman@nrc.gov)

Note: NRC generic communications may be found on the NRC public Web site, <http://www.nrc.gov>, under Electronic Reading Room/Document Collections.

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Note: NRC generic communications may be found on the NRC public Web site, <http://www.nrc.gov>, under Electronic Reading Room/Document Collections.

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**From:** Moderator  
**Date:** Tuesday, March 22, 2011 1:28:44 PM  
**Posted At:** U.S. NRC Blog  
**Conversation:** New Postings on NRC.Gov  
**Subject:** New Postings on NRC.Gov

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I wanted to draw attention to some important information just released on the NRC website related to our response efforts and the Japanese nuclear emergency.

A transcript for the public commission meeting held yesterday has been posted. The meeting included an overview of NRC actions related to the Japanese emergency and the possible short- and long-term activities for the NRC. The transcript can be found here: <http://www.nrc.gov/reading-rm/doc-collections/commission/recent/2011/>. And the slides from the meeting are located here:

<http://www.nrc.gov/reading-rm/doc-collections/commission/slides/2011/20110321/staff-slides-03212011-meeting-rev1.pdf>.

Chairman Jaczko gave opening remarks at the meeting. He said, in part, "We have a responsibility to the American people to undertake a systematic and methodical review of the safety of our own domestic nuclear facilities, in light of the natural disaster and the resulting nuclear emergency in Japan. Beginning to examine all available information is an essential part of our effort to analyze the event and understand its impact on Japan and implications for the United States. Our focus is always on keeping plants and radioactive materials in this country safe and secure."

A copy of his full opening remarks can be found here: <http://www.nrc.gov/reading-rm/doc-collections/news/2011/11-054.pdf>

We've also pulled together important documents and links related to the Japanese nuclear emergency onto one location on our home page. That page is available from the home page or directly here: <http://www.nrc.gov/japan/japan-info.html>

*Eliot Brenner*  
*Public Affairs Director*

Filed under: [Emergency Preparedness and Response](#), [General](#) Tagged: [nuclear](#)     
   

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NNNN/23

**From:** [McIntyre, David](#)  
**To:** [Ostroff, James](#)  
**Subject:** RE: One ohter oint  
**Date:** Tuesday, March 22, 2011 2:29:00 PM

---

No. But your colleague has a good memory – I'd forgotten that.

---

**From:** Ostroff, James [mailto:james\_ostroff@platts.com]  
**Sent:** Tuesday, March 22, 2011 2:29 PM  
**To:** McIntyre, David  
**Subject:** One ohter oint

A colleague just advised me of this:

May 13, 2008, then-NRC Commissioner Jaczko said at NEI's Dry Storage Info. Forum that NRC should consider a rulemaking to encourage utilities to move spent fuel from their storage pools into dry storage casks.

Did NRC take any actions subsequent to then-Commissioner Jaczko's comment?

Probably not, but I do need to check on this.

Thanks again,  
--Jim

**Jim Ostroff**  
Senior Editor  
Platts Nuclear Publications  
202 383-2249  
[james\\_ostroff@platts.com](mailto:james_ostroff@platts.com)

---

**From:** McIntyre, David [mailto:David.McIntyre@nrc.gov]  
**Sent:** Tuesday, March 22, 2011 2:08 PM  
**To:** Ostroff, James  
**Subject:** RE: Platts media -- question

Hi Jim – sorry for the delay, and thanks for prompting me.

The NRC believes spent fuel is safe in pools or casks and does not make a determination of when a plant should transfer it; licensees may transfer fuel at any time without specific NRC approval provided they use NRC-certified casks and are operating the ISFSI under general or specific license (ie, we don't have to approve each transfer); and we aren't working on anything that would change these answers (though of course everything will be looked at under our post-Japan review). If we were to determine a safety need to transfer fuel, we could act quickly through orders or guidance.

NNNN/24

Dave

---

**From:** Ostroff, James [mailto:james\_ostroff@platts.com]  
**Sent:** Monday, March 21, 2011 6:54 PM  
**To:** McIntyre, David  
**Subject:** Platts media -- question

Hi David,

I wanted to check with you regarding an issue raised today by several Union of Concerned Scientists officials.

Their points:

Nuclear plant operators on their own should move as much spent fuel as possible from pools to storage casks.

This would mitigate the entire issue of loss of power and water for cooling that is an issue at the Fukushima plants, they said.

If operators are reluctant to step up cask storage, UCS officials say the NRC should issue a directive to operators to do so, they said.

If you have a comment on the UCS officials' points that's fine; I'd like to have them.

But if not..., I would appreciate some factual information.

Do operators have leeway, on their own, to move nuclear fuel waste from pools to dry casks--assuming the casks meet NRC standards?

Or, do operators need some type of NRC approval--or have to file documents with the agency?

Does NRC have any proceeding in progress that would in any way affect bear on the use of fuel pools vs. dry casks?

If NRC made a determination that some amount, or percentage of spent fuel at nuclear power units should be moved from pools to storage casks, would it have to issue a regulation, or revise an existing one to effect this change?

Perhaps NRC has a specific authority that would it to order this unilaterally.

This article came up a bit earlier this evening. I have a 4 p.m. deadline Tuesday.

I don't need voluminous replies! Just the essentials will do. An e-mail reply is fine, but we could talk on the phone, too.

Many thanks for your help,  
--Jim

**Jim Ostroff**  
Senior Editor  
Platts Nuclear Publications  
202 383-2249  
james\_ostroff@platts.com

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**From:** [McIntyre, David](#)  
**To:** [Nancy Roth](#)  
**Subject:** RE: MEDIA - FW: Nancy Roth - Fuel Cycle Week  
**Date:** Tuesday, March 22, 2011 2:33:00 PM

---

I don't know the precise timing of our notifications or discussions with them. And I doubt we would get into such detail.

---

**From:** Nancy Roth [<mailto:neroth@innuco.com>]  
**Sent:** Tuesday, March 22, 2011 2:33 PM  
**To:** McIntyre, David  
**Subject:** Re: MEDIA - FW: Nancy Roth - Fuel Cycle Week

So Japanese officials knew the recommendation was to be announced?

Thanks,  
Nancy

On Mar 22, 2011, at 1:06 PM, McIntyre, David wrote:

Our team in Tokyo has been in constant contact with the Japanese authorities since their arrival last week.

---

**From:** Nancy Roth [<mailto:neroth@innuco.com>]  
**Sent:** Tuesday, March 22, 2011 12:54 PM  
**To:** McIntyre, David  
**Subject:** Re: MEDIA - FW: Nancy Roth - Fuel Cycle Week

Hi, Dave,

Very helpful as usual, thanks.

I look forward to looking at the data when it is available.

One last question, if I may. Wondering if anyone at NRC spoke with Japanese officials before going public with its evacuation recommendation. If not, why not?

Will resubscribe on my own, thank you.

Best,  
Nancy

On Mar 22, 2011, at 12:05 PM, McIntyre, David wrote:

Indeed, that link seems to be broken. I'll look into it.

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The calculations were made using extremely limited data from the Japanese and admittedly overly conservative assumptions.

I think the best way for you to get back on our list is to subscribe through the listserv address at the bottom any of our press releases. I think the system has anti-spam protection against third parties such as myself adding names.

Dave

---

**From:** Nancy Roth [<mailto:neroth@innuco.com>]  
**Sent:** Tuesday, March 22, 2011 11:33 AM  
**To:** McIntyre, David  
**Subject:** Re: MEDIA - FW: Nancy Roth - Fuel Cycle Week

Hi, Dave,

Thanks for this. I was unable to open the link to the figures in the news release, dunno why. Can you please send them to me separately?

Also, not meaning to question the data you sent out, but can't you tell me where NRC obtained the data? Does NRC perhaps have measuring devices on the ground in Japan? I understand the NRC volunteers did not actually visit the afflicted facilities.

Best,  
Nancy

PS: I've been dropped from the NRC sendout list b/c I ended an old email alias. Will you please sign me up again under [neroth@innuco.com](mailto:neroth@innuco.com)?

On Mar 22, 2011, at 7:59 AM, McIntyre, David wrote:

Hi Nancy – the decision to recommend US citizens evacuate out to 50 miles was based on the best information we had at the time, with three reactors in trouble, several spent fuel pools in trouble; and that with difficulties in discerning the extent of the situation, our Protective Measures Team used conservative assumptions in calculating potential dose rates. The figures that were issued with our press release are probably all the data we'll provide at this point.

Dave

---

**From:** Nancy Roth [mailto:[neroeth@innuco.com](mailto:neroeth@innuco.com)]  
**Sent:** Monday, March 21, 2011 7:48 PM  
**To:** McIntyre, David  
**Subject:** Re: MEDIA - FW: Nancy Roth - Fuel Cycle Week

Hi, Dave,

I've been watching coverage of NRC's take on the radiation dangers in the area around Fukushima since Commissioner Jaczko advised the White House to evacuate Americans within a 50 mile radius of the affected unit there. From what I've been able to discern, it seems Dr. Jaczko was working from reports of commission staff that were in Japan at the time.

But in the meeting this morning I heard something slightly different. William Borhardt said that the 50-mile radius guidance was not "based on existing conditions" at that time but on what it could lead to. He emphasized that were the issues with a U.S. reactor the NRC would provide the "exact same recommendation."

Meanwhile TEPCO and the Japanese government both vigorously denied Dr. Jaczko's assertions last week. I think the U.S. recommendation made them look like they had been withholding information from their own people.

So I can't believe Dr. Jaczko and the White House would make these recommendations lightly. Isn't there something more you can tell me about the reports from the staff on site in Japan? It shouldn't be confidential information if it spurred the recommendation of this very aggressive evacuation.

How did they arrive at the conclusion that the water in the spent fuel containers was gone? A lot of my colleagues are scratching their heads about that. And is it possible to get numbers on the levels of radiation the spent fuel storage facilities emitted, and over what period of time, that alarmed the senior administration officials?

Many thanks,  
Nancy

On Mar 21, 2011, at 5:25 PM, McIntyre, David wrote:

Hi Nancy – We've had some issues with the reliability of information coming from the Japanese too – but that's

probably to be expected given the disruption of the earthquake/tsunami and the difficulty in knowing exactly what's going on in the plant. We of course have our team in Japan to help with relaying information, as well as other assets.

Dave McIntyre

---

**From:** Couret, Ivonne  
**Sent:** Monday, March 21, 2011 4:43 PM  
**To:** McIntyre, David  
**Subject:** MEDIA - FW: Nancy Roth - Fuel Cycle Week

Can you follow-up? Ivonne

Ivonne L. Couret  
Public Affairs Officer  
Office of Public Affairs  
Media Desk  
[opa.resource@nrc.gov](mailto:opa.resource@nrc.gov)  
301-415-8200

Visit our online photo gallery. Incorporate graphics and photographs to tell your story!  
<http://www.nrc.gov/reading-rm/photo-gallery/>

2010-2011 Information Digest - Where you can find NRC Facts at a Glance  
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350/>

---

**From:** Ghneim, Munira  
**Sent:** Monday, March 21, 2011 4:38 PM  
**To:** Couret, Ivonne  
**Subject:** Nancy Roth - Fuel Cycle Week

Organization – Fuel Cycle Week  
Contact – Nancy Roth  
Phone – did not want to leave a number  
Email – [neroeth@innuco.com](mailto:neroeth@innuco.com)  
Request – Would like a handle on how the NRC understands what is going on. Japan's information is inconsistent.

Thank You  
Munira Ghneim  
Contract Secretary  
Office of Information Services  
301-415-1170

**From:** Moderator  
**Date:** Tuesday, March 22, 2011 2:45:57 PM  
**Posted At:** U.S. NRC Blog  
**Conversation:** All About EPZs  
**Subject:** All About EPZs

---

Whether by virtue of regular testing of sirens, mailings about emergency plans or possibly the receipt of potassium iodide (KI) pills, there are frequent reminders for those who live within a 10-mile radius of a U.S. nuclear power plant of the need to be ready should a significant event occur at the facility.

This area is known as the 10-mile Emergency Planning Zone (EPZ), and it is well established in federal regulations as the focal point of preparing for a severe accident at a reactor.

Some confusion has cropped up in the media and elsewhere recently regarding the size of EPZs in the wake of developments involving the Fukushima Daiichi reactors and spent fuel pools in Japan. The source of this confusion appears to stem from the NRC advisory on March 16th for American citizens who were within 50 miles of the plant to evacuate: <http://pbadupws.nrc.gov/docs/ML1108/ML110800133.pdf>.

The advisory to evacuate to 50 miles was based on calculations done by NRC experts indicating releases from the three hobbled Japanese reactors and two fuel pools could – and a key word here is could – possibly exceed conservatively set safe radiation-exposure limits for the public. This advisory was made using limited data and conservative assumptions.

On its face, this recommendation seems to be at odds with the size used for American EPZs. In fact, it was consistent with the same kind of approach that would be used in the United States should a comparable, although extremely unlikely, event take place here.

In November 1976, a federal task force was formed to look at salient emergency planning issues for U.S. nuclear power plants. Out of that comprehensive evaluation came a recommendation that a 10-mile-radius EPZ would assure that “prompt and effective actions can be taken to protect the public in the event of an accident” at a plant. This was based on research showing the most significant impacts of an accident would be expected in the immediate vicinity of a plant and therefore any initial protective actions, such as evacuations or sheltering in place, should be focused there.

Put another way, the projected radiation levels would not be expected to exceed EPA protective action dose guidelines (1 rem to the body or 5 rem to the thyroid) beyond 10 miles under most accident scenarios.

That does not mean the protective actions could not expand beyond the 10-mile radius.

Rather, emergency planners have always known such actions could be necessary if the situation warranted it. Indeed, U.S. nuclear power plants are required to consider and drill for the possibility of radiation releases that could have impacts up to 50 miles away, in addition to the required biennial exercises conducted in the vicinity of each nuclear power plant to assess implementation of the emergency plan within the 10-mile EPZ. Once every six years, each plant takes part in an exercise graded by the NRC and FEMA to demonstrate how it would handle such an event.

As the document NUREG 0654/FEMA-REP-1 on emergency planning states "In a particular emergency, protective actions might well be restricted to a small part of the planning zone. On the other hand, for the worst possible accidents, protective actions would need to be taken outside the planning zones." (This joint document is the basis for emergency planning around nuclear power plants and adds background to our regulations found in 10CFR 50.47.)

The Japanese have been confronted with extremely challenging circumstances wrought by a record earthquake followed by a massive tsunami. As the NRC carefully monitored developments there, the agency used the best information available to it to make a protective action recommendation to the U.S. Embassy in Tokyo for Americans within 50 miles of the six-reactor Japanese site, which was experiencing problems in four reactors and two spent fuel pools.

Were a similar accident to occur in the U.S., the response would be guided by the same considerations. But it is worth noting the United States has no nuclear complexes of this size.

Once the salient facts regarding the events at Fukushima Daiichi are made clear to the NRC, it intends to assess its own regulations and practices for any pertinent lessons learned that can be applied here. This will include an assessment of current emergency planning guidance and policy.

As the NRC carefully monitored developments there, the agency used the best information available to it to make a protective action recommendation.

More information on emergency planning for U.S. nuclear power plants is available on the NRC website at: <http://www.nrc.gov/about-nrc/emerg-preparedness.html> .

Eliot Brenner

*Public Affairs Director*

Filed under: Emergency Preparedness and Response, General Tagged: nuclear   

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**From:** McIntyre, David  
**To:** Kammerer, Annie  
**Subject:** FW: California Nuclear Plants Rated Highest Seismic Hazard  
**Date:** Tuesday, March 22, 2011 3:17:00 PM

---

Annie – were you involved in providing info to Senator Boxer’s folks? She’s issued the press release below. Matt Wald of the New York Times is trying to figure out exactly what we told her.

Thanks,  
Dave

---

**From:** Wald, Matthew [mailto:mattwald@nytimes.com]  
**Sent:** Tuesday, March 22, 2011 2:53 PM  
**To:** McIntyre, David  
**Subject:** FW: California Nuclear Plants Rated Highest Seismic Hazard

---

**From:** McCray, Nathan (EPW) [mailto:Nathan\_McCray@epw.senate.gov]  
**Sent:** Tuesday, March 22, 2011 2:32 PM  
**Subject:** California Nuclear Plants Rated Highest Seismic Hazard

For Immediate Release  
March 22, 2011  
[kate\\_gilman@epw.senate.gov](mailto:kate_gilman@epw.senate.gov)

Contact: Mary Kerr or Kate Gilman (EPW/Boxer): 202-224-8832  
[mary\\_kerr@epw.senate.gov](mailto:mary_kerr@epw.senate.gov) or

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## U.S. Senate Committee on Environment and Public Works

### NRC Informs Boxer That Two Nuclear Plants Are Rated Highest Seismic Hazard *Both plants in California*

**Washington, DC** – Senator Barbara Boxer (D-CA), Chairman of the Environment and Public Works Committee, has received new information from the Nuclear Regulatory Commission (NRC) indicating that two California nuclear plants are the only ones in the nation that are located in the highest seismic hazard areas. According to the NRC, its rating was based on “the level of seismic activity and the potential for large magnitude earthquakes.”

Senators Boxer said: “**New information about the severe seismic risk at the San Onofre Nuclear Generating Station and the Diablo Canyon Power Plant make clear that these two plants require immediate attention in light of the**

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**catastrophic events in Japan.”**

Senator Boxer and Senator Diane Feinstein (D-CA) sent a letter (attached) to the NRC asking detailed questions about the two California nuclear plants’ design and operation, type of reactors, and preparedness to withstand an earthquake or tsunami.

Senator Boxer added: **“Given this new information, the questions raised in the letter to the NRC deserve immediate attention.”**

###

The text of the letter is pasted below:

March 16, 2011

The Honorable Gregory Jaczko  
Chairman  
U. S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Dear Chairman Jaczko:

The unfolding nuclear disaster in Japan has raised questions about the safety of nuclear power plants here in the U.S. As Senators from California, we are particularly interested in the safety of San Onofre Nuclear Generating Station, located in San Clemente, and the Diablo Canyon Nuclear Power Plant near San Luis Obispo, both of which are near earthquake faults.

Roughly 424,000 live within 50 miles of the Diablo Canyon and 7.4 million live within 50 miles of San Onofre Nuclear Generating Station. Although many safety measures have been taken to address potential hazards associated with these facilities, we need to ensure that the risk is fully evaluated.

For example, a 2008 California Energy Commission report presented very clear warnings of potential threats at both of these plants. This report found that the San Onofre plant could experience "larger and more frequent earthquakes" than the maximum 7.0 magnitude earthquake predicted when the plant was designed. It is our understanding that the NRC has not taken action to address these warnings in the report. It is also our understanding that the 2008 report found that there is an additional fault near the Diablo Canyon plant that should be taken into consideration as part of NRC's relicensing process. We want to know if the NRC will address all of the threats, including seismic threats, described in the 2008 report at these facilities.

Therefore we ask that the Nuclear Regulatory Commission (NRC) perform a thorough inspection at these two plants to evaluate their safety and emergency preparedness plans.

In addition, we ask the NRC to answer the questions below regarding plant design and operations, type of reactor, and preparedness to withstand an earthquake or tsunami and other potential threats.

Plant Design and Operations

1. What changes to the design or operation of these facilities have improved safety at the plants since they began operating in the mid-1980s?
2. What emergency notification systems have been installed at California nuclear power plants? Has there ever been a lapse of these systems during previous earthquakes or emergencies?
3. What safety measures are in place to ensure continued power to California reactors in the event of an extended power failure?

#### Type of Reactor

1. What are the differences and similarities between the reactors being used in California (pressurized water reactors) and those in Japan (boiling water reactors), as well as the facilities used to house the reactors, including the standards to which they were built and their ability to withstand natural and manmade disasters?

#### Earthquakes and Tsunamis

1. We have been told that both Diablo Canyon and San Onofre Nuclear Generating Station are designed to withstand the maximum credible threat at both plants, which we understand to be much less than the 9.0 earthquake that hit Japan. What assumptions have you made about the ability of both plants to withstand an earthquake or tsunami? Given the disaster in Japan, what are our options to provide these plants with a greater margin for safety?
2. Have new faults been discovered near Diablo Canyon or San Onofre Nuclear Generating Station since those plants began operations? If so, how have the plants been modified to account for the increased risk of an earthquake? How will the NRC consider information on ways to address risks posed by faults near these plants that is produced pursuant to state law or recommendations by state agencies during the NRC relicensing process?
3. What are the evacuation plans for both plants in the event of an emergency? We understand that Highway 1 is the main route out of San Luis Obispo, what is the plan for evacuation of the nearby population if an earthquake takes out portions of the highway and a nuclear emergency occurs simultaneously?
4. What is the NRC's role in monitoring radiation in the event of a nuclear accident both here and abroad? What is the role of EPA and other federal agencies?
5. What monitoring systems currently are in place to track potential impacts on the U.S., including California, associated with the events in Japan?
6. Which federal agency is leading the monitoring effort and which agencies have responsibility for assessing human health impacts? What impacts have occurred to date on the health or environment of the U.S. or are currently projected or modeled in connection with the events in Japan?
7. What contingency plans are in place to ensure that the American public is notified in the event that hazardous materials associated with the events in Japan pose an imminent threat to the U.S.?

The NRC was created in the mid-1970s specifically to ensure the protection of public health and safety with regard to civilian nuclear power. The Commission plays an essential role ensuring that we learn from nuclear accidents and near misses. We hope you agree that we must identify whatever lessons are to be learned from the disaster in Japan in order to make facilities in the United States as safe as possible.

We look forward to working with you to ensure the safety of our nation's nuclear power plants and to make the changes necessary to ensure a nuclear tragedy does not occur in this country.

Sincerely,

Senator Barbara Boxer  
Chairman, Environment and Public Works Committee

Senator Dianne Feinstein  
Chairman, Appropriations Subcommittee on Interior, Environment and Related Agencies

**Nathan McCray**  
**Majority Staff**  
**U.S. Senate Committee on Environment and Public Works**  
**410 Dirksen Senate Office Building**  
**Washington, DC 20510**  
**202-224-8832**  
**202-224-1273 Fax**

**From:** [Harrington, Holly](#)  
**To:** [Shoop, Undine](#); [Courret, Ivonne](#); [Burnell, Scott](#); [Brenner, Eliot](#)  
**Subject:** RE: blog question on dose  
**Date:** Wednesday, March 16, 2011 5:42:44 PM

---

Excellent! Undine – let's talk tomorrow. I could use help doing this with other blog comments

---

**From:** Shoop, Undine  
**Sent:** Wednesday, March 16, 2011 5:14 PM  
**To:** [Harrington, Holly](#); [Courret, Ivonne](#); [Burnell, Scott](#); [Brenner, Eliot](#)  
**Subject:** RE: blog question on dose

Holly,

After reading previous moderator replies on the blog, I have revised my write up for you so it is hopefully closer to what you would actually post.

Undine

---

**From:** [Harrington, Holly](#)  
**Sent:** Wednesday, March 16, 2011 3:24 PM  
**To:** [Shoop, Undine](#); [Courret, Ivonne](#); [Burnell, Scott](#); [Brenner, Eliot](#)  
**Subject:** RE: blog question on dose

Can you write me up something that directly responds to blog comment. This is good

---

**From:** Shoop, Undine  
**Sent:** Wednesday, March 16, 2011 2:14 PM  
**To:** [Harrington, Holly](#); [Courret, Ivonne](#); [Burnell, Scott](#); [Brenner, Eliot](#)  
**Subject:** blog question on dose

One of my staff pointed out a comment on the blog related to dose, specifically that it would be helpful if we would use mSv in addition to rem when we are discussing dose since most of the world uses the international standard for units (SI) including the IAEA and TEPCO press releases. The conversion is:

1 mSv = .1 rem

Undine Shoop  
Chief, Health Physics and Human Performance Branch  
Division of Inspection and Regional Support  
Office of Nuclear Reactor Regulation  
301-415-2063

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Attachment Response to question originally posted to the\_1.docx (14137 Bytes) cannot be converted to PDF format.

**From:** [Breskovic, Clarence](#)  
**To:** [Breskovic, Clarence](#)  
**Subject:** Fukushima: Panel discussion by Wisconsin Institutes for Discovery (March 22)  
**Date:** Wednesday, March 23, 2011 7:56:28 AM

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Online video (1.45 hrs): <http://mediasite.ics.uwex.edu/mediasite5/Viewer/?peid=aa0340142f4448c3969ee005e68331b11d>

Description:

“This panel discussion provides a technical and medical background to the emerging situation at Japan’s damaged Fukushima Daiichi nuclear plant. Experts in nuclear engineering and medical physics will describe the chain of events that led to damage at the nuclear plant and what the risks are to public health of radiation releases.”

About the Wisconsin Institutes for Discovery:  
<http://discovery.wisc.edu/home/discovery/about-us/about-us.cmsx>

I can’t vouch for the scientific or news value of this event but I am sure many others will follow.

Clarence Breskovic  
International Policy Analyst  
U.S. Nuclear Regulatory Commission  
Office of International Programs  
11555 Rockville Pike  
Rockville, MD 20852, USA  
Tel: 1-301-415-2364  
Fax: 1-301-415-2395  
Alternate Email: [cal.breskovic@gmail.com](mailto:cal.breskovic@gmail.com)

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**From:** [McIntyre, David](#)  
**To:** [Horn, Brian](#)  
**Cc:** [Habighorst, Peter](#); [Dessaules, Pete](#)  
**Subject:** RE: quick question about nuclear power plants  
**Date:** Wednesday, March 23, 2011 9:06:00 AM

---

Thanks, Brian - interesting the way people reach out. We'll handle it.

Dave

**David McIntyre**  
*Office of Public Affairs*  
*U.S. Nuclear Regulatory Commission*  
*(301) 415-8200*

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

**From:** Horn, Brian  
**Sent:** Wednesday, March 23, 2011 7:30 AM  
**To:** McIntyre, David  
**Cc:** Habighorst, Peter; Dessaules, Pete  
**Subject:** FW: quick question about nuclear power plants

Morning David:

Following is an e-mail that a student sent to me (Brian Horn) and several DOE employees and contractors.

I understand that OPA wishes to receive these type of requests.

I have not replied to the e-mail request, and do not plan to respond unless OPA directs me to respond.

Respectfully,  
Brian Horn  
NRC's Technical Project Manager  
for the NMMSS contract  
(Nuclear Materials Management and Safeguards System-NMMSS)  
301-492-3122 (office telephone)

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

**From:** Berezowsky, Karly Rae [<mailto:KBerezowsky@flagler.edu>]  
**Sent:** Tuesday, March 22, 2011 3:11 PM  
**To:** [NMMSS@hq.doe.gov](mailto:NMMSS@hq.doe.gov)  
**Cc:** [Gary.Hirsch@hq.doe.gov](mailto:Gary.Hirsch@hq.doe.gov); Horn, Brian; [Pete.Dessaules@hq.doe.gov](mailto:Pete.Dessaules@hq.doe.gov)

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Subject: quick question about nuclear power plants

To whom it may concern:

I am a student at Flagler College in St. Augustine, Florida. I am doing a project about student's reactions to whether or not nuclear power plants here in the United States should be shut down or not based on what is happening in Japan. I was hoping that someone would provide me with a quote based on what they think of this, their personal opinion and their job title. Any feedback would be helpful. I just need an expert's comment on this, it's for a class paper.

Warmly,  
Karly Berezowsky

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**From:** [Hayden, Elizabeth](#)  
**To:** [Joosten, Sandy](#)  
**Cc:** [McIntyre, David](#); [Brenner, Eliot](#); [Harrington, Holly](#); [Courret, Ivonne](#); [Janbergs, Holly](#); [Burnell, Scott](#)  
**Subject:** RE: COMGBJ-11-0002  
**Date:** Wednesday, March 23, 2011 9:06:47 AM

---

Thanks. I see it at <http://www.nrc.gov/reading-rm/doc-collections/commission/comm-secy/2011/2011-0002comgbj.pdf>

*Beth*

---

**From:** Joosten, Sandy  
**Sent:** Wednesday, March 23, 2011 8:04 AM  
**To:** Vietti-Cook, Annette; Brenner, Eliot; Hayden, Elizabeth  
**Subject:** COMGBJ-11-0002

The Chairman's COM on NRC Actions Following the Events in Japan has been posted to the NRC's public web site.

Sandy

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**From:** [Burnell, Scott](#)  
**To:** [McIntyre, David](#)  
**Subject:** RE: Spent fuel pools  
**Date:** Wednesday, March 23, 2011 11:53:16 AM

---

All too true, likely.

---

**From:** McIntyre, David  
**Sent:** Wednesday, March 23, 2011 11:53 AM  
**To:** Burnell, Scott  
**Subject:** RE: Spent fuel pools

Last I recall, NRR has something to do with spent fuel pools. ☹ And B5b was moved to NRR from NSIR awhile ago – Eric Bowman helped me answer some of these questions on Sunday.

---

**From:** Burnell, Scott  
**Sent:** Wednesday, March 23, 2011 11:51 AM  
**To:** McIntyre, David  
**Subject:** RE: Spent fuel pools

Well, since it's NSIR I would be bugging them, not NRR. But I'm brain-fried, you know that.

---

**From:** McIntyre, David  
**Sent:** Wednesday, March 23, 2011 11:50 AM  
**To:** Burnell, Scott  
**Subject:** RE: Spent fuel pools

This might be a good thing to get Bob Nelson's team involved with.

---

**From:** Burnell, Scott  
**Sent:** Wednesday, March 23, 2011 11:18 AM  
**To:** Jones, Steve  
**Cc:** McIntyre, David  
**Subject:** FW: Spent fuel pools

Steve;

Hate to keep leaning on you, but who in NSIR would be a good contact on our response to the '04 NAS report? Thanks.

Scott

---

**From:** Crowley, Kevin [<mailto:KCrowley@nas.edu>]  
**Sent:** Wednesday, March 23, 2011 11:17 AM  
**To:** Burnell, Scott  
**Subject:** RE: Spent fuel pools

Thanks Scott. I recall that some orders were issued after Diaz's letter but I don't

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know if they were made public. Kevin

---

**From:** Burnell, Scott [mailto:Scott.Burnell@nrc.gov]  
**Sent:** Wednesday, March 23, 2011 11:12 AM  
**To:** Crowley, Kevin  
**Subject:** RE: Spent fuel pools

Hi Kevin;

The quickest response is then-Chairman Diaz's March 2005 letter to Sen. Domenici:

<http://www.nrc.gov/reading-rm/doc-collections/congress-docs/correspondence/2005/domenici-03142005.pdf>

I'm still checking with staff on our specific responses to the recommendations. Thanks.

Scott

---

**From:** Crowley, Kevin [mailto:KCrowley@nas.edu]  
**Sent:** Wednesday, March 23, 2011 11:05 AM  
**To:** Burnell, Scott  
**Cc:** Crowley, Kevin  
**Subject:** Spent fuel pools

Hi Scott:

Since the earthquake/tsunami in Japan I have been deluged with calls from reporters about our 2006 spent fuel report (Safety and Security of Commercial Spent Nuclear Fuel Storage), which was sponsored by your agency at the direction of Congress. One question that I am being asked repeatedly is what steps your agency took in response to our report. I have suggested that reporters talk with your agency directly about that.

For my own edification, it would be helpful to know whether any orders/directives were issued to plant operators as result of our report. Could you direct me to any written public materials that describe your agency's responses?

Many thanks,

Kevin

**From:** [McIntyre, David](#)  
**To:** [Jones, Steve](#); [Burnell, Scott](#)  
**Subject:** RE: Spent fuel pools  
**Date:** Wednesday, March 23, 2011 12:44:00 PM

---

And Dan's in Tokyo right now, I believe.

---

**From:** Jones, Steve  
**Sent:** Wednesday, March 23, 2011 12:13 PM  
**To:** Burnell, Scott  
**Cc:** McIntyre, David  
**Subject:** RE: Spent fuel pools

Scott,

Dan Dorman and Scott Morris were the NSIR managers. I can't recall any NSIR staff that are still available.

Steve

---

**From:** Burnell, Scott  
**Sent:** Wednesday, March 23, 2011 11:18 AM  
**To:** Jones, Steve  
**Cc:** McIntyre, David  
**Subject:** FW: Spent fuel pools

Steve;

Hate to keep leaning on you, but who in NSIR would be a good contact on our response to the '04 NAS report? Thanks.

Scott

---

**From:** Crowley, Kevin [<mailto:KCrowley@nas.edu>]  
**Sent:** Wednesday, March 23, 2011 11:17 AM  
**To:** Burnell, Scott  
**Subject:** RE: Spent fuel pools

Thanks Scott. I recall that some orders were issued after Diaz's letter but I don't know if they were made public. Kevin

---

**From:** Burnell, Scott [<mailto:Scott.Burnell@nrc.gov>]  
**Sent:** Wednesday, March 23, 2011 11:12 AM  
**To:** Crowley, Kevin  
**Subject:** RE: Spent fuel pools

Hi Kevin;

The quickest response is then-Chairman Diaz's March 2005 letter to Sen. Domenici:

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<http://www.nrc.gov/reading-rm/doc-collections/congress-docs/correspondence/2005/domenici-03142005.pdf>

I'm still checking with staff on our specific responses to the recommendations.  
Thanks.

Scott

---

**From:** Crowley, Kevin [mailto:KCrowley@nas.edu]  
**Sent:** Wednesday, March 23, 2011 11:05 AM  
**To:** Burnell, Scott  
**Cc:** Crowley, Kevin  
**Subject:** Spent fuel pools

Hi Scott:

Since the earthquake/tsunami in Japan I have been deluged with calls from reporters about our 2006 spent fuel report (Safety and Security of Commercial Spent Nuclear Fuel Storage), which was sponsored by your agency at the direction of Congress. One question that I am being asked repeatedly is what steps your agency took in response to our report. I have suggested that reporters talk with your agency directly about that.

For my own edification, it would be helpful to know whether any orders/directives were issued to plant operators as result of our report. Could you direct me to any written public materials that describe your agency's responses?

Many thanks,

Kevin

**From:** LIA04 Hoc  
**To:** Harrington, Holly; McIntyre, David  
**Cc:** OST05 Hoc  
**Subject:** RI Request on TP re: coordination with Japanese Govt on PAR  
**Date:** Wednesday, March 23, 2011 3:41:28 PM

---

Dave/Holly, please see highlight before. It is regarding the concern over the PAR recommendation from the angle of whether or not the U.S. government coordinated with Japan before issuance. Are the RSLOs able to convey any information to that effect. All the TPs and blog entries I have seen on this topic are regarding the 50 miles vs. 10 miles.

Thanks,

Alison Rivera  
State Liaison  
NRC HQ Operations Center  
301-816-5193

---

**From:** McNamara, Nancy  
**Sent:** Wednesday, March 23, 2011 2:30 PM  
**To:** LIA04 Hoc; OST05 Hoc  
**Cc:** Tiff, Doug; Maier, Bill; Logaras, Herral; Trojanowski, Robert; Barker, Allan; Turtill, Richard  
**Subject:** Request for Consideration

Our states are still struggling with answering questions concerning the NRC making a PAR. One of the many concerns by the States is that during an event in the US, the NRC would publically issue a PAR disagreeing with the State's Protective Action Decision without discussing our disagreement with the State first. We all know that in theory, the expectation during a real event is that when the NRC is informed of the State's PAD and should we disagree with that PAD we would discuss it with the Governor or lead decision maker prior to going to the public.

However, the perception on the recent issuance of the PAR is that the NRC worked in a vacuum and did not coordinate our decision and public issuance with the Japanese Govt. I don't believe this was the case. I understand we had discussions with the Japanese Gov't and there was a mutual understanding between the US and Japan of our intentions.

We believe it would helpful to our States if we can tell them that the process worked the same as would be expected to occur during a US event. Can we do that? If so, what would be the talking point?

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**From:** [EDO Update](#)  
**To:** [Taylor, Renee](#)  
**Subject:** EDO Update  
**Date:** Wednesday, March 23, 2011 4:21:54 PM

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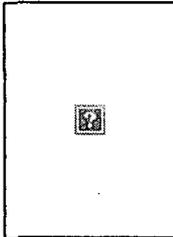
EDO Banner



## EDO Update



Wednesday, March 23, 2011



The NRC (as well as many other parts of the U.S. government) is continuing to provide assistance to Japan. Nearly every NRC employee has been affected, in one way or another, by our response to the Japan tragedy. We are beginning to send replacement staff to Japan for our team of NRC experts and 24/7 staffing of the operations center continues. I thank you for your adaptability, flexibility and willingness to contribute your efforts to our important work. Despite the fact that so much public attention is being directed to our Japan efforts, we continue to meet our primary responsibility of ensuring U.S. public health and safety.

### **Fukushima Event and Normal NRC Operations**

Although the situation is still dynamic, events at the Fukushima reactor site appear to be on the road to stabilizing. A wide range of complex technical challenges are being addressed in Japan including the restoration of "normal" electric power to the reactor plant equipment. I would like to reiterate my thanks and those of the Chairman and Commission both to those of you who are responding to the events in Japan and to those of you who continue to carry out our mission of ensuring the safe and secure civilian uses of nuclear materials in the U.S. I am impressed by the commitment and flexibility you have shown in challenging circumstances. Nearly everyone in the agency has had to step up with extra effort as many managers and staff have taken on additional duties. I would ask you all to continue demonstrating the same dedication for a bit longer, and to continue upholding the NRC Values and the principles of an Open, Collaborative Work Environment.

The Office of Human Resources has distributed information to supervisors and timekeepers to summarize the options and guidelines for determining work schedules and premium pay for employees serving in and supporting the Operations Center, or working in Japan. I ask supervisors to exercise flexibility and understanding as they

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accommodate responders' often unpredictable work schedule and premium pay needs.

For those who did not have a chance to watch last Friday's All Employees meeting, the video is available here:

<http://r2.nrc.gov/videoarchive/ViewVideo.cfm?vlink=275>

The video, as well as the PowerPoint files and transcript, of Monday's Commission meeting are available on this NRC public website page dedicated to the Fukushima events. I encourage the staff to periodically check this link for other updated information on the event.

<http://www.nrc.gov/japan/japan-info.html>

### **Continuing Resolution**

Congress has passed, and the President signed, another Continuing Resolution, extending federal government funding through April 8<sup>th</sup>. We continue to be prepared for a variety of scenarios.

### **Ann Thomas Retirement**

Ann Thomas, a long-time NRC employee known to many of you as the editor of the *NRC Reporter* (and before that, the *NR&C* newsletter) and a pillar of the Employees Welfare and Recreation Association, will be retiring at the end of this month. Please join me in extending to Ann our best wishes for an enjoyable retirement in her new home.



Bill Borchardt, EDO

**From:** [opa\\_administrators](#)  
**To:** [McIntyre, David](#)  
**Subject:** Nuclear Regulatory Commission Directs Staff on Continuing Agency Response to Japan Events; Adjusts Commission Schedule  
**Date:** Wednesday, March 23, 2011 5:53:41 PM  
**Attachments:** [11-055.pdf](#)

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NNNN/36



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# 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>

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No. 11-055

March 23, 2011

## **NUCLEAR REGULATORY COMMISSION DIRECTS STAFF ON CONTINUING AGENCY RESPONSE TO JAPAN EVENTS; ADJUSTS COMMISSION SCHEDULE**

The Nuclear Regulatory Commission has voted to launch a two-pronged review of U.S. nuclear power plant safety in the aftermath of the March 11 earthquake and tsunami and the resulting crisis at a Japanese nuclear power plant.

The Commission supported the establishment of an agency task force, made up of current senior managers and former NRC experts with relevant experience. The task force will conduct both short- and long-term analysis of the lessons that can be learned from the situation in Japan, and the results of their work will be made public.

“Our focus is always on ensuring the health and safety of the American people through our licensing and oversight of plants and radioactive materials in this country,” Chairman Jaczko said. “Examining all the available information from Japan is essential to understanding the event’s implications for the United States. We will perform a systematic and methodical review to see if there are changes that should be made to our programs and regulations to ensure protection of public health and safety.”

The Commission set an aggressive schedule for the task force to provide formal updates on the short-term effort in 30, 60 and 90 days. NRC senior technical staff provided the Commission a 90-minute briefing on Monday, as a first step. The staff reiterated their conclusions that the United States and its territories will avoid any harmful radiation levels as a result of the ongoing events at the Fukushima Daiichi plant damaged by the quake and subsequent tsunami.

NRC inspectors who are posted at every U.S. nuclear power plant will also support the task force’s short-term effort, supplemented as necessary by experts from the agency’s regional and headquarters offices.

“This work will help determine if any additional NRC responses, such as Orders requiring immediate action by U.S. plants, are called for, prior to completing an in-depth investigation of the information from events in Japan,” said NRC Executive Director for Operations Bill Borchardt.

The longer-term review will inform any permanent NRC regulation changes determined to be necessary. The Commission said it hopes the task force can begin the long-term evaluation in no later than 90 days, and added that the task force should provide a report with recommended actions within six months of the beginning of that effort.

The Commission also decided to revise its schedule for meetings and briefings to allow ample focus on the agency's response to events in Japan. Open Commission meetings on the status of the NRC response to the Japan earthquake are scheduled for April 14 and 28, a meeting on the staff's 30-day response is planned for May 3 and a meeting on the staff's 60-day response is planned for June 16. A revised Commission meeting schedule will be posted shortly on the NRC website.

###

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:** Couret, Ivonne  
**To:** Burnell, Scott; McIntyre, David; Brenner, Eliot; Dricks, Victor; Uselding, Lara; Mitlyng, Viktoria; Chandrathil, Prema; Screnci, Diane; Sheehan, Neil; Hannah, Roger; Ledford, Joey  
**Cc:** Janbergs, Holly; Hayden, Elizabeth; Harrington, Holly  
**Subject:** In Case you need the SRM -COMGBJ-11-0002 - NRC Actions Following the Events in Japan  
**Date:** Wednesday, March 23, 2011 6:16:08 PM

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03/23/2011 COMGBJ-11-0002 NRC Actions Following the Events in Japan

If reporters reach out to you - Page link to the document:

<http://www.nrc.gov/reading-rm/doc-collections/commission/recent/2011/>

**Ivonne L. Couret**  
Public Affairs Officer  
Office of Public Affairs  
Media Desk  
[opa.resource@nrc.gov](mailto:opa.resource@nrc.gov)  
301-415-8200

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2010-2011 Information Digest - Where you can find NRC Facts at a Glance  
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350/>

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**From:** [Burnell, Scott](#)  
**To:** [Landau, Mindy](#)  
**Subject:** RE: Media Calls  
**Date:** Wednesday, March 16, 2011 5:51:00 PM

---

Got it.

---

**From:** Landau, Mindy  
**Sent:** Wednesday, March 16, 2011 3:18 PM  
**To:** Burnell, Scott  
**Subject:** FW: Media Calls

Do you want this?

---

**From:** Akstulewicz, Brenda  
**Sent:** Wednesday, March 16, 2011 3:13 PM  
**To:** Landau, Mindy  
**Subject:** Media Calls

Jeff Beattie  
Energy Daily  
703-136-2405

[Jeffrey.beattie@IHS.com](mailto:Jeffrey.beattie@IHS.com)

- 1.) Was it Dr Jaczko who talked to Japanese officials saying the evac area should be larger?
- 2.) the directive to US residents of Japan to evac to 50 miles, who did that come from, was it the PM, and what is the right word? Was it an order, recommendation, directive?

**Brenda Akstulewicz**  
Administrative Assistant  
Office of Public Affairs  
301-415-8209  
[brenda.akstulewicz@nrc.gov](mailto:brenda.akstulewicz@nrc.gov)



NNNN/38

**From:** Burnell, Scott  
**To:** McIntyre, David  
**Subject:** RE: MEDIA FOLLOW UP SECOND EMAIL - aging reactors questions - chemical and engineering news  
**Date:** Thursday, March 24, 2011 8:43:38 AM

---

Excellent, merci buckets.

---

**From:** McIntyre, David  
**Sent:** Thursday, March 24, 2011 8:43 AM  
**To:** Burnell, Scott  
**Subject:** RE: MEDIA FOLLOW UP SECOND EMAIL - aging reactors questions - chemical and engineering news

The NRC's position is that the fuel is stored safely, in pool or in cask, and there is not a safety reason to move fuel to cask. I expect this will be part of our review of the Japan situation. About 22% of spent fuel is currently in cask, according to this 2010 report from Congressional Research Service to the BRC.

[http://www.brc.gov/pdfFiles/CRS\\_BlueRibbonCommissionWastePolicyHistory.pdf](http://www.brc.gov/pdfFiles/CRS_BlueRibbonCommissionWastePolicyHistory.pdf)

---

**From:** Burnell, Scott  
**Sent:** Thursday, March 24, 2011 8:35 AM  
**To:** McIntyre, David  
**Subject:** FW: MEDIA FOLLOW UP SECOND EMAIL - aging reactors questions - chemical and engineering news  
**Importance:** High

Dave – anything from your spent fuel discussions yesterday that directly relate to Jeff's #4? I've got the rest.

---

**From:** Couret, Ivonne  
**Sent:** Wednesday, March 23, 2011 5:18 PM  
**To:** Burnell, Scott  
**Subject:** MEDIA FOLLOW UP SECOND EMAIL - aging reactors questions - chemical and engineering news  
**Importance:** High

Ivonne L. Couret  
Public Affairs Officer  
Office of Public Affairs  
Media Desk  
opa.resource@nrc.gov  
301-415-8200

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2010-2011 Information Digest - Where you can find NRC Facts at a Glance  
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350/>

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**From:** Janbergs, Holly **On Behalf Of** OPA Resource  
**Sent:** Wednesday, March 23, 2011 4:06 PM  
**To:** Couret, Ivonne  
**Subject:** FW: aging reactors

---

**From:** Jeffrey Johnson [mailto:J\_Johnson@acs.org]  
**Sent:** Wednesday, March 23, 2011 4:01 PM  
**To:** OPA Resource  
**Subject:** RE: aging reactors

Ok--tried to get reaction yesterday with no luck...so will be more specific today but I need a response:

1. What does NRC require today to make up for shortcomings in the Mark 1 reactors?
2. Are there additional NRC requirements for reactors operating in the 40 to 60 year lifetimes?
3. Is NRC considering extending them to 80 years?
4. In light of Japan's problem with spent fuel pools, will NRC speed up efforts to get waste into dry cask storage? And what percentage of spent fuel is currently in dry casks today?
5. Why not take a pause in operations of older reactors in light of situation in Japan while NRC conducts its review due to Japan issue?

Thanks for time—I know you are working hard but I have to file this story. Best, jeff johnson, chemical and engineering news

---

**From:** Jeffrey Johnson  
**Sent:** Tuesday, March 22, 2011 3:54 PM  
**To:** 'opa.resource@nrc.gov'  
**Subject:** aging reactors

Hi...I am writing an article on the age of U.S. basic baseload electricity generators...nuclear and coal-fired units. I am using the GE Mark 1 and the Japanese incident to get into story. I am trying to figure out if the 23 U.S. mark 1 units are identical to the Japanese units and if not how are they different? And what is the difference between the GE Mark 2,3,4 units. I see from the NRC information digest, they all are boiling water reactors but is there more to it? For instance, do any of them have sturdier containment structures and do they all store spent fuel next to the reactor? I am writing now and will try to be brief in my questions. But I would appreciate a relatively quick call back...give me a time and I will be available. Thanks, Jeff Johnson, Chemical & Engineering News 202-872-6072

**From:** RMTPACTSU\_ELNRC  
**To:** [LIA11 Hoc](#); [LIA01 Hoc](#); [LIA02 Hoc](#); [LIA07 Hoc](#); [LIA08 Hoc](#); [LIA12 Hoc](#); [LIA04 Hoc](#); [ET07 Hoc](#); [Harrington, Holly](#); [McIntyre, David](#); [Burnell, Scott](#)  
**Subject:** FYI: Fukushima Press Clips 3.24.11  
**Date:** Thursday, March 24, 2011 10:20:36 AM  
**Attachments:** [Japan Clips 03.24.11.docx](#)

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**Subject:** Fukushima Clips 3.24.11

Please see attached. Thanks.

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**Japan/Fukushima Reactor Clips**  
**Thursday, April 21, 2011**

*Employees are reminded that when they are directly contacted by the media, they should refer the contact to NNSA's Office of Public Affairs at 202-586-7371.*

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## **FUKUSHIMA NEWS**

### **Federal officials release Japanese radiation measures (USA Today)**

Mar 23, 2011 | 06:22 PM

By Dan Vergano

Energy Department and **National Nuclear Security Administration** officials today detailed radiation measured from a recent aerial survey of Japan close to a crippled nuclear plant, finding a plume of high exposure headed northwest of the accident during the March 17 - 19 survey.

In the most high-exposure parts of the plume, radiation measures reached from 125 to 300 microSieverts per hour (12.5 mRem/hr to 30 mRem /hr). For perspective, the federal officials note that a medical x-ray exposes patients to about 100 microSieverts of radiation and the typical person receives 6,200 microSieverts exposure in a year (about .71 microSieverts /hr).

So the exposures are pretty low-dose, says the report. Still, the authors notes the "area of greater radiation extending northwest from the accident. This area may be of interest to public safety officials and responders."

### **Japanese radiation levels could have triggered larger evacuation area under U.S. guidelines (GovExec)**

By William Matthews [bmatthews@govexec.com](mailto:bmatthews@govexec.com) March 23, 2011

Radiation levels in some unevacuated areas around Japan's crippled Fukushima Dai-ichi nuclear power plant were high enough to trigger "protective action," likely an evacuation, under U.S. radiation exposure guidelines.

The Energy Department used airborne and ground-based monitors to detect radiation that exceeded 12.5 millirems per hour, or 1,200 millirems over a four-day period, in areas outside the 12-mile evacuation zone surrounding the Japanese disaster. Under U.S. guidelines, if exposure to radiation exceeds 1,000 millirems -- a standard unit for measuring radiation -- over four days, then Environmental Protection Agency recommends protective action, an Energy report this week said.

Protective action could consist of staying indoors during a small, short-term release of radiation, but likely would involve evacuating areas before a major release, said Roger Hannah, a spokesman for the Nuclear Regulatory Commission.

A day before the monitoring began, NRC already had urged U.S. citizens and military personnel to move at least 50 miles away from the Fukushima plant. Japanese authorities ordered people within 12 miles of the plant to evacuate.

"Our recommendations are usually very conservative," Hannah said. So while protective action can mean "sheltering indoors" if a minor radiation release is expected, evacuation is the most effective way to ensure that people are not exposed to radiation during a prolonged release, he said.

Japanese emergency workers have been struggling to regain control over the Fukushima nuclear plant since it was severely damaged during the March 11 earthquake and tsunami. Energy sent 33 radiation experts from its **National Nuclear Security Administration** to Japan on March 15. They joined six others already there to begin sampling for radiation using sensors aboard U.S. military planes and at numerous locations on the ground.

The monitors discovered radiation readings of less than 1.19 millirems per hour along the coast and as far south as Tokyo and Kawasaki, as well as due west of the stricken power plant. But in a swath stretching northwest from the plant, they gathered readings of greater than 12.5 millirems per hour. The high radiation readings were discovered in an area northwest of the 12-mile evacuation zone.

"Given the circumstances, we would have recommended a larger evacuation area," Hannah said.

Energy gathered radiation levels near the Japanese power plant from March 17-19, according to the department's report.

Meanwhile, the Food and Drug Administration announced that its inspectors might block imports of dairy products, fresh produce and infant formula that come from areas around the Fukushima power plant.

Japanese health officials said March 19 they had discovered radioactive iodine at five times acceptable levels in those products during screening March 16-18.

In an unrelated radiation scare on March 22, the American Federation of Government Employees called for the Transportation Security Administration to begin nationwide monitoring of TSA workers for exposure to radiation from X-ray machines used to inspect airline passengers' luggage.

AFGE president John Gage said TSA workers should be given dosimeters, devices that would track their radiation exposure. He said he made the request after learning TSA has ordered new tests on radiation-emitting equipment after finding errors in earlier results.

### **Anxiety in Japan over radiation in tap water (AP)**

*By SHINO YUASA and TOMOKO A. HOSAKA, Associated Press 32 mins ago*

TOKYO – Some shops across Tokyo began rationing goods — milk, toilet paper, rice and water — as a run on bottled water coupled with delivery disruptions left shelves bare Thursday nearly two weeks after a devastating earthquake and tsunami.

The unusual sights of scarcity in one of the world's richest, most modern capitals came a day after city officials reported that radioactive iodine in Tokyo's tap water measured more than twice the level considered safe for babies.

Radiation has been leaking from a nuclear plant 140 miles (220 kilometers) northeast of Tokyo since it was slammed by the March 11 quake and engulfed by the ensuing tsunami. Feverish efforts to get the plant's crucial cooling system back in operation have been beset by explosions, fires and radiation scares.

On Thursday, two workers at the Fukushima Dai-ichi plant were treated at a hospital after stepping in contaminated water while laying electrical cables in one unit, nuclear and government officials said. The water seeped over the top of their boots and onto their legs, said Takashi Kurita, spokesman for plant owner Tokyo Electric Power Co.

The two workers likely suffered "beta ray burns," Tokyo Electric officials said, citing doctors. They tested at radiation levels between 170 to 180 millisieverts, well below the maximum 250 millisieverts allowed for workers, said Fumio Matsuda, a spokesman for the Nuclear and Industrial Safety Agency.

More than two dozen people have been injured trying to bring the plant under control.

The developments highlighted the challenges Japan faces after a magnitude-9.0 quake off Sendai triggered a massive tsunami. An estimated 18,000 people have been killed and hundreds of thousands have been left homeless as officials scramble to avert a major nuclear crisis.

Radiation has seeped into raw milk, seawater and 11 kinds of vegetables, including broccoli, cauliflower and turnips, grown in areas around the plant.

The U.S. and Australia were halting imports of Japanese dairy and produce from the region, Hong Kong said it would require that Japan perform safety checks on meat, eggs and seafood, and Canada said it would upgrade controls on imports of Japanese food products. Singapore, too, has banned the sale of milk, produce, meat and seafood from areas near the plant.

Concerns also spread to Europe. In Iceland, officials said they measured trace amounts of radioactive iodine in the air but assured residents it was "less than a millionth" of levels found in European countries in the wake of the 1986 Chernobyl disaster.

Radioactive iodine is short-lived, with a half-life of eight days — the length of time it takes for half of it to break down harmlessly. However, experts say infants are particularly vulnerable to radioactive iodine, which can cause thyroid cancer.

In Tokyo, government spokesman Yukio Edano pleaded for calm, and said the government was considering importing bottled water from other countries to cover any shortages. Officials urged residents to avoid panicked stockpiling, sending workers to

distribute 240,000 bottles — enough for three small bottles of water for each of the 80,000 babies under age 1 registered with the city.

That didn't stop Reiko Matsumoto, mother of 5-year-old Reina, from rushing to a nearby store to stock up.

"The first thought was that I need to buy bottles of water," the Tokyo real estate agent said. "I also don't know whether I can let her take a bath."

New readings showed Tokyo tap water was back to safe levels Thursday but the relief was tempered by elevated levels of the cancer-linked isotope in two neighboring prefectures: Chiba and Saitama. A city in a third prefecture, just south of the nuclear plant, also showed high levels of radioactive iodine in tap water, officials said.

Tap water in Kawaguchi City in Saitama, north of Tokyo, contained 210 becquerels of radioactive iodine — well above the 100 becquerels considered safe for babies but below the 300-becquerel level for adults, Health Ministry official Shogo Misawa said.

In Chiba prefecture, the water tested high for radiation in two separate areas, said water safety official Kyoji Narita. The government there warned families in 11 cities in Chiba not to feed infants tap water.

"The high level of iodine was due to the nuclear disaster," Narita said. "There is no question about it."

Radiation levels also tested dangerously high in Hitachi in Ibaraki prefecture, about 70 miles (120 kilometers) south of the Fukushima plant, city water official Toshifumi Suzuki said. Officials were distributing bottled water, he said.

The limits refer to sustained consumption rates, and officials said parents should stop using tap water for baby formula but that it was no problem for infants to consume small amounts.

Still, shelves were bare in many stores across Tokyo.

Maruetsu supermarket in central Tokyo sought to impose buying limits on specific items to prevent hoarding: only one carton of milk per family, one 5-kilogram bag of rice, one package of toilet paper, one pack of diapers, signs said. Similar notices at some drug stores told women they could only purchase two feminine hygiene items at a time.

Maruetsu spokeswoman Kayoko Kano acknowledged that the earthquake and tsunami resulted in delays of some products.

A spokesman for Procter & Gamble Japan said its plant was fully operational but that rolling blackouts in Tokyo may be affecting distribution. "Consumers are nervous, and they may be buying up supplies," Noriyuki Endo added.

Hardship continued in the frigid, tsunami-struck northeast. Some 660,000 households still do not have water, the government said. Electricity has not been restored to some 209,000 homes, Tohoku Electric Power Co. said. Damage is estimated at \$309 billion, making it the most costly natural disaster on record.

In Fukushima, farmer Sumiko Matsuno went out to her fields and dug up all the vegetables she could — not to sell but to eat.

"If it's in the ground, it's still safe," she said. "The leafy ones are no good anymore. We are digging up all our carrots and onions as fast as we can."

Matsuno, 65, said she was worried about the future.

"If this goes on, it is going to really hurt us."

### **Anxiety Up as Tokyo Issues Warning on Its Tap Water (NY Times)**

By DAVID JOLLY and DENISE GRADY

March 23, 2011

TOKYO — Radioactive iodine detected in Tokyo's water supply prompted Japanese authorities on Wednesday to warn that infants in Tokyo and surrounding areas should not be given tap water to drink, adding to the anxiety about public safety posed by Japan's unfolding nuclear crisis.

Ei Yoshida, head of water purification for the Tokyo water department, said at a televised news conference that iodine 131 had been detected in water samples at a level of 210 becquerels per liter, about a quart. The recommended limit for infants is 100 becquerels per liter. For adults, the recommended limit is 300 becquerels. (The unit is named for Henri Becquerel, one of the discoverers of radioactivity.)

The announcement prompted a run on bottled water at stores in Tokyo and a pledge from the authorities to distribute bottled water to families with infants. Prime Minister Naoto Kan said earlier Wednesday that the public should avoid additional farm produce from areas near the Fukushima Daiichi Nuclear Power Station, severely damaged by the March 11 earthquake and tsunami, according to the Japanese news media.

The Health Ministry said that it was unlikely that there would be negative consequences for infants who were given the water, but that it should be avoided if possible and not be used to make infant formula. There was some confusion about the public health advice, with experts saying it should also apply to pregnant women, since they and fetuses were vulnerable.

"It's unfortunate, but the radiation is clearly being carried on the air from the Fukushima plant," Yukio Edano, the chief cabinet secretary, said Wednesday. "Because it's raining,

it's possible that a lot of places will be affected. Even if people consume the water a few times, there should be no long-term ill effects.”

As authorities tried to maintain calm in Tokyo, residents were racing to buy as much bottled water as they could, clearing the shelves of the city's stores. Mr. Edano said Thursday that officials were considering a plan to import water from overseas, to supplement the bottles they planned to begin distributing across the city.

Despite the frequent rain in recent days, it was not entirely clear why the levels of iodine were so high, said a senior Western nuclear executive, noting that the prevailing breezes seemed to be pushing radiation out to sea. “The contamination levels are well beyond what you'd expect from what is in the public domain,” said the executive, who insisted on anonymity and has broad contacts in Japan.

It was possible that the levels were an indirect indication that the problems at the plant were deeper than had been publicly acknowledged.

The daily Asahi Shimbun cited the Health Ministry as saying that drinking the water would hurt neither a pregnant woman nor her fetus, and that it was safe for bathing and other everyday activities.

But experts say that pregnant women, nursing mothers and fetuses, as well as children, face the greatest danger from radioactive iodine, which is taken in by the thyroid gland and can cause thyroid cancer. Children are at much higher risk than adults because they are growing, and their thyroid glands are more active and in need of iodine. In addition, the gland is smaller in children than in adults, so a given amount of iodine 131 will deliver a higher dose of radiation to a child's thyroid and potentially do more harm.

According to the Centers for Disease Control and Prevention, if an adult and a child ingest the same amount of radioactive iodine, the thyroid dose will be 16 times higher to a newborn than to an adult; for a child under 1 year old, eight times the adult dose; for a 5-year-old, four times the adult dose.

Pregnant women also take up more iodine 131 in the thyroid, especially in the first trimester. The iodine crosses the placenta and reaches the fetus, and the fetal thyroid takes up more iodine as pregnancy progresses. During the first week after birth a baby's thyroid activity increases up to fourfold and stays at that level for a few days, so newborns are especially vulnerable.

Potassium iodide can protect the thyroid by saturating it with normal iodine. People in Japan have been advised to take it.

The 1986 accident at Chernobyl caused an epidemic of thyroid cancer — 6,000 cases so far — in people who were exposed as children. The culprit was milk produced by cows that had grazed on grass heavily carpeted by fallout. The epidemic could probably have

been prevented if people in the region had been told not to drink milk and if they had been given potassium iodide.

The warning Wednesday applied to Tokyo's 23 wards, as well as to the towns of Mitaka, Tama, Musashino, Machida and Inagi to the west. At a press briefing on Thursday, Mr. Edano said radiation had also shown up in tests of water supplies for two of Tokyo's neighboring prefectures, Chiba and Saitama, in levels above the maximum recommended limits for infants, but below levels considered dangerous to adults.

At a Lawson convenience store in the Tsukiji neighborhood of central Tokyo, the shelves were about half-stocked with water. A clerk said he had restocked them just an hour before.

"People came in and cleared us out in the first hour after the announcement," he said, saying he did not want to be identified because he did not want to anger his boss. "They were taking 20 or 30 bottles at a time."

Outside the store a man struggling to load more than 30 half-liter bottles on his bicycle said he had bought the water for his wife, who is seven months pregnant.

"Tap water is O.K. for me," he said, asking that he be identified only by his family name, Takahashi. "But all they said was that babies shouldn't drink it. They haven't said anything about what pregnant women should do."

"We're going to stay in Tokyo for now," Mr. Takahashi, 31, said, "unless the reactor problem gets worse."

The city government said it would begin distributing 240,000 bottles of water on Thursday to families with children younger than 1 year, the broadcaster NHK reported. There are about 80,000 such children in the affected zone, NHK said. Outside Tokyo, the government said it had found radioactive materials exceeding legal limits in 11 vegetables in Fukushima Prefecture, the Kyodo news agency reported. Shipments of the affected vegetables from there ended on Monday. On Wednesday, Prime Minister Kan also suspended shipments of raw milk and parsley from neighboring Ibaraki Prefecture, Kyodo reported.

The United States Food and Drug Administration said on Tuesday that it would prohibit imports of dairy goods and produce from the affected region. Hong Kong also banned food and milk imports from the area. Canada on Wednesday imposed stricter controls on milk products, fruits and vegetables, and Australia on Thursday imposed new restrictions on food products including seaweed and seafood.

Mr. Kan's office said Wednesday that rebuilding after the 9.0-magnitude quake and tsunami would cost up to \$309 billion. The World Bank, citing private estimates, said on Monday that the figure could reach \$235 billion.

The economic cost of the disaster has hit the Tokyo Electric Power Company, which operates the crippled nuclear plant and is in negotiations with its bankers for loans of as much as \$24 billion, according to a person with direct knowledge of the situation who asked not to be identified.

The Associated Press reported on Wednesday that the official death toll from the disaster had been raised to more than 9,500, with more than 16,000 people missing, although officials said there could be overlap between the figures.

Meanwhile, a magnitude 6.0 quake shook Fukushima Prefecture in the morning, according to the Japan Meteorological Agency, followed by a magnitude 5.8 tremor about 20 minutes later.

### **Tokyo tap water not safe for infants, officials warn (LA Times)**

*Levels of radioactive iodine found to be about double the safe levels for children under age of 1. Black smoke billows from a reactor at the stricken Japanese nuclear plant.*

By Julie Makinen, Los Angeles Times  
2:54 PM PDT, March 23, 2011

Reporting from Tokyo -- Infants in Tokyo and five surrounding cities should not be allowed to consume tap water, the city's government said Wednesday after elevated levels of radioactive iodine from a crippled nuclear plant were detected at a water treatment plant.

Japanese Prime Minister Naoto Kan urged consumers not to eat a dozen types of contaminated vegetables from the region surrounding the nuclear facility 150 miles northeast of the capital and also expanded a shipment ban.

Water tests in Tokyo found levels of radioactive iodine 131 at 210 becquerels per liter Tuesday and 190 becquerels per liter on Wednesday morning, about double the level of 100 becquerels per liter deemed safe for children under the age of 1. A level of 300 becquerels per liter is considered safe for adults.

Tokyo Gov. Shintaro Ishihara said the city's water was safe for "non-potable" use and urged residents to remain calm. But some convenience stores were sold out of bottled water late Wednesday and officials announced plans to distribute bottled water to 80,000 households with young children.

The national government said damage from the March 11 earthquake, tsunami and nuclear accident could reach 25 trillion yen or nearly \$310 billion, significantly more than the World Bank's recent estimate of \$235 billion. The disaster could shrink Japan's gross domestic product by 0.5% in fiscal year 2011, which begins April 1, the government said.

The new estimate could even be on the low side, because the government said it excludes losses in productivity from continuing power outages as well as the problems at the Fukushima Daiichi nuclear plant. The disaster could shrink Japan's gross domestic product by 0.5% in fiscal year 2011, which begins April 1, the government said.

Workers continued their struggle to gain control over the Fukushima Daiichi nuclear plant. Dark smoke at the No. 3 reactor forced officials to evacuate the facility Wednesday afternoon.

Earlier, high temperatures at Reactor No. 1 and high radiation at Reactor No. 2 were reported, the government's nuclear agency said, dashing hopes that reestablishing power to the entire plant on Tuesday would quickly help stabilize it.

As relief officials and evacuees continued to battle subfreezing temperatures on the 12th day after the quake, the National Police agency said the death toll had increased to 9,523 and the number of missing had risen yet again, from 14,700 Wednesday morning to 16,094 by 11 p.m.

Some rescuers said the rising toll of missing may reflect the fact that aid workers are still encountering groups of survivors who had been cut off from rescue efforts and are only now registering their missing loved ones.

U.S. Ambassador to Japan John Roos and a contingent of U.S. military officials toured towns along Japan's battered northern coast. In Ishinomaki, he offered words of encouragement and further pledges of American support to a group of survivors who have taken shelter in an elementary school gymnasium.

In Yamada city in Iwate prefecture, about 100 miles north of Sendai, UCLA pediatric critical care doctor Kozue Shimabukuro said snow was falling as evacuees at one local elementary school lined up for food. Residents' mobility was improving after days in which residents were only able to get around by foot, she said, thanks in part to Japanese Self-Defense Force troops clearing massive amounts of debris. A gas shortage also has eased.

"A portable shower was set up today, so it was a good day," said Shimabukuro, 34, a native of Okinawa, who is volunteering with relief efforts.

At the nuclear plant, Tokyo Electric Power Co. said two workers were hospitalized after being injured Tuesday in the effort to reconnect power, although they were not exposed to radiation.

Chief cabinet secretary Yukio Edano said the source of the smoke Wednesday afternoon at Reactor No. 3 was unclear. But radiation levels one kilometer west of the plant had not changed, officials said. In Fukushima prefecture, tap water with levels exceeding 300 becquerels has been found.

Tepco has asked banks for about \$18 billion in emergency loans to cope with the crisis at the power plant and the resulting power shortages in a wider area. Economy Minister Kaoru Yosano said ongoing power shortages would pose the biggest problem for Japan's economy.

Insurers are tabulating their losses. Munich Re said Tuesday that it estimated its claims in Japan would amount to about 1.5 billion euros, or about \$2.1 billion, and that its profit forecast for the year could not be maintained. Hannover Re said Wednesday it would have claims of about 250 million euros, or \$355 million, from the Japan disaster. The World Bank's recent report estimated that insurers would face claims of up to \$33 billion in Japan.

Meanwhile, the U.S. Food and Drug Administration on Tuesday banned the importation of milk, milk products and fresh fruits and vegetables from four areas near the plant.

Minuscule particles of fallout from the Japanese plant have reached Iceland and are expected in France and elsewhere in Europe, experts said Wednesday, but stressed they don't pose a health risk, according to wire reports.

A plume carrying trace amounts of radioactive iodine has been detected in Iceland, the country's Radiation Safety Authority said. However, it added, the concentration was "less than a millionth" of what was found in European countries in the wake of the 1986 Chernobyl disaster that spewed radiation over a large distance.

### ***New Problems at Japanese Plant Subdue Optimism (NY Times)***

By KEITH BRADSHER

March 23, 2011

The Japanese electricians who bravely strung wires this week to all six reactor buildings at a stricken nuclear power plant succeeded despite waves of heat and blasts of radioactive steam.

The restoration of electricity at the plant, the Fukushima Daiichi Nuclear Power Station, stirred hopes that the crisis was ebbing. But nuclear engineers say some of the most difficult and dangerous tasks are still ahead — and time is not necessarily on the side of the repair teams.

The tasks include manually draining hundreds of gallons of radioactive water and venting radioactive gas from the pumps and piping of the emergency cooling systems, which are located diagonally underneath the overheated reactor vessels. The urgency of halting the spread of radioactive contamination from the site was underlined on Wednesday by the health warning that infants should not drink tap water — even in Tokyo, 140 miles southwest of the stricken plant — which raised alarms about extensive contamination.

“We’ve got at least 10 days to two weeks of potential drama before you can declare the accident over,” said Michael Friedlander, who worked as a nuclear plant operator for 13 years.

Nuclear engineers have become increasingly concerned about a separate problem that may be putting pressure on the Japanese technicians to work faster: salt buildup inside the reactors, which could cause them to heat up more and, in the worst case, cause the uranium to melt, releasing a range of radioactive material.

Richard T. Lahey Jr., who was General Electric’s chief of safety research for boiling-water reactors when the company installed them at the Fukushima Daiichi plant, said that as seawater was pumped into the reactors and boiled away, it left more and more salt behind.

He estimates that 57,000 pounds of salt have accumulated in Reactor No. 1 and 99,000 pounds apiece in Reactors No. 2 and 3, which are larger.

The big question is how much of that salt is still mixed with water and how much now forms a crust on the uranium fuel rods.

Crusts insulate the rods from the water and allow them to heat up. If the crusts are thick enough, they can block water from circulating between the fuel rods. As the rods heat up, their zirconium cladding can rupture, which releases gaseous radioactive iodine inside and may even cause the uranium to melt and release much more radioactive material.

Some of the salt might be settling to the bottom of the reactor vessel rather than sticking to the fuel rods, however.

The Japanese have reported that some of the seawater used for cooling has returned to the ocean, suggesting that some of the salt may have flowed out again, with some radioactive material. But clearly a significant amount of salt remains.

A Japanese nuclear safety regulator said on Wednesday that plans were under way to fix a piece of equipment that would allow freshwater instead of seawater to be pumped in.

He said that an informal international group of experts on boiling-water reactors was increasingly worried about salt accumulation and was inclined to recommend that the Japanese try to flood each reactor vessel’s containment building with cold water in an effort to prevent the uranium from melting down. That approach might make it harder to release steam from the reactors as part of the “feed-and-bleed” process that was being used to cool them, but that was a risk worth taking, he said.

Public alarm about the crisis increased on Wednesday after officials announced that levels of radioactive iodine had been detected in Tokyo’s tap water.

Recent rains might have washed radioactive particles into the water, as the Japanese government suggested. But prevailing breezes for the past two weeks should have been pushing the radiation mostly out to sea. And until Wednesday, some experts had predicted that radioactive iodine would not be much of a problem, because the fission necessary to produce iodine — which breaks down quickly, with a half-life of just eight days — stopped within minutes of the earthquake on March 11. The fear is that more radiation is being released than has been understood.

Preventing the reactors and storage pools from overheating through radioactive decay would go a long way toward limiting radioactive contamination. But that would require pumping a lot of cold freshwater through them.

The emergency cooling system pump and motor for a boiling-water reactor are roughly the size and height of a compact hatchback car standing on its back bumper. The powerful system has the capacity to propel thousands of gallons of water a minute throughout a reactor pressure vessel and storage pool. But that very power can also be the system's Achilles' heel.

The pump and piping are designed to be kept full of water. But they tend to leak and develop alternating pockets of air and water, Mr. Friedlander said.

If the pump is turned on without venting the air and draining the water, the water from the pump would hit the alternating pockets with enough force to blow holes in the piping. Venting the air and draining the water requires a technician to reach a dozen valves, sometimes using a ladder. The water is removed through a hose to the nearest drain, usually in the floor, that leads to machinery designed to remove radiation from the water.

The process takes a full 12 hours in a reactor that is operating normally, Mr. Friedlander said. But even then, the water in the pipes tends to be radioactively contaminated because the valves that separate it from the reactor are not entirely tight.

Backlash from the reactor is likely to be an even bigger problem when the water inside the reactor is much more radioactive than usual and is under extremely high pressure.

Japanese government and power company officials expressed optimism on Wednesday morning that the crisis was close to being brought under control, only to encounter two reminders in the afternoon of the unpredictable difficulties that lie ahead.

Fukushima Daiichi's Reactor No. 3 began belching black smoke for an hour late in the afternoon, leading its operator, the Tokyo Electric Power Company, to evacuate workers. A spokeswoman said Thursday that more tests were needed before the company could determine how to proceed in its effort to restore the cooling system.

No. 3 is considered one of the most dangerous of the reactors because of its fuel — mixed oxides, or mox, which contain a mixture of uranium and plutonium and can produce a more dangerous radioactive plume if scattered by fire or explosions.

The spokeswoman said workers would try to repair a pump at Reactor No. 5, which was shut down at the time of the quake and has shown few problems. The pump abruptly stopped working Wednesday afternoon.

### **Japan nuclear crisis still a serious concern (Reuters)**

Wed, Mar 23 2011

By Shinichi Saoshiro and Yoko Kubota

TOKYO (Reuters) - Tokyo residents were warned not to give babies tap water because of radiation leaking from a nuclear plant crippled in the earthquake and tsunami that devastated northeast Japan in the world's costliest natural disaster.

The U.N. atomic agency said there had been some positive developments at the Fukushima nuclear plant 250 km (150 miles) north of Tokyo but the overall situation remained serious. Some countries have started blocking imports of produce from Japan, fearful of radiation contamination.

The first official estimate put the cost from the March 11 disaster at more than \$300 billion, dwarfing losses from both the 1995 Kobe quake and Hurricane Katrina that swept through New Orleans in 2005, making it the world's costliest natural disaster.

The plant, battered by a 9.0 magnitude earthquake and tsunami that has left 23,000 people dead or missing, has still not been brought under control, and workers were forced away from the complex when black smoke began rising from one of its six reactors.

"There are some positive developments related to the availability of electrical power...although the overall situation remains of serious concern," Graham Andrew, a senior official of the International Atomic Energy Agency (IAEA), told a news conference.

Tokyo authorities said on Wednesday that water at a purification plant for the capital of 13 million people had 210 becquerels of radioactive iodine -- more than twice the safety level for infants.

Tokyo Governor Shintaro Ishihara said that level posed no immediate risk. "But, for infants under age one, I would like them to refrain from using tap water to dilute baby formula."

As concern grew over the risk to food safety of radiation from the nuclear plant, the United States became the first nation to block some food imports from the disaster zone.

It is stopping imports of milk, vegetable and fruit from four prefectures in the vicinity of the plant.

Hong Kong, a major importer of Japanese food, also banned produce and milk imports from the disaster zone. Japan's Jiji news agency said Hong Kong authorities had found radioactivity levels in spinach and turnip samples up to 10 times above the safety limit.

France this week asked the European Commission to look into harmonizing controls on radioactivity in imports from Japan, after the world's worst atomic crisis since Chernobyl in 1986.

Authorities have said above-safety radiation levels had been discovered in 11 types of vegetables from the area, in addition to milk and water, and have halted shipments of some food and told people there to stop eating leafy vegetables.

Japanese authorities told the IAEA two prefectures near the crippled plant -- Chiba and Ibaraki -- were advised to monitor seafood products, Andrew said.

High levels of radioactive iodine and cesium were measured close to water discharge points at the Fukushima power plant, "before dilution by the ocean," he told a news conference.

Chief cabinet secretary Yukio Edano, the government's public face during the disaster, urged the world not to overreact.

Edano also said an exclusion zone around the plant did not need to be expanded and he urged Tokyo residents not to hoard bottled water, a plea that fell on deaf ears with many shops quickly selling out of supplies.

"If this were temporary, I wouldn't be so worried. If this is a long term, I think we have a lot to worry about," said Riku Kato, father of a one-year-old baby.

Physicians for Social Responsibility, a U.S. anti-nuclear group, disputed the food safety assurances and called for a more strict ban on sales of exposed food.

"There is no safe level of radionuclide exposure, whether from food, water or other sources. Period," said physician Jeff Patterson, a former president of the group.

The Asian nation's worst crisis since World War Two has sent shock waves through global financial markets.

The damage estimate of \$300 billion could go higher as it does not include losses in economic activity from planned power outages or the broader impact of the nuclear crisis. The 1995 Kobe quake cost \$100 billion while Hurricane Katrina caused \$81 billion in damage.

More than a quarter of a million people are living in shelters, while rescuers and sniffer dogs comb debris and mud looking for corpses and personal mementos.

## POWER CABLES ATTACHED

Technicians have successfully attached power cables to all six reactors at the Fukushima plant and started a pump at one to cool overheating fuel rods.

As well as having its workers on the front line in highly dangerous circumstances, Tokyo Electric Power Co (TEPCO) is also facing accusations of a slow disaster response and questions over why it originally stored more uranium at the plant than it was designed to hold.

The IAEA has expressed concern about a lack of information from Japanese authorities, citing missing data on temperatures of spent fuel pools at the facility's reactors 1, 3 and 4.

Japan Nuclear Safety Commission Chairman Haruki Madarame said the government was "swiftly releasing information that is certain and not speculative" within Japan, but acknowledged it is behind in releasing information to foreign countries."

Experts have said tiny radioactive particles, measured by a network of monitoring stations as they spread eastwards from Japan across the Pacific, North America, the Atlantic and to Europe, were far too low to cause any harm to humans.

"It's only a matter of days before it disperses in the entire northern hemisphere," said Andrea Stahl, a senior scientist at the Norwegian Institute for Air Research.

## GLOBAL IMPACT

The Japan disaster has dealt a blow to the nuclear power industry around the world. Italy became the latest nation to re-assess its program, announcing a one-year moratorium on site selection and building of plants.

Crisis in the world's third-biggest economy -- and its key position in global supply chains, especially for the auto and technology sectors -- has added to global market jitters, also affected by conflict in Libya and unrest in the Middle East.

The death toll from the disaster has risen to 9,523, but with 16,094 people still missing, it is certain to rise.

There are reports that dozens of survivors, mostly elderly, have died in hospitals and evacuation centers from a lack of proper treatment, or simply because of the cold.

### ***Fukushima workers in hospital after radiation exposure (BBC News)***

24 March 2011 Last updated at 05:20 ET

Two workers at Japan's damaged Fukushima Daiichi nuclear power plant have been taken to hospital after being exposed to high levels of radiation.

The pair had been attempting to restore the cooling system in reactor 3, which was damaged by the quake on 11 March.

Several workers have now been hurt on the site, an indication of the scale of the task facing them.

Radiation levels in Tokyo's water supply have now fallen, but remain high in other areas of northern Japan.

The official death toll from the magnitude 9.0 quake and subsequent tsunami has now risen to 9,523. Another 16,094 people are listed as missing.

Japan's nuclear safety agency said three workers had been injured when their feet came into contact with radiation-contaminated water while laying cables in the turbine area of reactor 3.

They were exposed to radiation levels of 170-180 millisieverts, he said, which is lower than the maximum level permitted for workers on the site of 250 millisieverts. Two of the workers were taken to hospital.

"Although they wore protective clothing, the contaminated water seeped in and their legs were exposed to radiation," said a spokesman.

"Direct exposure to radiation usually leads to inflammation and so that's why they were sent to the hospital to be treated."

Most people are exposed to 2 millisieverts over the average year, while 100 millisieverts is considered the lowest level at which any increase in cancer is clearly evident.

The condition of the injured workers was not immediately known.

Japan's chief cabinet secretary Yukio Edano said the situation was "very regrettable".

'Serious concern'

The power plant's cooling systems failed after the quake and tsunami, leading to the reactors overheating.

Power has now been restored to the site, but work to restart the coolers in reactor 3 was briefly suspended on Wednesday after a plume of black smoke was seen coming from it.

Tokyo Electric Power Co, which operates the plant, later allowed workers to re-enter after establishing there was no fire and that radiation level in the area had not risen.

The International Atomic Energy Agency (IAEA) said there had been some "positive developments" at the site but that the situation was still "of serious concern".

The plant is 250km (155 miles) north-east of the capital, Tokyo. The government has declared a 20km exclusion zone and evacuated tens of thousands of people. Those living up to 30km away have been told to stay indoors to minimise exposure.

People in Fukushima prefecture have been told not to eat 11 types of green leafy vegetables grown locally because of contamination worries. Local producers have been ordered not to send the goods to market.

Tokyo residents were warned on Wednesday not to give tap water to babies less than a year old because levels of radioactive iodine - which can cause thyroid cancer - are twice the recommended safe level in some areas of the city.

Officials stressed that children would have to drink a lot of it before it harmed them and urged people not to panic-buy. But supermarket shelves were reported to have been cleared of bottled water by Thursday morning.

"Customers ask us for water. But there's nothing we can do," Masayoshi Kasahara, a supermarket worker in Tokyo told Reuters.

"We are asking for more deliveries but we don't know when the next shipment will come."

#### Emergency shelters

Radiation readings on Thursday showed levels in water in Tokyo had fallen back below the danger level, but the municipal authorities are distributing thousands of bottles of water to households with infants.

The authorities in the nearby city of Kawaguchi, Saitama prefecture, also reported radiation levels above safety norms in its water supply on Thursday.

Concern is also growing among Japan's neighbours. Australia has become the latest country to ban food imports from the affected region.

Police believe the final death toll from Japan's twin disaster may be more than 18,000.

Most of the deaths - 5,700 - have been reported in the prefecture of Miyagi. Three thousand bodies have been found in Iwate prefecture, and 776 in Fukushima.

At least 18,000 houses were destroyed and 130,000 damaged, and more than 200,000 people are living in emergency shelters.

The Japanese government has said it will cost as much as 25 trillion yen (\$309bn; £189bn) to rebuild the country after the disaster.

## ***U.S. Aircraft Carrier Moved From Yokosuka Port To Avoid Radiation Traces (Bloomberg)***

By Tony Capaccio, Bloomberg News  
March 23, 2011

The aircraft carrier USS George Washington was moved this week from its Japanese port to avoid a potentially costly and complex future cleanup to remove traces of radiation, the Navy's top uniformed official said yesterday.

The carrier did not face an acute, near-term radiation threat that would have forced its departure from Yokosuka, about 175 miles south of the crippled Fukushima Dai-ichi nuclear plant, said Chief of Naval Operations Admiral Gary Roughead.

Rather, Roughead said, he wanted to move the flattop because even residual traces of radiation on a nuclear-powered warship, while not harmful from a health standpoint, could be mistaken as a sign of a shipboard nuclear leak requiring identification and cleanup, he said.

"The fact that somebody could go aboard and detect some trace, I think, injects challenges," he said in an interview. "When you think of an aircraft carrier that has literally thousands of miles of ventilation ducting in it, you've got a significant cleaning issue.

"My view was 'let's just get her out,' get her away from where she could pick up any sort of contamination so that that ship stays clean," Roughead said.

U.S. Navy ships and helicopters have been involved in rescue efforts following the 9.0 magnitude earthquake and subsequent tsunami that hit Japan's Tohoku region on March 11.

The U.S. military has about 38,000 personnel ashore in Japan and an additional 11,000 afloat in the region or dispersed among 85 facilities on Honshu, Kyushu and Okinawa, according to U.S. Forces Japan.

"Radiation levels" from the crippled power plant "are not life-threatening or health-threatening -- for all Americans there -- but I watch that very closely," Roughead said.

"I am very comfortable were we are in Japan in terms of the safety to our people and the precautions being taken," he said.

The Japanese government has struggled to contain the ripple effects of the natural disasters that crippled the nuclear facility north of Tokyo.

Tokyo Electric Power Co. said fuel rods at the plant have been damaged, releasing five kinds of radioactive material and contaminating seawater for the first time.

**Japan atom plant worker received high radiation-IAEA (Reuters)**

3:07pm EDT

VIENNA, March 23 (Reuters) - One of the workers struggling to avert a disaster at Japan's crippled nuclear plant was exposed to a high radiation dose that may increase the risk of cancer, a U.N. atomic agency official said on Wednesday.

Japanese authorities have also told the International Atomic Energy Agency (IAEA) two prefectures near the crippled plant -- Chiba and Ibaraki -- were advised to monitor seafood products, the official, Graham Andrew, said.

High levels of radioactive iodine and caesium were measured close to water discharge points at the Fukushima power plant, "before dilution by the ocean", he told a news conference.

Japanese authorities tested seawater off the plant's site for radiation on Tuesday, but stressed elevated levels already detected were no cause for worry.

In a desperate attempt to cool the reactors and their spent fuel ponds, workers have sprayed or dumped sea-water into the plant's cooling system. Officials have acknowledged some of the water spilled back to sea.

The plant has still not been brought under control, and workers were forced away from the complex when black smoke began rising from one of its six reactors on Wednesday. The IAEA said it had not received any information about the incident.

**IAEA DEFENDS ROLE**

Andrew said Japanese authorities had told the agency radiation dose rates at the plant were decreasing, but suggested iodine and caesium contamination in nearby areas had risen.

The IAEA also had information about eighteen workers at the site which had been exposed to radiation since the accident, including one who got a dose rate of about 0.1 sieverts (106.3 millisieverts), although no medical treatment was required.

The agency did not say when it happened. The average dose for a nuclear plant worker is 50 millisieverts over five years.

The operator of Fukushima said last week it had raised the limit for the emergency work to 100 millisieverts an hour.

"The 0.1 sievert which you have there is certainly not a low dose and the individual may have a greater risk of certain cancer in the future...So it is something to be avoided, it is a high dose," Andrew said.

A senior former IAEA official, Olli Heinonen, has criticised the initial response of his former employer to the crisis, saying its early reports after the March 11 earthquake provided scant, and at times contradictory information from Japan.

The IAEA has said it could only give the information to its member states it itself received from Japan.

"I think our response was the best we could give in the circumstances...I'm surprised to hear that he is criticising us. He would understand, I think, from working here," Andrew said.

### **Nuclear crisis highlights operator's checkered past (CNN)**

By David Fitzpatrick and Drew Griffin, CNN Special Investigations Unit  
March 23, 2011 1:59 p.m. EDT

**(CNN)** -- The operator of the nuclear reactors and power plants on the northern coast of Japan has a documented history of errors and cover-ups and, according to anti-nuclear activists, a pattern of hiding the truth when things go wrong.

Amidst the confusion and uncertainty surrounding the exact nature of the stress and damage at the Fukushima Daiichi nuclear plant, even Japan's Prime Minister, Naoto Kan, was overheard demanding from officials of the Tokyo Electric Power Company (TEPCO) why the company withheld some information from the government.

Those reported comments were in themselves unusual because in the past, critics say, there has been close cooperation between the two.

"The history of the Japanese nuclear industry and the government is that is very tight and is less than glorious in regard to public information and full disclosure," Arjun Mahkijani told CNN.

Mahkijani is director of a small Washington-based public interest group called the Institute for Energy and Environmental Research and has long been critical of nuclear power, both in the United States and around the world.

"These events are unprecedented," he said, "and there's every reason to believe TEPCO has not told the entire truth of what's been happening."

TEPCO officials deny they have been hiding critical data from the Japanese government.

But there's a detailed history of just those kinds of events in the recent past.

In 2002, the president of TEPCO and four other executives resigned when it was discovered that repair and inspection records at the Fukushima plant had been doctored. The company admitted "dishonest practices" after an internal investigation.

"It was discovered that TEPCO had covered up incidents of cracking of an important piece of equipment in all of its reactors and as a result, they were forced to shut down all 17 of their reactors," anti-nuclear activist Phillip White told CNN. White is the English-language liaison for an organization called Citizens Nuclear Information Center (CNIC), Japan's largest anti-nuclear organization.

"There was a pattern that emerged that TEPCO isn't frank and deliberately covers up to protect its own interests," he said.

In 2007, an 6.8-magnitude earthquake struck western Japan and affected another plant owned by TEPCO. The company reported only a minor fire but later, admitted that the fire had burned for two hours and that hundreds of gallons of radioactive water had leaked into the sea.

"The plant simply wasn't designed for the level of earthquake that took place, " Mahkijani told CNN. "They were very lucky not to have a bigger disaster then."

Against that background is what White and other anti-nuclear activists say is a far too-cozy relationship between Japanese nuclear regulators and power plant operators like TEPCO.

The chief regulatory agency is called Nuclear Industrial and Safety Agency (NISA), but it does not, according to critics, operate at an arms-length distance from the industry it is charged with regulating. NISA is part of the giant Japanese Ministry of Economy, Trade and Industry (METI). That ministry is charged, among other things, with selling Japanese technology (including nuclear technology) abroad.

"There's no true regulation of the Japanese nuclear industry," Phillip White told CNN. "It's just an amiable fiction."

NISA approved a 10-year extension for the life of the oldest of the six reactors at Fukushima Daiichi just before the earthquake struck. This, despite allegations that safety at the reactor in question had been questioned.

TEPCO admitted on its website that it had failed to properly inspect 33 pieces of equipment related to the cooling systems at the reactor, and told CNN that everything that needed to be addressed has been done. It said it would take corrective action in the future to prevent similar problems from occurring.

Nuclear experts tell CNN that the reactors are now almost certainly inoperable in the future.

As one physicist, Dr. Kenneth Bergeron, told CNN, "It's a very frightening situation. And we can only hope for the best."

### **Concerns Escalate Over Possible Plutonium Release at Fukushima Reactor (Examiner)**

By Harold Saive

March 23rd, 2011 9:16 am ET

JAPAN: Concerns Escalate Over Possible Plutonium Release at Fukushima, unit 3 Reactor Wednesday, March 23, 2011 8:34

Over the years, Japan's nuclear energy program has been infiltrated by organized crime with safeguards systematically eroded by influence money. Today, paper vouchers replace strict physical documentation where the chain of custody for nuclear fuels has been broken.

In a Four Corners interview, Damon Moglen revealed that Fukushima unit 3 reactor is currently loaded with up to 500 pounds of plutonium.

Japan was apparently stockpiling plutonium under the pretext of Mixed Oxide Fuel (MOX) in with capability to rapidly transform the MOX to nuclear weapons grade.

Such a transformation of MOX could turn Japan into a formidable nuclear power, overnight with a measured risk of breaking the Nuclear Proliferation Treaty (NPT).

3/21/2011 Four Corners Interviews with Damon Moglen, Richard Brainowski and Ziggy Switkowski.

If the smoke billowing from the Fukushima reactor 3, amongst other reactors, does indeed contain plutonium, then this nuclear crisis has exposed Japan and the world to a much more extreme danger than the one originally envisaged. If so, we all ought to know about it. There should be some more specific investigations in regard to the contents.

### ***U.S. Military Leaders In Japan Say Water On Bases Safe To Drink (Stars and Stripes)***

By Charlie Reed

March 24, 2011

YOKOTA AIR BASE, Japan -- Water at U.S. military bases in Japan is safe to drink, U.S. Forces Japan said Thursday as public concern grew over elevated radiation levels detected in water and food supplies in Tokyo in recent days.

The U.S. embassy in Tokyo said Thursday that pregnant women and children under the age of three in the city should only drink bottled water. The embassy warning cited

reports from the Tokyo Metropolitan Government that radioactive iodine levels exceeding consumable limits for children under 3 had been detected at a purification plant Wednesday.

While food and water is safe to consume at bases in Japan, the military has “enhanced our measures to safeguard food and water supplies on all our military installations in Japan,” the USFJ statement read. “As an extra precaution, we have increased the frequency of water tests to daily to ensure the safety of our personnel and their families.”

The extra water tests follow days of other precautionary measures, including the mandatory pick up of potassium iodide pills by all U.S. military personnel and their immediate dependents in Japan.

Yokota Air Base commander Col. Otto Feather said Wednesday that the water at the base was “delicious” and drinkable.

Water tests at Yokosuka have not found any dangerous levels of radiation, base commander Capt. David Owen said in a broadcast message on AFN Thursday morning.

Concerns about drinking water arose after Tokyo officials found radioactive iodine in the Tokyo water system.

Yokosuka Naval Base gets its water from the Yokosuka municipal supply, Owen said. The base tests water in 16 locations, including the Negishi and Ikego housing areas.

“There is no problem with our water,” Owen said. “If there is, we would immediately let you know.”

During a televised news conference Wednesday, Ei Yoshida, head of water purification for the Tokyo water department, told reporters that infants in Tokyo should not be given tap water to drink.

Officials found radioactive iodine levels at 210 becquerels per liter. Officials said that health risks begin at 100 becquerels per liter for infants and 300 becquerels for adults.

Certain Japanese products such as milk and spinach have been pulled off shelves en masse following reports of tainted supplies of those foodstuffs originating from Fukushima prefecture, where the runaway nuclear power plant continues to leak.

Japanese workers loaded trucks with boxes of bottled water to distribute across Tokyo Thursday after residents cleared store shelves following warnings that the city’s tap water had elevated radiation, The Associated Press reported Thursday morning.

## **Radiation found in food, water and milk near Fukushima (Xinhua)**

2011-03-24 10:22:42

BEIJING, March 24 (Xinhuanet) --The Japanese authorities have urged people to stop eating certain foods originating from the area near Fukushima. Unsafe radiation levels have been found in 11 types of vegetables grown near the nuclear plant, as well as in milk and water.

Although traces of radiation surpassing safety limits have already been found in milk and water around the Daiichi plant, officials insist there is no danger to humans and have urged the world not to over react.

Japanese Chief Cabinet Secretary Yukio Edano said, "Unfortunately, we are expecting this situation to last longer than expected, so in order to prevent any possible damage from an early stage, we have put a ban on shipping of radiation contaminated vegetables to reduce human contact with harmful substances."

At this small vegetable store in downtown Tokyo, vegetables grown in Ibaraki prefecture were still being sold, and shoppers say they are not overly worried.

Housewife Chizuko Saito said, "I think it should be fine if I wash it properly before eating, but if I can find spinach from a different prefecture, I may buy it instead."

Worsened by a widespread lack of understanding of the technicalities of radiation, public concern over the situation is high around the world and radioactive particles have been detected as far away as Iceland.

The U.S. Food and Drug Administration has announced it is stopping imports of milk, vegetables and fruit from four prefectures in Japan's northeast.

South Korea may be next and France this week asked the European Commission to look into harmonizing controls on radioactivity in imports from Japan.

Although there has been progress in restoring power to the Fukushima site 13 days after the accident, more time is needed to stabilize the reactors.

## **FUKUSHIMA OPINION**

### **How we can reduce the risk of another Fukushima (WaPo)**

By Matthew Bunn, Wednesday, March 23, 7:39 PM

In 2006, a National Academy of Sciences committee recommended two simple steps to prevent spent nuclear fuel from catching fire: putting old, cool fuel next to the new, hot fuel discharged from a reactor, and adding sprayers that could dispense water if the

cooling water in the pool was lost. But no such action has been taken, either in the United States or in Japan — where the most deadly danger at Fukushima nuclear plant since the recent earthquake and subsequent tsunami has been the risk that uncovered spent fuel in the storage pools would catch fire, spreading radioactive material miles downwind. Nor has much of the older spent fuel been moved out of pools into safer dry casks made of steel and concrete — another possibility to reduce the risk.

The radioactive steam that rose over Fukushima should be a searing reminder of the costs of failing to identify such dangers and fix them. A serious blow has been dealt to public confidence in the nuclear industry and its overseers.

Every country operating nuclear facilities needs to undertake an urgent review — by an independent international team, not by the companies that own the plants or the agencies that have long regulated them — of whether there are risk-reduction steps as compelling as those the academy recommended that have not been taken. (Indeed, another simple academy recommendation that was not followed was that a group independent of both the U.S. nuclear industry and its regulators should review the security of spent fuel pools.)

The European Union has announced that its member states will work together to review the safety of all E.U. reactors in the coming months. The rest of the world must do likewise — as well as invite separate teams to review security.

The risk is not just accidents but attacks. Al-Qaeda has repeatedly considered sabotaging nuclear facilities. The 2006 study focused primarily on the danger that terrorists might succeed in draining the water from a spent-fuel storage pool, the same outcome raising risks in Japan. Moreover, al-Qaeda has long sought to get stolen nuclear material to make a crude nuclear bomb — which government studies in the United States and elsewhere have repeatedly concluded a sophisticated group might be able to do if it got enough weapons-usable nuclear material.

Nuclear facilities around the world are much less prepared for security incidents than for accidents. While U.S. reactors are required to have armed guard forces, many reactors abroad — and even some sites with potential nuclear bomb material — have none. One senior U.S. nuclear official I spoke to last fall described security for most of the reactors he had visited abroad as “frightening.” Everyone in the civilian nuclear industry is taught to focus on safety from day one, while on security, nuclear workers and managers might get a half-hour briefing once a year. All this needs to change.

At the nuclear security summit President Obama convened last spring, leaders from 47 countries agreed on the goal of securing all vulnerable nuclear materials worldwide within four years — but a great deal remains to be done to realize that ambition.

The International Atomic Energy Agency (IAEA) provides safety and security reviews for countries that request them — but it will need more money and additional experts to carry out these assessments on the scale required. It will take time for the IAEA to

assemble teams, and major obstacles are likely to include complacency, secrecy, sovereignty concerns and bureaucratic impediments.

As it outlines questions, it should start here:

1 Why haven't operators of nuclear plants been required to rearrange the fuel in reactors and provide sprayers, as the academy recommended?

1 Why was the Fukushima site required to have only eight hours of battery supply in case it lost power? Why are some U.S. reactors allowed to have only four?

1 Why were the backup diesel generators down low, where they might be swamped by a tsunami, rather than up high?

1 Why aren't reactors and sites with potential nuclear bomb material in all countries required to be protected against the kinds of attacks and theft attempts that terrorists and criminals have shown they have the capability to carry out?

1 Shouldn't all such facilities be required to have on-site armed guards, capable of holding off an attack until off-site forces arrive?

The task is urgent. While the odds are against another accident occurring tomorrow — more than two decades elapsed between Chernobyl and Fukushima — no one knows when terrorists might choose to strike.

Ultimately, regular independent, international reviews should be the norm in nuclear operations worldwide. All countries must demonstrate that they are doing everything practicable to prevent the next Fukushima — or something far worse.

*Matthew Bunn, an associate professor at the Harvard Kennedy School and a former adviser in the White House Office of Science and Technology Policy, is the author of "Securing the Bomb 2010: Securing All Nuclear Materials in Four Years."*

### **Feelings Of 'Accept Pain, Don't Complain' In Japan (NPR)**

Christopher Joyce | March 24, 2011

No country is more familiar with nuclear peril than Japan. The atomic bombs dropped on Hiroshima and Nagasaki in 1945, at the end of World War II, killed or irradiated hundreds of thousands of people, an event that dwarfs any nuclear incident since then.

One might think, then, that people in Japan would be traumatized by the calamity at the nuclear power complex in Fukushima. But the reality is more nuanced than that. From one generation to the next, even the most horrible events fade from cultural memory.

Isao Hashimoto, an artist in the city of Hakone, wants people to remember 1945.

"I have heard from my father [and] grandfather about the war — seriousness of war — and atomic bombs, so I think we should keep talking about this problem, especially toward the younger generation," Hashimoto says.

So Hashimoto created a very simple video — just a map of the world.

Starting in 1945 with the Hiroshima and Nagasaki bombs, it registers in chronological order every nuclear test explosion. One after another, each bomb shows up as a little red puff on the screen.

### **'Accept The Pain, Don't Complain'**

Fear of radiation burrowed into Japanese culture. Godzilla, the movie monster that destroyed Tokyo, was the spawn of radioactive fallout, as were other cinema monsters to follow. On the positive side, animators created the helpful cartoon robot, Atom Boy, who uses science for peace.

That was fantasy, but now in Japan the radioactive emissions are real again — they've even reached Tokyo.

At a restaurant in Tokyo, Sukeyasu Yamamoto orders lunch. No one is ordering spinach these days — the government says crops to the north are contaminated. Yamamoto is a nuclear physicist, trained at Yale, now teaching in Tokyo. He knows both cultures and says the reaction to the nuclear accident can be described in a word:

"*Gaman* — it is to endure, accept the pain, don't complain," he says. Yamamoto says another phrase: *shikata ganai*. It means "it can't be helped."

In a sense, that's the situation here: Japan needs electricity, and there's little coal and no oil domestically. The government cast the country's lot with nuclear power, building 55 reactors that generate 35 percent of the country's electricity.

### **Little Connection Between Bombings And Fukushima Disaster**

Yamamoto says many people here don't really associate the horrors of Hiroshima and Nagasaki with the crisis at the Fukushima nuclear reactor.

"The tsunami was more the atomic bomb effect of flattening the whole place," he says. "And the radiation is another disaster, which may be more hazardous in some ways, and long-lasting. But most people are not scientists, so they don't make that connection very easily."

In fact, Yamamoto says many of his students don't seem to know much about World War II and the bombings. He says people of *his* generation do remember. Two years ago, Yamamoto rediscovered the diaries he kept as a teenager during the war.

"These are the diaries starting from April 27, 1945," he says. "May 1: Today we heard about my father's death in action."

Sitting in an armchair at his tidy home in Tokyo, Yamamoto looks for an entry he made about the atomic bombs that America dropped on Aug. 6 and Aug. 9.

"This is Aug. 13," he reads. " 'Today a small aircraft came over, so that was more scary, because one plane can do it.' Because if I remember, there were only two planes over Hiroshima."

### **Focusing On Immediate Concerns**

For sure, people near the damaged nuclear complex in Fukushima are worried about their health and their food supply. But farther away, many Japanese people are more devastated by the tsunami. Some find the fact that Americans are worried about a cloud of radiation rather odd.

"My youngest daughter lives in San Francisco," says Yoshiko Suzuki, a bereavement counselor in Tokyo. "She is scared to death and worries about me, like, 'Mommy, why don't you get out of Japan and come here?' "

There are others who don't share Suzuki's complacency about the goings on in Fukushima, like Seiji Arihara, a filmmaker whose animated movie, *Nagasaki 1945*, describes the bombing and a hospital in that city treating survivors.

"In my movie I wanted to give out a message that people, humans can't live with radiation — it's just not possible," Arihara says.

So far, there hasn't been a groundswell of anti-nuclear demonstrations. Japan has more immediate concerns. That becomes clear while sitting in a Tokyo office interviewing Arihara, when translator Koki Ishibashi's cell phone rings an alert.

"I think this is an earthquake — an earthquake in Fukushima," Ishibashi says.

The quake's epicenter is, again, right near the nuclear power complex.

### **Nuclear Energy and Weapons: Uncontrollable in Time and Space** **(HuffPo)**

The earthquake and tsunami in Japan devastated a whole region. Radioactive emissions from the damaged nuclear reactors are very serious, and have already contaminated food and water, prompting a ban on food exports from four prefectures and a government warning not to give Tokyo tap water to babies. The crisis could impact human health and the environment on an even wider scale -- across Japan and around the globe.

Whether or not the brave technicians in Fukushima are successful in containing the bulk of the radiation in the six reactors, the message is clear: natural disasters and accidents will happen. If it can go wrong sooner or later it will go wrong, and Murphy's law and nuclear energy do not mix.

In Japan, the fear of radiation spreading is connected to the memory of the nuclear bombs dropped on Hiroshima and Nagasaki over 65 years ago. Over 100,000 people died from radiation exposure -- nearly as many as from the blast. The genetic effects continue down through the generations.

Japan's nuclear crisis has brought back to public consciousness the basic truth that the effects of nuclear disasters -- whether from nuclear energy or nuclear weapons -- are uncontrollable in time and space.

Current events at Fukushima remind us of the negligence of nuclear power companies in building nuclear power plants on earthquake fault lines or vulnerable coastlines. But they should also remind us of the even greater negligence of the nuclear weapon states in maintaining their arsenals of 20,000 nuclear weapons -- most with yields over 100 times greater than the Hiroshima and Nagasaki bombs, and many on hair trigger alert, ready to launch within minutes. Any accidental, unauthorized, inadvertent or intentional use today (or tomorrow) would have a catastrophic, widespread, unprecedented and unimaginable impact on humanity and the environment.

A recent statement released by international law experts from around the world, including former judges from the International Court of Justice, affirms that maintaining nuclear weapons and a readiness to use them is not only negligent, but given the dire consequences of any use, also against the law. The Vancouver Declaration on "Law's Imperative for the Urgent Achievement of a Nuclear-Weapon-Free World," notes that the use of nuclear weapons would be "contrary to the fundamental rules of international humanitarian law (laws governing use of force in wartime) forbidding the infliction of indiscriminate harm and unnecessary suffering."

In other words, during war one can attack military targets and personnel, but not civilians. One can inflict harm on military personnel, but not such harm that would last long after the conflict is over. In addition, it is illegal even in wartime to inflict long-term and severe damage on the environment. Nuclear weapons, with their uncontrollable blast, heat and radiation effects, could not be used without violating these laws. And if such an act is illegal, the *threat* to commit such an act is also illegal.

Thus, in 1996 the International Court of Justice (a. k. a. the World Court) determined that the threat or use of nuclear weapons would be generally illegal, and that there is an unconditional obligation to achieve the complete prohibition and elimination of nuclear weapons through good-faith negotiations.

Since then, failure of the nuclear weapon states to comply has had predictably disastrous results for global proliferation and nuclear danger, convincing India, Pakistan and North

Korea that if they can't cajole the nuclear weapon states to give up nuclear weapons, then they might as well join their nuclear club. Others are bound to follow suit.

Until recently, states that wanted to hang onto their nuclear arsenals and their policies to use them argued that such policies were legal by misrepresenting a clause in the Court's opinion. That clause stated that the ICJ could not reach a conclusion on the legality of threat or use in the extreme circumstance of self-defense when the very survival of a state is at stake. So by stating that they would only use nuclear weapons in "extreme circumstances," the nuclear weapon states avoided applying the general ruling of illegality to their nuclear weapons policies.

But they can no longer avoid this. In May 2010, the parties to the nuclear Non-Proliferation Treaty (NPT), which includes the major nuclear weapon states, affirmed that any use of nuclear weapons would cause catastrophic humanitarian consequences, and that states must comply with international humanitarian law "at all times." They also agreed that all states must make special efforts to build the framework for a nuclear weapons-free world, citing the United Nations Secretary-General's proposal for negotiations on a global nuclear abolition treaty.

Now governments have to choose: hang onto their nuclear arsenals, or uphold the rule of law to which they have agreed. They can't do both. We all know which will make us safer. Nuclear possession is a recipe for proliferation and corrosive to international humanitarian law, which, as the Vancouver Declaration says, "is essential to limiting the effects of armed conflicts, large and small, around the world."

The nuclear crisis in Japan has debunked the claims of authorities that their nuclear power stations, built with inferior containment on fault-lines, are safe and fully under control. Before something goes horribly wrong on the weapons front, we must also debunk the claims of the nuclear weapon states that nuclear weapons are safe as long as they are in the 'right hands.'

States including the US take the position that we should just trust them to take small steps towards nuclear disarmament sometime in an indefinite future. That's like trusting the nuclear power industry to police itself and voluntarily phase itself out in deference to public safety. It simply won't happen without a global prohibition enforced by the rest of the world, like the one outlined in the draft treaty circulated by the UN Secretary-General.

In 1996, the President of the International Court of Justice called nuclear weapons an "absolute evil." We have already applied international humanitarian law to other inhumane and indiscriminate (read "evil") weapons such as landmines and cluster munitions in order to achieve global treaties for banning them. Now it's time for absolute prohibition and elimination of nuclear weapons.

## **No Radiation Threat Says Media: Reporters Pulled out of Japan (Dissident Voice)**

*Meanwhile, Frightened Investors in USA and Europe Seek Protection*  
by Keith Harmon Snow / March 23rd, 2011

Reporting about the nuclear crises in Japan and around the world is getting curiouser and curiouser. Western media are heavily downplaying the threat of radiation in what amounts to an Alice in Wonderland fable of disinformation straight out of the rabbit hole.

Worried about profits and the the destabilization of the YEN and NIKKEI Index, the media is doing damage control to help keep people from flooding out of Japan and further destabilizing the Japanese economy. Given the evidence, the history of disasters and epidemics of disease, reporting that downplays Japan's radiation threat is criminal.

Meanwhile, back in the U.S.A., frightened investors are seeking protections and insurances from industry and government. Wall Street is worried. This is getting curiouser and curiouser.

For example, on 20 March 2011, CNN ran a video story, "Facts whisper, fears scream during crises," where their experts proclaim that fears of radiation are unfounded and misinformation abounds. CNN's latest nuclear expert — Dan Polansky — calls this *radiophobia*: an irrational fear of radiation with no basis in fact. Even for the Japanese nuclear workers who are closest to the Fukushima hot zone, says CNN reporter Stan Grant, "radiation might make people sick, but it won't kill them."

Meanwhile, CNN describes Dan Polansky as a "nuclear expert", who "specializes in weapons of mass destruction and knows about radiation." What they don't tell us is that Polansky works for the Georgia (USA) Department of Community Health, he studied at the **Lawrence Livermore National Laboratory (LLNL)** and the Idaho National Engineering Laboratory (**INEL**), and is a recent graduate of Radiological Emergency Planning at the Harvard School of Public Health.

Pretty good credentials, no doubt. Must be telling the truth. [Quack.]

However, LLNL and INEL are two of the Department of Energy and Department of Defense top classified weapons laboratories, both also SUPERFUND sites of massive toxic nuclear waste. Work at national laboratories like INEL and LLNL requires high-level national security clearances: it looks like Daniel Polansky is another spook.

The Harvard School of Public Health (HSPH) has produced some studies that show some incidence of disease around the Yankee Rowe reactor (Rowe, MA, U.S.A.), which is now decommissioned; but they have also helped to whitewash nuclear (and other) risks of modern day society.

This is indeed very curious.

The Harvard Center for Risk Analysis (HCRA) was founded by John D. Graham and specializes in advocating forms of risk-assessment widely criticized by community groups and legitimate health professionals. The Center gained funds from both industry and government agencies, including nuclear interests like: General Electric, the Edison Electric Institute, Electric Power Research Institute, New England Electric System (at least five nukes on the New England power grid) and Westinghouse Electric. GE and Westinghouse are two of the U.S.A.'s biggest nuke companies, and EPRI is a pro-uke think tank that has produced propaganda about nukes for more than four decades.

Harvard School of Public Health and the Harvard Center for Risk Analysis are not the same thing. Harvard School of Public Health supports the nuclear industry and helps to downplay radiation threats at many levels. However, Harvard Center for Risk Analysis is an industry front producing junk science — spurious information posited as science — and debunking truth everywhere in the corporate media.

Looking a little deeper down the rabbit hole we find, for one curious example, that David Ropeik is an Instructor in the Harvard University School of Continuing Education, Environmental Management program. Ropeik is also a former affiliate at the Harvard Center for Risk Assessment (which he says he left in 2004).

According to his own public relations biography advertised on the BAYER CropScience web page [Bayer is the big German multinational pharmaceutical corporation], Ropeik has also worked closely with the Harvard School of Public Health (HSPH) and he “has been interviewed on risk perception by *ABC Nightline*, National Public Radio, NBC *Dateline*, ABC *20/20*, Fox News, CNN, CNN International, BBC, CBC, CNBC, Voice of America, and dozens of regional radio stations nationwide.”

He has also “taught courses on media coverage of risk issues at the Harvard School of Public Health, the Kennedy School of Government, the Neiman Fellowship Program at Harvard, the Knight Science Journalism Fellowship program at MIT, Boston University’s Program in Science Journalism, the Emerson College program in Health Communication, and to the National Association of Science Writers, the Council for the Advancement of Science Writers, and the Society of Environmental Journalists.”

A long-time member of the Society of Environmental Journalists, David Ropeik is now a private consultant in Risk Perception, Risk Communication, and Risk Management with Ropeik & Associates, whose nuclear clients include Entergy Power Corporation (owns the dangerously unsafe Vermont Yankee Nuclear Power Station), Edison Electric Institute, the Electric Power Research Institute, the American Nuclear Society, the Egyptian Nuclear Authority, the International Atomic Energy Agency, the Nuclear Institute, the Massachusetts Department of Public Health (who did a study on the incidence of disease on the radiation ‘pathways’ from the Yankee Rowe Nuclear Power Station), The Veterans Board for Dose Reconstruction, Department of Defense, and etc., and etc., and etc.

“Risk is a subjective affair,” reads the home page of Ropeik & Associates. “It’s not just a matter of the facts, but also how those facts feel. Understanding why some risks feel more frightening, and some less, is essential for communicating about risk effectively, and for tackling the human behavioral aspects of overall risk management.”

As far as the Society of Environmental Journalists, this is just another trade industry group, like any ‘Society of Professional This-or-That’, which maintains deep ties to industry and the media corporations that have censored and distorted the truth about radiation, nuclear weapons and nuclear power. For example, a look at their sponsors and foundation donors quickly leads to a large list of corporate interests, including nuclear corporations.

What a curious world we live in.

Given that there is “so little threat from radiation” in Japan, it is very curious that NBC pulled their entire news team out of Japan. Curiously, it seems that CNN’s Anderson Cooper also pulled out of Japan — and who could blame him! — and is now reporting on Libya from somewhere else (Hong Kong?).

On March 20, 2011, Japanese Officials confirmed radiation food poisoning. “Chief Cabinet Secretary Yukio Edano said checks of milk from Fukushima prefecture, where the plant is located, and of spinach grown in Ibaraki, a neighbouring prefecture, surpassed limits set by the government... It was the government’s first report of food being contaminated by radiation since the March 11 quake and tsunami unleashed the nuclear crisis.”

Thousands of U.S. military families have also been evacuated from Japan under the U.S. Department of Defense ‘voluntary evacuation’ program initiated because of radiation concerns.

Meanwhile, on March 19, 2011 financial media began reporting that U.S. investors seeing the nuclear industry in Japan crash, burn and melt are frightened of Financial Losses due to Boring Utility Debt.

Curiouser and curiouser.

“Investors are seeking protection from a public backlash against nuclear power producers as the threat from earthquake-damaged reactors in Japan stokes calls by U.S. lawmakers to limit plants in this nation,” reported *Bloomberg News*.

“Utility companies, typically considered a haven among credit investors because of their resilience in economic downturns, are being punished as Tokyo Electric Power Co. struggles to cool damaged reactors. Environmental groups want limits on U.S. nuclear plants, and Representative Edward Markey is seeking a moratorium on facilities in seismically active areas. Nuclear-power executives say the nation’s reactors can withstand such disasters.”

Behind the scenes, corporations and money markets managers and futures investors are swapping debt portfolios and jockeying to maximize profits and minimize losses.

While the people of Japan suffer the fate of massive radiation emissions — ‘leaks’ is another term invented by the industry and used by media to downplay the invisible radiation dispersed near any reactor — the utility companies are portrayed as the victims. Utility companies are “being punished” and “investors seeking protection” are now the victims.

Curiouser, and curiouser, and curiouser.

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Articles are not written by DOE or NNSA personnel, and NNSA cannot vouch for their accuracy.

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**From:** RMPACTSU\_ELNRC  
**To:** LIA01 Hoc; LIA02 Hoc; ET07 Hoc; Harrington, Holly; Burnell, Scott; McIntyre, David  
**Subject:** FYI: WH blog post on japan  
**Date:** Thursday, March 24, 2011 11:02:17 AM

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**Subject:** WH blog post on japan

Sorry about the delay on WH side in getting this up for us.

<http://www.whitehouse.gov/blog/2011/03/23/usg-response-japan-earthquake-and-tsunami>

NNNN / 41

**From:** [Courret, Ivonne](#)  
**To:** [McIntyre, David](#)  
**Subject:** MEDIA - WSJ - ANI and Price  
**Date:** Thursday, March 24, 2011 1:10:47 PM  
**Importance:** High

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American Nuclear Insurers (ANI)

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**From:** McQueen, MP [<mailto:mp.mcqueen@wsj.com>]  
**Sent:** Thursday, March 24, 2011 12:07 PM  
**To:** OPA Resource  
**Subject:** request for follow up information re ANI

This report from our correspondents indicates Japanese reactors' insurance doesn't cover acts of natural disaster. Are we sure ours thru ANI does? Thank you.

**3. PLANT OPERATOR SEEKS BILLIONS IN LOANS.** Atsuko Fukase. The Wall Street Journal. 03/24/2011. Page A7. The Tokyo Electric Power Co. (Tepco), the operator of Fukushima Daiichi nuclear power plant damaged by the March 11 earthquake and tsunami, is seeking approximately \$25 billion in loans to repair its damaged power facilities. It is unclear how much Tepco will ultimately have to pay on top of compensation claims paid by the national government. Major banks in Japan seem to be prepared to provide most of the cash needed for repairs, but inside sources say that the loans sought by Tepco are so large that the nation's entire banking sector would be required to cooperate on the lending. During the last week in March, Yoshiaki Takaki, minister of education, culture, sports, science and technology, said that Tepco is likely to have to take some responsibility. The article explains that nuclear power plants operating in Japan are required to register with the General Insurance Association of Japan and participate in a nuclear insurance plan operated by Takaki's ministry. However, damages or claims related to earthquakes and tsunamis are not covered by the insurance association. Under the nation's 1961 Act on Compensation for Nuclear Damage, the operator of a nuclear facility is not liable for damage caused by its reactors if the damage resulted from a major natural disaster. The law means that insurers of the nuclear power plants will probably not have to make payouts.

NNNN/42

**From:** Harrington, Holly  
**To:** Brenner, Eliot; Burnell, Scott; Couret, Ivonne; Hayden, Elizabeth; McIntyre, David; Chandrathil, Prema; Dricks, Victor; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Screnci, Diane; Sheehan, Neil; Uselding, Lara  
**Cc:** Bonaccorso, Amy; Deavers, Ron  
**Subject:** DOE measurements from Japan, if anyone gets asked  
**Date:** Thursday, March 24, 2011 2:56:21 PM

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DOE has made public the AMS radiological measurement data from the overflights in Japan. The web link is at <http://energy.gov/news/10194.htm> .

NNNN/43

**From:** Hayden, Elizabeth  
**To:** Harrington, Holly; Brenner, Eliot; Burnell, Scott; Couret, Ivonne; McIntyre, David; Chandrathil, Prema; Dricks, Victor; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Screnci, Diane; Sheehan, Neil; Uselding, Lara  
**Subject:** RE: In case this was not already communicated  
**Date:** Thursday, March 24, 2011 3:54:35 PM

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We're working on a press release for the RIS that is suppose to be issued tomorrow or Monday on our request to licensees to voluntarily report on confirmed anomalous environmental radioactivity measurements likely from Fukushima plants. We plan to use the information to complement the federal and state monitoring programs.

*Beth Hayden*  
*Senior Advisor*  
*Office of Public Affairs*  
*U.S. Nuclear Regulatory Commission*  
*--- Protecting People and the Environment*  
*301-415-8202*  
*elizabeth.hayden@nrc.gov*

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**From:** Harrington, Holly  
**Sent:** Thursday, March 24, 2011 12:13 PM  
**To:** Brenner, Eliot; Burnell, Scott; Couret, Ivonne; Hayden, Elizabeth; McIntyre, David; Chandrathil, Prema; Dricks, Victor; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Screnci, Diane; Sheehan, Neil; Uselding, Lara  
**Subject:** In case this was not already communicated

Ignore, if you're already received this information, but just in case:

**From:** LIA04 Hoc  
**Sent:** Wednesday, March 23, 2011 6:33 PM  
**To:** LIA08 Hoc; LIA06 Hoc; Barker, Allan; Browder, Rachel; Erickson, Randy; Logaras, Harral; Maier, Bill; McNamara, Nancy; Tiff, Doug; Trojanowski, Robert; Woodruff, Gena  
**Cc:** OST05 Hoc; LIA04 Hoc; Piccone, Josephine; Jackson, Deborah; Easson, Stuart; Flannery, Cindy; Lukes, Kim; Maupin, Cardelia; Noonan, Amanda; Rautzen, William; Rivera, Alison; Ryan, Michelle; Turtill, Richard; Virgilio, Rosetta  
**Subject:** FYI - Trace amounts of I-131 in rainfall samples of Eastern plants

The HQs Operations Center (PMT and LIA teams) are working on a plan of action regarding confirmed samples of trace amounts of I-131 at three northeastern nuclear power plants – Ginna (NY), Nine Mile Point (NY), and Millstone (CT). We suspect that the info or news of positive samples may be released to the public ahead of the federal government. EPA has been contacted. NEI has agreed to collect the data from licensees and provide the data to NRC.

**The ET requested that we hold off on any communications on this issue outside of the NRC until further notice.**

NNNN / 44

**From:** Moderator  
**Date:** Thursday, March 24, 2011 4:04:31 PM  
**Posted At:** U.S. NRC Blog  
**Conversation:** Latest NRC Actions Related to Ongoing Events in Japan  
**Subject:** Latest NRC Actions Related to Ongoing Events in Japan

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The NRC Commissioners voted this week to direct the staff to launch a review of U.S. nuclear power plant safety – as a direct result of the Japanese nuclear power emergency. The review will include a task force that will do both a short-term and long-term analysis of lessons learned. The review will be public when it's completed. The task force doing the reports includes current senior managers at the NRC and former NRC experts with relevant experience.

The Chairman and Commissioners set very short deadlines for the task force. They want formal updates on the short-term effort in 30, 60 and 90 days. (Already NRC senior technical staff briefed the Commission on Monday about efforts so far. A [transcript](#) of that briefing is online. And the Commission wants the taskforce to start long-term evaluation within 90 days and should have a report on recommendations within six months of beginning that evaluation.

We'll post more information on the results of the taskforce both here on the blog and at [www.nrc.gov](http://www.nrc.gov).

In a decision also related to events in Japan, the Commission revised its schedule for meetings and briefings to remain focused on the agency's response to events in Japan. A revised Commission meeting schedule will be posted shortly on the NRC website here: <http://www.nrc.gov/public-involve/public-meetings/schedule.html>.

In other news, the IG report released today is focused on a subset of defects — manufacturing defects. Both utilities and NRC inspectors have processes for identifying and reporting manufacturing defects. The fundamental issue identified by the report is administrative and pertains to how these defects are reported. The NRC has a variety of other regulations that effectively encompass reporting all defects, and the NRC continues to conclude plants are operating safely. The NRC will look at the IG report to see if our reporting systems can be further strengthened.

*Eliot Brenner*  
*Public Affairs Director*

Filed under: [Emergency Preparedness and Response](#), [General](#) Tagged: [nuclear](#)     
   

NNNN/45

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**From:** Janbergs, Holly  
**To:** Burnell, Scott  
**Subject:** Jaczko Interview Request  
**Date:** Wednesday, March 16, 2011 6:52:22 PM

---

Erica Hill from the Early Show on CBS would like Jaczko to do a live spot in their morning show from 7-9 to update on the situation in Japan. She's also willing to pretape. I told her it was not likely but I would put her name into the queue.

hille@cbsnews.com  
917-445-8243

Beth Janbergs  
Public Affairs Assistant  
301-415-8211

NNNN/46

**From:** [NRC Announcement](#)  
**To:** [NRC Announcement](#)  
**Subject:** Daily: 6 New Items from Thursday, March 24, 2011  
**Date:** Thursday, March 24, 2011 10:01:44 PM

NRC Daily Announcements

Highlighted Information and Messages



**Thursday March 24, 2011 -- Headquarters Edition**

**[EWRA: Update Regarding the Geranium Sale for the Earth Day Celebration](#)**  
**[Employee Resources: Work Schedule and Premium Pay Guidance for Response to Events in Japan](#)**

**[Policy Reminder: Reminder on Use of Travel Charge Card Policies](#)**

**[General Interest: CPR/AED Training Classes](#)**

**[Employee Resources: Rotational Opportunity - NSIR/DSO/RSOB, Cyber Security Specialist/Program Manager, GG-12/13/14/15](#)**

**[Employee Resources: Rotational Opportunity - NSIR/DSO/RSOB, Cyber Security Specialist, GG-7/9/11 - Multiple Positions](#)**

## **EWRA: Update Regarding the Geranium Sale for the Earth Day Celebration**

The EWRA regrets to inform our loyal patrons that the annual Geranium sale will not take place this year. Based on prior years' inventory of plants that have been sold, the vendor informed us that they will not be able to accommodate EWRA and its Earth Day celebration this year.



(2011-03-24 00:00:00.0)

[View item in a new window](#)

## **Employee Resources: Work Schedule and Premium Pay Guidance for Response to Events in Japan**

NRC has implemented various work schedule and premium pay flexibilities as it strives to accommodate the challenging and often unpredictable work schedule and premium pay needs of employees responding to events in Japan. The Office of Human Resources (HR) has distributed information to managers, supervisors, responders, and timekeepers to summarize the options and guidelines for determining work schedules and premium pay for employees serving in and supporting the Operations Center, or working in Japan. The guidance applies to employees whose Offices/Regions determine that the employees directly support response efforts in the Operations Center and Japan even if the employees do not physically work in the Operations Center.

HR has posted the [Work Schedule and Premium Pay Guidance](#) on its intranet page and expects to add frequently asked questions. Based on questions received so far, HR notes that:

NNNN/47

- For employees on a NEWFlex schedule, HRMS will not accept more than 11.25 hours of regular work per day. Any amount worked beyond that on a single work day must be entered as overtime or compensatory time worked rather than regular time. (Employees on Expanded Compressed schedules may work more than 11.25 regular hours per day.)
- The maximum number of credit hours that an employee may carry over from one pay period to the next remains 24 credit hours. This is restricted by a governmentwide rule.
- Although the guidance applies to Senior Executive Service members (executives), executives remain ineligible for premium pay or credit hours as a matter of governmentwide law.

For further information about selecting work schedules and authorizing premium pay for responders, please contact [Lawrence Davidson](#), 301-492-2286.



(2011-03-24 00:00:00.0)

[View item in a new window](#)

### **Policy Reminder: Reminder on Use of Travel Charge Card Policies**

Yellow Announcement No. 037, "Reminder on Use of Travel Charge Card Policies," is now available on the [internal Web site](#) under Yellow Announcements.

This announcement can also be found in the ADAMS 2011 Yellow Announcements folder in the Main Library of the ADAMS Document Manager. In the folder, Yellow Announcements are arranged in report number order.

-----  
 If you have difficulty accessing a Web link in this announcement, contact the [NRC Announcement Coordinator](#), Beverly Martin, ADM/DAS, 301-492-3674.



(2011-03-24 00:00:00.0)

[View item in a new window](#)

### **General Interest: CPR/AED Training Classes**

The Office of Human Resources is offering CPR training courses, entitled "Cardiopulmonary Resuscitation (CPR)/Automated External Defibrillator (AED) for the Community and Workplace" for employees who wish to become CPR certified or maintain their CPR certification. The classes will be held at the Professional Development Center in Bethesda.

Listed below are the dates and time for the training:

Wednesday, April 20, 2011	8:30 a.m. - 12:30 p.m.
Thursday, April 28, 2011	8:30 a.m. - 12:30 p.m.
Wednesday, May 11, 2011	8:30 a.m. - 12:30 p.m.

If you would like to attend one of these sessions, please register through [iLearn](#).

Please remember that CPR certification is valid for 2 years from the date of issuance. To maintain a current certification, you have to attend a training session.

**Course Description**

- Covers the proper way to recognize and respond to an emergency in which a person may need CPR or an AED
- Taught by certified instructors from MedicFirst Aid International, Inc.
- Course duration - 4 hours
- 12 students per class
- Upon completion, the participants will be certified for 2 years

For additional information including training dates, please visit the HR [CPR/AED Web site](#).

Contact: [Sandra Johnson](#), HR/WLBB, 301-492-2284



(2011-03-24 00:00:00.0)

[View item in a new window](#)

**Employee Resources: Rotational Opportunity - NSIR/DSO/RSOB, Cyber Security Specialist/Program Manager, GG-12/13/14/15**

The **Office of Nuclear Security and Incident Response, Division of Security Operations, Reactor Security Oversight Branch**, has one rotational opportunity for a **Cyber Security Specialist/Program Manager** for employees at the **GG-12/13/14/15 level**. This rotation will last for 6-12 months, beginning in mid-to-late April 2011.

Detailed information is available on the [NRC internal Web page](#).

-----  
If you have difficulty accessing a Web link in this announcement, contact the [NRC Announcement Coordinator](#), Beverly Martin, ADM/DAS, 301-492-3674.



(2011-03-24 00:00:00.0)

[View item in a new window](#)

**Employee Resources: Rotational Opportunity - NSIR/DSO/RSOB, Cyber Security Specialist, GG-7/9/11 - Multiple Positions**

The **Office of Nuclear Security and Incident Response, Division of Security Operations, Reactor Security Oversight Branch**, has multiple rotational assignment opportunities for NRC employees as a **Cyber Security Specialist** at the **GG- 7/9/11** grade level in the Cyber Security Area. This rotation will last for 3+ months, beginning in mid-to-late April 2011.

Detailed information is available on the [NRC internal Web page](#).

-----  
If you have difficulty accessing a Web link in this announcement, contact the NRC  
Announcement Coordinator, Beverly Martin, ADM/DAS, 301-492-3674.



(2011-03-24 00:00:00.0)

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**[Frequently Asked Questions About the NRC Daily Announcements Email](#)**

**From:** CNN Breaking News  
**To:** [textbreakingnews@ema3lsv06.turner.com](mailto:textbreakingnews@ema3lsv06.turner.com)  
**Subject:** CNN Breaking News  
**Date:** Thursday, March 24, 2011 10:59:15 PM

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-- Death toll from Japan's earthquake and tsunami reaches 10,035 people, with 17,443 still missing, national police say.

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One CNN Center Atlanta, GA 30303  
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NNNN/48

**From:** Sheehan, Neil  
**To:** Burnell, Scott; Screnci, Diane; Hayden, Elizabeth  
**Cc:** Brenner, Eliot; Harrington, Holly; McIntyre, David; Couret, Ivonne; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Chandrathil, Prema; Dricks, Victor; Uselding, Lara  
**Subject:** RE: Number of plants to be reviewed as part of seismic study  
**Date:** Friday, March 25, 2011 9:06:21 AM

---

I would hope so. There seems to be a disconnect here and it's resulting in different PAOs providing different information.

---

**From:** Burnell, Scott  
**Sent:** Friday, March 25, 2011 9:05 AM  
**To:** Sheehan, Neil; Screnci, Diane; Hayden, Elizabeth  
**Cc:** Brenner, Eliot; Harrington, Holly; McIntyre, David; Couret, Ivonne; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Chandrathil, Prema; Dricks, Victor; Uselding, Lara  
**Subject:** RE: Number of plants to be reviewed as part of seismic study

No, no new decisions post-quake. We'll be most interested in the 27 plants' responses, but we expect every CEUS plant to respond to the GL. The Q&A should explain some of this.

---

**From:** Sheehan, Neil  
**Sent:** Friday, March 25, 2011 9:03 AM  
**To:** Burnell, Scott; Screnci, Diane; Hayden, Elizabeth  
**Cc:** Brenner, Eliot; Harrington, Holly; McIntyre, David; Couret, Ivonne; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Chandrathil, Prema; Dricks, Victor; Uselding, Lara  
**Subject:** RE: Number of plants to be reviewed as part of seismic study

I understand the review looked at all plants. We were told very clearly last September the number to receive more focused evaluation has been narrowed to 27. When did that change? Has a decision been made to now broaden out to all of the plants once again because of events in Japan?

---

**From:** Burnell, Scott  
**Sent:** Friday, March 25, 2011 9:02 AM  
**To:** Screnci, Diane; Sheehan, Neil; Hayden, Elizabeth  
**Cc:** Brenner, Eliot; Harrington, Holly; McIntyre, David; Couret, Ivonne; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Chandrathil, Prema; Dricks, Victor; Uselding, Lara  
**Subject:** RE: Number of plants to be reviewed as part of seismic study

Incomplete information, perhaps... The GI-199 effort has always included all CEUS plants.

---

**From:** Screnci, Diane  
**Sent:** Friday, March 25, 2011 9:01 AM  
**To:** Burnell, Scott; Sheehan, Neil; Hayden, Elizabeth  
**Cc:** Brenner, Eliot; Harrington, Holly; McIntyre, David; Couret, Ivonne; Hannah, Roger; Ledford, Joey;

NNNN/49

Mitlyng, Viktoria; Chandrathil, Prema; Dricks, Victor; Uselding, Lara  
**Subject:** RE: Number of plants to be reviewed as part of seismic study

Is that a change because of the earthquake in Japan... or have we been providing inaccurate information for two weeks?

**DIANE SCRENCI**

*SR. PUBLIC AFFAIRS OFFICER*

*USNRC, RI*

*610/337-5330*

---

**From:** Burnell, Scott  
**Sent:** Friday, March 25, 2011 9:00 AM  
**To:** Sheehan, Neil; Hayden, Elizabeth  
**Cc:** Brenner, Eliot; Harrington, Holly; McIntyre, David; Couret, Ivonne; Screnci, Diane; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Chandrathil, Prema; Dricks, Victor; Uselding, Lara  
**Subject:** RE: Number of plants to be reviewed as part of seismic study

We've got GI-199 Q&A ready for distribution and that should help, but the short version is that every CEUS plant will get the GL and perform updated analysis, it's the 27 we'll be particularly interested in.

---

**From:** Sheehan, Neil  
**Sent:** Friday, March 25, 2011 8:59 AM  
**To:** Hayden, Elizabeth  
**Cc:** Brenner, Eliot; Harrington, Holly; Burnell, Scott; McIntyre, David; Couret, Ivonne; Screnci, Diane; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Chandrathil, Prema; Dricks, Victor; Uselding, Lara  
**Subject:** Number of plants to be reviewed as part of seismic study

Beth,

I see you're quoted in the Greenwire story as saying we may now look at seismic risk for all of the U.S. reactors:

<http://www.eenews.net/Greenwire/print/2011/03/24/4> . We were told last September that the number of reactors making the cut for continued seismic evaluation was 27. Has that now changed? I'm confused.

Neil

**From:** OST02 HOC  
**To:** Abrams, Charlotte; Abu-Eid, Bobby; Adams, John; Afshar-Tous, Mugeh; Ahn, Hosung; Alemu, Bezakulu; Algama, Don; Alter, Peter; Anderson, Brian; Anderson, James; Arndt, Steven; Arribas-Colon, Maria; Ashkeboussi, Nima; Athey, George; Baker, Stephen; Ballam, Nick; Barnhurst, Daniel; Barr, Cynthia; Barss, Dan; Bazian, Samuel; Bensi, Michelle; Bergman, Thomas; Berry, Rollie; Bhachu, Ujagar; Bloom, Steven; Blount, Tom; Boger, Bruce; Bonnette, Cassandra; Borchardt, Bill; Bowers, Anthony; Bowman, Gregory; Boyce, Tom (RES); Brandon, Lou; Brandt, Philip; Brenner, Eliot; Brock, Kathryn; Brown, Cris; Brown, David; Brown, Eva; Brown, Frederick; Brown, Michael; Bukharin, Oleg; Burnell, Scott; Bush-Goddard, Stephanie; Campbell, Stephen; Camper, Larry; Carpenter, Cynthia; Carter, Mary; Case, Michael; Casto, Greg; Cecere, Bethany; Cervera, Margaret; Chazell, Russell; Chen, Yen-Ju; Cheok, Michael; Chokshi, Nilesh; Chowdhury, Prosanta; Chung, Donald; Circle, Jeff; Clement, Richard; Clinton, Rebecca; Coggins, Angela; Collins, Frank; Cool, Donald; Correia, Richard; Corson, James; Costa, Arlon; Couret, Ivonne; Craffey, Ryan; Crutchley, Mary Glenn; Cruz, Zahira; Cuadrado, Leira; Dacus, Eugene; DeCicco, Joseph; Decker, David; Dembek, Stephen; Devlin, Stephanie; Dimmick, Lisa; Doane, Margaret; Dorman, Dan; Dorsey, Cynthia; Dozier, Jerry; Drake, Margaret; Droggitis, Spiros; Dube, Donald; Dudes, Laura; Eads, Johnny; Emche, Danielle; English, Lance; Erlanger, Craig; Esmail, Hossein; Figueroa, Roberto; Fiske, Jonathan; Flanders, Scott; Flannery, Cindy; Floyd, Daphene; Foggie, Kirk; Foster, Jack; Fragovannis, Nancy; Franovich, Rani; Frazier, Alan; Freshman, Steve; Fuller, Edward; Galletta, Thomas; Gambone, Kimberly; Gardocki, Stanley; Gartman, Michael; Gibson, Kathy; Glitter, Joseph; Gilmer, James; Glenn, Nichole; Gordon, Dennis; Gott, William; Grant, Jeffery; Greenwood, Carol; Greenwood, Carol; Grimes, Kelly; Grobe, Jack; Gross, Allen; Gulla, Gerald; Hale, Jerry; Hardesty, Duane; Hardin, Kimberly; Hardin, Leroy; Harrington, Holly; Harris, Tim; Harrison, Donnie; Hart, Ken; Hart, Michelle; Harvey, Brad; Hasselberg, Rick; Hayden, Elizabeth; Helton, Donald; Henderson, Karen; Hilland, Patrick; Holahan, Patricia; Holahan, Vincent; Holian, Brian; HOO Hoc; Horn, Brian; Howard, Tabitha; Huffert, Anthony; Hurd, Sapna; Huyck, Doug; Imboden, Andy; Isom, James; Jackson, Karen; Jacobson, Jeffrey; Jervey, Richard; Jessie, Janelle; Johnson, Michael; Jolicoeur, John; Jones, Andrea; Jones, Cynthia; Jones, Henry; Kahler, Carolyn; Kammerer, Annie; Karas, Rebecca; Kauffman, John; Khan, Omar; Kolb, Timothy; Kotzalas, Margie; Kowalczyk, Jeffrey; Kratchman, Jessica; Kugler, Andrew; Lamb, Christopher; Lane, John; Larson, Emily; Laur, Steven; LaVie, Steve; Lewis, Robert; Li, Yong; Lichatz, Taylor; Lising, Jason; Lombard, Mark; Lubinski, John; Lui, Christiana; Lukes, Kim; Lynch, Jeffery; Ma, John; Mamish, Nader; Manahan, Michelle; Marksberry, Don; Marshall, Jane; Masao, Nagai; Maupin, Cardelia; Mavros, Lauren; Mazaika, Michael; McConnell, Keith; McCoppin, Michael; McDermott, Brian; McGinty, Tim; McGovern, Denise; McIntyre, David; McMurtray, Anthony; Merritt, Christina; Meyer, Karen; Miller, Charles; Miller, Chris; Milligan, Patricia; Miranda, Samuel; Mohseni, Aby; Moore, Scott; Morlang, Gary; Morris, Scott; Mroz (Sahm), Sara; Munson, Clifford; Murray, Charles; Nerret, Amanda; Nguyen, Caroline; Norris, Michael; Norton, Charles; Opara, Stella; Ordaz, Vonna; Owens, Janice; Padovan, Mark; Parillo, John; Patel, Jay; Patel, Pravin; Patrick, Mark; Perin, Vanice; Pope, Tia; Powell, Amy; Purdy, Gary; Quinlan, Kevin; Raddatz, Michael; Ragland, Robert; Ralph, Melissa; Ramsey, Jack; Reed, Elizabeth; Reed, Sara; Reed, Wendy; Reeves, Rosemary; Reis, Terrence; Resner, Mark; Riley (OCA), Timothy; Riner, Kelly; Rini, Brett; Robinson, Edward; Rodriguez-Luccioni, Hector; Rodgenbrodt, William; Ropon, Kimberly; Rosales-Cooper, Cindy; Rosenberg, Stacey; Ross-Lee, MaryJane; Roundtree, Amy; Ruland, William; Russell, Tonya; Ryan, Michelle; Salay, Michael; Salter, Susan; Salus, Amy; Sanfilippo, Nathan; Santos, Daniel; Scarborough, Thomas; Schaperow, Jason; Schmidt, Duane; Schmidt, Rebecca; Schoenebeck, Greg; Schrader, Eric; Schwartzman, Jennifer; Seber, Dogan; See, Kenneth; Shane, Raeann; Shea, James; Shepherd, Jill; Sheron, Brian; Skarda, Raymond; Skeen, David; Sloan, Scott; Smiroldo, Elizabeth; Smith, Brooke; Smith, Stacy; Smith, Theodore; Stahl, Eric; Stang, Annette; Stark, Johnathan; Steger (Tucci), Christine; Stieve, Alice; Stone, Rebecca; Stransky, Robert; Sturz, Fritz; Sullivan, Randy; Summers, Robert; Sun, Casper; Tappert, John; Tegeler, Bret; Temple, Jeffrey; Thaggard, Mark; Thomas, Eric; Thorp, John; Tiruneh, Nebiyu; Tobin, Jennifer; Trefethen, Jean; Tschiltz, Michael; Turtill, Richard; Uhle, Jennifer; Valencia, Sandra; Vaughn, James; Vick, Lawrence; Virgilio, Martin; Virgilio, Rosetta; Ward, Leonard; Ward, William; Wastler, Sandra; Watson, Bruce; Webber, Robert; Weber, Michael; White, Bernard; Wiggins, Jim; Williams, Donna; Williams, Joseph; Williamson, Linda; Willis, Dori; Wimbush, Andrea; Wittick, Brian; Wray, John; Wright, Lisa (Gibney); Wright, Ned; Wunder, George; Young, Francis; Zimmerman, Jacob; Zimmerman, Roy

**Subject:** Japanese Earthquake ERO Staffing March 20-26, 2011 (Pay Period 7, Week 2)  
**Date:** Friday, March 25, 2011 12:31:14 PM  
**Attachments:** Japan Earthquake - ERO Staffing Schedule - March 20-26.pdf

---

Good Afternoon,

Attached is the OPS Center revised watchbill for March 20-26. The watchbill for the week of March 27-April 2 will be sent by Saturday, March 27.

If you need to change the schedule, please send an email to OST02 HOC and your Teams Coordinator.

\*\*\*\*\*  
EST Admin Support

NWNN/50

NRC Operations Center  
eMail: [OST02.HOC@nrc.gov](mailto:OST02.HOC@nrc.gov)  
301-816-5100 x5600

Japan Earthquake ERO Staffing Roster  
 March 20-26, 2011  
 Pay Period 7 - Week 2

Position	Date	Time	Staff
<b>Executive Team</b>			
<b>ET Director</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Mike Johnson
Sun	20-Mar	7am - 3pm	Jim Wiggins
Sun	20-Mar	3pm-11pm	Brian Sheron
Sun-Mon	3/20-3/21	11pm - 7am	Mike Johnson
Mon	21-Mar	7am - 3pm	Mike Weber
Mon	21-Mar	3pm-11pm	Jim Wiggins
Mon-Tues	3/21-3/22	11pm - 7am	Mike Johnson
Tues	22-Mar	7am - 3pm	Mike Weber
Tues	22-Mar	3pm-11pm	Jim Wiggins
Tues-Wed	3/22-3/23	11pm - 7am	Bruce Boger
Wed	23-Mar	7am - 3pm	Mike Weber
Wed	23-Mar	3pm-11pm	Roy Zimmerman
Wed-Thur	3/23-3/24	11pm - 7am	Bruce Boger
Thur	24-Mar	7am - 3pm	Mike Weber
Thur	24-Mar	3pm-11pm	Roy Zimmerman
Thur-Fri	3/24-3/25	11pm - 7am	Jennifer Uhle
Fri	25-Mar	7am - 3pm	Jim Dyer
Fri	25-Mar	3pm-11pm	Roy Zimmerman
Fri-Sat	3/25-3/26	11pm-7am	Jennifer Uhle
Sat	26-Mar	7am - 3pm	Jim Dyer
Sat	26-Mar	3pm-11pm	Brian Sheron
Sat-Sun	3/26-3/27	11pm - 7am	Jennifer Uhle
<b>ET Response Advisor</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Scott Morris
Sun	20-Mar	7am - 3pm	Chris Miller
Sun	20-Mar	3pm-11pm	Mary Jane (MJ) Ross-Lee
Sun-Mon	3/20-3/21	11pm - 7am	Scott Morris
Mon	21-Mar	7am - 3pm	Brian McDermott
Mon	21-Mar	3pm-11pm	Chris Miller
Mon-Tues	3/21-3/22	11pm - 7am	Scott Morris
Tues	22-Mar	7am - 3pm	Mary Jane (MJ) Ross-Lee
Tues	22-Mar	3pm-11pm	Chris Miller
Tues-Wed	3/22-3/23	11pm - 7am	Tim McGinty
Wed	23-Mar	7am - 3pm	Brian McDermott
Wed	23-Mar	3pm-11pm	Joe Giitter
Wed-Thur	3/23-3/24	11pm - 7am	Tim McGinty
Thur	24-Mar	7am - 3pm	Mary Jane (MJ) Ross-Lee
Thur	24-Mar	3pm-11pm	Joe Giitter
Thur-Fri	3/24-3/25	11pm - 7am	Tim McGinty
Fri	25-Mar	7am - 3pm	Mary Jane (MJ) Ross-Lee
Fri	25-Mar	3pm-11pm	Joe Giitter
Fri-Sat	3/25-3/26	11pm-7am	Tim McGinty
Sat	26-Mar	7am - 3pm	Mary Jane (MJ) Ross-Lee
Sat	26-Mar	3pm-11pm	Joe Giitter
Sat-Sun	3/26-3/27	11pm - 7am	Chris Miller
<b>ET Rx Prot Measures &amp; State Coordinator</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Rob Lewis

## Japan Earthquake ERO Staffing Roster

March 20-26, 2011

Pay Period 7 - Week 2

Sun	20-Mar	7am - 3pm	Vonna Ordaz
Sun	20-Mar	3pm-11pm	Larry Camper
Sun-Mon	3/20-3/21	11pm - 7am	Cynthia Carpenter
Mon	21-Mar	7am - 3pm	Charlie Miller
Mon	21-Mar	3pm-11pm	Larry Camper
Mon-Tues	3/21-3/22	11pm - 7am	Rob Lewis
Tues	22-Mar	7am - 3pm	Charlie Miller
Tues	22-Mar	3pm-11pm	Patricia Holahan
Tues-Wed	3/22-3/23	11pm - 7am	Cynthia Carpenter
Wed	23-Mar	7am - 3pm	Charlie Miller
Wed	23-Mar	3pm-11pm	Patricia Holahan
Wed-Thur	3/23-3/24	11pm - 7am	N/A
Thur	24-Mar	7am - 3pm	Larry Camper
Thur	24-Mar	3pm-11pm	Cynthia Carpenter
Thur-Fri	3/24-3/25	11pm - 7am	N/A
Fri	25-Mar	7am - 3pm	Cynthia Carpenter
Fri	25-Mar	3pm-11pm	Patricia Holahan
Fri-Sat	3/25-3/26	11pm-7am	N/A
Sat	26-Mar	7am - 3pm	N/A
Sat	26-Mar	3pm-11pm	N/A
Sat-Sun	3/26-3/27	11pm - 7am	N/A
<b>Executive Briefing Team</b>			
<b>EBT Admin. Assistant</b>			
Sat-Sun	3/19-3/20	11pm - 9am	Sapna Hurd
Sun	20-Mar	9am - 7pm	Annette Stang
Sun-Mon	3/20-3/21	7pm-7am	Carolyn Kahler
Mon	21-Mar	7am - 3pm	A. Stang (7-11) / Sapna Hurd (11-3)
Mon	21-Mar	3pm-11pm	Tia Pope
Mon-Tues	3/21-3/22	11pm - 7am	Christina Merritt
Tues	22-Mar	7am - 3pm	Carolyn Kahler/Sapna Hurd
Tues	22-Mar	3pm-11pm	Jon Fiske
Tues-Wed	3/22-3/23	11pm - 7am	Tia Pope
Wed	23-Mar	7am - 3pm	Jon Fiske
Wed	23-Mar	3pm-11pm	Annette Stang
Wed-Thur	3/23-3/24	11pm - 7am	Christina Merritt
Thur	24-Mar	7am - 3pm	Carolyn Kahler/Sapna Hurd
Thur	24-Mar	3pm-11pm	Jonathan Fiske
Thur-Fri	3/24-3/25	11pm - 7am	Tia Pope
Fri	25-Mar	7am - 3pm	Jon Fiske
Fri	25-Mar	3pm-11pm	Sapna Hurd
Fri-Sat	3/25-3/26	11pm-7am	Carolyn Kahler
Sat	26-Mar	7am - 3pm	Kelly Riner
Sat	26-Mar	3pm-11pm	Louise Lovell
Sat-Sun	3/26-3/27	11pm - 7am	Jonathan Fiske
<b>EBT Coordinator</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Jim Andersen
Sun	20-Mar	7am - 3pm	Yen-Ju Chen
Sun	20-Mar	3pm-11pm	Caroline Nguyen
Sun-Mon	3/20-3/21	11pm - 7am	Jim Andersen
Mon	21-Mar	7am - 3pm	Yen-Ju Chen

## Japan Earthquake ERO Staffing Roster

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Mon	21-Mar	3pm-11pm	Sara Mroz
Mon-Tues	3/21-3/22	11pm - 7am	Jim Andersen
Tues	22-Mar	7am - 3pm	Caroline Nguyen
Tues	22-Mar	3pm-11pm	Sara Mroz
Tues-Wed	3/22-3/23	11pm - 7am	Jim Andersen
Wed	23-Mar	7am - 3pm	Yen-Ju Chen
Wed	23-Mar	3pm-11pm	Sara Mroz
Wed-Thur	3/23-3/24	11pm - 7am	Jim Andersen
Thur	24-Mar	7am - 3pm	Yen-Ju Chen
Thur	24-Mar	3pm-11pm	Sara Mroz
Thur-Fri	3/24-3/25	11pm - 7am	Jim Andersen
Fri	25-Mar	7am - 3pm	Caroline Nguyen
Fri	25-Mar	3pm-11pm	Sara Mroz
Fri-Sat	3/25-3/26	11pm-7am	Jim Andersen
Sat	26-Mar	7am - 3pm	Yen-Ju Chen/Tonya Russell
Sat	26-Mar	3pm-11pm	Sara Mroz
Sat-Sun	3/26-3/27	11pm - 7am	Jim Anderson
<b>Executive Support Team</b>			
<b>EST Status Officer</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Doug Huyck
Sun	20-Mar	7am - 3pm	Craig Erlanger
Sun	20-Mar	3pm-11pm	John Jolicoeur
Sun-Mon	3/20-3/21	11pm - 7am	Doug Huyck
Mon	21-Mar	7am - 3pm	Jane Marshall
Mon	21-Mar	3pm-11pm	Bill Gott
Mon-Tues	3/21-3/22	11pm - 7am	Jeff Grant
Tues	22-Mar	7am - 3pm	John Jolicoeur
Tues	22-Mar	3pm-11pm	Bill Gott
Tues-Wed	3/22-3/23	11pm - 7am	Jeff Grant
Wed	23-Mar	7am - 3pm	Sally Billings/Jane Marshall
Wed	23-Mar	3pm-11pm	Bill Gott
Wed-Thur	3/23-3/24	11pm - 7am	Jeff Grant
Thur	24-Mar	7am - 3pm	Jane Marshall
Thur	24-Mar	3pm-11pm	Bill Gott
Thur-Fri	3/24-3/25	11pm - 7am	Jeff Grant
Fri	25-Mar	7am - 3pm	Jane Marshall
Fri	25-Mar	3pm-11pm	Bill Gott
Fri-Sat	3/25-3/26	11pm-7am	Jeff Grant
Sat	26-Mar	7am - 3pm	Jane Marshall ?
Sat	26-Mar	3pm-11pm	Bill Gott
Sat-Sun	3/26-3/27	11pm - 7am	Jeff Grant
<b>EST Actions Officer</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Jonathan Fiske
Sun	20-Mar	7am - 3pm	Melissa Ralph
Sun	20-Mar	3pm-11pm	Jonathan Fiske
Sun-Mon	3/20-3/21	11pm - 7am	Dori Votolato-Willis
Mon	21-Mar	7am - 3pm	Melissa Ralph
Mon	21-Mar	3pm-11pm	Amanda Nerret
Mon-Tues	3/21-3/22	11pm - 7am	Kelly Grimes
Tues	22-Mar	7am - 3pm	Melissa Ralph

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Tues	22-Mar	3pm-11pm	Dori Votolato-Willis
Tues-Wed	3/22-3/23	11pm - 7am	Kelly Grimes
Wed	23-Mar	7am - 3pm	Melissa Ralph
Wed	23-Mar	3pm-11pm	Dori Votolato-Willis
Wed-Thur	3/23-3/24	11pm - 7am	Kelly Grimes
Thur	24-Mar	7am - 3pm	Wendy Reed
Thur	24-Mar	3pm-11pm	Dori Votolato-Willis
Thur-Fri	3/24-3/25	11pm - 7am	N/A
Fri	25-Mar	7am - 3pm	Amanda Nerret
Fri	25-Mar	3pm-11pm	Melissa Ralph
Fri-Sat	3/25-3/26	11pm-7am	N/A
Sat	26-Mar	7am - 3pm	James Corson
Sat	26-Mar	3pm-11pm	Don Algama
Sat-Sun	3/26-3/27	11pm - 7am	N/A
<b>EST Coordinator</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Rebecca Stone
Sun	20-Mar	7am - 3pm	Clyde Ragland
Sun	20-Mar	3pm-11pm	Tony Bowers
Sun-Mon	3/20-3/21	11pm - 7am	Rebecca Stone
Mon	21-Mar	7am - 3pm	Tony McMurtray
Mon	21-Mar	3pm-11pm	Tony Bowers
Mon-Tues	3/21-3/22	11pm - 7am	Rebecca Stone
Tues	22-Mar	7am - 3pm	Tony McMurtray
Tues	22-Mar	3pm-11pm	Clyde Ragland
Tues-Wed	3/22-3/23	11pm - 7am	Rebecca Stone
Wed	23-Mar	7am - 3pm	Tony McMurtray
Wed	23-Mar	3pm-11pm	Clyde Ragland
Wed-Thur	3/23-3/24	11pm - 7am	Rebecca Stone
Thur	24-Mar	7am - 3pm	Tony McMurtray
Thur	24-Mar	3pm-11pm	Clyde Ragland
Thur-Fri	3/24-3/25	11pm - 7am	Steve Campbell
Fri	25-Mar	7am - 3pm	Taylor Lichatz
Fri	25-Mar	3pm-11pm	Tony McMurtray
Fri-Sat	3/25-3/26	11pm-7am	Steve Campbell
Sat	26-Mar	7am - 3pm	Tonya Russell
Sat	26-Mar	3pm-11pm	Tony McMurtray
Sat-Sun	3/26-3/27	11pm - 7am	Steve Campbell
<b>EST Chronology Officer</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Cynthia Dorsey
Sun	20-Mar	7am - 3pm	James Vaughn
Sun	20-Mar	3pm-11pm	Rebecca Karas
Sun-Mon	3/20-3/21	11pm - 7am	Mark Resner
Mon	21-Mar	7am - 3pm	Hector Rodriguez-Luccioni
Mon	21-Mar	3pm-11pm	Rebecca Karas
Mon-Tues	3/21-3/22	11pm - 7am	Thomas Scarbrough
Tues	22-Mar	7am - 3pm	Hector Rodriguez-Luccioni
Tues	22-Mar	3pm-11pm	Rebecca Karas
Tues-Wed	3/22-3/23	11pm - 7am	Thomas Scarbrough
Wed	23-Mar	7am - 3pm	James Vaughn
Wed	23-Mar	3pm-11pm	Rebecca Karas

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Wed-Thur	3/23-3/24	11pm - 7am	Nick Ballam
Thur	24-Mar	7am - 3pm	Hector Rodriguez-Luccioni
Thur	24-Mar	3pm-11pm	Rebecca Karas
Thur-Fri	3/24-3/25	11pm - 7am	Thomas Scarbrough
Fri	25-Mar	7am - 3pm	Hector Rodriguez-Luccioni
Fri	25-Mar	3pm-11pm	Rebecca Karas
Fri-Sat	3/25-3/26	11pm-7am	Thomas Scarbrough
Sat	26-Mar	7am - 3pm	Nick Ballam
Sat	26-Mar	3pm-11pm	Rebecca Karas
Sat-Sun	3/26-3/27	11pm - 7am	Thomas Scarbrough
<b>EST Response Ops Mgr</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Jean Trefethan
Sun	20-Mar	7am - 3pm	Karen Jackson
Sun	20-Mar	3pm-11pm	Roberto Figueroa
Sun-Mon	3/20-3/21	11pm - 7am	Jean Trefethan
Mon	21-Mar	7am - 3pm	Bob Stransky
Mon	21-Mar	3pm-11pm	Omar Khan
Mon-Tues	3/21-3/22	11pm - 7am	Cris Brown
Tues	22-Mar	7am - 3pm	Bob Stransky
Tues	22-Mar	3pm-11pm	Karen Jackson
Tues-Wed	3/22-3/23	11pm - 7am	Roberto Figueroa
Wed	23-Mar	7am - 3pm	Bob Stransky
Wed	23-Mar	3pm-11pm	Jean Trefethan
Wed-Thur	3/23-3/24	11pm - 7am	Cris Brown
Thur	24-Mar	7am - 3pm	Karen Jackson
Thur	24-Mar	3pm-11pm	Omar Khan
Thur-Fri	3/24-3/25	11pm - 7am	Roberto Figueroa
Fri	25-Mar	7am - 3pm	Jean Trefethan
Fri	25-Mar	3pm-11pm	Cris Brown
Fri-Sat	3/25-3/26	11pm-7am	Roberto Figueroa
Sat	26-Mar	7am - 3pm	Omar Khan
Sat	26-Mar	3pm-11pm	Cris Brown
Sat-Sun	3/26-3/27	11pm - 7am	Roberto Figueroa
<b>EST Admin. Assistant</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Chris Lamb
Sun	20-Mar	7am - 3pm	Karen Meyer
Sun	20-Mar	3pm-11pm	Linda Williamson
Sun-Mon	3/20-3/21	11pm - 7am	Chris Lamb
Mon	21-Mar	7am - 3pm	Karen Meyer
Mon	21-Mar	3pm-11pm	Mary Glenn Crutchley
Mon-Tues	3/21-3/22	11pm - 7am	Andrea Wimbush
Tues	22-Mar	7am - 3pm	Cynthia Dorsey
Tues	22-Mar	3pm-11pm	Mary Glenn Crutchley
Tues-Wed	3/22-3/23	11pm - 7am	Michelle Manahan
Wed	23-Mar	7am - 3pm	Karen Meyer
Wed	23-Mar	3pm-11pm	Mary Glenn Crutchley
Wed-Thur	3/23-3/24	11pm - 7am	Andrea Wimbush
Thur	24-Mar	7am - 3pm	Cynthia Dorsey
Thur	24-Mar	3pm-11pm	Mary Glenn Crutchley
Thur-Fri	3/24-3/25	11pm - 7am	N/A

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Fri	25-Mar	7am - 3pm	Karen Meyer
Fri	25-Mar	3pm-11pm	Cynthia Dorsey
Fri-Sat	3/25-3/26	11pm-7am	N/A
Sat	26-Mar	7am - 3pm	Karen Meyer
Sat	26-Mar	3pm-11pm	Cynthia Dorsey
Sat-Sun	3/26-3/27	11pm - 7am	N/A
<b>Liaison Team</b>			
<b>LT Director</b>			
Sat-Sun	3/19-3/20	11pm - 7am	John Adams
Sun	20-Mar	7am - 3pm	Tom Bergman
Sun	20-Mar	3pm-11pm	Bob Webber
Sun-Mon	3/20-3/21	11pm - 7am	John Adams
Mon	21-Mar	7am - 3pm	Tom Bergman
Mon	21-Mar	3pm-11pm	Bob Webber
Mon-Tues	3/21-3/22	11pm - 7am	John Adams
Tues	22-Mar	7am - 3pm	Tom Bergman
Tues	22-Mar	3pm-11pm	Bob Webber
Tues-Wed	3/22-3/23	11pm - 7am	John Adams
Wed	23-Mar	7am - 3pm	Michael Tschiltz
Wed	23-Mar	3pm-11pm	Rich Correia
Wed-Thur	3/23-3/24	11pm - 7am	Jake Zimmerman
Thur	24-Mar	7am - 3pm	Michael Tschiltz
Thur	24-Mar	3pm-11pm	Rich Correia
Thur-Fri	3/24-3/25	11pm - 7am	Jake Zimmerman
Fri	25-Mar	7am - 3pm	Michael Tschiltz
Fri	25-Mar	3pm-11pm	Rich Correia
Fri-Sat	3/25-3/26	11pm-7am	Jake Zimmerman
Sat	26-Mar	7am - 3pm	Michael Tschiltz
Sat	26-Mar	3pm-11pm	Rich Correia
Sat-Sun	3/26-3/27	11pm - 7am	Marissa Bailey
<b>LT Coordinator</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Janelle Jessie
Sun	20-Mar	7am - 3pm	Jeff Temple
Sun	20-Mar	3pm-11pm	Nathan Sanfilippo
Sun-Mon	3/20-3/21	11pm - 7am	Milt Murray
Mon	21-Mar	7am - 3pm	Jeff Temple
Mon	21-Mar	3pm-11pm	Nathan Sanfilippo
Mon-Tues	3/21-3/22	11pm - 7am	Milt Murray
Tues	22-Mar	7am - 3pm	Rani Franovich
Tues	22-Mar	3pm-11pm	Nathan Sanfilippo
Tues-Wed	3/22-3/23	11pm - 7am	Milt Murray
Wed	23-Mar	7am - 3pm	Rani Franovich
Wed	23-Mar	3pm-11pm	Jeff Temple
Wed-Thur	3/23-3/24	11pm - 7am	Milt Murray
Thur	24-Mar	7am - 3pm	Rani Franovich
Thur	24-Mar	3pm-11pm	Jeff Temple
Thur-Fri	3/24-3/25	11pm - 7am	Milt Murray
Fri	25-Mar	7am - 3pm	Janelle Jessie
Fri	25-Mar	3pm-11pm	Rani Franovich
Fri-Sat	3/25-3/26	11pm-7am	Milt Murray

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Sat	26-Mar	7am - 3pm	Janelle Jessie
Sat	26-Mar	3pm-11pm	Rani Franovich
Sat-Sun	3/26-3/27	11pm - 7am	Milt Murray
<b>LT State Liaison</b>			
Sat-Sun	3/19-3/20	9pm-7am	Michelle Ryan/Rich Turtil (ON CALL ONLY)
Sun	20-Mar	7am-2pm	Michelle Ryan/Rich Turtil (ON CALL ONLY)
Sun	20-Mar	2pm-9pm	Michelle Ryan/Rich Turtil (ON CALL ONLY)
Sun-Mon	3/20-3/21	9pm-7am	Michelle Ryan/Rich Turtil (ON CALL ONLY)
Mon	21-Mar	7am-2pm	Flannery (Riveria-On Call)
Mon	21-Mar	2pm-9pm	Easson (Turtil-On Call)
Mon-Tue	3/21-3/22	9pm-7am	Michelle Ryan/Rich Turtil (ON CALL ONLY)
Tue	22-Mar	7am-2pm	Maupin
Tue	22-Mar	2pm-9pm	Easson/Michelle Ryan
Tue-Wed	3/22-3/23	9pm-7am	Alison Rivera/Amanda Noonan (ON CALL ONLY)
Wed	23-Mar	7am-2pm	Maupin
Wed	23-Mar	2pm-9pm	Alison Rivera
Wed-Thur	3/23-3/24	9pm-7am	Michelle Ryan/Turtil (ON CALL ONLY)
Thur	24-Mar	7am-2pm	Flannery
Thur	24-Mar	2pm-9pm	Amanda Noonan
Thur-Fri	3/24-3/25	9pm-7am	Rivera/Turtil (ON CALL ONLY)
Fri	25-Mar	7am-2pm	Kim Lukes
Fri	25-Mar	2pm-9pm	Michelle Ryan
Fri-Sat	3/25-3/26	9pm-7am	Alison Rivera/Amanda Noonan (ON CALL ONLY)
Sat	26-Mar	7am-2pm	Michelle Ryan/Amanda Noonan (ON CALL ONLY)
Sat	26-Mar	2pm-9pm	Michelle Ryan/Amanda Noonan (ON CALL ONLY)
Sat-Sun	3/26-3/27	9pm-7am	Michelle Rivera/Amanda Noonan (ON CALL ONLY)
<b>LT Federal Liaison (2)</b>			
Sun	20-Mar	7am - 3pm	Ned Wright
Sun	20-Mar	3pm-11pm	Jeff Temple
Sun-Mon	3/20-3/21	11pm - 7am	Scott Sloan
Sun-Mon	3/20-3/21	11pm - 7am	Lisa Wright
Mon	21-Mar	7am - 3pm	Beth Reed/Ted Smith
Mon	21-Mar	3pm-11pm	Ned Wright
Mon-Tues	3/21-3/22	11pm - 7am	Lisa Wright
Tues	22-Mar	7am - 3pm	Beth Reed/Ted Smith
Tues	22-Mar	3pm-11pm	Ned Wright
Tues-Wed	3/22-3/23	11pm - 7am	Lisa Wright
Wed	23-Mar	7am - 3pm	Jerry Hale/Ted Smith
Wed	23-Mar	3pm-11pm	Ned Wright
Wed-Thur	3/23-3/24	11pm - 7am	Lisa Wright
Thur	24-Mar	7am - 3pm	Ted Smith/Bethany Cecere
Thur	24-Mar	3pm-11pm	Jerry Hale
Thur-Fri	3/24-3/25	11pm - 7am	Scott Sloan
Fri	25-Mar	7am - 3pm	Ted Smith/Bethany Cecere
Fri	25-Mar	3pm-11pm	Jason Lising
Fri-Sat	3/25-3/26	11pm-7am	Scott Sloan
Sat	26-Mar	7am - 3pm	Jason Lising/Lisa Gibney
Sat	26-Mar	3pm-11pm	Jeff Temple
Sat-Sun	3/26-3/27	11pm - 7am	Scott Sloan

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<b>LT Congressional Liaison (2)</b>			
Sun	20-Mar	7am - 2pm	Rebecca Schmidt
	20-Mar	2pm-9pm	Reanne Shane
Mon	21-Mar	7am - 2pm	Spiros Droggitis
	21-Mar	2pm-9pm	Tim Riley
Tues	22-Mar	7am - 2pm	Tim Riley
	22-Mar	2pm-9pm	Spiros Droggitis
Wed	23-Mar	7am - 2pm	Gene Dacus
	23-Mar	2pm-9pm	Raeann Shane
Thur	24-Mar	7am - 2pm	Spiros Droggitis
	24-Mar	2pm-9pm	Raeann Shane
Fri	25-Mar	7am - 2pm	Gene Dacus
	25-Mar	2pm-9pm	Amy Powell
Sat	26-Mar	7am - 3pm	Amy Powell (ON CALL ONLY)
Sat	26-Mar	3pm-11pm	Amy Powell (ON CALL ONLY)
Sun	3/26-3/27	11pm - 7am	Amy Powell (ON CALL ONLY)
<b>LT International Liaison (2)</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Elizabeth Smioldo/Danielle Emche
Sun	20-Mar	7am - 3pm	Karen Henderson/Steve Baker
Sun	20-Mar	3pm-11pm	Eric Stahl/Nancy Fragoyanis
Sun-Mon	3/20-3/21	11pm - 7am	Elizabeth Smioldo/Jenny Tobin
Mon	21-Mar	7am - 3pm	Jen Schwartzman/Charlotte Abrams/Nancy (12-3)
Mon	21-Mar	3pm-11pm	Danielle Emche/Lauren Mayros
Mon-Tues	3/21-3/22	11pm - 7am	Eric Stahl/Mugeh Afshar-Tous
Tues	22-Mar	7am - 3pm	Jen Schwartzman/Charlotte Abrams/Nancy (12-3)
Tues	22-Mar	3pm-11pm	Danielle Emche/Lauren Mayros
Tues-Wed	3/22-3/23	11pm - 7am	Eric Stahl/Mugeh
Wed	23-Mar	7am - 3pm	Jen Schwartzman/Charlotte Abrams/Nancy (12-3)
Wed	23-Mar	3pm-11pm	Danielle Emche/Lauren Mayros
Wed-Thur	3/23-3/24	11pm - 7am	Eric Stahl/Mugeh
Thur	24-Mar	7am - 3pm	Steve Bloom/Lance English
Thur	24-Mar	3pm-11pm	Janice/Jenny Tobin
Thur-Fri	3/24-3/25	11pm - 7am	Andrea/Elizabeth Smioldo
Fri	25-Mar	7am - 3pm	Steve Bloom/Lance English
Fri	25-Mar	3pm-11pm	Janice/Jenny Tobin
Fri-Sat	3/25-3/26	11pm-7am	Andrea/Elizabeth Smioldo
Sat	26-Mar	7am - 3pm	Steve Bloom / Lance English
Sat	26-Mar	3pm-11pm	Janice Owens / Jenny Tobin
Sat-Sun	3/26-3/27	11pm - 7am	Cindy Rosales/ Elizabeth Smioldo
<b>Protective Measures Team</b>			
<b>PMTR Director</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Kathy Gibson
Sun	20-Mar	7am - 3pm	John Lubinski
Sun	20-Mar	3pm-11pm	Don Cool
Sun-Mon	3/20-3/21	11pm - 7am	Kathy Gibson
Mon	21-Mar	7am - 3pm	John Lubinski
Mon	21-Mar	3pm-11pm	Don Cool
Mon-Tues	3/21-3/22	11pm - 7am	John Tappert
Tues	22-Mar	7am - 3pm	John Lubinski
Tues	22-Mar	3pm-11pm	Don Cool

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Tues-Wed	3/22-3/23	11pm - 7am	John Tappert
Wed	23-Mar	7am - 3pm	Terry Reis
Wed	23-Mar	3pm-11pm	Cindy Jones
Wed-Thur	3/23-3/24	11pm - 7am	Randy Sullivan
Thur	24-Mar	7am - 3pm	Terry Reis
Thur	24-Mar	5pm-11pm	Cindy Jones
Thur-Fri	3/24-3/25	11pm - 7am	Randy Sullivan
Fri	25-Mar	7am - 3pm	Terry Reis
Fri	25-Mar	5pm-11pm	Cindy Jones
Fri-Sat	3/25-3/26	11pm-7am	Randy Sullivan
Sat	26-Mar	7am - 3pm	Terry Reis
Sat	26-Mar	3pm-11pm	Cindy Jones
Sat-Sun	3/26-3/27	11pm - 7am	Randy Sullivan
<b>PMTR Coordinator</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Lou Brandon
Sun	20-Mar	7am - 3pm	Nima Ashkeboussi
Sun	20-Mar	3pm-11pm	Jay Patel
Sun-Mon	3/20-3/21	11pm - 7am	Lou Brandon
Mon	21-Mar	7am - 3pm	Prosanta Chowdhury (8 am)
Mon	21-Mar	3pm-11pm	Jay Patel
Mon-Tues	3/21-3/22	11pm - 7am	Lou Brandon
Tues	22-Mar	7am - 3pm	Prosanta Chowdhury (8 am)
Tues	22-Mar	3pm-11pm	Nima Ashkeboussi
Tues-Wed	3/22-3/23	11pm - 7am	Mike Norris
Wed	23-Mar	7am - 3pm	John Wray
Wed	23-Mar	3pm-11pm	Nima Ashkeboussi
Wed-Thur	3/23-3/24	11pm - 7am	Mike Norris
Thur	24-Mar	7am - 3pm	John Wray
Thur	24-Mar	3pm-11pm	Jay Patel/Joe DeCicco
Thur-Fri	3/24-3/25	11pm - 7am	Mike Norris
Fri	25-Mar	7am - 3pm	Duane Hardesty/Joe DeCicco
Fri	25-Mar	3pm-11pm	Ryan Craffey
Fri-Sat	3/25-3/26	11pm-7am	Lou Brandon
Sat	26-Mar	7am - 3pm	Arlon Costa
Sat	26-Mar	3pm-11pm	Kimberly Hardin
Sat-Sun	3/26-3/27	11pm - 7am	Lou Brandon
<b>PMTR Prot Actions Asst Dir</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Greg Casto
Sun	20-Mar	7am - 3pm	Kathryn Brock
Sun	20-Mar	3pm-11pm	Tim Harris
Sun-Mon	3/20-3/21	11pm - 7am	Greg Casto (Jessica Kratchman - to shadow)
Mon	21-Mar	7am - 3pm	Kathryn Brock
Mon	21-Mar	3pm-11pm	Dan Barss
Mon-Tues	3/21-3/22	11pm - 7am	Jessica Kratchman
Tues	22-Mar	7am - 3pm	Kathryn Brock
Tues	22-Mar	3pm-11pm	Tim Harris
Tues-Wed	3/22-3/23	11pm - 7am	Jessica Kratchman
Wed	23-Mar	7am - 3pm	Sandra Wastler
Wed	23-Mar	3pm-11pm	Vince Holahan
Wed-Thur	3/23-3/24	11pm - 7am	Jessica Kratchman

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Thur	24-Mar	7am - 3pm	Sandra Wastler
Thur	24-Mar	3pm-11pm	Stacey Rosenberg
Thur-Fri	3/24-3/25	11pm - 7am	Jessica Kratchman
Fri	25-Mar	7am - 3pm	Kathryn Brock
Fri	25-Mar	3pm-11pm	Vince Holahan
Fri-Sat	3/25-3/26	11pm-7am	Greg Casto
Sat	26-Mar	7am - 3pm	Dan Barss
Sat	26-Mar	3pm-11pm	Sandra Wastler
Sat-Sun	3/26-3/27	11pm - 7am	Greg Casto/Jessica Kratchman
<b>PMTR RAAD</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Patricia Milligan
Sun	20-Mar	7am - 3pm	Eric Schrader
Sun	20-Mar	3pm-11pm	Steve LaVie
Sun-Mon	3/20-3/21	11pm - 7am	Mike Norris
Mon	21-Mar	7am - 3pm	Michelle Hart
Mon	21-Mar	3pm-11pm	Steve Lavie
Mon-Tues	3/21-3/22	11pm - 7am	Boby Abu-Eid
Tues	22-Mar	7am - 3pm	Bruce Watson
Tues	22-Mar	3pm-11pm	Steve LaVie
Tues-Wed	3/22-3/23	11pm - 7am	Boby Abu-Eid
Wed	23-Mar	7am - 3pm	Bruce Watson
Wed	23-Mar	3pm-11pm	Michelle Hart
Wed-Thur	3/23-3/24	11pm - 7am	Duane Schmidt
Thur	24-Mar	7am - 3pm	Bruce Watson
Thur	24-Mar	3pm-11pm	Steve LaVie
Thur-Fri	3/24-3/25	11pm - 7am	Cynthia Barr
Fri	25-Mar	7am - 3pm	Bruce Watson
Fri	25-Mar	3pm-11pm	Michelle Hart
Fri-Sat	3/25-3/26	11pm-7am	Cynthia Barr
Sat	26-Mar	7am - 3pm	Bruce Watson
Sat	26-Mar	3pm-11pm	Steve LaVie
Sat-Sun	3/26-3/27	11pm - 7am	Mike Norris
<b>PMTR Dose Assessment (RASCAL) - Need 2</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Kimberly Gambone/John Parillo
Sun	20-Mar	7am - 3pm	Casper Sun / Duane Schmidt
Sun	20-Mar	3pm-11pm	Margaret Cervera / Tony Huffert
Sun-Mon	3/20-3/21	11pm - 7am	Kimberly Gambone/John Parillo
Mon	21-Mar	7am - 3pm	Eric Schrader/Rich Clement
Mon	21-Mar	3pm-11pm	Margaret Cervera/Tony Huffert
Mon-Tues	3/21-3/22	11pm - 7am	John Parillo / Bernie White
Tues	22-Mar	7am - 3pm	Eric Schrader/Rich Clement
Tues	22-Mar	3pm-11pm	Gary Purdy/Casper Sun
Tues-Wed	3/22-3/23	11pm - 7am	Margaret Cervera/Tony Huffert
Wed	23-Mar	7am - 3pm	Eric Schrader/Rich Clement
Wed	23-Mar	3pm-11pm	Kimberly Gambone/Casper Sun
Wed-Thur	3/23-3/24	11pm - 7am	Tony Huffert/John Parillo
Thur	24-Mar	7am - 3pm	Eric Schrader/Rich Clement
Thur	24-Mar	3pm-11pm	Kimberly Gambone/Casper Sun
Thur-Fri	3/24-3/25	11pm - 7am	Tony Huffert/John Parillo
Fri	25-Mar	7am - 3pm	Eric Schrader/Rich Clement

Japan Earthquake ERO Staffing Roster  
 March 20-26, 2011  
 Pay Period 7 - Week 2

Fri	25-Mar	3pm-11pm	Gary Purdy/Casper Sun
Fri-Sat	3/25-3/26	11pm-7am	John Parillo / Bernie White
Sat	26-Mar	7am - 3pm	Tony Huffert/Charlie Hinson
Sat	26-Mar	3pm-11pm	Leroy Hardin/Gary Purdy?
Sat-Sun	3/26-3/27	11pm - 7am	John Parillo/Ron LaVera
<b>PMTR GIS Analyst</b>			
Sun-Mon	3/20-3/21	11pm - 7am	Alice Stieve
Mon	21-Mar	7am - 3pm	Nebiyu Tiruneh
Mon	21-Mar	3pm-11pm	Stephanie Devlin
Mon-Tues	3/21-3/22	11pm - 7am	Alice Stieve
Tues	22-Mar	7am - 3pm	Yong Li
Tues	22-Mar	3pm-11pm	Stephanie Devlin
Tues-Wed	3/22-3/23	11pm - 7am	Alice Stieve
Wed	23-Mar	7am - 3pm	Allen Gross
Wed	23-Mar	3pm-11pm	Stephanie Devlin
Wed-Thur	3/23-3/24	11pm - 7am	Phil Brandt
Thur	24-Mar	7am - 3pm	Yong Li
Thur	24-Mar	3pm-11pm	Stephanie Devlin
Thur-Fri	3/24-3/25	11pm - 7am	Dogan Seber
Fri	25-Mar	7am - 3pm	Allen Gross
Fri	25-Mar	3pm-11pm	N/A
Fri-Sat	3/25-3/26	11pm-7am	N/A
Sat	26-Mar	7am - 3pm	N/A
Sat	26-Mar	3pm-11pm	N/A
Sat-Sun	3/26-3/27	11pm - 7am	N/A
<b>PMTR Meteorologist</b>			
Sat-Sun	19-Mar	3pm-11pm	Mike Mazaika
Sun	3/19-3/20	11pm - 7am	David Brown
Sun	20-Mar	7am - 3pm	Kevin Quinlan
Sun	20-Mar	3pm-11pm	Mike Mazaika
Sun-Mon	3/20-3/21	11pm - 7am	David Brown
Mon	21-Mar	7am - 3pm	Mike Mazaika
Mon	21-Mar	3pm-11pm	Brad Harvey
Mon-Tues	3/21-3/22	11pm - 7am	Kevin Quinlan
Tues	22-Mar	7am - 3pm	David Brown
Tues	22-Mar	3pm-11pm	Brad Harvey
Tues-Wed	3/22-3/23	11pm - 7am	Andy Imboden/Kevin Quinlan
Wed	23-Mar	7am - 3pm	Mike Mazaika
Wed	23-Mar	3pm-11pm	Brad Harvey
Wed-Thur	3/23-3/24	11pm - 7am	Kevin Quinlan
Thur	24-Mar	7am - 3pm	David Brown
Thur	24-Mar	3pm-11pm	Brad Harvey
Thur-Fri	3/24-3/25	11pm - 7am	Kevin Quinlan
Fri	25-Mar	7am - 3pm	Mike Mazaika
Fri	25-Mar	3pm-11pm	N/A
Fri-Sat	3/25-3/26	11pm-7am	N/A
Sat	26-Mar	7am - 3pm	N/A
Sat	26-Mar	3pm-11pm	N/A
Sat-Sun	3/26-3/27	11pm - 7am	N/A

Japan Earthquake ERO Staffing Roster  
 March 20-26, 2011  
 Pay Period 7 - Week 2

<b>Reactor Safety Team</b>			
<b>RST Director</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Jennifer Uhle
Sun	20-Mar	7am - 3pm	Laura Dudes
Sun	20-Mar	3pm-11pm	Dave Skeen
Sun-Mon	3/20-3/21	11pm - 7am	Jennifer Uhle
Mon	21-Mar	7am - 3pm	Fred Brown
Mon	21-Mar	3pm-11pm	Dave Skeen
Mon-Tues	3/21-3/22	11pm - 7am	Jennifer Uhle
Tues	22-Mar	7am - 3pm	Fred Brown
Tues	22-Mar	3pm-11pm	Dave Skeen
Tues-Wed	3/22-3/23	11pm - 7am	Brian Holian
Wed	23-Mar	7am - 3pm	Fred Brown
Wed	23-Mar	3pm-11pm	Bill Ruland
Wed-Thur	3/23-3/24	11pm - 7am	Brian Holian
Thur	24-Mar	7am - 3pm	Fred Brown
Thur	24-Mar	3pm-11pm	Bill Ruland
Thur-Fri	3/24-3/25	11pm - 7am	Brian Holian
Fri	25-Mar	7am - 3pm	Pat Hiland
Fri	25-Mar	3pm-11pm	Bill Ruland
Fri-Sat	3/25-3/26	11pm-7am	Brian Holian
Sat	26-Mar	7am - 3pm	Pat Hiland
Sat	26-Mar	3pm-11pm	Bill Ruland
Sat	3/26-27/2011	11pm - 7am	Dave Skeen
<b>RST Coordinator</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Frank Collins
Sun	20-Mar	7am - 3pm	Peter Alter
Sun	20-Mar	3pm-11pm	Eric Thomas
Sun-Mon	3/20-3/21	11pm - 7am	Mike Morlang
Mon	21-Mar	7am - 3pm	Peter Alter
Mon	21-Mar	3pm-11pm	Greg Schoenebeck
Mon-Tues	3/21-3/22	11pm - 7am	Frank Collins
Tues	22-Mar	7am - 3pm	Rick Hasselberg
Tues	22-Mar	3pm-11pm	Mike Morlang
Tues-Wed	3/22-3/23	11pm - 7am	Oleg Bukharin
Wed	23-Mar	7am - 3pm	Eric Thomas
Wed	23-Mar	3pm-11pm	Greg Schoenebeck
Wed-Thur	3/23-3/24	11pm - 7am	Frank Collins
Thur	24-Mar	7am - 3pm	Rick Hasselberg
Thur	24-Mar	3pm-11pm	Brett Rini
Thur-Fri	3/24-3/25	11pm - 7am	Tom Boyce (RES)
Fri	25-Mar	7am - 3pm	Eric Thomas
Fri	25-Mar	3pm-11pm	Brett Rini
Fri-Sat	3/25-3/26	11pm-7am	Frank Collins
Sat	26-Mar	7am - 3pm	Eric Thomas
Sat	26-Mar	3pm-11pm	Mark Orr
Sat-Sun	3/26-3/27	11pm - 7am	Brett Rini
<b>Severe Accident/PRA</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Mike Salay
Sun	20-Mar	7am - 3pm	John Lane

## Japan Earthquake ERO Staffing Roster

March 20-26, 2011

Pay Period 7 - Week 2

Sun	20-Mar	3pm-11pm	Jim Gilmer
Sun-Mon	3/20-3/21	11pm - 7am	Don Dube
Mon	21-Mar	7am - 3pm	Jeff Circle
Mon	21-Mar	3pm-11pm	Hossein Esmaili
Mon-Tues	3/21-3/22	11pm - 7am	Jim Gilmer
Tues	22-Mar	7am - 3pm	Ed Fuller
Tues	22-Mar	3pm-11pm	Len Ward
Tues-Wed	3/22-3/23	11pm - 7am	Sam Miranda
Wed	23-Mar	7am - 3pm	Jeff Circle
Wed	23-Mar	3pm-11pm	Steven Arndt
Wed-Thur	3/23-3/24	11pm - 7am	Mike Salay
Thur	24-Mar	7am - 3pm	Jeff Circle
Thur	24-Mar	3pm-11pm	Steve Laur
Thur-Fri	3/24-3/25	11pm - 7am	Don Helton
Fri	25-Mar	7am - 3pm	Steven Arndt
Fri	25-Mar	3pm-11pm	Steve Laur
Fri-Sat	3/25-3/26	11pm-7am	Don Helton
Sat	26-Mar	7am - 3pm	Steven Arndt
Sat	26-Mar	3pm-11pm	Jerry Dozier
Sat-Sun	3/26-3/27	11pm - 7am	Ray Skarda
<b>BWR Expertise</b>			
Sat-Sun	3/19-3/20	11pm - 7am	John Kauffman
Sun	20-Mar	7am - 3pm	Larry Vick
Sun	20-Mar	3pm-11pm	Chuck Norton
Sun-Mon	3/20-3/21	11pm - 7am	Mike Brown
Mon	21-Mar	7am - 3pm	Bob Summers
Mon	21-Mar	3pm-11pm	Chuck Norton
Mon-Tues	3/21-3/22	11pm - 7am	Mike Brown
Tues	22-Mar	7am - 3pm	Tom Boyce (RES)
Tues	22-Mar	3pm-11pm	Chuck Norton
Tues-Wed	3/22-3/23	11pm - 7am	Mike Brown
Wed	23-Mar	7am - 3pm	Larry Vick
Wed	23-Mar	3pm-11pm	Chuck Norton
Wed-Thur	3/23-3/24	11pm - 7am	Eva Brown
Thur	24-Mar	7am - 3pm	Peter Alter
Thur	24-Mar	3pm-11pm	Chuck Norton
Thur-Fri	3/24-3/25	11pm - 7am	Eva Brown
Fri	25-Mar	7am - 3pm	Bob Summers
Fri	25-Mar	3pm-11pm	Chuck Norton
Fri-Sat	3/25-3/26	11pm-7am	Eva Brown
Sat	26-Mar	7am - 3pm	Mike Brown
Sat	26-Mar	3pm-11pm	Chuck Norton
Sat-Sun	3/26-3/27	11pm - 7am	Eva Brown
<b>RST Comm/ERDS Operator</b>			
Sat-Sun	3/19-3/20	11pm - 7am	Ujagar Bhachu
Sun	20-Mar	7am - 3pm	Denise McGovern
Sun	20-Mar	3pm-11pm	Donna Williams
Sun-Mon	3/20-3/21	11pm - 7am	Ujagar Bhachu
Mon	21-Mar	7am - 3pm	Joseph Williams
Mon	21-Mar	3pm-11pm	John Thorp

## Japan Earthquake ERO Staffing Roster

March 20-26, 2011

Pay Period 7 - Week 2

Mon-Tues	3/21-3/22	11pm - 7am	Bill Roggenbrodt
Tues	22-Mar	7am - 3pm	Steve Bloom
Tues	22-Mar	3pm-11pm	Jim Isom
Tues-Wed	3/22-3/23	11pm - 7am	Bill Roggenbrodt
Wed	23-Mar	7am - 3pm	Joseph Williams
Wed	23-Mar	3pm-11pm	Ken Hart
Wed-Thur	3/23-3/24	11pm - 7am	Bill Roggenbrodt
Thur	24-Mar	7am - 3pm	John Thorp
Thur	24-Mar	3pm-11pm	Ken Hart
Thur-Fri	3/24-3/25	11pm - 7am	Bill Roggenbrodt
Fri	25-Mar	7am - 3pm	Donna Williams
Fri	25-Mar	3pm-11pm	David Solorio
Fri-Sat	3/25-3/26	11pm-7am	Rick Hasselberg
Sat	26-Mar	7am - 3pm	John Thorp
Sat	26-Mar	3pm-11pm	Stan Gardocki
Sat-Sun	3/26-3/27	11pm - 7am	Denise McGovern
<b>RST Support (Seismology Q&amp;A)</b>			
Fri-Sat	3/18-3/19	11pm-7am	Off (On Call)
Sat	19-Mar	7am - 3pm	Off (On Call)
Sat	19-Mar	3pm-11pm	Off (On Call)
Sat-Sun	3/19-3/20	11pm - 7am	Alice Stieve (On Call) Working as PMT GIS
Sun	20-Mar	7am - 3pm	Cliff Munson (On Call)
Sun	20-Mar	3pm-11pm	Annie Kammerer (On Call)
Sun-Mon	3/20-3/21	11pm - 7am	Stephanie Devlin (On Call)
Mon	21-Mar	7am - 3pm	Cliff Munson (On Call)
Mon	21-Mar	3pm-11pm	A. Kammerer 3-11; M. Bensi 3-6 (On Call)
Mon-Tues	3/21-3/22	11pm - 7am	Dogan Seber (On Call)
Tues	22-Mar	7am - 3pm	Nilesh Chokchi On Call)
Tues	22-Mar	3pm-11pm	S. Devlin 3-11; M. Bensi 3-6 (On Call)
Tues-Wed	3/22-3/23	11pm - 7am	Cliff Munson (On Call)
Wed	23-Mar	7am - 3pm	Nilesh Chokchi On Call)
Wed	23-Mar	3pm-11pm	A. Kammerer 3-11, M. Bensi 3-6 (On Call)
Wed-Thur	3/23-3/24	11pm - 7am	Annie Kammerer (On Call)
Thur	24-Mar	7am - 3pm	Cliff Munson (On Call)
Thur	24-Mar	3pm-11pm	A. Kammerer 3-11, M. Bensi 3-6 (On Call)
Thur-Fri	3/24-3/25	11pm - 7am	Dogan Seber (On Call)
Fri	25-Mar	7am - 3pm	Dogan Seber (On Call)
Fri	25-Mar	3pm-11pm	A.Kammerer 3-11, M. Bensi 3-6 (On Call)
Fri-Sat	3/25-3/26	11pm-7am	Dogan Seber (On Call)
Sat	26-Mar	7am - 3pm	A. Kammerer (On Call)
Sat	26-Mar	3pm-11pm	A. Kammerer (On Call)
Sat-Sun	3/26-3/27	11pm - 7am	A. Kammerer (On Call)
<b>RST Support (Structural)</b>			
Fri-Sat	3/18-3/19	11pm-7am	Off (On Call)
Sat	19-Mar	7am - 3pm	Off (On Call)
Sat	19-Mar	3pm-11pm	Off (On Call)
Sat-Sun	3/19-3/20	11pm - 7am	Off (On Call)
Sun	20-Mar	7am - 3pm	Off (On Call)
Sun	20-Mar	3pm-11pm	Off (On Call)
Sun-Mon	3/20-3/21	11pm - 7am	Off (On Call)

## Japan Earthquake ERO Staffing Roster

March 20-26, 2011

Pay Period 7 - Week 2

Mon	21-Mar	7am - 3pm	Off (On Call)
Mon	21-Mar	3pm-11pm	Bret Tegeler (On Call)
Mon-Tues	3/21-3/22	11pm - 7am	Bret Tegeler (On Call)
Tues	22-Mar	7am - 3pm	Pravin Patel (On Call)
Tues	22-Mar	3pm-11pm	Bret Tegeler (On Call)
Tues-Wed	3/22-3/23	11pm - 7am	Bret Tegeler (On Call)
Wed	23-Mar	7am - 3pm	Pravin Patel (On Call)
Wed	23-Mar	3pm-11pm	Samir Chakrabart (On Call)
Wed-Thur	3/23-3/24	11pm - 7am	Samir Chakrabart (On Call)
Thur	24-Mar	7am - 3pm	Pravin Patel (On Call)
Thur	24-Mar	3pm-11pm	Jerry Chung (On Call)
Thur-Fri	3/24-3/25	11pm - 7am	Jerry Chung(On Call)
Fri	25-Mar	7am - 3pm	Pravin Patel (On Call)
Fri	25-Mar	3pm-11pm	Manas Chakravorty (On Call)
Fri-Sat	3/25-3/26	11pm-7am	Manas Chakravorty (On Call)
Sat	26-Mar	7am - 3pm	Off (On Call)
Sat	26-Mar	3pm-11pm	Off (On Call)
Sat-Sun	3/26-3/27	11pm - 7am	Off (On Call)

**From:** OST02 HOC  
**To:** Abrams, Charlotte; Abu-Eid, Bobby; Adams, John; Afshar-Tous, Mugeh; Ahn, Hosung; Alemu, Bezakulu; Algama, Don; Alter, Peter; Anderson, Brian; Anderson, James; Arndt, Steven; Arribas-Colon, Maria; Ashkeboussi, Nima; Athey, George; Baker, Stephen; Ballam, Nick; Barnhurst, Daniel; Barr, Cynthia; Barss, Dan; Bazian, Samuel; Bensi, Michelle; Bergman, Thomas; Berry, Rollie; Bhachu, Ujagar; Bloom, Steven; Blount, Tom; Boger, Bruce; Bonnette, Cassandra; Borchardt, Bill; Bowers, Anthony; Bowman, Gregory; Boyce, Tom (RES); Brandon, Lou; Brandt, Philip; Brenner, Eliot; Brock, Kathryn; Brown, Cris; Brown, David; Brown, Eva; Brown, Frederick; Brown, Michael; Bukharin, Oleg; Burnell, Scott; Bush-Goddard, Stephanie; Campbell, Stephen; Camper, Larry; Carpenter, Cynthia; Carter, Mary; Case, Michael; Casto, Greg; Cecere, Bethany; Cervera, Margaret; Chazell, Russell; Chen, Yen-Ju; Cheok, Michael; Chokshi, Niles; Chowdhury, Prosanta; Chung, Donald; Circle, Jeff; Clement, Richard; Clinton, Rebecca; Coggins, Angela; Collins, Frank; Cool, Donald; Correia, Richard; Corson, James; Costa, Arlon; Couret, Ivonne; Craffey, Ryan; Crutchley, Mary Glenn; Cruz, Zahira; Cuadrado, Leira; Dacus, Eugene; DeCicco, Joseph; Decker, David; Dembek, Stephen; Devlin, Stephen; Dimmick, Lisa; Doane, Margaret; Dorman, Dan; Dorsey, Cynthia; Dozier, Jerry; Drake, Margaret; Droggittis, Spiros; Dube, Donald; Dudes, Laura; Eads, Johnny; Emche, Danielle; English, Lance; Erlanger, Craig; Esmaili, Hossein; Figueroa, Roberto; Fiske, Jonathan; Flanders, Scott; Flannery, Cindy; Floyd, Daphene; Foggie, Kirk; Foster, Jack; Fragoyannis, Nancy; Franovich, Rani; Frazier, Alan; Freshman, Steve; Fuller, Edward; Galletta, Thomas; Gambone, Kimberly; Gardocki, Stanley; Gartman, Michael; Gibson, Kathy; Glitter, Joseph; Gilmer, James; Glenn, Nichole; Gordon, Dennis; Gott, William; Grant, Jeffery; Greenwood, Carol; Greenwood, Carol; Grimes, Kelly; Grobe, Jack; Gross, Allen; Gulla, Gerald; Hale, Jerry; Hardesty, Duane; Hardin, Kimberly; Hardin, Leroy; Harrington, Holly; Harris, Tim; Harrison, Donnie; Hart, Ken; Hart, Michelle; Harvey, Brad; Hasselberg, Rick; Hayden, Elizabeth; Helton, Donald; Henderson, Karen; Hiland, Patrick; Holahan, Patricia; Holahan, Vincent; Holian, Brian; HOO Hoc; Horn, Brian; Howard, Tabitha; Huffert, Anthony; Hurd, Sapna; Huyck, Doug; Imboden, Andy; Isom, James; Jackson, Karen; Jacobson, Jeffrey; Jervey, Richard; Jessie, Janelle; Johnson, Michael; Jolicoeur, John; Jones, Andrea; Jones, Cynthia; Jones, Henry; Kahler, Carolyn; Kammerer, Annie; Karas, Rebecca; Kauffman, John; Khan, Omar; Kolb, Timothy; Kotzalas, Margie; Kowalczyk, Jeffrey; Kratchman, Jessica; Kugler, Andrew; Lamb, Christopher; Lane, John; Larson, Emily; Laur, Steven; LaVie, Steve; Lewis, Robert; Li, Yong; Lichatz, Taylor; Lising, Jason; Lombard, Mark; Lubinski, John; Lui, Christiana; Lukes, Kim; Lynch, Jeffery; Ma, John; Mamish, Nader; Manahan, Michelle; Marksberry, Don; Marshall, Jane; Masao, Nagai; Maupin, Cardelia; Mayros, Lauren; Mazaika, Michael; McConnell, Keith; McCoppin, Michael; McDermott, Brian; McGinty, Tim; McGovern, Denise; McIntyre, David; McMurtray, Anthony; Merritt, Christina; Meyer, Karen; Miller, Charles; Miller, Chris; Milligan, Patricia; Miranda, Samuel; Mohseni, Aby; Moore, Scott; Morlang, Gary; Morris, Scott; Mroz (Sahm), Sara; Munson, Clifford; Murray, Charles; Nerret, Amanda; Nguyen, Caroline; Norris, Michael; Norton, Charles; Opara, Stella; Ordaz, Vonna; Owens, Janice; Padovan, Mark; Parillo, John; Patel, Jay; Patel, Pravin; Patrick, Mark; Perin, Vanice; Pope, Tia; Powell, Amy; Purdy, Gary; Quinlan, Kevin; Raddatz, Michael; Ragland, Robert; Ralph, Melissa; Ramsey, Jack; Reed, Elizabeth; Reed, Sara; Reed, Wendy; Reeves, Rosemary; Reis, Terrence; Resner, Mark; Riley (OCA), Timothy; Riner, Kelly; Rini, Brett; Roach, Edward; Robinson, Edward; Rodriguez-Luccioni, Hector; Roggenbrodt, William; Ropon, Kimberly; Rosales-Cooper, Cindy; Rosenberg, Stacey; Ross-Lee, MaryJane; Roundtree, Amy; Ruland, William; Russell, Tonya; Ryan, Michelle; Salay, Michael; Salter, Susan; Salus, Amy; Sanfilippo, Nathan; Santos, Daniel; Scarborough, Thomas; Schaperow, Jason; Schmidt, Duane; Schmidt, Rebecca; Schoenebeck, Greg; Schrader, Eric; Schwartzman, Jennifer; Seber, Dogan; See, Kenneth; Shane, Raeann; Shea, James; Shepherd, Jill; Sheron, Brian; Skarda, Raymond; Skeen, David; Sloan, Scott; Smiroldo, Elizabeth; Smith, Brooke; Smith, Stacy; Smith, Theodore; Stahl, Eric; Stang, Annette; Stark, Johnathan; Steger (Tucci), Christine; Stieve, Alice; Stone, Rebecca; Stransky, Robert; Sturz, Fritz; Sullivan, Randy; Summers, Robert; Sun, Casper; Tappert, John; Tegeler, Bret; Temple, Jeffrey; Thaggard, Mark; Thomas, Eric; Thorp, John; Tiruneh, Nebiyu; Tobin, Jennifer; Trefethen, Jean; Tschiltz, Michael; Turtill, Richard; Uhle, Jennifer; Valencia, Sandra; Vaughn, James; Vick, Lawrence; Virgilio, Martin; Virgilio, Rosetta; Ward, Leonard; Ward, William; Wastler, Sandra; Watson, Bruce; Webber, Robert; Weber, Michael; White, Bernard; Wiggins, Jim; Williams, Donna; Williams, Joseph; Williamson, Linda; Willis, Dori; Wimbush, Andrea; Wittick, Brian; Wray, John; Wright, Lisa (Gibney); Wright, Ned; Wunder, George; Young, Francis; Zimmerman, Jacob; Zimmerman, Roy

**Subject:** JAPANESE EARTHQUAKE ERO STAFFING MARCH 27 - APRIL 2 (PAYPERIOD 8, WEEK 1)  
**Date:** Friday, March 25, 2011 6:16:50 PM  
**Attachments:** MASTER RESPONDER SCHEDULE FOR JAPAN EARTHQUAKE.pdf

Attached is the OPS Center Watchbill for Sunday, March 27 – Saturday, April 2. All positions except the PMTR RAAD, Sunday, 3pm – 11pm, are filled through Monday days (7:00am-3:00pm). Please contact the various Team Coordinators and [OST02.HOC@nrc.gov](mailto:OST02.HOC@nrc.gov) if you would like to work any open slots.

If you need to change the schedule please send an email to [OST02.HOC@nrc.gov](mailto:OST02.HOC@nrc.gov) and your teams coordinator

EST Admin Support  
NRC Operations Center

NNNN/51

301-816-5100 x5600

EST Admin Support  
NRC Operations Center  
eMail: [OST02.HOC@nrc.gov](mailto:OST02.HOC@nrc.gov)

## Japan Earthquake ERO Staffing Roster

Mar 27-Apr 2, 2011

Pay Period 8 - Week 1

Position	Date	Time	Staff
<b>Executive Team</b>			
<b>ET Director</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Jennifer Uhle
Sun	27-Mar	7am - 3pm	Jim Dyer
Sun	27-Mar	3pm-11pm	Brian Sheron
Sun-Mon	3/27-3/28	11pm - 7am	Jim Wiggins
Mon	28-Mar	7am - 3pm	Mike Weber
Mon	28-Mar	3pm-11pm	Roy Zimmerman
Mon-Tue	3/28-3/29	11pm - 7am	Jim Wiggins
Tue	29-Mar	7am - 3pm	Mike Weber
Tue	29-Mar	3pm-11pm	Roy Zimmerman
Tue-Wed	3/29-3/30	11pm - 7am	Jim Wiggins
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	Roy Zimmerman
Wed-Thur	3/30-3/31	11pm - 7am	Jim Wiggins
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	Brian Sheron
Thur-Fri	3/31-4/1	11pm - 7am	Cynthia Carpenter
Fri	1-Apr	7am - 3pm	Mike Weber
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	Cynthia Carpenter
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm - 7am	Cynthia Carpenter
<b>ET Response Advisor</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Chris Miller
Sun	27-Mar	7am - 3pm	Tom Blount
Sun	27-Mar	3pm-11pm	Brian McDermott
Sun-Mon	3/27-3/28	11pm - 7am	Scott Morris
Mon	28-Mar	7am - 3pm	Tom Blount
Mon	28-Mar	3pm-11pm	Brian McDermott
Mon-Tue	3/28-3/29	11pm - 7am	Chris Miller
Tue	29-Mar	7am - 3pm	Tom Blount
Tue	29-Mar	3pm-11pm	Brian McDermott
Tue-Wed	3/29-3/30	11pm - 7am	Scott Morris
Wed	30-Mar	7am - 3pm	Tom Blount
Wed	30-Mar	3pm-11pm	Brian McDermott
Wed-Thur	3/30-3/31	11pm - 7am	Scott Morris
Thur	31-Mar	7am - 3pm	
Thur	31-Mar	3pm-11pm	Mark Thaggard
Thur-Fri	3/31-4/1	11pm - 7am	Scott Morris
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	Mark Thaggard
Fri-Sat	4/1-4/2	11pm-7am	Scott Morris
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm-7am	Brian McDermott

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<b>ET Rx Prot Measures &amp; State Coordinator</b>			
Sat-Sun	3/26-3/27	11pm - 7am	N/A
Sun	27-Mar	7am - 3pm	N/A
Sun	27-Mar	3pm-11pm	N/A
Sun-Mon	3/27-3/28	11pm - 7am	N/A
Mon	28-Mar	7am - 3pm	N/A
Mon	28-Mar	3pm-11pm	N/A
Mon-Tue	3/28-3/29	11pm - 7am	N/A
Tue	29-Mar	7am - 3pm	N/A
Tue	29-Mar	3pm-11pm	N/A
Tue-Wed	3/29-3/30	11pm - 7am	N/A
Wed	30-Mar	7am - 3pm	N/A
Wed	30-Mar	3pm-11pm	N/A
Wed-Thur	3/30-3/31	11pm - 7am	N/A
Thur	31-Mar	7am - 3pm	N/A
Thur	31-Mar	3pm-11pm	N/A
Thur-Fri	3/31-4/1	11pm - 7am	N/A
Fri	1-Apr	7am - 3pm	N/A
Fri	1-Apr	3pm-11pm	N/A
Fri-Sat	4/1-4/2	11pm-7am	N/A
Sat	2-Apr	7am - 3pm	N/A
Sat	2-Apr	3pm-11pm	N/A
Sat-Sun	4/2-4/3	11pm - 7am	N/A
<b>Executive Briefing Team</b>			
<b>EBT Admin. Assistant</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Jonathan Fiske
Sun	27-Mar	7am - 3pm	Annette Stang
Sun	27-Mar	3pm-11pm	Carolyn Kahler
Sun-Mon	3/27-3/28	11pm - 7am	Christina Merritt
Mon	28-Mar	7am - 3pm	Louise Lovell
Mon	28-Mar	3pm-11pm	Annette Stang
Mon-Tue	3/28-3/29	11pm - 9am	Jonathan Fiske
Tue	29-Mar	9am - 3pm	Sapna Hurd
Tue	29-Mar	3pm-11pm	Tonya Russell
Tue-Wed	3/29-3/30	11pm - 7am	Christina Merritt
Wed	30-Mar	7am - 3pm	Carolyn Kahler/Sapna Hurd
Wed	30-Mar	3pm-11pm	Tonya Russell
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	Louise Lovell
Thur	31-Mar	3pm-11pm	Sapna Hurd
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	Annette Stang
Fri	1-Apr	3pm-11pm	Sapna Hurd
Fri-Sat	4/1-4/2	11pm-7am	
<b>EBT Coordinator</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Jim Anderson
Sun	27-Mar	7am - 3pm	Eddie Robinson

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Sun	27-Mar	3pm-11pm	Nicole Glenn
Sun-Mon	3/27-3/28	11pm - 7am	Caroline Nguyen
Mon	28-Mar	7am - 3pm	Yen Chen
Mon	28-Mar	3pm-11pm	Sara Mroz
Mon-Tue	3/28-3/29	11pm - 7am	Jim Anderson
Tue	29-Mar	7am - 3pm	Yen Chen
Tue	29-Mar	3pm-11pm	Sara Mroz
Tue-Wed	3/29-3/30	11pm - 7am	Jim Anderson
Wed	30-Mar	7am - 3pm	Yen Chen
Wed	30-Mar	3pm-11pm	Sara Mroz
Wed-Thur	3/30-3/31	11pm - 7am	Jim Anderson
Thur	31-Mar	7am - 3pm	Yen Chen
Thur	31-Mar	3pm-11pm	Sara Mroz
Thur-Fri	3/31-4/1	11pm - 7am	Jim Anderson
Fri	1-Apr	7am - 3pm	Yen Chen
Fri	1-Apr	3pm-11pm	Sara Mroz
Fri-Sat	4/1-4/2	11pm-7am	Jim Anderson
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm - 7am	

**Executive Support Team**

**EST Status Officer**

Sat-Sun	3/26-3/27	11pm - 7am	Jeff Grant
Sun	27-Mar	7am - 3pm	Jane Marshall
Sun	27-Mar	3pm-11pm	Bill Gott
Sun-Mon	3/27-3/28	11pm - 7am	Jeff Grant
Mon	28-Mar	7am - 3pm	Jane Marshall
Mon	28-Mar	3pm-11pm	Bill Gott
Mon-Tue	3/28-3/29	11pm - 7am	Jeff Grant
Tue	29-Mar	7am - 3pm	Jane Marshall
Tue	29-Mar	3pm-11pm	Bill Gott
Tue-Wed	3/29-3/30	11pm - 7am	Jeff Grant
Wed	30-Mar	7am - 3pm	Jane Marshall
Wed	30-Mar	3pm-11pm	Bill Gott
Wed-Thur	3/30-3/31	11pm - 7am	Jeff Grant
Thur	31-Mar	7am - 3pm	Jane Marshall
Thur	31-Mar	3pm-11pm	Bill Gott
Thur-Fri	3/31-4/1	11pm - 7am	Jeff Grant
Fri	1-Apr	7am - 3pm	Jane Marshall ?
Fri	1-Apr	3pm-11pm	Bill Gott
Fri-Sat	4/1-4/2	11pm-7am	Jeff Grant
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm - 7am	

**EST Actions Officer**

Sat-Sun	3/26-3/27	11pm - 7am	N/A
Sun	27-Mar	7am - 3pm	Kelly Grimes

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Sun	27-Mar	3pm-11pm	Melissa Ralph
Sun-Mon	3/27-3/28	11pm - 7am	N/A
Mon	28-Mar	7am - 3pm	Zahira Cruz
Mon	28-Mar	3pm-11pm	Melissa Ralph
Mon-Tue	3/28-3/29	11pm - 7am	N/A
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	Melissa Ralph
Tue-Wed	3/29-3/30	11pm - 7am	N/A
Wed	30-Mar	7am - 3pm	Wendy Reed
Wed	30-Mar	3pm-11pm	Melissa Ralph
Wed-Thur	3/30-3/31	11pm - 7am	N/A
Thur	31-Mar	7am - 3pm	Jonathan Fiske
Thur	31-Mar	3pm-11pm	Melissa Ralph
Thur-Fri	3/31-4/1	11pm - 7am	N/A
Fri	1-Apr	7am - 3pm	Wendy Reed
Fri	1-Apr	3pm-11pm	Melissa Ralph
Fri-Sat	4/1-4/2	11pm-7am	Don Algama
Sat	2-Apr	7am - 3pm	Anthony Bowers
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm - 7am	N/A

**EST Coordinator**

Sat-Sun	3/26-3/27	11pm - 7am	Steve Campbell
Sun	27-Mar	7am - 3pm	Tonya Russell
Sun	27-Mar	3pm-11pm	Stella Opara
Sun-Mon	3/27-3/28	11pm - 7am	Taylor Lichatz
Mon	28-Mar	7am - 3pm	Tony McMurtray
Mon	28-Mar	3pm-11pm	Rebecca Stone
Mon-Tue	3/28-3/29	11pm - 7am	Stacy Smith
Tue	29-Mar	7am - 3pm	Anthony Bowers
Tue	29-Mar	3pm-11pm	Tony McMurtray
Tue-Wed	3/29-3/30	11pm - 7am	Rebecca Stone
Wed	30-Mar	7am - 3pm	Taylor Lichatz
Wed	30-Mar	3pm-11pm	Tony McMurtray
Wed-Thur	3/30-3/31	11pm - 7am	Rebecca Stone
Thur	31-Mar	7am - 3pm	Anthony Bowers
Thur	31-Mar	3pm-11pm	Tony McMurtray
Thur-Fri	3/31-4/1	11pm - 7am	Rebecca Stone
Fri	1-Apr	7am - 3pm	Steve Campbell
Fri	1-Apr	3pm-11pm	Tony McMurtray
Fri-Sat	4/1-4/2	11pm-7am	Rebecca Stone
Sat	2-Apr	7am - 3pm	Stacy Smith
Sat	2-Apr	3pm-11pm	Steve Campbell
Sat-Sun	4/2-4/3	11pm - 7am	Rebecca Stone

**EST Chronology Officer**

Sat-Sun	3/26-3/27	11pm - 7am	Thomas Scarbrough
Sun	27-Mar	7am - 3pm	Hector Rodriguez
Sun	27-Mar	3pm-11pm	Rebecca Karas

Japan Earthquake ERO Staffing Roster

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Sun-Mon	3/27-3/28	11pm - 7am	Thomas Scarbrough
Mon	28-Mar	7am - 3pm	Hector Rodriguez
Mon	28-Mar	3pm-11pm	Rebecca Karas
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	Vanice Perin
Tue	29-Mar	3pm-11pm	Rebecca Karas
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	Hector Rodriguez
Wed	30-Mar	3pm-11pm	Rebecca Karas
Wed-Thur	3/30-3/31	11pm - 7am	Thomas Scarbrough
Thur	31-Mar	7am - 3pm	Vanice Perin
Thur	31-Mar	3pm-11pm	Rebecca Karas
Thur-Fri	3/31-4/1	11pm - 7am	Nick Ballam
Fri	1-Apr	7am - 3pm	Sandra Valencia
Fri	1-Apr	3pm-11pm	Rebecca Karas
Fri-Sat	4/1-4/2	11pm-7am	Nick Ballam
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm - 7am	

**EST Response Ops Mgr**

Sat-Sun	3/26-3/27	11pm - 7am	Roberto Figueroa
Sun	27-Mar	7am - 3pm	Omar Khan
Sun	27-Mar	3pm-11pm	Cris Brown
Sun-Mon	3/27-3/28	11pm - 7am	Roberto Figueroa
Mon	28-Mar	7am - 3pm	Karen Jackson
Mon	28-Mar	3pm-11pm	Cris Brown
Mon-Tue	3/28-3/29	11pm - 7am	Omar Khan
Tue	29-Mar	7am - 3pm	Bob Stransky
Tue	29-Mar	3pm-11pm	Cris Brown
Tue-Wed	3/29-3/30	11pm - 7am	Karen Jackson
Wed	30-Mar	7am - 3pm	Omar Khan
Wed	30-Mar	3pm-11pm	Cris Brown
Wed-Thur	3/30-3/31	11pm - 7am	Bob Stransky
Thur	31-Mar	7am - 3pm	Karen Jackson
Thur	31-Mar	3pm-11pm	Omar Khan
Thur-Fri	3/31-4/1	11pm - 7am	Bob Stransky
Fri	1-Apr	7am - 3pm	Roberto Figueroa
Fri	1-Apr	3pm-11pm	Karen Jackson
Fri-Sat	4/1-4/2	11pm-7am	Omar Khan
Sat	2-Apr	7am - 3pm	Roberto Figueroa
Sat	2-Apr	3pm-11pm	Karen Jackson
Sat-Sun	4/2-4/3	11pm - 7am	Omar Khan

**EST Admin. Assistant**

Sat-Sun	3/26-3/27	11pm - 7am	N/A
Sun	27-Mar	7am - 3pm	Karen Meyer
Sun	27-Mar	3pm-11pm	Cynthia Dorsey
Sun-Mon	3/27-3/28	11pm - 7am	N/A

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Mon	28-Mar	7am - 3pm	Michelle Manahan
Mon	28-Mar	3pm-11pm	Carol Greenwood
Mon-Tue	3/28-3/29	11pm - 7am	N/A
Tue	29-Mar	7am - 3pm	Michelle Manahan
Tue	29-Mar	3pm-11pm	Mary Glenn Crutchley
Tue-Wed	3/29-3/30	11pm - 7am	N/A
Wed	30-Mar	7am - 3pm	Cynthia Dorsey
Wed	30-Mar	3pm-11pm	Mary Glenn Crutchley
Wed-Thur	3/30-3/31	11pm - 7am	N/A
Thur	31-Mar	7am - 3pm	Amy Salus
Thur	31-Mar	3pm-11pm	Tabitha Howard
Thur-Fri	3/31-4/1	11pm - 7am	N/A
Fri	1-Apr	7am - 3pm	Carol Greenwood
Fri	1-Apr	3pm-11pm	Tabitha Howard
Fri-Sat	4/1-4/2	11pm-7am	N/A
Sat	2-Apr	7am - 3pm	Karen Meyer
Sat	2-Apr	3pm-11pm	Cynthia Dorsey
Sat-Sun	4/2-4/3	11pm - 7am	N/A

**Liaison Team****LT Director**

Sat-Sun	3/26-3/27	11pm - 7am	Marissa Bailey
Sun	27-Mar	7am - 3pm	Mike Tschiltz
Sun	27-Mar	3pm-11pm	Marrisa Bailey
Sun-Mon	3/27-3/28	11pm - 7am	Mark Thaggard
Mon	28-Mar	7am - 3pm	Allen Howe
Mon	28-Mar	3pm-11pm	Marrisa Bailey
Mon-Tue	3/28-3/29	11pm - 7am	
Tue	29-Mar	7am - 3pm	Allen Howe
Tue	29-Mar	3pm-11pm	Marrisa Bailey
Tue-Wed	3/29-3/30	11pm - 7am	
Wed	30-Mar	7am - 3pm	Allen Howe
Wed	30-Mar	3pm-11pm	Marrisa Bailey
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	John Adams
Thur	31-Mar	3pm-11pm	Mark Lombard
Thur-Fri	3/31-4/1	11pm - 7am	Bob Webber
Fri	1-Apr	7am - 3pm	John Adams
Fri	1-Apr	3pm-11pm	Mark Lombard
Fri-Sat	4/1-4/2	11pm-7am	Tom Bergman
Sat	2-Apr	7am - 3pm	John Adams
Sat	2-Apr	3pm-11pm	Mark Lombard
Sat-Sun	4/2-4/3	11pm - 7am	Tom Bergman

**LT Coordinator**

Sat-Sun	3/26-3/27	11pm - 7am	Milt Murray
Sun	27-Mar	7am - 3pm	Lisa Gibney
Sun	27-Mar	3pm-11pm	Jeff Temple
Sun-Mon	3/27-3/28	11pm - 7am	Milt Murray

Japan Earthquake ERO Staffing Roster  
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Mon	28-Mar	7am - 3pm	Jeff Temple
Mon	28-Mar	3pm-11pm	Rani Franovich
Mon-Tue	3/28-3/29	11pm - 7am	Janelle Jessie
Tue	29-Mar	7am - 3pm	Milt Murray
Tue	29-Mar	3pm-11pm	Rani Franovich
Tue-Wed	3/29-3/30	11pm - 7am	Janelle Jessie
Wed	30-Mar	7am - 3pm	Milt Murray
Wed	30-Mar	3pm-11pm	Jeff Temple
Wed-Thur	3/30-3/31	11pm - 7am	Janelle Jessie
Thur	31-Mar	7am - 3pm	Milt Murray
Thur	31-Mar	3pm-11pm	Jeff Temple
Thur-Fri	3/31-4/1	11pm - 7am	Rani Franovich
Fri	1-Apr	7am - 3pm	Jeff Temple
Fri	1-Apr	3pm-11pm	Janelle Jessie
Fri-Sat	4/1-4/2	11pm-7am	Rani Franovich
Sat	2-Apr	7am - 3pm	Jeff Temple
Sat	2-Apr	3pm-11pm	Milt Murray
Sat-Sun	4/2-4/3	11pm - 7am	
<b>LT State Liaison</b>			
Sat-Sun	3/26-3/27	9pm-7am	A. Rivera/A. Noonan (ON CALL)
Sun	27-Mar	7am-2pm	Alison Rivera (ON CALL)
Sun	27-Mar	2pm-9pm	Alison Rivera (ON CALL)
Sun-Mon	3/27-3/28	9pm-7am	Alison Rivera (ON CALL)
Mon	28-Mar	7am-2pm	C. Maupin/C. Flannery (ON CALL)
Mon	28-Mar	2pm-9pm	Stuart Easson
Mon-Tue	3/28-3/29	9pm-7am	R. Virgilio (ON CALL)
Tue	29-Mar	7am-2pm	C. Maupin/C. Flannery (ON CALL)
Tue	29-Mar	2pm-9pm	Stuart Easson
Tue-Wed	3/29-3/30	9pm-7am	Richard Turtill (ON CALL)
Wed	30-Mar	7am-2pm	Cindy Flannery
Wed	30-Mar	2pm-9pm	Michelle Ryan
Wed-Thur	3/30-3/31	9pm-7am	Richard Turtill (ON CALL)
Thur	31-Mar	7am-2pm	Amanda Noonan
Thur	31-Mar	2pm-9pm	Michelle Ryan
Thur-Fri	3/31-4/1	9pm-7am	Richard Turtill (ON CALL)
Fri	1-Apr	7am-2pm	Kim Lukes
Fri	1-Apr	2pm-9pm	Alison Rivera
Fri-Sat	4/1-4/2	9pm-7am	Richard Turtill (ON CALL)
Sat	2-Apr	7am-2pm	Amanda Noonan (ON CALL)
Sat	2-Apr	2pm-9pm	Amanda Noonan (ON CALL)
Sat-Sun	2-Apr	9pm-7am	Amanda Noonan (ON CALL)
<b>LT Federal Liaison (2)</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Scott Sloan
Sun	27-Mar	7am - 3pm	Susan Salter / Lisa Gibney
Sun	27-Mar	3pm-11pm	Jerry Hale
Sun-Mon	3/27-3/28	11pm - 7am	Scott Sloan
Mon	28-Mar	7am - 3pm	Susan Salter / Lisa Gibney

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Mon	28-Mar	3pm-11pm	Lisa Wright
Mon-Tue	3/28-3/29	11pm - 7am	Ned Wright
Tue	29-Mar	7am - 3pm	Susan Salter / Jerry Hale
Tue	29-Mar	3pm-11pm	Lisa Wright
Tue-Wed	3/29-3/30	11pm - 7am	Ned Wright
Wed	30-Mar	7am - 3pm	Bethany Cecere / Jerry Hale
Wed	30-Mar	3pm-11pm	Lisa Wright
Wed-Thur	3/30-3/31	11pm - 7am	Ned Wright
Thur	31-Mar	7am - 3pm	Jeff Temple / Jason Lising
Thur	31-Mar	3pm-11pm	Ted Smith
Thur-Fri	3/31-4/1	11pm - 7am	Ned Wright
Fri	1-Apr	7am - 3pm	Jeff Lynch / Beth Reed
Fri	1-Apr	3pm-11pm	Jerry Hale
Fri-Sat	4/1-4/2	11pm-7am	Jason Lising
Sat	2-Apr	7am - 3pm	Beth Reed
Sat	2-Apr	3pm-11pm	Bethany Cecere
Sat-Sun	4/2-4/3	11pm - 7am	Jason Lising

**LT Congressional Liaison (2)**

Sat-Sun	3/26-3/27	11pm - 7am	Amy Powell (ON CALL)
Sun	27-Mar	7am - 3pm	Amy Powell (ON CALL)
Sun	27-Mar	3pm-11pm	Amy Powell (ON CALL)
Sun-Mon	3/27-3/28	11pm - 7am	Amy Powell (ON CALL)
Mon	28-Mar	7am - 3pm	Amy Powell (ON CALL)
Mon	28-Mar	3pm-11pm	Amy Powell (ON CALL)
Mon-Tue	3/28-3/29	11pm - 7am	Amy Powell (ON CALL)
Tue	29-Mar	7am - 3pm	Amy Powell (ON CALL)
Tue	29-Mar	3pm-11pm	Amy Powell (ON CALL)
Tue-Wed	3/29-3/30	11pm - 7am	Amy Powell (ON CALL)
Wed	30-Mar	7am - 3pm	Amy Powell (ON CALL)
Wed	30-Mar	3pm-11pm	Amy Powell (ON CALL)
Wed-Thur	3/30-3/31	11pm - 7am	Amy Powell (ON CALL)
Thur	31-Mar	7am - 3pm	Amy Powell (ON CALL)
Thur	31-Mar	3pm-11pm	Amy Powell (ON CALL)
Thur-Fri	3/31-4/1	11pm - 7am	Amy Powell (ON CALL)
Fri	1-Apr	7am - 2pm	Amy Powell (ON CALL)
Fri	1-Apr	2pm-9pm	Amy Powell (ON CALL)
Sat	2-Apr	7am - 2pm	Amy Powell (ON CALL)
Sat	2-Apr	2pm-9pm	Amy Powell (ON CALL)
Sun	3-Apr	7am-2pm	Amy Powell (ON CALL)

**LT International Liaison (2)**

Sat-Sun	3/26-3/27	11pm - 7am	Cindy Rosales/ Elizabeth Smiroldo
Sun	27-Mar	7am - 3pm	Jill Shepard/ Karen Henderson
Sun	27-Mar	3pm-11pm	Nancy Fragoyannis/ Jenny Tobin
Sun-Mon	3/27-3/28	11pm - 7am	Steve Baker / Brian Wittick
Mon	28-Mar	7am - 3pm	Jill Shepard/ Karen Henderson
Mon	28-Mar	3pm-11pm	Nancy Fragoyannis / Cindy Rosales
Mon-Tue	3/28-3/29	11pm - 7am	Steve Baker / Brian Wittick

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Tue	29-Mar	7am - 3pm	Jill Shepard/ Karen Henderson
Tue	29-Mar	3pm-11pm	Nancy Fragoyannis / Gerri Fehst
Tue-Wed	3/29-3/30	11pm - 7am	Steve Baker / Brian Wittick
Wed	30-Mar	7am - 3pm	Eric Stahl / Lauren Mayros (J. Tobin 12-3)
Wed	30-Mar	3pm-11pm	Danielle Emche / Mugah Afshar-Tous
Wed-Thur	3/30-3/31	11pm - 7am	Jen Schwartzman / Charlotte Abrams
Thur	31-Mar	7am - 3pm	Jill Shepard / Lauren Mayros
Thur	31-Mar	3pm-11pm	Gerri / Mugah Afshar-Tous
Thur-Fri	3/31-4/1	11pm - 7am	Jen Schwartzman / Charlotte Abrams
Fri	1-Apr	7am - 3pm	Cindy Rosales/ Lauren Mayros
Fri	1-Apr	3pm-11pm	Gerri/ Mugah Afshar-Tous
Fri-Sat	4/1-4/2	11pm-7am	Jen Schwartzman / Charlotte Abrams
Sat	2-Apr	7am - 3pm	Steve Bloom/ Karen Henderson
Sat	2-Apr	3pm-11pm	Janice Owens / Jenny Tobin
Sat-Sun	4/2-4/3	11pm - 7am	Gerri Fehst / Elizabeth Smiroldo
<b>Protective Measures Team</b>			
<b>PMTR Director</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Randy Sullivan
Sun	27-Mar	7am - 3pm	Don Cool
Sun	27-Mar	3pm-11pm	Vince Holahan
Sun-Mon	3/27-3/28	11pm - 7am	John Tappert
Mon	28-Mar	7am - 3pm	Don Cool
Mon	28-Mar	3pm-11pm	Vince Holahan
Mon-Tue	3/28-3/29	11pm - 7am	John Tappert
Tue	29-Mar	7am - 3pm	Terry Reis
Tue	29-Mar	3pm-11pm	Vince Holahan
Tue-Wed	3/29-3/30	11pm - 7am	Patricia Milligan
Wed	30-Mar	7am - 3pm	Terry Reis
Wed	30-Mar	3pm-11pm	Vince Holahan
Wed-Thur	3/30-3/31	11pm - 7am	Patricia Milligan
Thur	31-Mar	7am - 3pm	Randy Sullivan
Thur	31-Mar	3pm-11pm	Terry Reis
Thur-Fri	3/31-4/1	11pm - 7am	Christiana Lui
Fri	1-Apr	7am - 3pm	Randy Sullivan
Fri	1-Apr	3pm-11pm	Don Cool
Fri-Sat	4/1-4/2	11pm-7am	Christiana Lui
Sat	2-Apr	7am - 3pm	Randy Sullivan
Sat	2-Apr	3pm-11pm	Don Cool
Sat-Sun	4/2-4/3	11pm - 7am	Christiana Lui
<b>PMTR Coordinator</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Lou Brandon
Sun	27-Mar	7am - 3pm	Ryan Craffey
Sun	27-Mar	3pm-11pm	Jay Patel
Sun-Mon	3/27-3/28	11pm - 7am	Lou Brandon
Mon	28-Mar	7am - 3pm	Duane Hardesty
Mon	28-Mar	3pm-11pm	Nima Ashkeboussi
Mon-Tue	3/28-3/29	11pm - 7am	Lou Brandon

Japan Earthquake ERO Staffing Roster

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Tue	29-Mar	7am - 3pm	Duane Hardesty
Tue	29-Mar	3pm-11pm	Nima Ashkeboussi
Tue-Wed	3/29-3/30	11pm - 7am	Lou Brandon
Wed	30-Mar	7am - 3pm	Michael Raddatz
Wed	30-Mar	3pm-11pm	Jay Patel
Wed-Thur	3/30-3/31	11pm - 7am	Ryan Craffey
Thur	31-Mar	7am - 3pm	Duane Hardesty
Thur	31-Mar	3pm-11pm	Michael Raddatz
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	Duane Hardesty
Fri	1-Apr	3pm-11pm	Nima Ashkeboussi
Fri-Sat	4/1-4/2	11pm-7am	
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm - 7am	

**PMTR Prot Actions Asst Dir**

Sat-Sun	3/26-3/27	11pm - 7am	Greg Casto
Sun	27-Mar	7am - 3pm	Kevin Williams
Sun	27-Mar	3pm-11pm	Tim Harris
Sun-Mon	3/27-3/28	11pm - 7am	Greg Casto/Jessical Kratchman
Mon	28-Mar	7am - 3pm	Sandra Wastler
Mon	28-Mar	3pm-11pm	Mike McCoppin
Mon-Tue	3/28-3/29	11pm - 7am	Greg Casto/Jessical Kratchman
Tue	29-Mar	7am - 3pm	
Tue	29-Mar	3pm-11pm	Tim Harris
Tue-Wed	3/29-3/30	11pm - 7am	Greg Casto
Wed	30-Mar	7am - 3pm	Alemu Bezakulu
Wed	30-Mar	3pm-11pm	Sandra Wastler
Wed-Thur	3/30-3/31	11pm - 7am	Greg Casto
Thur	31-Mar	7am - 3pm	Jessica Kratchman
Thur	31-Mar	3pm-11pm	Tim Harris
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	Sandra Wastler/Jessica Kratchman
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
Sat	2-Apr	7am - 3pm	Alemu Bezakulu
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm - 7am	

**PMTR RAAD**

Sat-Sun	3/26-3/27	11pm - 7am	Mike Norris
Sun	27-Mar	7am - 3pm	Michelle Hart
Sun	27-Mar	3pm-11pm	
Sun-Mon	3/27-3/28	11pm - 7am	Mike Norris
Mon	28-Mar	7am - 3pm	Steve LaVie
Mon	28-Mar	3pm-11pm	Michelle Hart
Mon-Tue	3/28-3/29	11pm - 7am	Mike Norris
Tue	29-Mar	7am - 3pm	

Japan Earthquake ERO Staffing Roster

Mar 27-Apr 2, 2011

Pay Period 8 - Week 1

Tue	29-Mar	3pm-11pm	
Tue-Wed	3/29-3/30	11pm - 7am	Mike Norris
Wed	30-Mar	7am - 3pm	
Wed	30-Mar	3pm-11pm	Steve LaVie
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	Michelle Hart
Thur	31-Mar	3pm-11pm	
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	Steve LaVie
Fri-Sat	4/1-4/2	11pm-7am	Michelle Hart
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm - 7am	

**PMTR Dose Assessment (RASCAL) - Need 2**

Sat-Sun	3/26-3/27	11pm - 7am	John Parillo/Ron LaVera
Sun	27-Mar	7am - 3pm	Tony Huffert
Sun	27-Mar	3pm-11pm	Casper Sun/Ed Roach
Sun-Mon	3/27-3/28	11pm - 7am	Margaret Cervera/John Parillo
Mon	28-Mar	7am - 3pm	Rich Clement/Tony Huffert
Mon	28-Mar	3pm-11pm	Bernie White/Casper Sun
Mon-Tue	3/28-3/29	11pm - 7am	Margaret Cervera/John Parillo
Tue	29-Mar	7am - 3pm	Tony Huffert/Rich Clement
Tue	29-Mar	3pm-11pm	Casper Sun
Tue-Wed	3/29-3/30	11pm - 7am	Margaret Cervera/Bernie White
Wed	30-Mar	7am - 3pm	Tony Huffert/Rich Clement
Wed	30-Mar	3pm-11pm	Casper Sun
Wed-Thur	3/30-3/31	11pm - 7am	Margaret Cervera/John Parillo
Thur	31-Mar	7am - 3pm	Rich Clement/Joe DeCicco
Thur	31-Mar	3pm-11pm	Bernie White (Maybe)/Casper Sun
Thur-Fri	3/31-4/1	11pm - 7am	John Parillo
Fri	1-Apr	7am - 3pm	/Rich Clement
Fri	1-Apr	3pm-11pm	Casper Sun
Fri-Sat	4/1-4/2	11pm-7am	John Parillo
Sat	2-Apr	7am - 3pm	Tony Huffert
Sat	2-Apr	3pm-11pm	Casper Sun
Sat-Sun	4/2-4/3	11pm - 7am	

**PMTR GIS Analyst**

Sat-Sun	3/26-3/27	11pm - 7am	N/A
Sun	27-Mar	7am - 3pm	(ON CALL)
Sun	27-Mar	3pm-11pm	N/A
Sun-Mon	3/27-3/28	11pm - 7am	N/A
Mon	28-Mar	7am - 3pm	(ON CALL)
Mon	28-Mar	3pm-11pm	N/A
Mon-Tue	3/28-3/29	11pm - 7am	N/A
Tue	29-Mar	7am - 3pm	(ON CALL)
Tue	29-Mar	3pm-11pm	N/A

## Japan Earthquake ERO Staffing Roster

Mar 27-Apr 2, 2011

Pay Period 8 - Week 1

Tue-Wed	3/29-3/30	11pm - 7am	N/A
Wed	30-Mar	7am - 3pm	(ON CALL)
Wed	30-Mar	3pm-11pm	N/A
Wed-Thur	3/30-3/31	11pm - 7am	N/A
Thur	31-Mar	7am - 3pm	(ON CALL)
Thur	31-Mar	3pm-11pm	N/A
Thur-Fri	3/31-4/1	11pm - 7am	N/A
Fri	1-Apr	7am - 3pm	(ON CALL)
Fri	1-Apr	3pm-11pm	N/A
Fri-Sat	4/1-4/2	11pm-7am	N/A
Sat	2-Apr	7am - 3pm	(ON CALL)
Sat	2-Apr	3pm-11pm	N/A
Sat-Sun	4/2-4/3	11pm - 7am	N/A

**PMTR Meteorologist**

Sat-Sun	3/26-3/27	11pm - 7am	N/A
Sun	27-Mar	7am - 3pm	(ON CALL)
Sun	27-Mar	3pm-11pm	N/A
Sun-Mon	3/27-3/28	11pm - 7am	N/A
Mon	28-Mar	7am - 3pm	(ON CALL)
Mon	28-Mar	3pm-11pm	N/A
Mon-Tue	3/28-3/29	11pm - 7am	N/A
Tue	29-Mar	7am - 3pm	(ON CALL)
Tue	29-Mar	3pm-11pm	N/A
Tue-Wed	3/29-3/30	11pm - 7am	N/A
Wed	30-Mar	7am - 3pm	(ON CALL)
Wed	30-Mar	3pm-11pm	N/A
Wed-Thur	3/30-3/31	11pm - 7am	N/A
Thur	31-Mar	7am - 3pm	(ON CALL)
Thur	31-Mar	3pm-11pm	N/A
Thur-Fri	3/31-4/1	11pm - 7am	N/A
Fri	1-Apr	7am - 3pm	(ON CALL)
Fri	1-Apr	3pm-11pm	N/A
Fri-Sat	4/1-4/2	11pm-7am	N/A
Sat	2-Apr	7am - 3pm	(ON CALL)
Sat	2-Apr	3pm-11pm	N/A
Sat-Sun	4/2-4/3	11pm - 7am	N/A

**Reactor Safety Team****RST Director**

Sat-Sun	3/26-3/27	11pm - 7am	Dave Skeen
Sun	27-Mar	7am - 3pm	Pat Hiland
Sun	27-Mar	3pm-11pm	Fred Brown
Sun-Mon	3/27-3/28	11pm - 7am	Dave Skeen
Mon	28-Mar	7am - 3pm	Pat Hiland
Mon	28-Mar	3pm-11pm	Fred Brown
Mon-Tue	3/28-3/29	11pm - 7am	Dave Skeen
Tue	29-Mar	7am - 3pm	Jennifer Uhle
Tue	29-Mar	3pm-11pm	Fred Brown

Japan Earthquake ERO Staffing Roster

Mar 27-Apr 2, 2011

Pay Period 8 - Week 1

Tue-Wed	3/29-3/30	11pm - 7am	Dave Skeen
Wed	30-Mar	7am - 3pm	Jennifer Uhle
Wed	30-Mar	3pm-11pm	Fred Brown
Wed-Thur	3/30-3/31	11pm - 7am	Mike Case
Thur	31-Mar	7am - 3pm	Jennifer Uhle
Thur	31-Mar	3pm-11pm	Bill Ruland
Thur-Fri	3/31-4/1	11pm - 7am	Mike Case
Fri	1-Apr	7am - 3pm	Jennifer Uhle
Fri	1-Apr	3pm-11pm	Bill Ruland
Fri-Sat	4/1-4/2	11pm-7am	Mike Case
Sat	2-Apr	7am - 3pm	Brian Holian
Sat	2-Apr	3pm-11pm	Bill Ruland
Sat-Sun	4/2-4/3	11pm - 7am	Mike Case

**RST Coordinator**

Sat-Sun	3/26-3/27	11pm - 7am	Brett Rini
Sun	27-Mar	7am - 3pm	Peter Alter
Sun	27-Mar	3pm-11pm	Rick Hasselberg
Sun-Mon	3/27-3/28	11pm - 7am	Frank Collins
Mon	28-Mar	7am - 3pm	Peter Alter
Mon	28-Mar	3pm-11pm	Rick Hasselberg
Mon-Tue	3/28-3/29	11pm - 7am	Mike Morlang
Tue	29-Mar	7am - 3pm	Peter Alter
Tue	29-Mar	3pm-11pm	Greg Schoenebeck
Tue-Wed	3/29-3/30	11pm - 7am	Mike Morlang
Wed	30-Mar	7am - 3pm	Peter Alter
Wed	30-Mar	3pm-11pm	Greg Schoenebeck
Wed-Thur	3/30-3/31	11pm - 7am	Frank Collins
Thur	31-Mar	7am - 3pm	Peter Alter
Thur	31-Mar	3pm-11pm	Greg Schoenebeck
Thur-Fri	3/31-4/1	11pm - 7am	Frank Collins
Fri	1-Apr	7am - 3pm	Brett Rini
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	Frank Collins
Sat	2-Apr	7am - 3pm	Peter Alter
Sat	2-Apr	3pm-11pm	Brett Rini
Sat-Sun	4/2-4/3	11pm - 7am	Oleg Bukharin

**Severe Accident/PRA**

Sat-Sun	3/26-3/27	11pm - 7am	Ray Skarda
Sun	27-Mar	7am - 3pm	Andy Howe
Sun	27-Mar	3pm-11pm	Jeff Mitman
Sun-Mon	3/27-3/28	11pm - 7am	Jim Gilmer
Mon	28-Mar	7am - 3pm	Jeff Circle
Mon	28-Mar	3pm-11pm	Len Ward
Mon-Tue	3/28-3/29	11pm - 7am	Steve Arndt
Tue	29-Mar	7am - 3pm	Hossein Esmaili
Tue	29-Mar	3pm-11pm	Ed Fuller
Tue-Wed	3/29-3/30	11pm - 7am	Steve Arndt

## Japan Earthquake ERO Staffing Roster

Mar 27-Apr 2, 2011

Pay Period 8 - Week 1

Wed	30-Mar	7am - 3pm	Jim Gilmer
Wed	30-Mar	3pm-11pm	Hossein Esmaili
Wed-Thur	3/30-3/31	11pm - 7am	Steve Arndt
Thur	31-Mar	7am - 3pm	Don Chung
Thur	31-Mar	3pm-11pm	Hossein Esmaili
Thur-Fri	3/31-4/1	11pm - 7am	Steve Arndt
Fri	1-Apr	7am - 3pm	Jeff Mitman
Fri	1-Apr	3pm-11pm	Don Hilton
Fri-Sat	4/1-4/2	11pm-7am	Ray Skarda
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm - 7am	

**BWR Expertise**

Sat-Sun	3/26-3/27	11pm - 7am	Eva Brown
Sun	27-Mar	7am - 3pm	Mike Brown
Sun	27-Mar	3pm-11pm	Chuck Norton
Sun-Mon	3/27-3/28	11pm - 7am	Eva Brown
Mon	28-Mar	7am - 3pm	Mike Brown
Mon	28-Mar	3pm-11pm	Chuck Norton
Mon-Tue	3/28-3/29	11pm - 7am	Jim Shea
Tue	29-Mar	7am - 3pm	Mike Brown
Tue	29-Mar	3pm-11pm	Chuck Norton
Tue-Wed	3/29-3/30	11pm - 7am	Jim Shea
Wed	30-Mar	7am - 3pm	Mike Brown
Wed	30-Mar	3pm-11pm	Chuck Norton
Wed-Thur	3/30-3/31	11pm - 7am	Jim Shea
Thur	31-Mar	7am - 3pm	Mike Brown
Thur	31-Mar	3pm-11pm	Chuck Norton
Thur-Fri	3/31-4/1	11pm - 7am	Jim Shea
Fri	1-Apr	7am - 3pm	Mike Brown
Fri	1-Apr	3pm-11pm	Chuck Norton
Fri-Sat	4/1-4/2	11pm-7am	Eva Brown
Sat	2-Apr	7am - 3pm	Mike Brown
Sat	2-Apr	3pm-11pm	Chuck Norton
Sat-Sun	4/2-4/3	11pm - 7am	Eva Brown

**RST Comm/ERDS Operator**

Sat-Sun	3/26-3/27	11pm - 7am	Denise McGovern
Sun	27-Mar	7am - 3pm	Mark Padovan
Sun	27-Mar	3pm-11pm	Bill Roggenbrodt
Sun-Mon	3/27-3/28	11pm - 7am	Denise McGovern
Mon	28-Mar	7am - 3pm	Mark Padovan
Mon	28-Mar	3pm-11pm	Rick Jervey
Mon-Tue	3/28-3/29	11pm - 7am	Brian Horn
Tue	29-Mar	7am - 3pm	John Thorp
Tue	29-Mar	3pm-11pm	Andy Kugler
Tue-Wed	3/29-3/30	11pm - 7am	Brian Horn
Wed	30-Mar	7am - 3pm	Steve Bloom

## Japan Earthquake ERO Staffing Roster

Mar 27-Apr 2, 2011

Pay Period 8 - Week 1

Wed	30-Mar	3pm-11pm	Bill Roggenbrodt
Wed-Thur	3/30-3/31	11pm - 7am	
Thur	31-Mar	7am - 3pm	Jerry Dozier
Thur	31-Mar	3pm-11pm	John Thorp
Thur-Fri	3/31-4/1	11pm - 7am	
Fri	1-Apr	7am - 3pm	Andy Kugler
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	Liliana Ramadan
Sat	2-Apr	7am - 3pm	John Thorp
Sat	2-Apr	3pm-11pm	Mark Padovan
Sat-Sun	4/2-4/3	11pm - 7am	

**RST Support (Seismology Q&A)**

Sat-Sun	3/26-3/27	11pm - 7am	(ON CALL)
Sun	27-Mar	7am - 3pm	(ON CALL)
Sun	27-Mar	3pm-11pm	(ON CALL)
Sun-Mon	3/27-3/28	11pm - 7am	(ON CALL)
Mon	28-Mar	7am - 3pm	(ON CALL)
Mon	28-Mar	3pm-11pm	(ON CALL)
Mon-Tue	3/28-3/29	11pm - 7am	(ON CALL)
Tue	29-Mar	7am - 3pm	(ON CALL)
Tue	29-Mar	3pm-11pm	(ON CALL)
Tue-Wed	3/29-3/30	11pm - 7am	(ON CALL)
Wed	30-Mar	7am - 3pm	(ON CALL)
Wed	30-Mar	3pm-11pm	(ON CALL)
Wed-Thur	3/30-3/31	11pm - 7am	(ON CALL)
Thur	31-Mar	7am - 3pm	(ON CALL)
Thur	31-Mar	3pm-11pm	(ON CALL)
Thur-Fri	3/31-4/1	11pm - 7am	(ON CALL)
Fri	1-Apr	7am - 3pm	(ON CALL)
Fri	1-Apr	3pm-11pm	(ON CALL)
Fri-Sat	4/1-4/2	11pm-7am	(ON CALL)
Sat	2-Apr	7am - 3pm	(ON CALL)
Sat	2-Apr	3pm-11pm	(ON CALL)
Sat-Sun	4/2-4/3	11pm - 7am	(ON CALL)

**RST Support (Structural)**

Sat-Sun	3/26-3/27	11pm - 7am	Off (ON CALL)
Sun	27-Mar	7am - 3pm	Off (ON CALL)
Sun	27-Mar	3pm-11pm	Off (ON CALL)
Sun-Mon	3/27-3/28	11pm - 7am	Off (ON CALL)
Mon	28-Mar	7am - 3pm	Off (ON CALL)
Mon	28-Mar	3pm-11pm	Off (ON CALL)
Mon-Tues	3/28-3/29	11pm - 7am	Off (ON CALL)
Tues	29-Mar	7am - 3pm	Off (ON CALL)
Tues	29-Mar	3pm-11pm	Off (ON CALL)
Tues-Wed	3/29-3/30	11pm - 7am	Off (ON CALL)
Wed	30-Mar	7am - 3pm	Off (ON CALL)
Wed	30-Mar	3pm-11pm	Off (ON CALL)

## Japan Earthquake ERO Staffing Roster

Mar 27-Apr 2, 2011

Pay Period 8 - Week 1

Wed-Thur	3/30-3/31	11pm - 7am	Off (ON CALL)
Thur	31-Mar	7am - 3pm	Off (ON CALL)
Thur	31-Mar	3pm-11pm	Off (ON CALL)
Thur-Fri	3/31-4/1	11pm - 7am	Off (ON CALL)
Fri	1-Apr	7am - 3pm	Off (ON CALL)
Fri	1-Apr	3pm-11pm	Off (ON CALL)
Fri-Sat	4/1-4/2	11pm-7am	Off (ON CALL)

**From:** Taylor, Robert  
**To:** Harrington, Holly; Burnell, Scott; McIntyre, David  
**Subject:** Talking Points w/SFP info  
**Date:** Wednesday, March 16, 2011 7:25:48 PM  
**Attachments:** QUAKE TP 3 16 .docx

---

All,

The ET has blessed a new talking point regarding the status of the Japanese SFPs. Note that this talking point has a date stamp due to the potential that the event can evolve.

Will post the attached to WebEOC.

Regards,  
Rob

NNNN/52

Attachment QUAKE\_TP\_3\_16\_\_1.docx (17839 Bytes) cannot be converted to PDF format.

**From:** [Brenner, Eliot](#)  
**To:** [McIntyre, David](#)  
**Subject:** here"s your chance  
**Date:** Saturday, March 26, 2011 12:13:16 PM

---

To write the nastiest questions you can think of to prepare the chairman for his CBS interview. Anything you had ever wanted to ask ....

Contributions welcome.

NNNN/53

**From:** Skeen, David  
**To:** Kammerer, Annie  
**Cc:** Howe, Allen; Nelson, Robert; Hiland, Patrick; Stutzke, Martin; Giitter, Joseph; Rihm, Roger; McDermott, Brian; Hasselberg, Rick; Chokshi, Niles; Munson, Clifford; Cook, Christopher; Flanders, Scott; Ross-Lee, MaryJane; Brown, Frederick; Giitter, Joseph; Howe, Allen; Case, Michael; Ruland, William; Dudes, Laura; Karas, Rebecca; Ake, Jon; Munson, Clifford; Hogan, Rosemary; Uhle, Jennifer; Marshall, Michael; Uselding, Lara; Randall, John; Allen, Don; Burnell, Scott; Hayden, Elizabeth; Pires, Jose; Graves, Herman; Candra, Hernando; Murphy, Andrew; Murphy, Andrew; Pires, Jose; Hogan, Rosemary; Sheron, Brian; Dricks, Victor; Warnick, Greg; Reynoso, John; Lantz, Ryan; Markley, Michael  
**Subject:** RE: latest version of Q&As  
**Date:** Tuesday, March 15, 2011 6:18:31 AM

---

Annie,

Thank you for this comprehensive report. It is clear that you, Jon Ake, and Cliff Munson, have made substantial effort to create a document that will be the basis for much of the NRC's communications on seismic and tsunami risk over the coming days. What's more, you pulled this together in a very short time, since you only began working on it on Saturday, when I asked you to come to the Incident Response Center to assist the Reactor Safety Team shortly after the tragic events in Japan occurred. It is folks like you, Jon, and Cliff that make the NRC the outstanding organization that it is.

I would ask that if anyone has comments, to please route them through you, so that you maintain control of the document for the time being. Please let us know when you make revisions to the document.

---

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

All,

This is the first draft of the seismic-specific Q&As. It is pretty rough and there are many answers still missing, but people have contributed a lot and we thought it may be useful for many people trying to answer questions coming in.

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

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

Annie

Dr. Annie Kammerer, PE  
Senior Seismologist and Earthquake Engineer

NNNN/54

**From:** RMTPACTSU\_ELNRC  
**To:** Harrington, Holly; McIntyre, David; Burnell, Scott  
**Subject:** Japan News: Tokyo Issues Tap Water Warning for Infants  
**Date:** Wednesday, March 23, 2011 7:17:31 AM

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**Subject:** Japan News: Tokyo Issues Tap Water Warning for Infants

### **Tokyo Issues Tap Water Warning for Infants**

Source: The New York Times

Date: March 23, 2011

By DAVID JOLLY and KEVIN DREW

TOKYO — Radioactive iodine detected in the capital's water supply spurred a warning for infants on Wednesday as the government issued a stark new estimate about the costs of rebuilding from the earthquake and tsunami that slammed into the northeast of the country this month.

Ei Yoshida, head of water purification for the Tokyo water department, said at a televised news conference that infants in Tokyo and surrounding areas should not drink tap water. He said iodine-131 had been detected in water samples at a level of 210 becquerels per liter. The recommended limit for infants is 100 becquerels per liter.

For adults, the recommended limit is 300 becquerels.

The Health Ministry said in a statement that it was unlikely that there would be negative consequences to infants who did drink the water, but said it should be avoided if possible and that it should not be used to make infant formula.

The warning applies to the 23 wards of Tokyo, as well as the towns of Mitaka, Tama, Musashino, Machida and Inagi to the west of the city.

The announcement about the water added to the growing anxiety about public safety posed by the Fukushima Daiichi Nuclear Power Station which was severely damaged by the March 11 earthquake and tsunami. Earlier Wednesday, Prime Minister Naoto Kan said the public should avoid additional farm produce from areas near the power station because of contamination, according to Japanese media.

The government found radioactive materials at levels exceeding legal limits in 11 vegetables in Fukushima Prefecture, the Kyodo news agency reported. Shipments of the affected vegetables from Fukushima Prefecture ended on Monday.

On Wednesday, Mr. Kan also suspended shipment of raw milk and parsley from neighboring Ibaraki Prefecture, Kyodo reported.

Meanwhile, the United States Food and Drug Administration said on Tuesday that it would prohibit imports of dairy goods and produce from the affected region.

NNNN/SS

The spread of a small amount of radiation is inevitable, considering the steam that is generated as emergency workers spray water on damaged reactors and cooling pools at the Fukushima complex. Government and company officials were nonetheless expressing increasing optimism that the crisis was closer to being brought under control.

Officials said Wednesday on morning that they were hoping that power to cooling pumps would be restored at many of the six reactors in the next few days, and said they were planning to test the cooling system on Reactor No. 3 later in the day.

But black smoke began rising from No. 3 in the afternoon, leading the plant operator, Tokyo Electric Power Company, to evacuate workers from the area. No flames were visible, the company said.

Rebuilding after the 9.0-magnitude quake and tsunami, which ravaged the northeastern coast of the main Japanese island of Honshu, will cost from \$197 billion to \$309 billion, Mr. Kan's office said on Wednesday.

The government raised the death toll on Wednesday to more than 9,400, and said more than 14,000 were missing, although officials said there could be overlap between the two figures.

David Jolly reported from Tokyo, and Kevin Drew from Hong Kong.

**Helen Ho and Alison Lapp**

*Information Coordinators*

Pacific Tsunami and Japan Earthquake Response Management Team

[RMTPACTSU\\_INC@ofda.gov](mailto:RMTPACTSU_INC@ofda.gov)

202-712-0039

**From:** [Harrington, Holly](#)  
**To:** [RMTFACTSU\\_ELNRC](#); [Burnell, Scott](#); [McIntyre, David](#)  
**Cc:** [LIA11 Hoc](#)  
**Subject:** RE: Awareness: Marshall Shield to President Obama: I MUST BE SENT TO JAPAN TODAY!  
**Date:** Monday, March 28, 2011 8:43:14 AM  
**Sensitivity:** Confidential

---

*In my opinion, this requires no action from the NRC.*

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**From:** RMTFACTSU\_ELNRC [mailto:[RMTFACTSU\\_ELNRC@ofda.gov](mailto:RMTFACTSU_ELNRC@ofda.gov)]  
**Sent:** Saturday, March 26, 2011 11:37 AM  
**To:** Harrington, Holly; Burnell, Scott; McIntyre, David  
**Cc:** LIA11 Hoc  
**Subject:** Awareness: Marshall Shield to President Obama: I MUST BE SENT TO JAPAN TODAY!  
**Sensitivity:** Confidential

Holly, Scott, David:

I'm sure that you are well aware of this individual and his messages. USAID has received over 50 messages in the last few days and has reported him to their Security Office. I would, however, like to draw your attention his latest e-mail which specifically names the NRC.

Thanks!

Michael I. Dudek

---

**From:** Marshall Shield [mailto:[corp@myshield.us](mailto:corp@myshield.us)]  
**Sent:** Friday, March 25, 2011 9:07 PM  
**To:** RMTFACTSU\_ELC  
**Cc:** [president@whitehouse.gov](mailto:president@whitehouse.gov); [The.Secretary@hq.doe.gov](mailto:The.Secretary@hq.doe.gov); 'Marshall Shield'  
**Subject:** President Obama: I MUST BE SENT TO JAPAN TODAY!  
**Importance:** High  
**Sensitivity:** Confidential

**March 25, 2011 6:00 PM PST USA**

To: President Obama  
Ambassador Ichiro Fujisaki  
Secretary of Energy: Dr. Steven Chu: Japan - IAEA  
Corporate Executives: Tokyo Electric Power  
U.S. NUCLEAR REGULATORY COMMISSION  
IEEE

From: Marshall Shield

Subject: Expertise to solve nuclear reactor problems: Second to NONE!

NNNN/56

I spent a year in Japan and loved every second I was there, a wonderful country with wonderful persons...I am looking forward to working with the Nuclear problems has a GS-15, I know what to do and what equipment it will take to get all the reactors under control, plus I will stay until all reactors are stable!

I've sent my information to the above, as of today, many have responded: Marshall Shield is the BEST person to be sent to work with the Tokyo Electric Power personnel.

The U.S. Nuclear Regulatory Commission agrees with me! I've sent my documents: World Disaster – Nuclear Plants Survival and a request for a Task Force to support/advise/consult all nuclear plant owners/operators/engineers around the world. I am writing/compiling a book in all languages' for the countries that have/will have nuclear power plants, which includes the procedures described here:

### ***World Disasters – Nuclear Plants survival***

- What the owners/operators/engineers must do to protect their nuclear plants, so they can survive a natural disaster
- Instant response team to support them, available 24/7, anywhere on Planet Earth
- Steps to recover: Power/Computers/Cooling
- Schedule/Steps to provide proper shut down to stable conditions
- Importance to have backup power/water pumps online: 24/7
- These back up units have to be protected, to preclude their destruction during a natural disaster
- Operations/turnover from disaster situation to shut down/standby
- Source for all hardware/software/systems to help any troubled reactor
- To provide instant support (During Disaster Support) via the fastest transportation available
- Training for Owners\*Operators\*Engineers\*Technicians to ensure a faster/proper recovery process

**I must be sent to help!**

**I know how to seal the radiation, to STOP it from getting into the atmosphere/environment!**

What is the cost to send me? (Pennies)

Or

The probable cost to Japan & the Environment if you don't?  
(Trillions)!

I am available to fly from SeaTac or US Air Force  
Base McCord or US Navy Base Whidbey Island Naval  
base within hours!

I am the best man to solve these critical problems  
and am available to go today!

*Marshall Shield*

Office: 360-336-3057 PST USA

Cellular: 360-661-7041

Email: [ceo@myshield.us](mailto:ceo@myshield.us)

**From:** Mehrhoff, Vivian  
**To:** Ahn, Tae; Albert, Michelle; Alferink, Beth; Andersen, James; Bahadur, Sher; Bailey, Marissa; Bielecki, Jessica; BowdenBerry, Elva; Brach, Bill; Bradbury, John; Brooks, David; Bupp, Margaret; Campbell, Andy; Campbell, Larry; Camper, Larry; Cao, Tianqing; Cermeno, Andrea; Chang, Kien; Ciocco, Jeff; Coleman, Neil; Collins, Elmo; Comar, Manny; Compton, Keith; Cuadrado, Jose; Damon, Dennis; David Turner; Davis, Jack; Dricks, Victor; Eubanks-White, Darlene; Everett, Vincent; Fedors, Randall; Fetter, Allen; Firth, James; Ford, William; Francis, Karin; Freeman, Denise; Garcia-Santos, Norma; Gendelman, Adam; Glenn, Chad; Gray, Anita; Guttman, Jack; Gwo, Jin-Ping; Hair, Christopher; Hamdan, Latif; Haney, Catherine; Higgs, Gloria; Howell, Art; Hull, John; Jagannath, Banad; John Stamatkos; Johnson, Robert; Kobetz, Timothy; Kokajko, Lawrence; Kotra, Janet; Latta, Robert; Lee, Mike; Leeds, Eric; Lenehan, Daniel; Leslie, Bret; Lewis, Robert; Maier, Bill; Markley, Christopher; Matula, Thomas; McCartin, Timothy; McIntyre, David; McKenney, Christopher; Misenhimer, David; Mohseni, Aby; Mullins, Alicia; Nataraja, Mysore; Ordaz, Vonna; Parker, Nicole; Parrott, Jack; Pineda, Christine; Powell, Amy; Rahimi, Meraj; Rivera, Carmen; Roach, Kevin; Rubenstone, James; Salomon, Stephen; Sampson, Michele; Schlapper, Gerald; Self, Stephen; Silvia, Andrea; Spitzberg, Blair; Stablein, King; StAmour, Norman; Staub, Janet; Sulima, John; Tannenbaum, Anita; Trifiletti, Sue; Uselding, Lara; Valencia, Jennifer; Virgilio, Rosetta; Wastler, Sandra; Waters, Michael; Weaver, Doug; Weber, Michael; Whaley, Sheena; White, Bernard; Willoughby, Leonard; Young, Mitzi  
**Subject:** News Clips - LVRJ, 03/28/2011  
**Date:** Monday, March 28, 2011 9:59:52 AM  
**Attachments:** [image001.png](#)

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## EDITORIAL

### The end of nuclear?

Posted: Mar. 28, 2011 | 2:04 a.m.

Nuclear radiation is dangerous. The current public health concerns growing out of the post-tsunami crisis involving four active nuclear reactors in Japan are serious and immediate.

That said, however, two full generations after the science fiction films of the 1950s gave us rampaging monsters born of the unseen horrors of nuclear fallout, our responses to nuclear accidents are still conditioned more by emotion than by rational analysis.

Calls have been widespread in the past two weeks that the accident involving Japan's Fukushima reactors should "spell the end of nuclear power."

Really? More than 400 peaceful nuclear power plants are now in operation around the world -- 104 of them in the United States -- supplying 20 percent or more of the energy needs of many nations, including ours. Replacing that power would mean mining and burning vastly more coal.

Around the world, coal mining accidents have taken many more lives over the years than nuclear accidents. Tens of thousands have had their lives shortened by coal-related respiratory diseases referred to as "black lung." These costs are real and easily seen, whereas even in the "worst case" nuclear power accident to date, in 1986 at the Soviet reactor at Chernobyl, where the death toll may have risen into the thousands, alarmist reports that farmland for hundreds of miles around would be poisoned for centuries have turned out to be wildly overblown.

Nor has the public response even to non-nuclear accidents always been calm and measured. The recent blowout of a deep-sea BP oil drilling rig in the Gulf of Mexico showed safety standards were not adequately enforced, but the resulting dire warnings of "environmental catastrophe" were quickly replaced with reports of cleanup crews asking, "Where's the oil?" The resulting political decision to place a moratorium on American-based drilling in the Gulf simply transferred those rigs and their activities to other locations around the world, exacerbating America's shortage of domestically produced oil (and the jobs that come with it).

This is not the end of nuclear power. In fact, General Electric -- which designed the Fukushima reactors 40 years ago -- now asks why federal regulators are dragging their feet on approving plans for passive-cooled designs that could limit the damage from future accidents, by cooling and shutting down troubled cores through mere gravity flow, without requiring the aid of vulnerable diesel-electric pumps.

Take a casual attitude toward nuclear power, or a callous one toward power plant workers who risk their lives or their health? No. But nuclear power is no more likely to be banned than we are likely to give up eating deep-sea fish just because the job of a deep-sea fisherman is so hazardous.

COMMENT(S): 4 Reader Comment(s)

LINK: <http://www.lvrj.com/opinion/the-end-of-nuclear-118759434.html>

NNNN/57

*Vivian L. Mehrhoff*

Administrative Assistant

Division of Reactor Safety

Region IV - Arlington, Texas 76011

817-860-8166



*"Death is not the greatest loss in life. The greatest loss is what dies inside us while we live." ...Norman Cousins*

**From:** [McIntyre, David](#)  
**To:** [Reeves, Rosemary](#)  
**Subject:** RE: Your Upcoming FCIX Panel Session  
**Date:** Monday, March 28, 2011 12:25:00 PM

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Hi Rosemary – I am working on some talking points about spent fuel, though it relates more to our situation here in light of Japan rather than Japan itself. And I will now be drawing heavily on the white paper Bernie helped with over the weekend.

Yes, I guess FCIX will be more interesting than usual this year. Welcome to the “New Normal”!

Dave

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**From:** Reeves, Rosemary  
**Sent:** Monday, March 28, 2011 11:28 AM  
**To:** McIntyre, David  
**Subject:** FW: Your Upcoming FCIX Panel Session

David,

I would like to make sure you are aware of several points about the upcoming FCIX 2011. I'm sure you are very busy with urgent matters, but perhaps you could call me when you have a minute. Thanks,  
Rosemary

Rosemary Reeves  
FCIX 2011 Project Manager  
Office of Nuclear Materials Safety and Safeguards  
US Nuclear Regulatory Commission  
Washington, DC 20555-0001  
Phone: 301-492-3156  
Mail Stop: E2-C40M  
Email: [Rosemary.Reeves@nrc.gov](mailto:Rosemary.Reeves@nrc.gov)

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**From:** Leslie, Bret  
**Sent:** Wednesday, March 23, 2011 12:12 PM  
**To:** Reeves, Rosemary; Campbell, Larry  
**Cc:** Hiltz, Thomas; Bailey, Marissa  
**Subject:** RE: Your Upcoming FCIX Panel Session

Regarding “Bear in mind the SF pool in Japan unit 3-4 may come up during the questions, so I recommend having someone who can discuss that topic on the panel, or at least on hand.”

OPA is finishing up public outreach materials (e.g., FAQs) on this event as a resource for the agency. My understanding from our discussion at the NRC

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Facilitator Corp meeting yesterday is that OPA will be completed with these materials in a week or two. I will pass them along when I see them.

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**From:** Reeves, Rosemary  
**Sent:** Wednesday, March 23, 2011 10:03 AM  
**To:** Campbell, Larry; Leslie, Bret  
**Cc:** Hiltz, Thomas; Bailey, Marissa  
**Subject:** RE: Your Upcoming FCIX Panel Session

Hi Larry,

Thanks for getting right into the FCIX planning for the panel you offered to chair. Some people have the impression that we have lots of time, when in fact we really don't. We do need to be locking in the speakers right now.

As for the title of the panel, my notes reflected the following, which was incorporated in the March 17 version of the FCIX Planning and Topic List. I'm OK with any other title you want. For example, you could elect to call this panel "Spent Fuel Issues." Last year we had a similar panel titled "Regulating Spent Fuel Processes."

Panel 8: Back-End of Fuel Cycle

Chair: Larry Campbell

- Regulatory Framework for Reprocessing Used Nuclear Fuel – Bret Leslie
- Long-Term Storage & Waste Confidence Rule – TBD
- Other Topic (International) – TBD (possibly Remi)
- Summary of Blue Ribbon Commission's Process – TBD (Possibly Meserve or Diminichi)

I happen to sit close to Brit Hill's office, and I have given him a "heads-up" on our interest in getting a speaker from the BR committee for the FCIX. Now I'm not sure if it was Brit Hill or Bret Leslie to speak with on the BR committee. In any case, you should follow up. I merely wrote down the names listed above, based on what I heard at the FCIX meeting we had on 3/17. I don't have any contacts with them to offer you. Please make the contact with them, initially though HLWRS.

I liked your ideas for speakers for the second talk - I didn't have any one in particular in mind, (although Janet Kotra comes to my mind on the WCR). There are probably several options, and your suggestions sound good. (Remember, it would be helpful to include some women on each panel for diversity, if appropriate for the topic.)

I have not had a chance to work out the schedule yet, although I hope to get it done soon. Based on the past, the panel lasts 60 to 90 minutes, and each panelist has about 10-12 minutes to present, then we take questions. If you come up with a 5<sup>th</sup> panelist, we can adjust. Bear in mind the SF pool in Japan unit 3-4 may come up during the questions, so I recommend having someone who can discuss that topic on the panel, or at least on hand.

If you have any additional questions, let me know. Email works best for me today, as I work from home 1 day a week: each Wednesday.

Rosemary

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**From:** Campbell, Larry  
**Sent:** Wednesday, March 23, 2011 9:22 AM  
**To:** Leslie, Bret  
**Cc:** Reeves, Rosemary; Hiltz, Thomas; Bailey, Marissa  
**Subject:** Your Upcoming FCIX Panel Session

Bret,

I am the Chair for the upcoming (June 7-9) Fuel Cycle Information Exchange (FCIX) Panel Session (no title yet) which I understand you will be presenting a discussion on "Regulatory Framework for Reprocessing Used Nuclear Fuel." It is my understanding that in the Session the following discussions will be presented:

1. Regulatory Framework for Reprocessing Used Nuclear Fuel (Bret Leslie)
2. Long-Term Storage & Waste Confidence Rule (??? Maybe Vonna Ordaz, Mike Waters ??)
3. Status of Blue Ribbon Commission (?? We would like to get someone – either a Blue Ribbon Commission member or a staffer to discuss)

I would like to discuss your presentation and get your thoughts on who would be the best individual for FCSS to contact regarding Item 3 above. Please give me a call and we can set up a time to meet (492-3295).

**Rosemary,**

You are working out the logistics so here are a few questions for you: What is the title of this Panel Session? What day and time will this Panel Session occur? How much time will each panel member have for their individual presentations? Is it acceptable for me to contact the Blue Ribbon Commission staff or is this something you should do? Who did you have in mind for Item 2 above?

Larry

**From:** McIntyre, David  
**To:** horie@ntvic.com; OPA Resource; Burnell, Scott; Couret, Ivonne  
**Subject:** RE: //////////Japanese TV inquiry //////////  
**Date:** Monday, March 28, 2011 12:50:00 PM

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Hi Tomoko - we are not commenting on the Chairman's itinerary. However, on BACKGROUND and not for attribution I can point out that he is scheduled to testify on Capitol Hill on Wednesday. We will add your news organization to the list of those requesting to interview him.

David McIntyre  
Office of Public Affairs  
U.S. Nuclear Regulatory Commission  
(301) 415-8200

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

From: Tomoko Horie [mailto:horie@ntvic.com]  
Sent: Monday, March 28, 2011 12:48 PM  
To: OPA Resource; McIntyre, David; Burnell, Scott; Couret, Ivonne  
Subject: //////////Japanese TV inquiry //////////

Hello,

My name is Tomoko of Nippon TV, Japanese TV network.  
I understand that NRC chairman Jaczko is in Japan now.  
Can you give us an info when he will be back from Japan?  
We would also like to send interview request upon his return, could you advise to whom I should send an interview request?

Thank you very much.

Sincerely,

\*\*\*\*\*

Tomoko Horie  
Nippon TV, Washington, D.C. Bureau  
Email:horie@ntvic.com  
Tel: 202-210-8425

NNNN/59

**From:** Moderator  
**Date:** Monday, March 28, 2011 1:43:29 PM  
**Posted At:** U.S. NRC Blog  
**Conversation:** Ongoing NRC Activities  
**Subject:** Ongoing NRC Activities

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As the Japan nuclear emergency continues into its third week, the NRC continues both to monitor the important events taking place across the Pacific and continue pursuing our ongoing responsibilities.

The NRC's headquarters-based Operations Center continues to be staffed 24 hours a day with experts in nuclear reactors and protective measures, among others. NRC staffers who are part of a team in Japan continue to provide whatever assistance is requested, with some members of the team returning to the U.S. and fresh experts joining the team.

Today, NRC Chairman Jaczko arrived in Tokyo for a meeting with senior Japanese government and TEPCO officials. Afterwards, the Embassy in Tokyo issued a statement in which Jaczko said:

"Our nuclear experts are working closely with their Japanese counterparts, and we both continue to share expert analysis as we move forward to address this challenge. I reconfirmed in my meetings that we are prepared to provide any assistance we can in the days to come. The unprecedented challenge before us remains serious and our best experts remain fully engaged to help Japan address the situation."

Meanwhile, the NRC issued its final supplemental environmental impact statement for a limited work authorization and the combined licenses for the proposed Vogtle Units 3 and 4 reactors. The [press release](#) can be found online.

And later this week, NRC staff will meet with representatives of the nuclear power industry to discuss issues with buried and underground piping at nuclear power plants. The public can participate through an audio bridge. The [meeting notice](#) is available online.

For the past two weeks the focus of this blog has been exclusively on Japan-related issues. Tomorrow, we're transitioning back to our regular official bloggers, who will resume writing about the many different things this agency does. I will write about Japan-related activities when it's warranted.

Come back this week for posts on an award we received for our support of minority engineers and a word from the NRC historian.

*Eliot Brenner*  
*Public Affairs Director*

NNNN/60

Filed under: [General](#) Tagged: [nuclear](#)       

[View article...](#)

**From:** [Harrington, Holly](#)  
**To:** [Abraham, Susan](#); [Bonaccorso, Amy](#); [Campbell, Tison](#); [Crouch, Nicole](#); [Culp, Lisa](#); [Deegan, George](#); [Ellmers, Glenn](#); [English, Kimberly](#); [Francis, Karin](#); [Goldberg, Francine](#); [Groh, Deborah](#); [Howard, Patrick](#); [Janney, Margie](#); [Jasinski, Robert](#); [Landau, Mindy](#); [Mroz \(Sahm\), Sara](#); [Rakovan, Lance](#); [Reiter, Stuart](#); [Rihm, Roger](#); [Sall, Basia](#); [Schwartzman, Jennifer](#); [Sentz, Brian](#); [Sexton, Kimberly](#); [Shropshire, Alan](#); [Stahl, Eric](#); [Steger \(Tucci\), Christine](#); [Usilton, William](#); [VandenBerghe, John](#); [Weil, Jenny](#); [Wellock, Thomas](#); [Andrews, Tom](#); [Barkley, Richard](#); [Cain, Chuck](#); [Hay, Michael](#); [Heck, Jared](#); [Tift, Doug](#); [Woodruff, Gena](#)  
**Cc:** [Brenner, Eliot](#); [Burnell, Scott](#); [Couret, Ivonne](#); [Hayden, Elizabeth](#); [McIntyre, David](#); [Chandrathil, Prema](#); [Dricks, Victor](#); [Hannah, Roger](#); [Ledford, Joey](#); [Mittlyng, Viktoria](#); [Screnci, Diane](#); [Sheehan, Neil](#); [Uselding, Lara](#)  
**Subject:** Update on the blog  
**Date:** Monday, March 28, 2011 2:07:57 PM

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We just put up the latest blog post “closing out” our laser focus on Japan and signaling a return to “regularly scheduled programming” on the blog. Eliot will continue to blog about Japan as events warrant, but I’m back to using my queue to populate the blog. I’ve got a healthy backlog of posts, but please keep them coming!

Statistics for the blog are very interesting. We’ve logged a total of 60,000 views in just under two months. Our highest views in a day was a bit more than 5,500. The events in Japan stirred a lot of interest in the blog. Our week of March 14 had average views per day of 3,219! The week of March 21 we were down, but still above our usual pace. That week we had an average of 788 views per day.

Thank you all for your continuing support of the blog!

Holly Harrington

NNNN 1.61

**From:** [Shapiro, Nicholas S.](#)  
**To:** [Brenner, Eliot](#); [Burnell, Scott](#); [Sheehan, Neil](#)  
**Subject:** Fw: NYT: Scientists Project Path of Radiation Plume  
**Date:** Wednesday, March 16, 2011 11:44:13 PM

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

From: Shapiro, Nicholas S.  
To: DL-WHO-Press; Brennan, John O.; DeParle, Nancy-Ann; Holdren, John P.; Avery, Heidi E.; Kamoie, Brian E.; Reed, Richard A.; Kern, Dab; McDonough, Denis R.; Anderson, Brooke  
Sent: Wed Mar 16 23:41:13 2011  
Subject: NYT: Scientists Project Path of Radiation Plume

Jaczko is very clear in this not affecting homeland

NYT: Scientists Project Path of Radiation Plume

By WILLIAM J. BROAD

<[http://topics.nytimes.com/top/reference/timestopics/people/b/william\\_j\\_broad/index.html?inline=nyt-per](http://topics.nytimes.com/top/reference/timestopics/people/b/william_j_broad/index.html?inline=nyt-per)>

[http://www.nytimes.com/2011/03/17/science/17plume.html?\\_r=1&hp](http://www.nytimes.com/2011/03/17/science/17plume.html?_r=1&hp)

A United Nations

<[http://topics.nytimes.com/top/reference/timestopics/organizations/u/united\\_nations/index.html?inline=nyt-org](http://topics.nytimes.com/top/reference/timestopics/organizations/u/united_nations/index.html?inline=nyt-org)> forecast of the possible movement of the radioactive plume coming from crippled Japanese reactors shows it churning across the Pacific and touching the Aleutian Islands on Thursday before hitting Southern California late Friday.

Health and nuclear experts emphasize that radiation in the plume will be diluted as it travels and, at worst, would have extremely minor health consequences in the United States, even if hints of it are ultimately detectable. In a similar way, radiation from the Chernobyl disaster in 1986 spread around the globe and reached the West Coast of the United States in 10 days, its levels measurable but minuscule.

The projection, by the Comprehensive Test Ban Treaty Organization, an arm of the United Nations in Vienna, gives no information about actual radiation levels but only shows how a radioactive plume would probably move and disperse.

The forecast, calculated Tuesday, is based on patterns of Pacific winds at that time and the predicted path is likely to change as weather patterns shift.

On Sunday, the United States Nuclear Regulatory Commission

<[http://topics.nytimes.com/top/reference/timestopics/organizations/n/nuclear\\_regulatory\\_commission/index.html?inline=nyt-org](http://topics.nytimes.com/top/reference/timestopics/organizations/n/nuclear_regulatory_commission/index.html?inline=nyt-org)> said it expected that no "harmful levels of radioactivity" would travel from Japan <<http://topics.nytimes.com/top/news/international/countriesandterritories/japan/index.html?inline=nyt-geo>> to the United States "given the thousands of miles between the two countries."

The test ban treaty group routinely does radiation projections in an effort to understand which of its global stations to activate for monitoring the worldwide ban on nuclear arms testing. It has more than 60 stations that sniff the air for radiation spikes and uses weather forecasts and powerful computers to model the transport of radiation on the winds.

On Wednesday, the agency declined to release its Japanese forecast, which The New York Times obtained from other sources. The forecast was distributed widely to the agency's member states.

But in interviews, the technical specialists of the agency did address how and why the forecast had been drawn up.

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"It's simply an indication," said Lassina Zerbo, head of the agency's International Data Center. "We have global coverage. So when something happens, it's important for us to know which station can pick up the event."

For instance, the Japan forecast shows that the radioactive plume will probably miss the agency's monitoring stations at Midway and in the Hawaiian Islands but is likely to be detected in the Aleutians and at a monitoring station in Sacramento.

The forecast assumes that radioactivity in Japan is released continuously and forms a rising plume. It ends with the plume heading into Southern California and the American Southwest, including Nevada, Utah and Arizona. The plume would have continued eastward if the United Nations scientists had run the projection forward.

Earlier this week, the leading edge of the tangible plume was detected by the Navy's Seventh Fleet when it was operating about 100 miles northeast of the Japanese reactor complex. On Monday, the Navy said it had repositioned its ships and aircraft off Japan "as a precautionary measure."

The United Nations agency has also detected radiation from the stricken reactor complex at its detector station in Gunma, Japan, which lies about 130 miles to the southwest.

The chairman of the Nuclear Regulatory Commission, Gregory B. Jaczko, said Monday that the plume posed no danger to the United States. "You just aren't going to have any radiological material that, by the time it traveled those large distances, could present any risk to the American public," he said in a White House briefing.

Mr. Jaczko was asked if the meltdown of a core of one of the reactors would increase the chance of harmful radiation reaching Hawaii or the West Coast.

"I don't want to speculate on various scenarios," he replied. "But based on the design and the distances involved, it is very unlikely that there would be any harmful impacts."

The likely path of the main Japanese plume across the Pacific has also caught the attention of Europeans, many of whom recall how the much closer Chernobyl reactor in Ukraine began spewing radiation.

In Germany on Wednesday, the Federal Office for Radiation Protection held a news conference that described the threat from the Japanese plume as trifling and said there was no need for people to take iodine tablets. The pills can prevent poisoning from the atmospheric release of iodine-131, a radioactive byproduct of nuclear plants. The United States is also carefully monitoring and forecasting the plume's movements. The agencies include the Federal Aviation Administration, the National Oceanic and Atmospheric Administration, the Department of Defense, and the Department of Energy.

On Wednesday, Steven Chu

[http://topics.nytimes.com/top/reference/timestopics/people/c/steven\\_chu/index.html?inline=nyt-per](http://topics.nytimes.com/top/reference/timestopics/people/c/steven_chu/index.html?inline=nyt-per) , the energy secretary, told Congress that the United States was planning to deploy equipment in Japan that could detect radiation exposure on the ground and in the air. In total, the department's team includes 39 people and more than eight tons of equipment.

"We continue to offer assistance in any way we can," Dr. Chu said at a hearing, "as well as informing ourselves of what the situation is."





## AMERICAN NUCLEAR SOCIETY

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Date: March 25, 2011

To: Joe Colvin  
ANS President

From: Michaele (Mikey) Brady Raap   
Chair, ANS Professional Divisions Committee

Below please find the Technical Brief on The Impact of Mixed Oxide Fuel Use on Accident Consequences at Fukushima Daiichi. This Technical Brief contains factual information prepared by the ANS Special Committee on Nuclear Non-Proliferation.

### **The Impact of Mixed Oxide Fuel Use on Accident Consequences at Fukushima Daiichi**

**American Nuclear Society Technical Brief – March 2011**

#### **Conclusion**

Mixed Oxide (MOX) fuel has been used safely in nuclear power reactors for decades. The presence of a limited number of MOX fuel assemblies at Fukushima Daiichi Unit 3 has not had a significant impact on the ability to cool the reactor or on any radioactive releases from the site due to damage from the earthquake and tsunami.

#### **Summary**

At the time of the magnitude 9.0 earthquake, Fukushima Daiichi Unit 3 was operating with 32 mixed oxide (MOX) fuel assemblies and 516 low enriched uranium (LEU) fuel assemblies in its reactor core. In other words, less than 6% of the fuel in the Unit 3 core was MOX fuel. There were no other MOX fuel assemblies (new, in operation or used) at the Fukushima Daiichi plant at the time of the accident.

MOX fuel assemblies were loaded into Fukushima Daiichi Unit 3 for the first time in the fall of 2010. The MOX fuel had been used for less than five months at the time of the accident. Differences in initial fuel composition between MOX and LEU fuel can lead to differences in consequences (prompt fatalities and latent cancers) following a core damage event with releases to the environment.

There are indications that Fukushima Daiichi Unit 3 suffered damage to some of its core. The core damage resulted from a loss of core cooling due to damage to plant systems from the tsunami that followed the earthquake. The damage was not related to the presence of MOX fuel.

There have been no prompt fatalities as a result of radiation exposure from Fukushima Daiichi. Prompt evacuation has minimized radiation exposure to the public, so long-term public health consequences from radiation exposure are expected to be small. Given the small number of MOX fuel assemblies at Fukushima Daiichi Unit 3 at the time of the event, coupled with the short time of irradiation of the MOX fuel, it can be concluded that MOX fuel has had and will have no perceptible impact on any consequences from the event.

## **Background**

It is important to note that while LEU fuel begins its useful life with no plutonium, as it is used in a light water reactor it builds up plutonium as a result of the nuclear reactions in the core. By the end of its useful life an LEU fuel assembly contains about 1% plutonium actually generates more power from plutonium than from uranium. All reactor cores contain plutonium; those cores loaded with some MOX fuel contain more.

Mixed oxide (MOX) fuel is comprised of a blend of uranium oxide and plutonium oxide. MOX fuel is predominantly uranium, with average concentrations of plutonium that range from 3-10%. The presence of plutonium produces modest changes in some physical characteristics of the fuel material such as thermal conductivity. However, MOX fuel and low-enriched uranium (LEU) fuel are fundamentally similar. Moreover, the physical dimensions and structural material of a MOX fuel assembly are essentially identical to that of a LEU fuel assembly. To the naked eye, a MOX fuel assembly and a LEU fuel assembly are identical.

Nuclear power plants have been generating electricity for use by the public since the 1950s, and over those years the industry has compiled an enviable safety record. Today over 400 reactors worldwide generate substantial amounts of emissions-free electricity. Dozens of those reactors currently generate power using a mixture of conventional LEU fuel assemblies and MOX fuel assemblies in their reactor cores. The majority of the fuel loaded into these reactors is LEU (60-70% or more), while the remainder (30-40% or less) is MOX. The use of MOX fuel allows the re-use of plutonium that was recovered during nuclear fuel recycling operations. The fabrication and use of MOX fuel has been carried out safely and efficiently on an industrial scale since the 1970s. Safety authorities in France, Belgium, Germany, Switzerland and Japan have all approved the use of MOX fuel in light water reactors using the same rigorous standards that are applied for the licensing of LEU fuel.

Safety is the cornerstone of nuclear power plant operations. Nuclear power plant operators perform safety analyses to determine how the plants will respond during various “what if” problem scenarios. Some of those scenarios involve extreme conditions coupled with multiple equipment failures that lead to estimates of damage to the fuel in the reactor core. Scenarios with significant damage to the reactor core are referred to as severe accidents, and such accidents can result in the calculated release of radionuclides to the environment. Severe accident consequences are the adverse public health effects – fatalities and latent cancers – that arise from the offsite release of radionuclides from a damaged reactor core.

When uranium or plutonium atoms split (fission), they release a relatively large amount of energy which is converted into heat and eventually electricity. The smaller atoms left behind after fission are referred to as fission products. In addition, some of the uranium and plutonium atoms in nuclear fuel assemblies absorb neutrons without fissioning, becoming even heavier atoms called actinides. Both fission products and actinides are radioactive, posing a health hazard if they are released to the environment. Using MOX fuel alters somewhat the “source term,” or mix of radionuclides in the core and available for release following a severe accident. The different source term between MOX fuel and LEU fuel leads to different calculated consequences following a postulated severe accident.

In November 1999 the Department of Energy published the Surplus Plutonium Disposition Environmental Impact Statement which documented, among other things, the consequences of four severe accident scenarios at three different reactors using some MOX fuel derived from weapons grade plutonium. Each reactor accident sequence was analyzed with two different reactor core assumptions: a reference case with all LEU fuel, and a second case with a mixed core of approximately 40% MOX fuel and the remainder LEU fuel. For each case the severe accident was assumed to progress in the same manner. Relative to the reference case with all LEU fuel, the offsite consequences to the public with the mixed MOX-LEU core ranged from 4% lower to 22% higher, depending on the reactor studied and the accident sequence. Most cases resulted in consequence increases of 10% or less. The differences between the consequences relate back to differences in the source term. The mixed MOX-LEU core consequences were generally higher because of the presence of more radioactive actinides in the MOX fuel at the time of the postulated accident. However, the differences were modest compared to the uncertainty associated with the consequence calculations for these extremely low probability events.

The type of plutonium used in MOX fuel can also impact severe accident consequences. The aforementioned analysis assumed weapons grade plutonium. If the calculations had been done for MOX fuel containing plutonium from recycled commercial nuclear fuel, as is the practice in Europe and Asia today, the difference between the all uranium cases and the 40% MOX fuel consequences would have been greater than cited above. This is again due primarily to the presence of more radioactive actinides in used “reactor grade” MOX fuel (with plutonium from recycled reactor fuel) than in used weapons grade MOX fuel (with plutonium from retired nuclear weapons).

Turning to the Fukushima Daiichi reactors in Japan, Unit 3 was using some reactor grade MOX fuel at the time of the March 2011 earthquake. Had it been using a 40% MOX fuel core, one could expect an increase in severe accident consequences on the order of 10% for weapons grade MOX. With a 40% reactor grade MOX core, and applying a bounding factor of four increase relative to weapons grade MOX, the overall increase in severe accident consequences would have been on the order of 40% relative to the all LEU fuel case. However, Unit 3 was loaded with only 32 MOX fuel assemblies during refueling operations in the fall of 2010. There are a total of 548 fuel assemblies in the Unit 3 reactor core, so this represents less than 6% of the total fuel in the core. The MOX fuel had been operating in Unit 3 for less than five months; fuel assemblies are typically used for a total of 3-4 years in reactor cores before being replaced by new fuel and discharged to used fuel pools. Therefore, the MOX fuel would have built up relatively few radioactive fission products and actinides at the time of the earthquake and subsequent damage to the reactor core. With these facts in mind – the low percentage of MOX fuel in the core and the short operation time for the MOX fuel – it is evident that the presence of MOX fuel at Fukushima Daiichi Unit 3 has had no significant impact on the offsite releases of radioactivity following the earthquake and tsunami.

Other than the 32 MOX fuel assemblies in the Unit 3 reactor core, at the time of the earthquake there were no other MOX fuel assemblies (new or used) at the Fukushima Daiichi plant. The problems encountered at Fukushima Daiichi reactors stem from plant damage due to the tsunami that followed the earthquake, not the use of MOX fuel in Unit 3.

It is also important to put the public health consequences from the event in perspective. There have been no prompt fatalities as a result of radiation exposure. Moreover, prompt evacuation has minimized the exposure of the population to radiation. At this point, the consequences of the event are expected to be small. MOX fuel effects, if any, would be a small change to an already small number.

In conclusion, MOX fuel has been used safely in nuclear power reactors for decades. The presence of a limited number of MOX fuel assemblies at Fukushima Daiichi Unit 3 has not had a significant impact on the ability to cool the reactor or on any radioactive releases from the site due to damage from the earthquake and tsunami.

**From:** [Harrington, Holly](#)  
**To:** [Courret, Ivonne](#); [Brenner, Eliot](#); [Hayden, Elizabeth](#)  
**Cc:** [McIntyre, David](#); [Burnell, Scott](#); [Hannah, Roger](#)  
**Subject:** RE: FYI - Kyodo News (3/23) 9:32 AM - Radioactive iodine exceeding limit for infants found in Tokyo water  
**Date:** Wednesday, March 23, 2011 10:26:53 AM

---

Yes, I'm tracking down with federal folks are working on US gov response

---

**From:** Courret, Ivonne  
**Sent:** Wednesday, March 23, 2011 10:26 AM  
**To:** Brenner, Eliot; Harrington, Holly; Hayden, Elizabeth  
**Cc:** McIntyre, David; Burnell, Scott; Hannah, Roger  
**Subject:** FYI - Kyodo News (3/23) 9:32 AM - Radioactive iodine exceeding limit for infants found in Tokyo water

## Radioactive iodine exceeding limit for infants found in Tokyo water

TOKYO, March 23, Kyodo

The Tokyo metropolitan government warned Wednesday that infants should not drink tap water in Tokyo's 23 wards and five of its suburban cities as radioactive iodine exceeding the limit for them was detected in water at a purification plant.

The amount of the substance was 210 becquerels per 1 kilogram of water at the plant in the Kanamachi district of Katsushika Ward, which serves the cities of Musashino, Mitaka, Machida, Tama and Inagi as well as central Tokyo, above the limit of 100 becquerels for infants but below 300 becquerels for older people, the metropolitan government said.

The detection came amid the country's worst nuclear crisis that has led to radiation leaks at Tokyo Electric Power Co.'s Fukushima Daiichi nuclear power plant, located about 220 kilometers northeast of Tokyo, triggered by the devastating earthquake and tsunami earlier this month.

The central government said separately it had detected radioactive iodine in 12 prefectures in a survey of tap water Tuesday covering all but four of Japan's 47 prefectures, all at levels below the regulated limit, up from eight prefectures as of Monday.

Iwate, Akita, Yamagata and Shizuoka prefectures were added to the list Tuesday. Among the four prefectures not covered by the ministry's survey, Fukushima Prefecture announced that it had detected radioactive iodine in its own survey.

Cesium, another radioactive substance, was also found in four of the 12 prefectures where radioactive iodine was detected, including Tokyo and Gunma. Cesium measuring 5.3 becquerels was detected in Tochigi and 4.8 becquerels in Ibaraki against the limit of 200 becquerels, the Ministry of Education, Culture, Sports, Science and Technology said.

NNNN/64

While the Tokyo government also found 190 becquerels of radioactive iodine Wednesday at the Kanamachi plant, as well as 32 becquerels on Tuesday at a plant in Hamura in western Tokyo, none was detected at a plant in Asaka, Saitama Prefecture. The science ministry found 19 becquerels in tap water in Tokyo on Tuesday as well as 15 becquerels in Tochigi and 12 becquerels in Ibaraki.

The ministry also said it had detected 1.17 million becquerels of radioactive iodine and 163,000 becquerels of cesium per kg of soil in samples collected in Iitate, Fukushima Prefecture, 40 km from the nuclear plant, in a survey it conducted Sunday.

==Kyodo

**Ivonne L. Couret**  
**Public Affairs Officer**  
**Office of Public Affairs**  
**Media Desk**  
**[opa.resource@nrc.gov](mailto:opa.resource@nrc.gov)**  
**301-415-8200**

Visit our online photo gallery. Incorporate graphics and photographs to tell your story!  
<http://www.nrc.gov/reading-rm/photo-gallery/>

2010-2011 Information Digest - Where you can find NRC Facts at a Glance  
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350/>

**From:** Brenner, Eliot  
**To:** [Akstulewicz, Brenda](#); [Chandrathil, Prema](#); [McIntyre, David](#); [Screnci, Diane](#); [Harrington, Holly](#); [Courret, Ivonne](#); [Janbergs, Holly](#); [Ledford, Joey](#); [Sheehan, Neil](#); [Hannah, Roger](#); [Burnell, Scott](#); [Uselding, Lara](#); [Shannon, Valerie](#); [Dricks, Victor](#); [Mitlyng, Viktoria](#)  
**Subject:** FW: COMMISSION E-READER....TUESDAY, MARCH 29, 2011  
**Date:** Tuesday, March 29, 2011 12:27:56 PM  
**Attachments:** [Tab A 03-20-11 Nicholas White 11-0155.pdf](#)  
[dailymemos.doc](#)

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Just in case someone has a couple of days to kill, volunteer to respond to this one!

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**From:** Champ, Billie  
**Sent:** Tuesday, March 29, 2011 12:01 PM  
**To:** Commission E-Reader Distribution; E-Reader Distribution  
**Subject:** COMMISSION E-READER....TUESDAY, MARCH 29, 2011

~~INTERNAL USE ONLY~~  
**Some of the information contained in the  
Reader is not publicly available.  
If there are any questions, please contact SECY.**

**READING FILE**

**INDEX**

**March 29, 2011**

**INCOMING CORRESPONDENCE**

**Tab "A" 03/20/11 -- Letter from Nicholas White, concerns Fukushima Daiichi nuclear plant accident - implication for U.S. nuclear plants.**

NNNN/65

9 Spy Rock Hill  
Manchester  
MA 01944  
3/20/2011

Chairman Gregory B. Jaczko  
Nuclear Regulatory Commission  
11545 Rockville Pike,  
Rockville, MD 20852.

Dear Chairman Jaczko,

**Fukushima Daiichi Nuclear Plant Accident - Implications for US Nuclear Plants.**

You were shown on television on Wednesday March 16th speaking of the problem in the spent fuel ponds and in particular the pond in reactor building #4. NRC's account of the progress of the incident acknowledged that the cooling ponds, particularly of No. 3 and No. 4 reactors, may pose the greatest threat.

The necessary openness seems to be lacking in NRC documents relating to similar US plants, and I write to request specific answers to questions and for a more frank inclusion of these issues in publications from NRC.

I am an industrial physicist and obtained my doctorate working at the Nuclear Physics Department of Oxford University. I am a US citizen.

An NRC public document relating to the incident's implications was posted March 19<sup>1</sup>. I shall refer to this document as FAQs. It does not mention spent fuel. However I gather that industry confidential documents do so<sup>2</sup>.

According to Tokyo Electric Power Company in March 2010, there were/are 1760 tons of uranium in spent fuel rods stored in 7 ponds and one dry storage facility at Fukushima Daiichi<sup>4</sup>. Their presentation makes clear that the racks were modified to increase the quantity and density of fuel stored in each pond over the original design. Each reactor has a pond located at the top of the reactor structure. Each pond contains substantially more fuel than the payload in the reactor, for a total of up to 4.5 times the payload. The fuel is stored outside the containment. The only partition between the pond and the environment is a sheet metal wall and roof.

The sheet metal wall was blown away in reactors 1, 2, and 3, and fires have burned large holes in the wall of reactor 4, according to press reports and Google Earth pictures. Thus four spent fuel ponds are open to the atmosphere. Each is apparently loaded to the maximum possible, and at 3,450 fuel assemblies in each, they are loaded beyond the original design limit.

Precise knowledge of the water levels in the ponds is not available, and at the time of writing it is believed that water levels are being increased. Some statements seems to

3/25...To EDO for Direct Reply...Suspense: April 8...Cpy to: RF, SECY to  
Ack...11-0155 Note:Commission should review response prior to dispatch

indicate that there has always been some water in all the ponds - but it would be good to hear this confirmed. Pond 4 is structurally compromised, and Pond 3 contains spent mixed fuel - i.e. a mix for uranium and plutonium. There has been a statement that the in-ground pond number 7 was stable. The status of the dry long-term on-site storage has not been clarified publicly.

With this summary of my present understanding, may I pose the following questions to you and to the NRC, and suggest that these be answered publicly, possibly by posting on the web along with the other FAQs relating to the issue, and promptly:

1. Concerning spent fuel pond location
  - a) In how many sites in the US are the spent fuel ponds located at elevated locations as at Fukushima?
  - b) In how many sites in the US are the spent fuel ponds located in the reactor buildings?
  - c) In what fraction of sites in the US are the spent fuel ponds below grade level?
  - d) In how many sites in the US are the spent fuel ponds enclosed by walls which could easily be penetrated by a projectile such as a bullet or a small plane?
  - e) What is the largest quantity of spent fuel stored in a single pond in a United States reactor facility?
  
2. In the event of the loss of the coolant in a spent fuel pond, the fuel cladding will catch fire. What further events could or will occur?
  - a) Will the racks collapse?
  - b) If intact spent fuel rods collapse into the base of the pond, will they become critical in the absence of water? If water is subsequently applied?
  - c) What are the levels of plutonium isotopes in spent fuel rods in ponds in commercial reactors around the US? What proportion of the rods in use are composed of mixed fuel? How does this modify the previous answer 2b?
  
3. Reactors are often designed so that in the event of a meltdown, the molten fuel flows to a large distributed area within the containment, so as to prevent a critical mass from assembling. This precaution has not been applied to the ponds, so far as we have been told.
  - a) What passive safety measures are implemented, and in which facility designs, to prevent criticality in a worst-case scenario in cooling ponds?
  
4. Original intent in this BWR design was that spent fuel would be stored in the elevated pond only until initial activity was reduced - around 3 years.
  - a) What is the longest time that spent fuel rods have been kept in an elevated storage pond in the US?
  - b) In Fukushima, storage density was increased above the initial design. Press reports state the US increase in storage density in the ponds is greater. What is the mean and the maximum storage density in spent fuel ponds in the US?

5. The FAQs document states that reactors are designed to withstand specified ground movements. Values are not given.
- What are the horizontal acceleration and amplitude magnitudes used in the design and certification of US reactor facilities? Define the range of values used in US facilities if these vary by location.
  - Are these accelerations applied across the entire facility, including ponds, generators, auxiliary equipment, and to non-critical equipment capable of inflicting damage?
  - What will happen to the water level in approved pond designs during movement at these limits? Include a discussion of resonance.
6. In the Chernobyl event, the amount of non-volatile material dispersed was far higher than anticipated, reported by international agencies as between 3 and 6 tons<sup>5</sup>. In the event of a fire in stored spent fuel in a storage pond from which most of the water has been lost, what are the current estimates of the fraction of the fuel that can be vaporized, atomized, dispersed as fume and smoke, and distributed into the atmosphere?
7. With hindsight, what passive features of the reactor facility design would have helped at Fukushima, that had been omitted? For example:
- Pond location
  - Pond containment
  - Backup means of providing water, such as passive standpipes
  - Runoff control
8. NRC stated that 'The damage to Fukushima Daiichi nuclear power station appears to have been caused by initiating events outside of the design basis for the facilities.'<sup>2</sup> This comes just after stating: "The NRC continues to determine that US nuclear plants are safe. This does not change the NRC's perception of earthquake hazard (i.e., ground motion levels) at US nuclear plants."<sup>1</sup>
- At this point, do you consider that the spent fuel rods posed a significant hazard?
  - The design basis of Fukushima was inadequate. NRC states that all design rules for US plants have been based on local conditions. Does this mean generally that the safety margins should be increased?
  - Has the NRC already come to the conclusion that spent fuel creates a greater hazard than was appreciated in the previous century. If so, a great deal of remedial work should have commenced six or so years ago. Has it? If not, why not?
9. In December 2006, the Nuclear Energy Institute (NEI) issued NEI 06-12, Revision 2, "B.5.b Phase 2 & 3 Submittal Guideline." NEI 06-12 is designated 'for Official Use Only – Security Related Information (OUO-SRI)'. Does this mean that the existence of spent fuel pond hazards, their nature, and their solutions, is being withheld from the public on security grounds?
10. Press reports are conflicting about the existence of backup generators onsite at US plants. What is the minimum requirement for backup power at US nuclear power plants: capacity, number, fuel reserves, fuel storage, protection?

I am concerned that the spent fuel rod issue is perceived by NRC as very serious, but that the information is being withheld from the public for ostensible security reasons. If this is true, the public must be made aware that they are having the facts concerning the risks hidden from them. The risk balance between alerting terrorists to target opportunities (surely too late in many instances) and concealing intrinsic safety and preparedness deficiencies has been altered by the events in Japan.

This is an open letter. I intend to seek answers to the questions posed, and others, wherever appropriate, and to ensure that the answers are made public. These questions were prompted in part by your own comments, and are posed with the goal of trying to constructively learn lessons from these sad events. NRC has so far failed to address these issues in its publicly posted documents. I remain personally agnostic with regard to the future role of nuclear power in providing electricity, but I am certain that there have been failures that we cannot afford to repeat.

Sincerely,

A handwritten signature in black ink, appearing to read "NR White". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

Dr. Nicholas R. White.

References:

1. 'NRC frequently asked questions related to the March 11, 2011 Japanese Earthquake and Tsunami', <http://www.nrc.gov/japan/faqs-related-to-japan.pdf>
2. <http://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/2011/ML110760432.pdf>
3. In December 2006, the Nuclear Energy Institute (NEI) issued NEI 06-12, Revision 2, "B.5.b Phase 2 & 3 Submittal Guideline." NEI 06-12 is designated for Official Use Only - Security Related Information (OUO-SRI). NEI endorsed this document and publicly discusses in general terms the issues it raises including spent fuel pond loss of coolant.
4. [www.nirs.org/reactorwatch/accidents/6-1\\_powerpoint.pdf](http://www.nirs.org/reactorwatch/accidents/6-1_powerpoint.pdf)
5. Nuclear Energy Agency, OECD, Volume 3, No. 1, p.230. Chernobyl: Assessment of Radiological and Health Impacts, 2002 Update of *Chernobyl: Ten Years On*

**LIMITED DISTRIBUTION COMMISSIONERS - OFFICES ONLY**  
**SECY DAILY REPORT – March 29, 2011**

1. **OCA to Comrs. dtd 03/29/11** – Draft Testimony for the FY12 Budget Hearing Before the House Appropriations Committee, Subcommittee on Energy and Water Development.
2. **OGC to Comrs. dtd 03/28/11** – Recent Court Decision in the Diablo Canyon ISFSI Litigation.
3. **OCA to Comrs. dtd 03/28/11** -- Draft Testimony for Hearing on “Improving the Nation’s Response to Catastrophic Disasters” Before the House Committee on Transportation and Infrastructure.
4. **OE to Comrs. dtd 03/28/11** – Periodic Update on Progress of Materials Licensees to Address Safety Culture.
5. **OCA to Comrs. dtd 03/28/11** -- Draft Testimony for the Hearing Before the Senate Appropriations Subcommittee on Energy and Water Development in Light of Events in Japan.

**From:**  
**To:**

OST02 HOC

Abrams, Charlotte; Abu-Eid, Bobby; Adams, John; Afshar-Tous, Mugeh; Ahn, Hosung; Alemu, Bezakulu; Algama, Don; Alter, Peter; Anderson, Brian; Anderson, James; Arndt, Steven; Arribas-Colon, Maria; Ashkebousi, Nima; Athey, George; Baker, Stephen; Ballam, Nick; Barnhurst, Daniel; Barr, Cynthia; Barss, Dan; Bazian, Samuel; Bensi, Michelle; Bergman, Thomas; Berry, Rollic; Bhachu, Ujaqar; Bloom, Steven; Blount, Tom; Boger, Bruce; Bonnette, Cassandra; Borchardt, Bill; Bowers, Anthony; Bowman, Gregory; Boyce, Tom (RES); Brandon, Lou; Brandt, Philip; Brenner, Eliot; Brock, Kathryn; Brown, Cris; Brown, David; Brown, Eva; Brown, Frederick; Brown, Michael; Bukharin, Oleg; Burnell, Scott; Bush-Goddard, Stephanie; Campbell, Stephen; Camper, Larry; Carpenter, Cynthia; Carter, Mary; Case, Michael; Casto, Greg; Cecere, Bethany; Cervera, Margaret; Chazell, Russell; Chen, Yen-Ju; Cheok, Michael; Chokshi, Nilesh; Chowdhury, Prosanta; Chung, Donald; Circle, Jeff; Clement, Richard; Clinton, Rebecca; Coggins, Angela; Collins, Frank; Cool, Donald; Correia, Richard; Corson, James; Costa, Arlon; Couret, Ivonne; Craffey, Ryan; Crutchley, Mary Glenn; Cruz, Zahira; Cuadrado, Leira; Dacus, Eugene; DeCicco, Joseph; Decker, David; Dembek, Stephen; Devlin, Stephanie; Dimmick, Lisa; Doane, Margaret; Dorman, Dan; Dorsey, Cynthia; Dozier, Jerry; Drake, Margaret; Droggitis, Spiros; Dube, Donald; Dudes, Laura; Eads, Johnny; Easson, Stuart; Emche, Danielle; English, Lance; Erlanger, Craig; Esmaili, Hossein; Figueroa, Roberto; Fiske, Jonathan; Flanders, Scott; Flannery, Cindy; Floyd, Daphene; Foggie, Kirk; Foster, Jack; Fragoyannis, Nancy; Franovich, Rani; Frazier, Alan; Freshman, Steve; Fuller, Edward; Galletta, Thomas; Gabbone, Kimberly; Gardocki, Stanley; Gartman, Michael; Gibson, Kathy; Giitter, Joseph; Gilmer, James; Glenn, Nichole; Gordon, Dennis; Gott, William; Grant, Jeffery; Greenwood, Carol; Greenwood, Carol; Grimes, Kelly; Grobe, Jack; Gross, Allen; Gulla, Gerald; Hale, Jerry; Hardesty, Duane; Hardin, Kimberly; Hardin, Leroy; Harrington, Holly; Harris, Tim; Harrison, Donnie; Hart, Ken; Hart, Michelle; Harvey, Brad; Hasselberg, Rick; Hayden, Elizabeth; Helton, Donald; Henderson, Karen; Hilland, Patrick; Holahan, Patricia; Holahan, Vincent; Holian, Brian; HOO Hoc; Horn, Brian; Howard, Tabitha; Huffert, Anthony; Hurd, Sapna; Huyck, Doug; Imboden, Andy; Isom, James; Jackson, Karen; Jacobson, Jeffrey; Jervey, Richard; Jessie, Janelle; Johnson, Michael; Jolicoeur, John; Jones, Andrea; Jones, Cynthia; Jones, Henry; Kahler, Carolyn; Kammerer, Annie; Karas, Rebecca; Kauffman, John; Khan, Omar; Kolb, Timothy; Kotzalas, Margie; Kowalczyk, Jeffrey; Kratchman, Jessica; Kugler, Andrew; Lamb, Christopher; Lane, John; Larson, Emily; Laur, Steven; LaVie, Steve; Lewis, Robert; Li, Yong; Lichatz, Taylor; Lising, Jason; Lombard, Mark; Lovell, Louise; Lubinski, John; Lui, Christiana; Lukes, Kim; Lynch, Jeffery; Ma, John; Mamish, Nader; Manahan, Michelle; Marksberry, Don; Marshall, Jane; Masao, Nagai; Maupin, Cardelia; Mayros, Lauren; Mazaika, Michael; McConnell, Keith; McCoppin, Michael; McDermott, Brian; McGinty, Tim; McGovern, Denise; McIntyre, David; McMurtray, Anthony; Merritt, Christina; Meyer, Karen; Miller, Charles; Miller, Chris; Milligan, Patricia; Miranda, Samuel; Mohseni, Aby; Moore, Scott; Morlang, Gary; Morris, Scott; Mroz (Sahm), Sara; Munson, Clifford; Murray, Charles; Nerret, Amanda; Nguyen, Caroline; Norris, Michael; Norton, Charles; Opara, Stella; Ordaz, Vonna; Owens, Janice; Padovan, Mark; Parrillo, John; Patel, Jay; Patel, Pravin; Patrick, Mark; Perin, Vanice; Pope, Tia; Powell, Amy; Purdy, Gary; Quinlan, Kevin; Raddatz, Michael; Ragland, Robert; Ralph, Melissa; Ramsey, Jack; Reed, Elizabeth; Reed, Sara; Reed, Wendy; Reeves, Rosemary; Reis, Terrence; Resner, Mark; Riley (OCA), Timothy; Riner, Kelly; Rini, Brett; Roach, Edward; Robinson, Edward; Rodriguez-Luccioni, Hector; Roggenbrodt, William; Ropon, Kimberly; Rosales-Cooper, Cindy; Rosenberg, Stacey; Ross-Lee, MaryJane; Roundtree, Amy; Ruland, William; Russell, Tonya; Ryan, Michelle; Salay, Michael; Salter, Susan; Salus, Amy; Sanfilippo, Nathan; Santos, Daniel; Scarbrough, Thomas; Schaperow, Jason; Schmidt, Duane; Schmidt, Rebecca; Schoenebeck, Greg; Schrader, Eric; Schwartzman, Jennifer; Seber, Dogan; See, Kenneth; Shane, Raeann; Shea, James; Shepherd, Jill; Sheron, Brian; Skarda, Raymond; Skeen, David; Sloan, Scott; Smiroldo, Elizabeth; Smith, Brooke; Smith, Stacy; Smith, Theodore; Stahl, Eric; Stang, Annette; Stark, Johnathan; Steger (Tucci), Christine; Stieve, Alice; Stone, Rebecca; Stransky, Robert; Sturz, Fritz; Sullivan, Randy; Summers, Robert; Sun, Casper; Takacs, Michael; Tappert, John; Tegeler, Bret; Temple, Jeffrey; Thaggard, Mark; Thomas, Eric; Thorp, John; Tiruneh, Nebiyu; Tobin, Jennifer; Trefethen, Jean; Tschiltz, Michael; Turtill, Richard; Uhle, Jennifer; Valencia, Sandra; Vaughn, James; Vick, Lawrence; Virgilio, Martin; Virgilio, Rosetta; Ward, Leonard; Ward, William; Wastler, Sandra; Watson, Bruce; Webber, Robert; Weber, Michael; White, Bernard; Wiggins, Jim; Williams, Donna; Williams, Joseph; Williamson, Linda; Willis, Dori; Wimbush, Andrea; Wittick, Brian; Wray, John; Wright, Lisa (Gibney); Wright, Ned; Wunder, George; Young, Francis; Zimmerman, Jacob; Zimmerman, Roy; Solorio, Dave

**Cc:**

OST01 HOC

**Subject:**

Updated NRC Operations Center Watchlist for March 27 - April 2, 2011 (Pay Period 8)

**Date:**

Tuesday, March 29, 2011 5:08:37 PM

**Attachments:**

MASTER RESPONDER SCHEDULE FOR JAPAN EARTHQUAKE 2011.pdf

**Importance:**

High

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All...

Attached is an updated schedule for this week.

There are still available positions that need to be filled. If you are interested in filling a position, please coordinate through the respective team coordinators:

- Executive Team (Michelle Evans)
- Reactor Safety Team (Rick Hasselberg or Peter Alter)

NNNN/66

- **Protective Measures Team (Lou Brandon)**

**Thank you...**

**EST Administrative Support  
NRC Operations Center  
eMail: [OST02.HOC@nrc.gov](mailto:OST02.HOC@nrc.gov)  
301-816-5100**

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Position	Date	Time	Staff
<b>Executive Team</b>			
<b>ET Director</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Jennifer Uhle
Sun	27-Mar	7am - 3pm	Jim Dyer
Sun	27-Mar	3pm-11pm	Brian Sheron
Sun-Mon	3/27-3/28	11pm - 7am	Jim Wiggins
Mon	28-Mar	7am - 3pm	Mike Weber
Mon	28-Mar	3pm-11pm	Roy Zimmerman
Mon-Tue	3/28-3/29	11pm - 7am	Jim Wiggins
Tue	29-Mar	7am - 3pm	Mike Weber
Tue	29-Mar	3pm-11pm	Roy Zimmerman
Tue-Wed	3/29-3/30	11pm - 7am	Jim Wiggins
Wed	30-Mar	7am - 3pm	Bruce Boger
Wed	30-Mar	3pm-11pm	Roy Zimmerman
Wed-Thur	3/30-3/31	11pm - 7am	Jim Wiggins
Thur	31-Mar	7am - 3pm	Bruce Boger
Thur	31-Mar	3pm-11pm	Brian Sheron
Thur-Fri	3/31-4/1	11pm - 7am	Cynthia Carpenter
Fri	1-Apr	7am - 3pm	Mike Weber
Fri	1-Apr	3pm-11pm	Bruce Boger
Fri-Sat	4/1-4/2	11pm-7am	Cynthia Carpenter
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm - 7am	Cynthia Carpenter
<b>ET Response Advisor</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Chris Miller
Sun	27-Mar	7am - 3pm	Tom Blount
Sun	27-Mar	3pm-11pm	Brian McDermott
Sun-Mon	3/27-3/28	11pm - 7am	Chris Miller
Mon	28-Mar	7am - 3pm	Tom Blount
Mon	28-Mar	3pm-11pm	Brian McDermott
Mon-Tue	3/28-3/29	11pm - 7am	Scott Morris
Tue	29-Mar	7am - 3pm	Tom Blount
Tue	29-Mar	3pm-11pm	Brian McDermott
Tue-Wed	3/29-3/30	11pm - 7am	Scott Morris
Wed	30-Mar	7am - 3pm	Tom Blount
Wed	30-Mar	3pm-11pm	Brian McDermott
Wed-Thur	3/30-3/31	11pm - 7am	Scott Morris
Thur	31-Mar	7am - 3pm	Joe Giitter
Thur	31-Mar	3pm-11pm	Mark Thaggard
Thur-Fri	3/31-4/1	11pm - 7am	Scott Morris
Fri	1-Apr	7am - 3pm	Tom Blount
Fri	1-Apr	3pm-11pm	Mark Thaggard
Fri-Sat	4/1-4/2	11pm-7am	Scott Morris
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	Mary Jane Ross Lee
Sat-Sun	4/2-4/3	11pm-7am	Brian McDermott

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

<b>ET Rx Prot Measures &amp; State Coordinator</b>			
Sat-Sun	3/26-3/27	11pm - 7am	N/A
Sun	27-Mar	7am - 3pm	N/A
Sun	27-Mar	3pm-11pm	N/A
Sun-Mon	3/27-3/28	11pm - 7am	N/A
Mon	28-Mar	7am - 3pm	N/A
Mon	28-Mar	3pm-11pm	N/A
Mon-Tue	3/28-3/29	11pm - 7am	N/A
Tue	29-Mar	7am - 3pm	N/A
Tue	29-Mar	3pm-11pm	N/A
Tue-Wed	3/29-3/30	11pm - 7am	N/A
Wed	30-Mar	7am - 3pm	N/A
Wed	30-Mar	3pm-11pm	N/A
Wed-Thur	3/30-3/31	11pm - 7am	N/A
Thur	31-Mar	7am - 3pm	N/A
Thur	31-Mar	3pm-11pm	N/A
Thur-Fri	3/31-4/1	11pm - 7am	N/A
Fri	1-Apr	7am - 3pm	N/A
Fri	1-Apr	3pm-11pm	N/A
Fri-Sat	4/1-4/2	11pm-7am	N/A
Sat	2-Apr	7am - 3pm	N/A
Sat	2-Apr	3pm-11pm	N/A
Sat-Sun	4/2-4/3	11pm - 7am	N/A
<b>Executive Briefing Team</b>			
<b>EBT Admin. Assistant</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Jonathan Fiske
Sun	27-Mar	7am - 3pm	Annette Stang
Sun	27-Mar	3pm-11pm	Carolyn Kahler
Sun-Mon	3/27-3/28	11pm - 7am	Christina Merritt
Mon	28-Mar	7am - 3pm	Louise Lovell
Mon	28-Mar	3pm-11pm	Annette Stang
Mon-Tue	3/28-3/29	11pm - 7am	Jonathan Fiske (11pm - 9am)
Tue	29-Mar	7am - 3pm	Sapna Hurd (9am - 3pm)
Tue	29-Mar	3pm-11pm	Tonya Russell
Tue-Wed	3/29-3/30	11pm - 7am	Christina Merritt
Wed	30-Mar	7am - 3pm	Carolyn Kahler/Sapna Hurd
Wed	30-Mar	3pm-11pm	Tonya Russell
Wed-Thur	3/30-3/31	11pm - 7am	Jeanne Dempsey
Thur	31-Mar	7am - 3pm	Louise Lovell
Thur	31-Mar	3pm-11pm	Tonya Russell
Thur-Fri	3/31-4/1	11pm - 7am	Tia Pope
Fri	1-Apr	7am - 3pm	Annette Stang
Fri	1-Apr	3pm-11pm	Sapna Hurd
Fri-Sat	4/1-4/2	11pm-7am	
Sat	2-Apr	7am-3pm	
Sat	2-Apr	3pm-11pm	
Sat-Sun	Apr 2-Apr3	11pm-7am	
<b>EBT Coordinator</b>			

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Sat-Sun	3/26-3/27	11pm - 7am	Jim Anderson
Sun	27-Mar	7am - 3pm	Eddie Robinson
Sun	27-Mar	3pm-11pm	Nichole Glenn
Sun-Mon	3/27-3/28	11pm - 7am	Caroline Nguyen
Mon	28-Mar	7am - 3pm	Yen Chen
Mon	28-Mar	3pm-11pm	Sara Mroz
Mon-Tue	3/28-3/29	11pm - 7am	Jim Anderson
Tue	29-Mar	7am - 3pm	Yen Chen
Tue	29-Mar	3pm-11pm	Sara Mroz
Tue-Wed	3/29-3/30	11pm - 7am	Jim Anderson
Wed	30-Mar	7am - 3pm	Yen Chen
Wed	30-Mar	3pm-11pm	Sara Mroz
Wed-Thur	3/30-3/31	11pm - 7am	Jim Anderson
Thur	31-Mar	7am - 3pm	Yen Chen
Thur	31-Mar	3pm-11pm	Sara Mroz
Thur-Fri	3/31-4/1	11pm - 7am	Jim Anderson
Fri	1-Apr	7am - 3pm	Yen Chen
Fri	1-Apr	3pm-11pm	Sara Mroz
Fri-Sat	4/1-4/2	11pm-7am	Jim Anderson
Sat	2-Apr	7am - 3pm	Tonya Russell
Sat	2-Apr	3pm-11pm	Nichole Glenn
Sat-Sun	4/2-4/3	11pm - 7am	
<b>Executive Support Team</b>			
<b>EST Status Officer</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Jeff Grant
Sun	27-Mar	7am - 3pm	Jane Marshall
Sun	27-Mar	3pm-11pm	Bill Gott
Sun-Mon	3/27-3/28	11pm - 7am	Jeff Grant
Mon	28-Mar	7am - 3pm	Jane Marshall
Mon	28-Mar	3pm-11pm	Bill Gott
Mon-Tue	3/28-3/29	11pm - 7am	Jeff Grant
Tue	29-Mar	7am - 3pm	Jane Marshall
Tue	29-Mar	3pm-11pm	Bill Gott
Tue-Wed	3/29-3/30	11pm - 7am	Jeff Grant
Wed	30-Mar	7am - 3pm	Jane Marshall
Wed	30-Mar	3pm-11pm	Bill Gott
Wed-Thur	3/30-3/31	11pm - 7am	Jeff Grant
Thur	31-Mar	7am - 3pm	Jane Marshall
Thur	31-Mar	3pm-11pm	Bill Gott
Thur-Fri	3/31-4/1	11pm - 7am	Jeff Grant
Fri	1-Apr	7am - 3pm	Jane Marshall
Fri	1-Apr	3pm-11pm	Bill Gott
Fri-Sat	4/1-4/2	11pm-7am	Jeff Grant
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	Craig Erlanger
Sat-Sun	4/2-4/3	11pm - 7am	
<b>EST Actions Officer</b>			
Sat-Sun	3/26-3/27	11pm - 7am	N/A

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Sun	27-Mar	7am - 3pm	Kelly Grimes
Sun	27-Mar	3pm-11pm	Melissa Ralph
Sun-Mon	3/27-3/28	11pm - 7am	N/A
Mon	28-Mar	7am - 3pm	Zahira Cruz
Mon	28-Mar	3pm-11pm	Melissa Ralph
Mon-Tue	3/28-3/29	11pm - 7am	N/A
Tue	29-Mar	7am - 3pm	Bezakulu Alemu/Kelly Grimes
Tue	29-Mar	3pm-11pm	Melissa Ralph
Tue-Wed	3/29-3/30	11pm - 7am	N/A
Wed	30-Mar	7am - 3pm	Wendy Reed
Wed	30-Mar	3pm-11pm	Melissa Ralph
Wed-Thur	3/30-3/31	11pm - 7am	N/A
Thur	31-Mar	7am - 3pm	Jonathan Fiske
Thur	31-Mar	3pm-11pm	Melissa Ralph
Thur-Fri	3/31-4/1	11pm - 7am	N/A
Fri	1-Apr	7am - 3pm	Wendy Reed
Fri	1-Apr	3pm-11pm	Melissa Ralph
Fri-Sat	4/1-4/2	11pm-7am	Don Algama
Sat	2-Apr	7am - 3pm	Anthony Bowers
Sat	2-Apr	3pm-11pm	Bezakulu Alemu
Sat-Sun	4/2-4/3	11pm - 7am	N/A
<b>EST Coordinator</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Steve Campbell
Sun	27-Mar	7am - 3pm	Tonya Russell
Sun	27-Mar	3pm-11pm	Stella Opara
Sun-Mon	3/27-3/28	11pm - 7am	Taylor Lichatz
Mon	28-Mar	7am - 3pm	Tony McMurtray
Mon	28-Mar	3pm-11pm	Rebecca Stone
Mon-Tue	3/28-3/29	11pm - 7am	Stacy Smith
Tue	29-Mar	7am - 3pm	Tony McMurtray
Tue	29-Mar	3pm-11pm	Tony Bowers
Tue-Wed	3/29-3/30	11pm - 7am	Rebecca Stone
Wed	30-Mar	7am - 3pm	Tony McMurtray
Wed	30-Mar	3pm-11pm	Stacy Smith
Wed-Thur	3/30-3/31	11pm - 7am	Rebecca Stone
Thur	31-Mar	7am - 3pm	Anthony Bowers
Thur	31-Mar	3pm-11pm	Tony McMurtray
Thur-Fri	3/31-4/1	11pm - 7am	Rebecca Stone
Fri	1-Apr	7am - 3pm	Steve Campbell
Fri	1-Apr	3pm-11pm	Tony McMurtray
Fri-Sat	4/1-4/2	11pm-7am	Rebecca Stone
Sat	2-Apr	7am - 3pm	Stacy Smith
Sat	2-Apr	3pm-11pm	Steve Campbell
Sat-Sun	4/2-4/3	11pm - 7am	Rebecca Stone
<b>EST Chronology Officer</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Thomas Scarbrough
Sun	27-Mar	7am - 3pm	Hector Rodriguez
Sun	27-Mar	3pm-11pm	Rebecca Karas

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Sun-Mon	3/27-3/28	11pm - 7am	Thomas Scarbrough
Mon	28-Mar	7am - 3pm	Hector Rodriguez
Mon	28-Mar	3pm-11pm	Rebecca Karas
Mon-Tue	3/28-3/29	11pm - 7am	Nick Ballam
Tue	29-Mar	7am - 3pm	Vanice Perin
Tue	29-Mar	3pm-11pm	Rebecca Karas
Tue-Wed	3/29-3/30	11pm - 7am	Nick Ballam
Wed	30-Mar	7am - 3pm	Hector Rodriguez
Wed	30-Mar	3pm-11pm	Rebecca Karas
Wed-Thur	3/30-3/31	11pm - 7am	Thomas Scarbrough
Thur	31-Mar	7am - 3pm	Vanice Perin
Thur	31-Mar	3pm-11pm	Rebecca Karas
Thur-Fri	3/31-4/1	11pm - 7am	Nick Ballam
Fri	1-Apr	7am - 3pm	Sandra Valencia
Fri	1-Apr	3pm-11pm	Margie Kotzalas/Rebecca Karas
Fri-Sat	4/1-4/2	11pm-7am	Nick Ballam
Sat	2-Apr	7am - 3pm	Mark Resner
Sat	2-Apr	3pm-11pm	Rebecca Karas
Sat-Sun	4/2-4/3	11pm - 7am	Nick Ballam
<b>EST Response Ops Mgr</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Roberto Figueroa
Sun	27-Mar	7am - 3pm	Omar Khan
Sun	27-Mar	3pm-11pm	Cris Brown
Sun-Mon	3/27-3/28	11pm - 7am	Roberto Figueroa
Mon	28-Mar	7am - 3pm	Karen Jackson
Mon	28-Mar	3pm-11pm	Cris Brown
Mon-Tue	3/28-3/29	11pm - 7am	Omar Khan
Tue	29-Mar	7am - 3pm	Bob Stransky
Tue	29-Mar	3pm-11pm	Cris Brown
Tue-Wed	3/29-3/30	11pm - 7am	Karen Jackson
Wed	30-Mar	7am - 3pm	Omar Khan
Wed	30-Mar	3pm-11pm	Cris Brown
Wed-Thur	3/30-3/31	11pm - 7am	Bob Stransky
Thur	31-Mar	7am - 3pm	Karen Jackson
Thur	31-Mar	3pm-11pm	Omar Khan
Thur-Fri	3/31-4/1	11pm - 7am	Bob Stransky
Fri	1-Apr	7am - 3pm	Roberto Figueroa
Fri	1-Apr	3pm-11pm	Karen Jackson
Fri-Sat	4/1-4/2	11pm-7am	Omar Khan
Sat	2-Apr	7am - 3pm	Roberto Figueroa
Sat	2-Apr	3pm-11pm	Karen Jackson
Sat-Sun	4/2-4/3	11pm - 7am	Omar Khan
<b>EST Admin. Assistant</b>			
Sat-Sun	3/26-3/27	11pm - 7am	N/A
Sun	27-Mar	7am - 3pm	Tonya Russell/Karen Meyer
Sun	27-Mar	3pm-11pm	Cynthia Dorsey
Sun-Mon	3/27-3/28	11pm - 7am	N/A
Mon	28-Mar	7am - 3pm	Michelle Manahan

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Mon	28-Mar	3pm-11pm	Carol Greenwood
Mon-Tue	3/28-3/29	11pm - 7am	N/A
Tue	29-Mar	7am - 3pm	Michelle Manahan
Tue	29-Mar	3pm-11pm	Mary Glenn Crutchley
Tue-Wed	3/29-3/30	11pm - 7am	N/A
Wed	30-Mar	7am - 3pm	Cynthia Dorsey
Wed	30-Mar	3pm-11pm	Mary Glenn Crutchley
Wed-Thur	3/30-3/31	11pm - 7am	N/A
Thur	31-Mar	7am - 3pm	Amy Salus
Thur	31-Mar	3pm-11pm	Tabitha Howard
Thur-Fri	3/31-4/1	11pm - 7am	N/A
Fri	1-Apr	7am - 3pm	Carol Greenwood
Fri	1-Apr	3pm-11pm	Tabitha Howard
Fri-Sat	4/1-4/2	11pm-7am	N/A
Sat	2-Apr	7am - 3pm	Karen Meyer
Sat	2-Apr	3pm-11pm	Cynthia Dorsey
Sat-Sun	4/2-4/3	11pm - 7am	N/A

**Liaison Team**

**LT Director**

Sat-Sun	3/26-3/27	11pm - 7am	Marissa Bailey
Sun	27-Mar	7am - 3pm	Mike Tschiltz
Sun	27-Mar	3pm-11pm	Marrisa Bailey
Sun-Mon	3/27-3/28	11pm - 7am	Mark Thaggard
Mon	28-Mar	7am - 3pm	Allen Howe
Mon	28-Mar	3pm-11pm	Marrisa Bailey
Mon-Tue	3/28-3/29	11pm - 7am	Bob Caldwell
Tue	29-Mar	7am - 3pm	Allen Howe
Tue	29-Mar	3pm-11pm	Marrisa Bailey
Tue-Wed	3/29-3/30	11pm - 7am	Bob Caldwell
Wed	30-Mar	7am - 3pm	Allen Howe
Wed	30-Mar	3pm-11pm	Marrisa Bailey
Wed-Thur	3/30-3/31	11pm - 7am	Andy Campbell
Thur	31-Mar	7am - 3pm	John Adams
Thur	31-Mar	3pm-11pm	Mark Lombard
Thur-Fri	3/31-4/1	11pm - 7am	Bob Webber
Fri	1-Apr	7am - 3pm	John Adams
Fri	1-Apr	3pm-11pm	Mark Lombard
Fri-Sat	4/1-4/2	11pm-7am	Tom Bergman
Sat	2-Apr	7am - 3pm	John Adams
Sat	2-Apr	3pm-11pm	Marissa Bailey
Sat-Sun	4/2-4/3	11pm - 7am	Tom Bergman

**LT Coordinator**

Sat-Sun	3/26-3/27	11pm - 7am	Milt Murray
Sun	27-Mar	7am - 3pm	Lisa Gibney
Sun	27-Mar	3pm-11pm	Jeff Temple
Sun-Mon	3/27-3/28	11pm - 7am	Milt Murray
Mon	28-Mar	7am - 3pm	Jeff Temple
Mon	28-Mar	3pm-11pm	Rani Franovich

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Mon-Tue	3/28-3/29	11pm - 7am	Janelle Jessie
Tue	29-Mar	7am - 3pm	Milt Murray
Tue	29-Mar	3pm-11pm	Rani Franovich
Tue-Wed	3/29-3/30	11pm - 7am	Janelle Jessie
Wed	30-Mar	7am - 3pm	Milt Murray
Wed	30-Mar	3pm-11pm	Jeff Temple
Wed-Thur	3/30-3/31	11pm - 7am	Rani Franovich
Thur	31-Mar	7am - 3pm	Milt Murray
Thur	31-Mar	3pm-11pm	Jeff Temple
Thur-Fri	3/31-4/1	11pm - 7am	Rani Franovich
Fri	1-Apr	7am - 3pm	Jeff Temple
Fri	1-Apr	3pm-11pm	Janelle Jessie
Fri-Sat	4/1-4/2	11pm-7am	Rani Franovich
Sat	2-Apr	7am - 3pm	Jeff Temple
Sat	2-Apr	3pm-11pm	Milt Murray
Sat-Sun	4/2-4/3	11pm - 7am	Joe Rivers
<b>LT State Liaison</b>			
Sat-Sun	3/26-3/27	9pm-7am	A. Rivera/A. Noonan (ON CALL)
Sun	27-Mar	7am-2pm	Alison Rivera (ON CALL)
Sun	27-Mar	2pm-9pm	Alison Rivera (ON CALL)
Sun-Mon	3/27-3/28	9pm-7am	Alison Rivera (ON CALL)
Mon	28-Mar	7am-2pm	C. Maupin/C. Flannery (ON CALL)
Mon	28-Mar	2pm-9pm	Stuart Easson
Mon-Tue	3/28-3/29	9pm-7am	R. Virgilio (ON CALL)
Tue	29-Mar	7am-2pm	C. Maupin/R. Turttil (ON CALL)
Tue	29-Mar	2pm-9pm	Stuart Easson
Tue-Wed	3/29-3/30	9pm-7am	Richard Turttil (ON CALL)
Wed	30-Mar	7am-2pm	Cindy Flannery
Wed	30-Mar	2pm-9pm	Michelle Ryan
Wed-Thur	3/30-3/31	9pm-7am	Richard Turttil (ON CALL)
Thur	31-Mar	7am-2pm	Amanda Noonan
Thur	31-Mar	2pm-9pm	Michelle Ryan
Thur-Fri	3/31-4/1	9pm-7am	Richard Turttil (ON CALL)
Fri	1-Apr	7am-2pm	Kim Lukes
Fri	1-Apr	2pm-9pm	Alison Rivera
Fri-Sat	4/1-4/2	9pm-7am	Richard Turttil (ON CALL)
Sat	2-Apr	7am-2pm	Amanda Noonan (ON CALL)
Sat	2-Apr	2pm-9pm	Amanda Noonan (ON CALL)
Sat-Sun	2-Apr	9pm-7am	Amanda Noonan (ON CALL)
<b>LT Federal Liaison (2)</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Scott Sloan
Sun	27-Mar	7am - 3pm	Susan Salter / Lisa Wright
Sun	27-Mar	3pm-11pm	Jerry Hale
Sun-Mon	3/27-3/28	11pm - 7am	Scott Sloan
Mon	28-Mar	7am - 3pm	Jason Lising/Susan Salter
Mon	28-Mar	3pm-11pm	Lisa Wright
Mon-Tue	3/28-3/29	11pm - 7am	Ned Wright
Tue	29-Mar	7am - 3pm	Susan Salter / Jerry Hale

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Tue	29-Mar	3pm-11pm	Lisa Wright
Tue-Wed	3/29-3/30	11pm - 7am	Ned Wright
Wed	30-Mar	7am - 3pm	Jerry Hale/Bethany Cecere
Wed	30-Mar	3pm-11pm	Lisa Wright
Wed-Thur	3/30-3/31	11pm - 7am	Bethany Cecere
Thur	31-Mar	7am - 3pm	Jason Lising/Bethany Cecere
Thur	31-Mar	3pm-11pm	Jeff Lynch
Thur-Fri	3/31-4/1	11pm - 7am	Ned Wright
Fri	1-Apr	7am - 3pm	Jeff Lynch / Beth Reed
Fri	1-Apr	3pm-11pm	Jerry Hale
Fri-Sat	4/1-4/2	11pm-7am	Jason Lising
Sat	2-Apr	7am - 3pm	Beth Reed
Sat	2-Apr	3pm-11pm	Bethany Cecere
Sat-Sun	4/2-4/3	11pm - 7am	Jason Lising

**LT Congressional Liaison (2)**

Sat-Sun	3/26-3/27	11pm - 7am	Amy Powell (ON CALL)
Sun	27-Mar	7am - 3pm	Amy Powell (ON CALL)
Sun	27-Mar	3pm-11pm	Amy Powell (ON CALL)
Sun-Mon	3/27-3/28	11pm - 7am	Amy Powell (ON CALL)
Mon	28-Mar	7am - 3pm	Amy Powell (ON CALL)
Mon	28-Mar	3pm-11pm	Amy Powell (ON CALL)
Mon-Tue	3/28-3/29	11pm - 7am	Amy Powell (ON CALL)
Tue	29-Mar	7am - 3pm	Amy Powell (ON CALL)
Tue	29-Mar	3pm-11pm	Amy Powell (ON CALL)
Tue-Wed	3/29-3/30	11pm - 7am	Amy Powell (ON CALL)
Wed	30-Mar	7am - 3pm	Amy Powell (ON CALL)
Wed	30-Mar	3pm-11pm	Amy Powell (ON CALL)
Wed-Thur	3/30-3/31	11pm - 7am	Amy Powell (ON CALL)
Thur	31-Mar	7am - 3pm	Amy Powell (ON CALL)
Thur	31-Mar	3pm-11pm	Amy Powell (ON CALL)
Thur-Fri	3/31-4/1	11pm - 7am	Amy Powell (ON CALL)
Fri	1-Apr	7am - 2pm	Amy Powell (ON CALL)
Fri	1-Apr	2pm-9pm	Amy Powell (ON CALL)
Sat	2-Apr	7am - 2pm	Amy Powell (ON CALL)
Sat	2-Apr	2pm-9pm	Amy Powell (ON CALL)
Sun	3-Apr	7am-2pm	Amy Powell (ON CALL)

**LT International Liaison (2)**

Sat-Sun	3/26-3/27	11pm - 7am	Cindy Rosales/ Elizabeth Smiroldo
Sun	27-Mar	7am - 3pm	Jill Shepard/ Karen Henderson
Sun	27-Mar	3pm-11pm	Nancy Fragoyannis/ Jenny Tobin
Sun-Mon	3/27-3/28	11pm - 7am	Steve Baker / Brian Wittick
Mon	28-Mar	7am - 3pm	Jill Shepard/ Karen Henderson
Mon	28-Mar	3pm-11pm	Nancy Fragoyannis / Cindy Rosales
Mon-Tue	3/28-3/29	11pm - 7am	Steve Baker / Brian Wittick
Tue	29-Mar	7am - 3pm	Jill Shepard/ Karen Henderson
Tue	29-Mar	3pm-11pm	Nancy Fragoyannis / Gerri Fehst
Tue-Wed	3/29-3/30	11pm - 7am	Steve Baker / Brian Wittick
Wed	30-Mar	7am - 3pm	Charlotte Abrahams / Lauren Mayros (J. Tobin 12-3)

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Wed	30-Mar	3pm-11pm	Gerri Fesht / Mugah Afshar-Tous
Wed-Thur	3/30-3/31	11pm - 7am	Jen Schwartzman / Charlotte Abrams
Thur	31-Mar	7am - 3pm	Jill Shepard/Lauren Mayros
Thur	31-Mar	3pm-11pm	Gerri Fehst/Mugah Afshar-Tous
Thur-Fri	3/31-4/1	11pm - 7am	Jen Schwartzman / Charlotte Abrams
Fri	1-Apr	7am - 3pm	Cindy Rosales/ Lauren Mayros
Fri	1-Apr	3pm-11pm	Gerri Fehst/Mugah Afshar-Tous
Fri-Sat	4/1-4/2	11pm-7am	Jen Schwartzman / Charlotte Abrams
Sat	2-Apr	7am - 3pm	Steve Bloom/ Karen Henderson
Sat	2-Apr	3pm-11pm	Janice Owens / Jenny Tobin
Sat-Sun	4/2-4/3	11pm - 7am	Gerri Fehst / Elizabeth Smiroldo

**Protective Measures Team**

**PMTR Director**

Sat-Sun	3/26-3/27	11pm - 7am	Randy Sullivan
Sun	27-Mar	7am - 3pm	Don Cool
Sun	27-Mar	3pm-11pm	Christiana Lui
Sun-Mon	3/27-3/28	11pm - 7am	John Tappert
Mon	28-Mar	7am - 3pm	Don Cool
Mon	28-Mar	3pm-11pm	Doug Coe
Mon-Tue	3/28-3/29	11pm - 7am	John Tappert
Tue	29-Mar	7am - 3pm	Don Cool
Tue	29-Mar	3pm-11pm	Doug Coe
Tue-Wed	3/29-3/30	11pm - 7am	Greg Casto
Wed	30-Mar	7am - 3pm	Don Cool
Wed	30-Mar	3pm-11pm	Doug Coe
Wed-Thur	3/30-3/31	11pm - 7am	Greg Casto
Thur	31-Mar	7am - 3pm	Randy Sullivan
Thur	31-Mar	3pm-11pm	John Lubinski
Thur-Fri	3/31-4/1	11pm - 7am	Christiana Lui
Fri	1-Apr	7am - 3pm	Randy Sullivan
Fri	1-Apr	3pm-11pm	Don Cool
Fri-Sat	4/1-4/2	11pm-7am	Christiana Lui
Sat	2-Apr	7am - 3pm	Randy Sullivan
Sat	2-Apr	3pm-11pm	Don Cool
Sat-Sun	4/2-4/3	11pm - 7am	Christiana Lui

**PMTR Coordinator**

Sat-Sun	3/26-3/27	11pm - 7am	Lou Brandon
Sun	27-Mar	7am - 3pm	Ryan Craffey
Sun	27-Mar	3pm-11pm	Jay Patel
Sun-Mon	3/27-3/28	11pm - 7am	Lou Brandon
Mon	28-Mar	7am - 3pm	Duane Hardesty
Mon	28-Mar	3pm-11pm	Nima Ashkeboussi
Mon-Tue	3/28-3/29	11pm - 7am	Lou Brandon
Tue	29-Mar	7am - 3pm	Duane Hardesty
Tue	29-Mar	3pm-11pm	Nima Ashkeboussi
Tue-Wed	3/29-3/30	11pm - 7am	Lou Brandon
Wed	30-Mar	7am - 3pm	Michael Raddatz
Wed	30-Mar	3pm-11pm	Jay Patel

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Wed-Thur	3/30-3/31	11pm - 7am	Ryan Craffey
Thur	31-Mar	7am - 3pm	Duane Hardesty
Thur	31-Mar	3pm-11pm	Michael Raddatz
Thur-Fri	3/31-4/1	11pm - 7am	Kimberly Hardin/ Lou Brandon
Fri	1-Apr	7am - 3pm	Duane Hardesty
Fri	1-Apr	3pm-11pm	Nima Ashkeboussi
Fri-Sat	4/1-4/2	11pm-7am	Lou Brandon
Sat	2-Apr	7am - 3pm	Prosanta Chowdhury
Sat	2-Apr	3pm-11pm	Kimberly Hardin
Sat-Sun	4/2-4/3	11pm - 7am	Lou Brandon

**PMTR Prot Actions Asst Dir**

Sat-Sun	3/26-3/27	11pm - 7am	Greg Casto
Sun	27-Mar	7am - 3pm	Kevin Williams
Sun	27-Mar	3pm-11pm	Tim Harris
Sun-Mon	3/27-3/28	11pm - 7am	Greg Casto
Mon	28-Mar	7am - 3pm	Sandra Wastler
Mon	28-Mar	3pm-11pm	Mike McCoppin
Mon-Tue	3/28-3/29	11pm - 7am	Greg Casto
Tue	29-Mar	7am - 3pm	Michael Takacs
Tue	29-Mar	3pm-11pm	Tim Harris
Tue-Wed	3/29-3/30	11pm - 7am	Bruce Musico
Wed	30-Mar	7am - 3pm	Michael Takacs
Wed	30-Mar	3pm-11pm	Sandra Wastler
Wed-Thur	3/30-3/31	11pm - 7am	Bruce Musico
Thur	31-Mar	7am - 3pm	Jessica Kratchman
Thur	31-Mar	3pm-11pm	Tim Harris
Thur-Fri	3/31-4/1	11pm - 7am	Eric Benner
Fri	1-Apr	7am - 3pm	Jessica Kratchman
Fri	1-Apr	3pm-11pm	
Fri-Sat	4/1-4/2	11pm-7am	
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	Sandra Wastler
Sat-Sun	4/2-4/3	11pm - 7am	

**PMTR RAAD**

Sat-Sun	3/26-3/27	11pm - 7am	Mike Norris
Sun	27-Mar	7am - 3pm	Michelle Hart
Sun	27-Mar	3pm-11pm	Leroy Hardin
Sun-Mon	3/27-3/28	11pm - 7am	Mike Norris
Mon	28-Mar	7am - 3pm	Steve LaVie
Mon	28-Mar	3pm-11pm	Michelle Hart
Mon-Tue	3/28-3/29	11pm - 7am	Mike Norris
Tue	29-Mar	7am - 3pm	Bruce Watson
Tue	29-Mar	3pm-11pm	Steve LaVie
Tue-Wed	3/29-3/30	11pm - 7am	Mike Norris
Wed	30-Mar	7am - 3pm	Bruce Watson
Wed	30-Mar	3pm-11pm	Steve LaVie
Wed-Thur	3/30-3/31	11pm - 7am	Eric Benner
Thur	31-Mar	7am - 3pm	Michelle Hart

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Thur	31-Mar	3pm-11pm	Eric Schrader
Thur-Fri	3/31-4/1	11pm - 7am	Mike Norris
Fri	1-Apr	7am - 3pm	
Fri	1-Apr	3pm-11pm	Steve LaVie
Fri-Sat	4/1-4/2	11pm-7am	Michelle Hart
Sat	2-Apr	7am - 3pm	
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm - 7am	Mike Norris

**PMTR Dose Assessment (RASCAL) - Need 2 people per day**

Sat-Sun	3/26-3/27	11pm - 7am	John Parillo/Ron LaVera
Sun	27-Mar	7am - 3pm	Tony Huffert/Larry Wheeler
Sun	27-Mar	3pm-11pm	Casper Sun/Ed Roach
Sun-Mon	3/27-3/28	11pm - 7am	Margaret Cervera/John Parillo
Mon	28-Mar	7am - 3pm	Rich Clement/Tony Huffert
Mon	28-Mar	3pm-11pm	Bernie White/Casper Sun
Mon-Tue	3/28-3/29	11pm - 7am	Margaret Cervera/John Parillo
Tue	29-Mar	7am - 3pm	Tony Huffert/Rich Clement
Tue	29-Mar	3pm-11pm	Casper Sun/Fritz Sturtz
Tue-Wed	3/29-3/30	11pm - 7am	Margaret Cervera/Bernie White
Wed	30-Mar	7am - 3pm	Tony Huffert/Rich Clement
Wed	30-Mar	3pm-11pm	Casper Sun/Ron LaVera
Wed-Thur	3/30-3/31	11pm - 7am	Margaret Cervera/John Parillo
Thur	31-Mar	7am - 3pm	Rich Clement/Joe DeCicco
Thur	31-Mar	3pm-11pm	Bernie White?/Casper Sun
Thur-Fri	3/31-4/1	11pm - 7am	John Parillo/Leroy Hardin
Fri	1-Apr	7am - 3pm	Margaret Cervera/Rich Clement
Fri	1-Apr	3pm-11pm	Casper Sun/Fritz Sturtz
Fri-Sat	4/1-4/2	11pm-7am	John Parillo/ ?
Sat	2-Apr	7am - 3pm	Ronald LaVera/ ?
Sat	2-Apr	3pm-11pm	Casper Sun/Leroy Hardin
Sat-Sun	4/2-4/3	11pm - 7am	John Parillo/Fritz Sturtz

**PMTR GIS Analyst**

Sat-Sun	3/26-3/27	11pm - 7am	N/A
Sun	27-Mar	7am - 3pm	(ON CALL)
Sun	27-Mar	3pm-11pm	N/A
Sun-Mon	3/27-3/28	11pm - 7am	N/A
Mon	28-Mar	7am - 3pm	(ON CALL)
Mon	28-Mar	3pm-11pm	N/A
Mon-Tue	3/28-3/29	11pm - 7am	N/A
Tue	29-Mar	7am - 3pm	(ON CALL)
Tue	29-Mar	3pm-11pm	N/A
Tue-Wed	3/29-3/30	11pm - 7am	N/A
Wed	30-Mar	7am - 3pm	(ON CALL)
Wed	30-Mar	3pm-11pm	N/A
Wed-Thur	3/30-3/31	11pm - 7am	N/A
Thur	31-Mar	7am - 3pm	(ON CALL)
Thur	31-Mar	3pm-11pm	N/A
Thur-Fri	3/31-4/1	11pm - 7am	N/A

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Fri	1-Apr	7am - 3pm	(ON CALL)
Fri	1-Apr	3pm-11pm	N/A
Fri-Sat	4/1-4/2	11pm-7am	N/A
Sat	2-Apr	7am - 3pm	(ON CALL)
Sat	2-Apr	3pm-11pm	N/A
Sat-Sun	4/2-4/3	11pm - 7am	N/A
<b>PMTR Meteorologist</b>			
Sat-Sun	3/26-3/27	11pm - 7am	N/A
Sun	27-Mar	7am - 3pm	(ON CALL)
Sun	27-Mar	3pm-11pm	N/A
Sun-Mon	3/27-3/28	11pm - 7am	N/A
Mon	28-Mar	7am - 3pm	(ON CALL)
Mon	28-Mar	3pm-11pm	N/A
Mon-Tue	3/28-3/29	11pm - 7am	N/A
Tue	29-Mar	7am - 3pm	(ON CALL)
Tue	29-Mar	3pm-11pm	N/A
Tue-Wed	3/29-3/30	11pm - 7am	N/A
Wed	30-Mar	7am - 3pm	(ON CALL)
Wed	30-Mar	3pm-11pm	N/A
Wed-Thur	3/30-3/31	11pm - 7am	N/A
Thur	31-Mar	7am - 3pm	(ON CALL)
Thur	31-Mar	3pm-11pm	N/A
Thur-Fri	3/31-4/1	11pm - 7am	N/A
Fri	1-Apr	7am - 3pm	(ON CALL)
Fri	1-Apr	3pm-11pm	N/A
Fri-Sat	4/1-4/2	11pm-7am	N/A
Sat	2-Apr	7am - 3pm	(ON CALL)
Sat	2-Apr	3pm-11pm	N/A
Sat-Sun	4/2-4/3	11pm - 7am	N/A
<b>Reactor Safety Team</b>			
<b>RST Director</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Dave Skeen
Sun	27-Mar	7am - 3pm	Pat Hiland
Sun	27-Mar	3pm-11pm	Fred Brown
Sun-Mon	3/27-3/28	11pm - 7am	Dave Skeen
Mon	28-Mar	7am - 3pm	Pat Hiland
Mon	28-Mar	3pm-11pm	Fred Brown
Mon-Tue	3/28-3/29	11pm - 7am	Dave Skeen
Tue	29-Mar	7am - 3pm	Ed Hackett
Tue	29-Mar	3pm-11pm	Fred Brown
Tue-Wed	3/29-3/30	11pm - 7am	Dave Skeen
Wed	30-Mar	7am - 3pm	Brian Holian
Wed	30-Mar	3pm-11pm	Fred Brown
Wed-Thur	3/30-3/31	11pm - 7am	Mike Case
Thur	31-Mar	7am - 3pm	Ed Hackett
Thur	31-Mar	3pm-11pm	Bill Ruland
Thur-Fri	3/31-4/1	11pm - 7am	Mike Case
Fri	1-Apr	7am - 3pm	Allen Howe

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Fri	1-Apr	3pm-11pm	Bill Ruland
Fri-Sat	4/1-4/2	11pm-7am	Mike Case
Sat	2-Apr	7am - 3pm	Brian Holian
Sat	2-Apr	3pm-11pm	Pat Hiland
Sat-Sun	4/2-4/3	11pm - 7am	Mike Case
<b>RST Coordinator</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Brett Rini
Sun	27-Mar	7am - 3pm	Peter Alter
Sun	27-Mar	3pm-11pm	Rick Hasselberg
Sun-Mon	3/27-3/28	11pm - 7am	Frank Collins
Mon	28-Mar	7am - 3pm	Peter Alter
Mon	28-Mar	3pm-11pm	Tom Boyce (RES)/Dion
Mon-Tue	3/28-3/29	11pm - 7am	Mike Morlang
Tue	29-Mar	7am - 3pm	Brett Rini
Tue	29-Mar	3pm-11pm	Greg Schoenebeck
Tue-Wed	3/29-3/30	11pm - 7am	Mike Morlang
Wed	30-Mar	7am - 3pm	Peter Alter
Wed	30-Mar	3pm-11pm	Greg Schoenebeck
Wed-Thur	3/30-3/31	11pm - 7am	Frank Collins
Thur	31-Mar	7am - 3pm	Peter Alter
Thur	31-Mar	3pm-11pm	Greg Schoenebeck
Thur-Fri	3/31-4/1	11pm - 7am	Frank Collins
Fri	1-Apr	7am - 3pm	Brett Rini
Fri	1-Apr	3pm-11pm	Mark Orr
Fri-Sat	4/1-4/2	11pm-7am	Frank Collins
Sat	2-Apr	7am - 3pm	Peter Alter
Sat	2-Apr	3pm-11pm	Brett Rini
Sat-Sun	4/2-4/3	11pm - 7am	Oleg Bukharin
<b>Severe Accident/PRA</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Ray Skarda
Sun	27-Mar	7am - 3pm	Andy Howe
Sun	27-Mar	3pm-11pm	Jeff Mitman
Sun-Mon	3/27-3/28	11pm - 7am	Jim Gilmer
Mon	28-Mar	7am - 3pm	Jeff Circle
Mon	28-Mar	3pm-11pm	Len Ward
Mon-Tue	3/28-3/29	11pm - 7am	Donnie Harrison
Tue	29-Mar	7am - 3pm	Hossein Esmaili
Tue	29-Mar	3pm-11pm	Ed Fuller
Tue-Wed	3/29-3/30	11pm - 7am	Donnie Harrison
Wed	30-Mar	7am - 3pm	Jim Gilmer
Wed	30-Mar	3pm-11pm	Hossein Esmaili
Wed-Thur	3/30-3/31	11pm - 7am	Steve Arndt
Thur	31-Mar	7am - 3pm	Don Chung
Thur	31-Mar	3pm-11pm	Hossein Esmaili
Thur-Fri	3/31-4/1	11pm - 7am	Steve Arndt
Fri	1-Apr	7am - 3pm	Jeff Mitman
Fri	1-Apr	3pm-11pm	Don Hilton
Fri-Sat	4/1-4/2	11pm-7am	Ray Skarda

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Sat	2-Apr	7am - 3pm	Hossein Esmaili
Sat	2-Apr	3pm-11pm	
Sat-Sun	4/2-4/3	11pm - 7am	Ray Skarda
<b>BWR Expertise</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Eva Brown
Sun	27-Mar	7am - 3pm	Mike Brown
Sun	27-Mar	3pm-11pm	Chuck Norton
Sun-Mon	3/27-3/28	11pm - 7am	Eva Brown
Mon	28-Mar	7am - 3pm	Mike Brown
Mon	28-Mar	3pm-11pm	Chuck Norton
Mon-Tue	3/28-3/29	11pm - 7am	Jim Shea
Tue	29-Mar	7am - 3pm	Mike Brown
Tue	29-Mar	3pm-11pm	Chuck Norton
Tue-Wed	3/29-3/30	11pm - 7am	Jim Shea
Wed	30-Mar	7am - 3pm	Mike Brown
Wed	30-Mar	3pm-11pm	Chuck Norton
Wed-Thur	3/30-3/31	11pm - 7am	Jim Shea
Thur	31-Mar	7am - 3pm	Mike Brown
Thur	31-Mar	3pm-11pm	Chuck Norton
Thur-Fri	3/31-4/1	11pm - 7am	Jim Shea
Fri	1-Apr	7am - 3pm	Mike Brown
Fri	1-Apr	3pm-11pm	Chuck Norton
Fri-Sat	4/1-4/2	11pm-7am	Eva Brown
Sat	2-Apr	7am - 3pm	Mike Brown
Sat	2-Apr	3pm-11pm	Chuck Norton
Sat-Sun	4/2-4/3	11pm - 7am	Eva Brown
<b>RST Comm/ERDS Operator</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Denise McGovern
Sun	27-Mar	7am - 3pm	Mark Padovan
Sun	27-Mar	3pm-11pm	Bill Roggenbrodt
Sun-Mon	3/27-3/28	11pm - 7am	Denise McGovern
Mon	28-Mar	7am - 3pm	Mark Padovan
Mon	28-Mar	3pm-11pm	Rick Jervey
Mon-Tue	3/28-3/29	11pm - 7am	Brian Horn
Tue	29-Mar	7am - 3pm	John Thorp
Tue	29-Mar	3pm-11pm	Andy Kugler
Tue-Wed	3/29-3/30	11pm - 7am	Brian Horn
Wed	30-Mar	7am - 3pm	Steve Bloom
Wed	30-Mar	3pm-11pm	Bill Roggenbrodt
Wed-Thur	3/30-3/31	11pm - 7am	Liliana Ramadan
Thur	31-Mar	7am - 3pm	Jon Thompson
Thur	31-Mar	3pm-11pm	John Thorp
Thur-Fri	3/31-4/1	11pm - 7am	Mark Padovan
Fri	1-Apr	7am - 3pm	Andy Kugler
Fri	1-Apr	3pm-11pm	David Solario
Fri-Sat	4/1-4/2	11pm-7am	Liliana Ramadan
Sat	2-Apr	7am - 3pm	John Thorp
Sat	2-Apr	3pm-11pm	Stan Gardocki

**Japan Earthquake ERO Staffing Roster  
Mar 27-Apr 2, 2011 (Pay Period 8)**

Sat-Sun	4/2-4/3	11pm - 7am	
<b>RST Support (Seismology Q&amp;A)</b>			
Sat-Sun	3/26-3/27	11pm - 7am	(ON CALL)
Sun	27-Mar	7am - 3pm	(ON CALL)
Sun	27-Mar	3pm-11pm	(ON CALL)
Sun-Mon	3/27-3/28	11pm - 7am	(ON CALL)
Mon	28-Mar	7am - 3pm	(ON CALL)
Mon	28-Mar	3pm-11pm	(ON CALL)
Mon-Tue	3/28-3/29	11pm - 7am	(ON CALL)
Tue	29-Mar	7am - 3pm	(ON CALL)
Tue	29-Mar	3pm-11pm	(ON CALL)
Tue-Wed	3/29-3/30	11pm - 7am	(ON CALL)
Wed	30-Mar	7am - 3pm	(ON CALL)
Wed	30-Mar	3pm-11pm	(ON CALL)
Wed-Thur	3/30-3/31	11pm - 7am	(ON CALL)
Thur	31-Mar	7am - 3pm	(ON CALL)
Thur	31-Mar	3pm-11pm	(ON CALL)
Thur-Fri	3/31-4/1	11pm - 7am	(ON CALL)
Fri	1-Apr	7am - 3pm	(ON CALL)
Fri	1-Apr	3pm-11pm	(ON CALL)
Fri-Sat	4/1-4/2	11pm-7am	(ON CALL)
Sat	2-Apr	7am - 3pm	(ON CALL)
Sat	2-Apr	3pm-11pm	(ON CALL)
Sat-Sun	4/2-4/3	11pm - 7am	(ON CALL)
<b>RST Support (Structural)</b>			
Sat-Sun	3/26-3/27	11pm - 7am	Off (ON CALL)
Sun	27-Mar	7am - 3pm	Off (ON CALL)
Sun	27-Mar	3pm-11pm	Off (ON CALL)
Sun-Mon	3/27-3/28	11pm - 7am	Off (ON CALL)
Mon	28-Mar	7am - 3pm	Pravin Patel (ON CALL)
Mon	28-Mar	3pm-11pm	Pravin Patel (ON CALL)
Mon-Tues	3/28-3/29	11pm - 7am	Pravin Patel (ON CALL)
Tues	29-Mar	7am - 3pm	Pravin Patel (ON CALL)
Tues	29-Mar	3pm-11pm	Pravin Patel (ON CALL)
Tues-Wed	3/29-3/30	11pm - 7am	Pravin Patel (ON CALL)
Wed	30-Mar	7am - 3pm	Pravin Patel (ON CALL)
Wed	30-Mar	3pm-11pm	Pravin Patel (ON CALL)
Wed-Thur	3/30-3/31	11pm - 7am	Pravin Patel (ON CALL)
Thur	31-Mar	7am - 3pm	Pravin Patel (ON CALL)
Thur	31-Mar	3pm-11pm	Pravin Patel (ON CALL)
Thur-Fri	3/31-4/1	11pm - 7am	Pravin Patel (ON CALL)
Fri	1-Apr	7am - 3pm	Pravin Patel (ON CALL)
Fri	1-Apr	3pm-11pm	Pravin Patel (ON CALL)
Fri-Sat	4/1-4/2	11pm-7am	Pravin Patel (ON CALL)

**From:** Hoc, PMT12  
**To:** McIntyre, David  
**Cc:** Cullingford, Michael; PMT03 Hoc  
**Subject:** FW: NRC Protective Action Recommendations; questions received from JANUS (consulting company) in Japan  
**Date:** Tuesday, March 29, 2011 5:40:15 PM

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Dave – have you seen this specific request before? Please action as appropriate.

Tim Harris  
PMT PAAD

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**From:** Cullingford, Michael  
**Sent:** Tuesday, March 29, 2011 12:56 PM  
**To:** PMT02 Hoc; Hoc, PMT12  
**Cc:** Wittick, Brian  
**Subject:** FW: NRC Protective Action Recommendations; questions received from JANUS (consulting company) in Japan

I received the below enquiry and understand that it should go first to OPA. I am not sure of the process that is followed to respond. I would like to be copied on the response. Thank you.....mc

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

**From:** Junko Sugaya <[jsugaya@janus.co.jp](mailto:jsugaya@janus.co.jp)>  
**Sent:** Thu, Mar 17, 2011 11:36 am  
**Subject:** NRC Protective Action Recommendatins

I would like to ask NRC one thing on NRC News No. 11-050. Please kindly let me know any appropriate person to contact.

I do not care how conservative NRC calculates but please add a little more description on the assumptions. Full core inventories release? People stay outside all day? Please understand how news media and people react the calculation results regardless the assumptions or the real conditions.

I carefully read real trends of radiation monitoring data. It is 0.05 micro Sv/hr, quite normal here in Tokyo. The dose staying here is lower than the dose I fly to DC. Somewhat higher in Ibaraki and Gumma, neighboring prefectures to Fukushima as 0.2 micro Sv/hr but it is still okay to calculate the annual dose of 1.7mSv/yr.

Radiation monitoring data (micro Sv/hr) at each prefecture:  
[http://www.mext.go.jp/component/a\\_menu/other/detail/\\_icsFiles/afieldfile/2011/03/17/1303724\\_6\\_3.pdf](http://www.mext.go.jp/component/a_menu/other/detail/_icsFiles/afieldfile/2011/03/17/1303724_6_3.pdf)

This mirror site is more user friendly.

<http://eq.yahoo.co.jp/>

You can see radiation monitoring data on a map around Fukushima NPPs with 20km and 30 km circle lines. This site also provides English table but the information is not as much as Japanese site.

Lastly, I'm fine in Tokyo. I'm so thankful that things are okay with me and my families in this historical disaster. I'm also very thankful for the international specialists' cooperation for this special "operating experience".

Sincerely,

NNNN/67

Junko Sugaya  
JAPAN NUS Co., Ltd.  
TEL: +81-3-5925-6757  
FAX: +81-3-5925-6735  
E-MAIL: [jsugaya@janus.co.jp](mailto:jsugaya@janus.co.jp)  
JANUS Home Page: <http://www.janus.co.jp/eng/index.html>

**From:** Holian, Brian  
**To:** Lew, David; Dean, Bill; Boger, Bruce; Leeds, Eric  
**Cc:** Galloway, Melanie; Pham, Bo; Burnell, Scott; Dacus, Eugene; Nelson, Robert; Giitter, Joseph; Howe, Allen; Screnci, Diane; Sheehan, Neil; Roberts, Darrell; Wilson, Peter; Spencer, Mary; Pelton, David  
**Subject:** VY...Lic Ren  
**Date:** Thursday, March 17, 2011 10:38:02 AM

---

As of today, we plan to issue the VY license on Monday.

The timing has not been discussed... I would expect we may sign it prior to the 0900 Commission meeting on the Japan event. (I will try and firm up a time today and get back to you).

DLR will fax it to the licensee after it is signed.

I do not believe we will do any press release...DLR/NRR will continue to work the Comm plan with Region I and OPA. (we are working some backup Q and A on VY hardened vent, etc.)

The basic answer to questions on "why renew now"....will be that the applicant has satisfied the requirements of Part 54. The staff has completed an extensive review. In light of the event in Japan, the NRC is doing, and will complete, an extensive review – and any regulatory changes (short term or long term) will be applied through Part 50 on the applicable plants (irrespective of whether a plant has gone through license renewal or not).

Bill...I know you'll want to let the Governor's office know a little in advance. I would hope Monday morning early is time enough...as I'm sure you are all concerned that we not unnecessarily cycle the government offices / news organizations prior to that (esp. if there is some minor change).

- Brian

NNNN/68

**From:** [Chang, Richard](#)  
**To:** [Santiago, Patricia](#)  
**Cc:** [Schaperow, Jason](#); [Tinkler, Charles](#); [Burnell, Scott](#)  
**Subject:** SOARCA and Japan news article  
**Date:** Thursday, March 17, 2011 8:46:11 AM

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Pat,

Here is another article comparing SOARCA and what is happening in Japan:

<http://nationalcybersecurity.net/nrc-tapping-tech-for-better-analysis-of-nuclear-accidents/>

Richard Chang  
Program Manager  
RES/DSA/SPB  
301-251-7980

NNNN/69

**From:** [Janbergs, Holly](#) on behalf of [OPA Resource](#)  
**To:** [McIntyre, David](#)  
**Subject:** FW: Japan's reactors  
**Date:** Wednesday, March 30, 2011 9:55:09 AM

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Unsure how to handle - do we have someone who can address technical comments like this, or should we give him the stock "we're doing what we can" answer?

-Bethany

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

From: Love, Michael Lynn. (MSFC-AS42)[URS Logistics] [<mailto:michael.love@nasa.gov>]  
Sent: Wednesday, March 30, 2011 9:33 AM  
To: OPA Resource  
Subject: Japan's reactors

Currently I have read about the use of seawater for cooling and the contamination.

May I suggest that they begin to pump nitrogen into the containment with the water to add much more cooling effect and the nitrogen is a neutron absorbent. After some relative cooling then pump water with a borax solution to kill the neutron activity even more by encapsulation.

The nitrogen gas would become radioactive but nitrogen -17 half life is extremely short (4.3 sec.) and would not pose a air hazard.

Michael Love

NNNN/70

**From:** Couret, Ivonne  
**To:** McIntyre, David; Burnell, Scott; Harrington, Holly; Janbergs, Holly; Medina, Veronika; Chandrathil, Prema; Mitlyng, Viktoria; Dricks, Victor; Uselding, Lara; Screnci, Diane; Sheehan, Neil; Hannah, Roger; Ledford, Joey  
**Cc:** Hayden, Elizabeth  
**Subject:** FYI - written testimony for today's Senate Approps Energy and Water hearing  
**Date:** Wednesday, March 30, 2011 10:24:00 AM  
**Attachments:** Final - Written Testimony for SAC Energy and Water 3 30 11.docx

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We aren't releasing until after he speaks. He is currently speaking will send email when he is done. Ivonne

---

**From:** Powell, Amy  
**Sent:** Wednesday, March 30, 2011 10:18 AM  
**To:** Couret, Ivonne  
**Cc:** Decker, David  
**Subject:** Per your request - written testimony for today's Senate Approps Energy and Water hearing

David is working on testimony for tomorrow, so I am sending you the attached. FYI, the Chairman has not yet delivered his opening statement at this hearing (Senators are making their opening statements now).

Amy Powell  
Associate Director  
U. S. Nuclear Regulatory Commission  
Office of Congressional Affairs  
Phone: 301-415-1673

NNNN/71

WRITTEN STATEMENT  
BY GREGORY B. JACZKO, CHAIRMAN  
UNITED STATES NUCLEAR REGULATORY COMMISSION  
TO THE  
APPROPRIATIONS COMMITTEE  
SUBCOMMITTEE ON ENERGY AND WATER  
UNITED STATES SENATE  
MARCH 30, 2011

Chairman Feinstein, Ranking Member Alexander, and Members of the Subcommittee, I appreciate the opportunity to appear before you to address the response of the United States Nuclear Regulatory Commission (NRC) to the recent tragic events in Japan. People across the country and around the world who have been touched by the magnitude and scale of this disaster are closely following the events in Japan and the repercussions in this country and in other countries.

I traveled to Japan over the past weekend, and just returned yesterday. I wanted to convey a message of support and cooperation to our Japanese counterparts there and to assess the current situation. I also met with senior Japanese government and TEPCO officials, and consulted with our NRC team of experts who are in Japan as part of our assistance effort.

I would first like to reiterate my condolences to all those who have been affected by the earthquake and tsunami in Japan. Our hearts go out to all who have been dealing with the aftermath of these natural disasters, and we are mindful of the long and difficult road they will face in recovering. We know that the people of Japan are resilient and strong, and we have every confidence that they will come through this horrific time and move forward, with resolve, to

rebuild their vibrant country. Our agency stands together with the people of Japan at this most difficult and challenging time.

The NRC is an independent agency, with approximately 4000 staff. We play a critically important role in protecting the American people and the environment. Our agency sets the rules by which commercial nuclear power plants operate, and nuclear materials are used in thousands of academic, medical and industrial settings in the United States. We have at least two resident inspectors who work full-time at every nuclear plant in the country, and we are proud to have world-class scientists, engineers and professionals representing nearly every discipline.

Since Friday, March 11, when the earthquake and tsunami struck, the NRC's headquarters 24-hour Emergency Operations Center has been fully activated, with staffing augmented to monitor and analyze events at nuclear power plants in Japan. At the request of the Japanese government, and through the United States Agency for International Development (USAID), the NRC sent a team of its technical experts to provide on-the-ground support, and we have been in continual contact with them. Within the United States, the NRC has been working closely with other Federal agencies as part of our government's response to the situation.

During these past several weeks, our staff has remained focused on our essential safety and security mission. I want to recognize their tireless efforts and their critical contributions to the U.S. response to assist Japan. In spite of the evolving situation, the long hours, and the intensity of efforts over the past week, NRC staff has approached their responsibilities with dedication, determination and professionalism, and I am incredibly proud of their efforts. The American people also can be proud of the commitment and dedication within the Federal workforce, which is exemplified by our staff every day.

The NRC's primary responsibility is to ensure the adequate protection of the public health and safety of the American people. Toward that end, we have been very closely monitoring the activities in Japan and reviewing all currently available information. Review of this information, combined with our ongoing inspection and licensing oversight, gives us confidence that the U.S. plants continue to operate safely. To date, there has been no reduction in the licensing or oversight function of the NRC as it relates to any of the U.S. licensees.

Our agency has a long history of conservative regulatory decision-making. We have been intelligently using risk insights to help inform our regulatory process, and, for more than 35 years of civilian nuclear power in this country, we have never stopped requiring improvements to plant designs, and modifying our regulatory framework as we learn from operating experience.

Despite the very high level of support being provided by the NRC in response to the events in Japan, we continue to remain focused on our domestic responsibilities.

I'd like to begin with a brief overview of our immediate and continuing response to the events in Japan. I then want to further discuss the reasons for our continuing confidence in the safety of the U. S. commercial nuclear reactor fleet, and the path forward for the NRC in order to learn all the lessons we can, in light of these events.

On Friday, March 11<sup>th</sup>, an earthquake hit Japan, resulting in the shutdown of more than 10 reactors. The ensuing tsunami appears to have caused the loss of normal and emergency alternating current power to the six unit Fukushima Daiichi site. It is those six units that have received the majority of our attention since that time. Units One, Two, and

Three were in operation at the time of the earthquake. Units Four, Five, and Six were in previously scheduled outages.

Shortly after 4:00 AM EDT on Friday, March 11th, the NRC Emergency Operations Center made the first call, informing NRC management of the earthquake and the potential impact on U.S. plants. We went into the monitoring mode at our Emergency Operations Center, and the NRC's first concern was possible impacts of the tsunami on U.S. plants and radioactive materials on the West Coast, and in Hawaii, Alaska, and U. S. Territories in the Pacific. We were in communication with licensees and NRC resident inspectors at Diablo Canyon Power Plant and San Onofre Nuclear Generating Station in California, and the Radiation Control Program Directors for California, Washington, Oregon and Hawaii.

On that same day, we began interactions with our Japanese regulatory counterparts and dispatched two experts to Japan to help at the U.S. embassy in Tokyo. By Monday, March 14, we had dispatched a total of 11 NRC staff to provide technical support to the American embassy and the Japanese government. We have subsequently rotated in additional staff to continue our on-the-ground assistance in Japan. The areas of focus for this team are: 1) to assist the Japanese government and respond to requests from our Japanese regulatory counterparts; and 2) to support the U. S. ambassador and the U.S. government assistance effort.

On Wednesday, March 16, we collaborated with other U. S. government agencies and decided to advise American citizens to evacuate within a 50-mile range around the plant. This decision was a prudent course of action and would be consistent with what we would do under similar circumstances in the United States. This evacuation range was predicated on a combination of the information that we had available at the time, which indicated the possibility that reactor cores and spent fuel pools may have been compromised, and hypothetical

calculations of the approximate activity available for release from one reactor and two spent-fuel pools at a four-reactor site.

We have an extensive range of stakeholders with whom we have ongoing interaction regarding the Japan situation, including the White House, Congressional staff, our state regulatory counterparts, a number of other federal agencies, and international regulatory bodies around the world.

The NRC response in Japan and our Emergency Operations Center continue with the dedicated efforts of over 250 NRC staff on a rotating basis. The entire agency is coordinating and working together in response to this event so that we can provide assistance to Japan while continuing the vital activities necessary to fulfill our domestic responsibilities.

It is important to note that the U. S. government has an extensive network of radiation monitors across this country. Monitoring at nuclear power plants and the U. S. Environmental Protection Agency's (EPA) system has not identified any radiation levels that effect public health and safety in this country. In fact, natural background radiation from sources such as rocks, the sun, and buildings, is 100,000 times more than doses attributed to any level that has been detected in the U.S. to date. Therefore, based on current data, we feel confident that there is no reason for concern in the United States regarding radioactive releases from Japan.

There are many factors that assure us of ongoing domestic reactor safety. We have, since the beginning of the regulatory program in the United States, used a philosophy of Defense-in-Depth, which recognizes that nuclear reactors require the highest standards of design, construction, oversight, and operation, and does not rely on any single layer of protection for public health and safety. Designs for every individual reactor in this country take into account site-specific factors and include a detailed evaluation for natural events, such as

earthquakes, tornadoes, hurricanes, floods, and tsunamis, as they relate to that site.

There are multiple physical barriers to radiation in every reactor design. Additionally, there are both diverse and redundant safety systems that are required to be maintained in operable condition and frequently tested to ensure that the plant is in a high condition of readiness to respond to any situation.

We have taken advantage of the lessons learned from previous operating experience to implement a program of continuous improvement for the U. S. reactor fleet. We have learned from experience across a wide range of situations, including most significantly, the Three Mile Island accident in 1979. As a result of those lessons learned, we have significantly revised emergency planning requirements and emergency operating procedures. We have addressed many human factors issues regarding how control room employees operate the plant, added new requirements for hydrogen control to help prevent explosions inside of containment, and created requirements for enhanced control room displays of the status of pumps and valves.

The NRC has a post-accident sampling system that enables the monitoring of radioactive material release and possible fuel degradation. One of the most significant changes after Three Mile Island was an expansion of the Resident Inspector Program, which now has at least two full-time NRC inspectors on site at each nuclear power plant. These inspectors have unfettered access to all licensees' activities related to nuclear safety and security.

As a result of operating experience and ongoing research programs, we have developed requirements for severe accident management guidelines. These are components and procedures developed to ensure that, in the event all of the above-described precautions failed and a severe accident occurred, the plant would still protect

public health and safety. The requirements for severe accident management have been in effect for many years and are frequently evaluated by the NRC inspection program.

As a result of the events of September 11, 2001, we identified important pieces of equipment that, regardless of the cause of a significant fire or explosion at a plant, the NRC requires licensees to have available and staged in advance, as well as new procedures and policies to help deal with a severe situation.

Our program of continuous improvement, based on operating experience, will now include evaluation of the significant events in Japan and what we can learn from them. We already have begun enhancing inspection activities through temporary instructions to our inspection staff, including the resident inspectors and the region-based inspectors in our four Regional offices, to look at licensees' readiness to deal with both design-basis accidents and beyond-design-basis accidents.

We have also issued an information notice to licensees to make them aware of the events in Japan, and the kinds of activities we believe they should be engaged in to verify their readiness. It is expected that licensees review the information related to their capabilities to mitigate conditions that result from severe accidents, including the loss of significant operational and safety systems, to ensure that they are in effect and operational.

During the past 20 years, there have been a number of new rulemakings that have enhanced the domestic fleet's preparedness against some of the problems we are seeing in Japan. The "station blackout" rule requires every plant in this country to analyze what the plant response would be if it were to lose all alternating current so that it could respond using batteries for a period of time, and then have procedures in place to restore alternating current to the site and provide cooling to the core.

The hydrogen rule requires modifications to reduce the impacts of hydrogen generated for beyond-design-basis events and core damage. There are equipment qualification rules that require equipment, including pumps and valves, to remain operable under the kinds of environmental temperature and radiation conditions that you would see under a design-basis accident.

With regard to the type of containment design used by the most heavily damaged plants in Japan, the NRC has had a Boiling Water Reactor Mark I Containment Improvement Program since the late 1980s. This program required installation of hardened vent systems for containment pressure relief, as well as enhanced reliability of the automatic depressurization system.

A final factor that underpins our belief in the ongoing safety of the U. S. fleet is the emergency preparedness and planning requirements in place that provide ongoing training, testing, and evaluations of licensees' emergency preparedness programs. In coordination with our federal partner, the Federal Emergency Management Administration (FEMA), these activities include extensive interaction with state and local governments, as those programs are evaluated and tested on a periodic basis.

Along with our confidence in the safety of U.S. nuclear power plants, our agency has a responsibility to the American people to undertake a systematic and methodical review of the safety of our domestic facilities, in light of the natural disaster and the resulting nuclear situation in Japan.

Examining all available information is an essential part of the effort to analyze the event and understand its impact on Japan and its implications for the United States. Our focus is always on keeping nuclear plants and radioactive materials in this country safe and secure.

On Monday, March 21, my colleagues on the Commission and I met to review the status of the situation in Japan and identify the steps needed to conduct that review. We consequently decided to establish a senior level agency task force to conduct a comprehensive review of our processes and regulations to determine whether the agency should make additional improvements to our regulatory system, and to make recommendations to the Commission for its policy direction.

The review will be conducted in both a short-term and a longer-term timeframe. The short-term review has already begun, and the task force will brief the Commission at 30, 60 and 90 day intervals, to identify potential or preliminary near-term operational or regulatory issues. The task force then will undertake a longer-term review as soon as NRC has sufficient information from the events in Japan. That longer-term review will be completed in six months from the beginning of the evaluation.

The task force will evaluate all technical and policy issues related to the event to identify additional potential research, generic issues, changes to the reactor oversight process, rulemakings, and adjustments to the regulatory framework that may warrant action by the NRC. We also expect to evaluate potential interagency issues, such as emergency preparedness, and examine the applicability of any lessons learned to non-operating reactors and materials licensees. We expect to seek input from all key stakeholders during this process. A report with appropriate recommendations will be provided to the Commission within six months of the start of this evaluation. Both the 90-day and final reports will be made

publicly available.

In conclusion, I want to reiterate that we continue to make our domestic responsibilities for licensing and oversight of the U.S. licensees our top priority and that the U.S. plants continue to operate safely. In light of the events in Japan, there will be a near-term evaluation of their relevance to the U.S. fleet, and we are continuing to gather the information necessary to take a longer, more comprehensive and thorough look at the events in Japan and their lessons for us. Based on these efforts, we will take all appropriate actions necessary to ensure the continuing safety of the American people.

Chairman Feinstein, Ranking Member Alexander, and Members of the Subcommittee, on behalf of the Commission, thank you for the opportunity to appear before you. I look forward to continuing to work with you to advance the NRC's important safety mission.

**From:** [Landau, Mindy](#)  
**To:** [McIntyre, David](#)  
**Subject:** RE: NRC Reply - Market Watch NY  
**Date:** Wednesday, March 30, 2011 2:25:20 PM

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ok

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**From:** McIntyre, David  
**Sent:** Wednesday, March 30, 2011 2:24 PM  
**To:** Landau, Mindy  
**Subject:** RE: NRC Reply - Market Watch NY

Well, I think it's part of the GI-199 effort, which will look at all plants in the central and eastern US, which special emphasis on the 27 at 17 sites, including IP. This will of course not be unrelated to the task force review of the Japan crisis. Yes, please respond.

---

**From:** Landau, Mindy  
**Sent:** Wednesday, March 30, 2011 2:20 PM  
**To:** McIntyre, David  
**Subject:** FW: NRC Reply - Market Watch NY

Dave – sent to you in Scott's place. Let me know if you want me to respond.

---

**From:** Landau, Mindy  
**Sent:** Wednesday, March 30, 2011 2:19 PM  
**To:** Burnell, Scott  
**Subject:** FW: NRC Reply - Market Watch NY

I'll be happy to respond, just want to make sure the answer is that IP assessment will be done as part of our larger task force effort....

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**From:** Gelsi, Steven [<mailto:SGelsi@marketwatch.com>]  
**Sent:** Wednesday, March 30, 2011 1:17 PM  
**To:** Landau, Mindy  
**Subject:** RE: NRC Reply - Market Watch NY

Hello could you confirm that the NRC will conduct a seismic risk assessment of Entergy's Indian Point plant next year, as the first of 27 reviews of nuclear power units at 17 plants?

Platts did a story about this yesterday citing your colleague Beth Hayden.

Thanks

STEVE Gelsi  
Energy Reporter  
MarketWatch  
212 416 4659

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**From:** Landau, Mindy [<mailto:Mindy.Landau@nrc.gov>]  
**Sent:** Wednesday, March 23, 2011 2:17 PM

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**To:** Gelsi, Steven  
**Subject:** RE: NRC Reply - Market Watch NY

I'm sorry but that is outside our jurisdiction, and we have no such information

Regards,  
Mindy

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**From:** Gelsi, Steven [mailto:SGelsi@marketwatch.com]  
**Sent:** Wednesday, March 23, 2011 1:27 PM  
**To:** Landau, Mindy  
**Subject:** RE: NRC Reply - Market Watch NY

Hello Mindy

Is it possible to look up any proposed nuclear plants that have received an investment from Tokyo Electric Power? They had planned to invest in a plant being built by NRG and I wanted to see if there were any other. Thanks.

Steve Gelsi  
Energy Reporter  
MarketWatch  
212 416 4659

---

**From:** Landau, Mindy [mailto:Mindy.Landau@nrc.gov]  
**Sent:** Wednesday, March 16, 2011 4:18 PM  
**To:** Gelsi, Steven  
**Subject:** RE: NRC Reply - Market Watch NY

Steve, we have no confirmation of that.

Mindy Landau (assisting Public Affairs)

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**From:** Gelsi, Steven <SGelsi@marketwatch.com>  
**To:** Couret, Ivonne  
**Sent:** Wed Mar 16 11:21:43 2011  
**Subject:** RE: NRC Reply - Market Watch NY

Hello Ivonne

ABC news reported about two hours ago that a large American nuclear response team of hundreds of military and other folks is on its way to Japan.

I didn't see anything else about this on your web site? Could you confirm?

---

**From:** Couret, Ivonne [mailto:Ivonne.Couret@nrc.gov]  
**Sent:** Monday, March 14, 2011 1:13 PM  
**To:** Gelsi, Steven  
**Subject:** RE: NRC Reply - Market Watch NY

11:45a.m.

Ivonne L. Couret  
Public Affairs Officer  
Office of Public Affairs



 (301) 415-8205  
 [ivonne.couret@nrc.gov](mailto:ivonne.couret@nrc.gov)

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NRC Employees can read interesting insight on the OPA Blog  
<http://portal.nrc.gov/OCM/opa/blog/default.aspx>

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**From:** Gelsi, Steven [mailto:SGelsi@marketwatch.com]  
**Sent:** Monday, March 14, 2011 1:11 PM  
**To:** Couret, Ivonne  
**Subject:** RE: NRC Reply - Market Watch NY

Thanks how long has this been out? Dow Jones Newswires just flashed headlines on it

---

**From:** Couret, Ivonne [mailto:Ivonne.Couret@nrc.gov]  
**Sent:** Monday, March 14, 2011 1:08 PM  
**To:** Gelsi, Steven  
**Subject:** RE: NRC Reply - Market Watch NY

Ivonne L. Couret  
Public Affairs Officer  
Office of Public Affairs



 (301) 415-8205  
 [ivonne.couret@nrc.gov](mailto:ivonne.couret@nrc.gov)

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<http://portal.nrc.gov/OCM/opa/blog/default.aspx>

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---

**From:** Gelsi, Steven [mailto:SGelsi@marketwatch.com]  
**Sent:** Monday, March 14, 2011 1:06 PM  
**To:** Couret, Ivonne  
**Subject:** RE: NRC Reply - Market Watch NY

Hello could you please send over release ASAP about Japan formally asking US for help in cooling reactors? Thanks

STEVE GELSI

---

**From:** Couret, Ivonne [mailto:Ivonne.Couret@nrc.gov]  
**Sent:** Sunday, March 13, 2011 1:00 PM  
**To:** Gelsi, Steven  
**Subject:** RE: NRC Reply - Market Watch NY

New Reactor Application under review - <http://www.nrc.gov/reactors/new-reactors/col.html> - There have been request from the licensee specifically talking about Vogtle Limited Work Authorization (LWA)

Limited work authority regulations to allow some preconstruction activities without NRC approval, such as site clearing, road building, and transmission line routing. Other activities require authorization by NRC. Thus applicants must place request for LWA. Does this help? Ivonne

**Ivonne L. Couret**  
Public Affairs Officer  
Office of Public Affairs



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 [ivonne.couret@nrc.gov](mailto:ivonne.couret@nrc.gov)

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**From:** Gelsi, Steven [mailto:SGelsi@marketwatch.com]  
**Sent:** Sunday, March 13, 2011 12:46 PM  
**To:** Couret, Ivonne  
**Subject:** RE: NRC Reply - Market Watch NY

Thanks – Ivonne, you said no construction permits have yet been issued, but there have been preliminary construction plants issued for at least one project.

---

**From:** Couret, Ivonne [mailto:Ivonne.Couret@nrc.gov]  
**Sent:** Sunday, March 13, 2011 12:42 PM  
**To:** Gelsi, Steven  
**Subject:** NRC Reply - Market Watch NY

Steve -

Website link to BWR backgrounder – Diagrams hyperlinked  
Information Digest provide summary of NRC regulatory activities is plain English -  
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350/>  
Details of current operating commercial Nuclear Reactors – Appendix A (attached)

Another resource is NEI.org website at  
<http://www.nei.org/newsandevents/information-on-the-japanese-earthquake-and-reactors-in-that-region>  
Trust this helps. Ivonne

Ivonne L. Couret  
Public Affairs Officer  
Office of Public Affairs



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 Please consider the environmental impact before printing this email.

**From:** Brenner, Eliot  
**To:** McIntyre, David  
**Subject:** RE: 90-day review  
**Date:** Wednesday, March 30, 2011 1:12:42 PM

---

Not beyond pete not being on the group. Can't imagine why she would think that.

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

From: McIntyre, David  
Sent: Wednesday, March 30, 2011 1:10 PM  
To: Brenner, Eliot  
Subject: FW: 90-day review

Anything I'm authorized to leak? Beyond telling her Lyons is otherwise preoccupied?

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

From: Nancy Roth [<mailto:neroeth@innuco.com>]  
Sent: Wednesday, March 30, 2011 1:09 PM  
To: McIntyre, David  
Subject: Re: 90-day review

Was hoping to get some info about it before the pub goes out this evening. Isn't there anything else you can tell me?

For example, have all the members of the task force been identified? Are former commissioners, like Pete Lyons, on the task force?

Thanks,  
Nancy

On Mar 30, 2011, at 1:05 PM, McIntyre, David wrote:

> I don't know exactly when it will be issued; such things can be hard  
> to predict.  
>  
> Meetings are already posted on the Commission schedule, even earlier  
> than those.

> -----Original Message-----

> From: Nancy Roth [<mailto:neroeth@innuco.com>]  
> Sent: Wednesday, March 30, 2011 1:04 PM  
> To: McIntyre, David  
> Subject: Re: 90-day review

> Is that coming out today, Dave?

> By Commission briefings you mean the 30, 60 and 90-day updates? --N.

> On Mar 30, 2011, at 1:00 PM, McIntyre, David wrote:

>> We have a press release in the works with more detail about the task  
>> force and its review. Some Commission briefings have already been  
>> scheduled.

>> -----Original Message-----

>> From: Nancy Roth [<mailto:neroeth@innuco.com>]  
>> Sent: Wednesday, March 30, 2011 11:08 AM

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>> To: McIntyre, David  
>> Subject: 90-day review  
>>  
>> Hi, David,  
>>  
>> Has the 90-day review of safety plans and procedures at U.S. nuclear  
>> plants started yet?  
>>  
>> The Commission called for a task force to perform it--are you able  
>> yet  
>> to supply all or at least some names and titles of task force  
>> members?  
>> Who is leading it?  
>>  
>> I ask all this b/c at yesterday's briefing of the Senate Committee on  
>> Energy and Nat. Resources on new events in Japan I was struck at how  
>> difficult it was for Pete Lyons and Bill Borchardt to answer a lot of  
>> questions, due to the dearth of information yet available from  
>> Japan--  
>> and because the review has not been completed.  
>>  
>> It was clear that industry members are hard pressed to explain and  
>> interpret the situation in Japan for the public. The study should  
>> help.  
>>  
>> Many thanks,  
>> Nancy  
>

**From:** [Nancy Roth](#)  
**To:** [McIntyre, David](#)  
**Subject:** Re: 90-day review  
**Date:** Wednesday, March 30, 2011 3:27:44 PM

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Yesterday at the briefing before the Senate Energy committee he talked in great detail about the safety review the Commission had performed after the events of 9/11, when he was a commissioner. Because of his degree of knowledge and familiarity with the safety issues of concern to the senators it struck me that NRC would do well to call on him, even peripherally, for this study coming up.

Of course he has his hands full at DOE. Has anyone else been confirmed for the task force?

On Mar 30, 2011, at 3:12 PM, McIntyre, David wrote:

> The only thing I'm at liberty to say is that Lyons is otherwise pre-occupied. How'd you get the idea he'd be on it?

>

> -----Original Message-----

> From: Nancy Roth [<mailto:neroth@innuoco.com>]

> Sent: Wednesday, March 30, 2011 1:09 PM

> To: McIntyre, David

> Subject: Re: 90-day review

>

> Was hoping to get some info about it before the pub goes out this evening. Isn't there anything else you can tell me?

>

> For example, have all the members of the task force been identified?

> Are former commissioners, like Pete Lyons, on the task force?

>

> Thanks,

> Nancy

>

> On Mar 30, 2011, at 1:05 PM, McIntyre, David wrote:

>

>> I don't know exactly when it will be issued; such things can be hard to predict.

>>

>> Meetings are already posted on the Commission schedule, even earlier than those.

>>

>> -----Original Message-----

>> From: Nancy Roth [<mailto:neroth@innuoco.com>]

>> Sent: Wednesday, March 30, 2011 1:04 PM

>> To: McIntyre, David

>> Subject: Re: 90-day review

>>

>> Is that coming out today, Dave?

>>

>> By Commission briefings you mean the 30, 60 and 90-day updates? --N.

>>

>>

>> On Mar 30, 2011, at 1:00 PM, McIntyre, David wrote:

>>

>>> We have a press release in the works with more detail about the task

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>>> force and its review. Some Commission briefings have already been  
>>> scheduled.  
>>>  
>>> -----Original Message-----  
>>> From: Nancy Roth [<mailto:neroeth@innuco.com>]  
>>> Sent: Wednesday, March 30, 2011 11:08 AM  
>>> To: McIntyre, David  
>>> Subject: 90-day review  
>>>  
>>> Hi, David,  
>>>  
>>> Has the 90-day review of safety plans and procedures at U.S. nuclear  
>>> plants started yet?  
>>>  
>>> The Commission called for a task force to perform it--are you able  
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>>> to supply all or at least some names and titles of task force  
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>>> Who is leading it?  
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>>> I ask all this b/c at yesterday's briefing of the Senate Committee  
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>>> Energy and Nat. Resources on new events in Japan I was struck at  
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>>> questions, due to the dearth of information yet available from  
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>>> and because the review has not been completed.  
>>>  
>>> It was clear that industry members are hard pressed to explain and  
>>> interpret the situation in Japan for the public. The study should  
>>> help.  
>>>  
>>> Many thanks,  
>>> Nancy  
>>  
>

**From:** [Hayden, Elizabeth](#)  
**To:** [McIntyre, David](#)  
**Subject:** RE: ACRS briefing on April 7th  
**Date:** Wednesday, March 30, 2011 5:41:10 PM  
**Attachments:** [image001.png](#)

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I thought it was 2 hours?

*Beth Hayden*  
*Senior Advisor*  
*Office of Public Affairs*  
*U.S. Nuclear Regulatory Commission*  
*--- Protecting People and the Environment*  
*301-415-8202*  
*elizabeth.hayden@nrc.gov*

---

**From:** McIntyre, David  
**Sent:** Wednesday, March 30, 2011 3:49 PM  
**To:** Couret, Ivonne; Hayden, Elizabeth  
**Cc:** Janbergs, Holly  
**Subject:** RE: ACRS briefing on April 7th

They really think people are going to shlep all the way out here for a 20-minute public session??

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**From:** Couret, Ivonne  
**Sent:** Wednesday, March 30, 2011 3:32 PM  
**To:** Hayden, Elizabeth  
**Cc:** McIntyre, David; Janbergs, Holly  
**Subject:** FW: ACRS briefing on April 7th  
**Importance:** High

Next Thursday they are having a briefing on Japanese event and they are requesting OPA support and attend. I will not be here I thought perhaps Bethany could attend. Please advise. Ivonne

---

**From:** Diaz-Sanabria, Yoira  
**Sent:** Wednesday, March 30, 2011 2:59 PM  
**To:** Couret, Ivonne  
**Cc:** Hackett, Edwin; Santos, Cayetano; Berrios, Ilka  
**Subject:** ACRS briefing on April 7th  
**Importance:** High

Ivonne,

Per our conversation. ACRS briefing on Events at the Fukushima Reactor Site in Japan (open/closed) will be held on April 7, 2011 from 10:45 am – 12:45 pm. Portions of the briefing will be closed to the public to protect information that is in confidence by the Japan authorities. The open session will be the first 15-20 min. The NRC staff is the only audience allow during the closed session. It will be ideal to have the support from OPA due to the sensitivity and high profile of this subject.

NNNN/75

Please feel free to contact me if you need further information.

Thanks in advance,

*Yaira K. Diaz-Sanabria*

**Advisory Committee on Reactor Safeguards**

✉ T2-E26 | ☎ 301-415-8064 | FAX 301-415-5589

**Yaira.Diaz-Sanabria@nrc.gov**



Please consider the environment before printing this e-mail. Thank you.

**From:** [Hayden, Elizabeth](#)  
**To:** [Courret, Ivonne](#); [Harrington, Holly](#)  
**Cc:** [McIntyre, David](#); [Janbergs, Holly](#)  
**Subject:** RE: ACRS briefing on April 7th  
**Date:** Wednesday, March 30, 2011 5:46:47 PM  
**Attachments:** [image001.png](#)

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That may be a bit much to ask of Bethany by herself. We will have you, Scott and Eliot out that day.

Holly, could you help out at the beginning of the meeting to make sure the place isn't overrun by reporters, cameras, etc? If there are very few reporters there, perhaps you can leave Bethany to give the ACRS peace of mind.

*Beth Hayden*  
*Senior Advisor*  
*Office of Public Affairs*  
*U.S. Nuclear Regulatory Commission*  
*--- Protecting People and the Environment*  
*301-415-8202*  
*elizabeth.hayden@nrc.gov*

---

**From:** Courret, Ivonne  
**Sent:** Wednesday, March 30, 2011 3:32 PM  
**To:** Hayden, Elizabeth  
**Cc:** McIntyre, David; Janbergs, Holly  
**Subject:** FW: ACRS briefing on April 7th  
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**Cc:** Hackett, Edwin; Santos, Cayetano; Berrios, Ilka  
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**Importance:** High

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Thanks in advance,

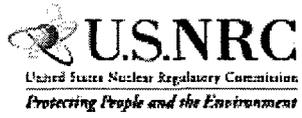
NNNN/76

*Yaira K. Diaz-Sanabria*

**Advisory Committee on Reactor Safeguards**

☒ T2-E26 | ☎ 301-415-8064 | FAX 301-415-5589

**Yaira.Diaz-Sanabria@nrc.gov**



Please consider the environment before printing this e-mail. Thank you.

**From:** RMPACTSU\_ELNRC  
**To:** PMT01 Hoc; Hoc, PMT12; PMT09 Hoc; Harrington, Holly; LIA01 Hoc; LIA11 Hoc; McIntyre, David; Burnell, Scott  
**Subject:** FYI: Miami Herald Article on Radiation Suits Provided by South FloridaCompany  
**Date:** Thursday, March 17, 2011 10:44:32 AM

---

**Subject:** Miami Herald Article on Radiation Suits Provided by South FloridaCompany

Posted on Wednesday, 03.16.11

## MEDICAL TECHNOLOGY

# Radiation suits from South Florida sent to help Japan

**Rescue workers will receive protective suits made of Demron, a unique material manufactured in a Medley factory.**



## Related Content

By **Bridget Carey**

[bcarey@miamiherald.com](mailto:bcarey@miamiherald.com)

As Japan's nuclear crisis escalates, emergency workers are finding protection in a unique safety suit created in South Florida.

More than 200 full-body nuclear radiation protection suits manufactured in Medley have been donated to aid power plant workers and rescue teams in Japan, and the company, Radiation Shield Technologies, is working full-time to keep up with orders from companies in Japan.

The suits are in high demand because of their unique material, called Demron, invented by Coral Gables anesthesiologist and pain-management specialist Dr. Ronald DeMeo. The radiation-blocking material offers protection against multiple threats, including infrared radiation, extreme heat, nuclear fallout, biological and chemical agents.

DeMeo has been selling Demron products to military and rescue staff around the globe for several years, but he first invented the fabric for medical personal. After using a continuous

NNNN/77

X-ray machine with his patients, he saw sunburn-like skin damage on his arms and hands. And he also saw many colleagues in his field afflicted with different types of skin cancers.

“I didn’t think we were taking this X-ray machine seriously enough. I started to look into better shielding,” said DeMeo, who runs the medical practice Meridian Pain & Diagnostics in Coral Gables. “I didn’t realize I was venturing into something that hasn’t been invented before.”

After nuclear reactors following the earthquake and tsunami in Japan were damaged, DeMeo directed his Hong Kong distributors to send suits in stock to Japan. They are expected to arrive this weekend.

DeMeo made calls to donate the gear as soon as he saw footage of first responders who lacked protective clothing.

Rescue workers from Miami-Dade County, New York City and others worldwide have been customers of the Demron products. But with the Japan crisis, orders for the suits spiked. He said he plans to expand his current staff of 30 in Medley to keep up with growing demand from Asia and the Middle East, as well as an increase of interest from the U.S. West Coast. Currently, the company is able to make about 500 suits a month.

The all-black suits, valued at \$1,700 each, weigh nearly 10 pounds and can be put on by the wearer without outside assistance – which can’t be done with other radiological suits, according Dan Edward, head of business development at Radiation Shield Technologies.

DeMeo said he sees the wrong message being sent about how the radiation leak isn’t too dangerous.

“I really think it’s the wrong message. We really have to take this seriously,” DeMeo said. “Even low dose radiation exposure can increase your risk of cancer. Some people act like it’s a food group and it’s harmless. It’s not.”

Read more: <http://www.miamiherald.com/2011/03/16/2118690/radiation-suits-from-south-florida.html#ixzz1Griw95o6>

**From:** Kammerer, Annie  
**To:** Munson, Clifford; Karas, Rebecca; Ake, Jon; Seber, Dogan; Devlin, Stephanie; Chokshi, Nilesh  
**Cc:** Case, Michael; Skeen, David; Hiland, Patrick; Hasselberg, Rick; Brenner, Eliot; Harrington, Holly; Burnell, Scott; McIntyre, David; RST01 Hoc  
**Subject:** Seismic Team Members supporting the RST, Responsibilities, and Protocols  
**Date:** Wednesday, March 16, 2011 8:13:00 PM

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All,

We are increasing seismic support to the Reactor Safety Team (RST) and Office of Public Affairs (OPA) in the Ops Center such that there will be a responsible person in the Ops center that the RST and OPA teams can turn to at all times. **(RST and OPA staff see a note to you at the bottom of the page)**

**Staffing in the next few days is generally as follows:**

7am to 3pm: Cliff Munson (on site) and Jon Ake remotely. (The exception is Thursday when Cliff and Jon are both working remotely and Nilesh is in the center)

3pm to 11pm: Annie Kammerer (on site) with some support by Jon Ake remotely

11pm to 7 am: GIS staffers (all of whom are seismologist) will support RST and OPA by acting as a point of contact. This will be Stephanie Devlin or Dogan Seber, depending on the day.

**General Responsibilities:**

- All members of the seismic team noted above have the responsibility to support the RST and OPA in assuring that a timely response to questions, both in house and from the media (through OPA), is provided.
- All members of the seismic team also have the responsibility to assure that the Seismic Q&A document is updated with all the questions received and answered, such that the NRC message is consistent and we don't reinvent the wheel.

**Specific Responsibilities:**

- Annie Kammerer is the keeper of the seismic Q&A document and is responsible for issuing the document as needed.
- Cliff is the point of contact during the 7am to 3pm shift. He will be supported by Jon Ake and, to the extent possible, Annie Kammerer.
- Annie and Cliff are responsible for the coordination of assistance coming from the various groups who are providing responses in their areas of expertise.
- The GIS staff should first act in their official role as technical specialists. However, when questions come into the Op Center or OPA, they are to act as a point of contact and area responsible for assuring the timely response to seismic- or tsunami-related questions, using the below protocols.

**Protocols for Seismic Team:**

- To keep everyone on the same page, please send all Q&As received to Annie, Cliff and Jon.
- When possible, please add the Q&As received during the shift (even if they are just the questions without answers) into the working version of the word document, using track changes. If not possible to add during shift, please make a list of new items and provide to Cliff or Annie so that they can be dug out of email and added.
- The primary responsibility of the GIS team is the GIS work. In their secondary role

NNNN|70

as seismic contacts for RST and OPA, they should undertake the following actions:

- First determine if the question being asked is already in the seismic Q&As, if so, please provide to RST or OPA
- If the question is not immediately available, please call Annie (try me first, and use 415.307.6922) or Cliff to inform us that a new question has come in, and what it is. Please don't be shy about calling.

**RST and OPA staff: Note that all correspondence should be sent to Annie Kammerer, Clifford Munson and Jon Ake. We are a tight team who have worked together for years; and we immediately forward everything we see to each other anyway. This will save us a step and a lot of extra email. Also email Niles when he is on duty in the Ops Center.**

---

**From:** Betancourt, Luis  
**Sent:** Thursday, March 24, 2011 1:44 PM  
**To:** Couret, Ivonne  
**Subject:** RE: Spanish translation

Ok. I'll send you something by the end of the day.

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT) RES/DE/DICB   301-251-7409   MS C-2A07M   <a href="mailto:Luis.Betancourt@nrc.gov">Luis.Betancourt@nrc.gov</a>
<i>U.S. Nuclear Regulatory Commission</i>

 Please consider the environment before printing this e-mail

---

**From:** Couret, Ivonne  
**Sent:** Thursday, March 24, 2011 1:43 PM  
**To:** Betancourt, Luis  
**Subject:** RE: Spanish translation

Sooner is better than later. If so, mark time with Japan. Ivonne

---

**From:** Betancourt, Luis  
**Sent:** Thursday, March 24, 2011 1:43 PM  
**To:** Couret, Ivonne  
**Cc:** Medina, Veronika  
**Subject:** RE: Spanish translation

Sure! By when do you need it?

LUIS BETANCOURT DIGITAL I&C ENGINEER (EIT) RES/DE/DICB   301-251-7409   MS C-2A07M   <a href="mailto:Luis.Betancourt@nrc.gov">Luis.Betancourt@nrc.gov</a>
<i>U.S. Nuclear Regulatory Commission</i>

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**From:** Couret, Ivonne  
**Sent:** Thursday, March 24, 2011 1:42 PM  
**To:** Betancourt, Luis  
**Cc:** Medina, Veronika  
**Subject:** FW: Spanish translation

Do you have time to do a quick read of this translation and make tweaks. Veronika has been generous to clean up from the literal translation. We want to make this available to the public. Thanks, Ivonne

---

**From:** Medina, Veronika  
**Sent:** Thursday, March 24, 2011 1:08 PM  
**To:** Couret, Ivonne  
**Subject:** Spanish translation

Ivonne,

Attached please find the last Spanish translation.

NNNN/79

Veronika



United States Nuclear Regulatory Commission

*Protecting People and the Environment*

# Preguntas más frecuentes a la NRC relacionadas con el terremoto y el tsunami del 11 de marzo de 2011 en Japón

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### **1) ¿Puede un terremoto y un tsunami tan grande como los que ocurrieron en Japón ocurrir en los EE.UU.?**

Este terremoto se produjo en una zona de subducción, la cual es el tipo de región tectónica donde se producen los terremotos de mayor magnitud. Una zona de subducción ocurre cuando dos placas tectónicas se encuentran y una de las placas se desliza debajo de la otra. Un tsunami tan masivo como el ocurrido en Japón requiere un terremoto como los que ocurren en zonas de subducción. En el territorio continental de los EE.UU., la única zona de subducción existente es la zona de subducción de Cascadia, la cual está ubicada en la costa del norte de California, Oregon y Washington. Por tanto, un terremoto y tsunami continental tan grande como el ocurrido en Japón sólo puede suceder en esta área. La única central nuclear cerca de la zona de subducción de Cascadia es la Estación Generadora de Columbia (Columbia Generating Station). Esta central se encuentra a una gran distancia de la costa [aproximadamente 225 millas (362 km)] y la zona de subducción [aproximadamente 300 millas (483 km)], por lo que los movimientos del suelo en la central se estima que sean muy inferiores a los observados en las centrales de Fukushima. Esta distancia también ayuda a disminuir la posibilidad de que un tsunami afecte la central. Fuera de la zona de subducción de Cascadia, no se espera que los terremotos excedan una magnitud aproximada de 8. La magnitud se mide en una escala logarítmica, por lo que un terremoto de magnitud 9 es aproximadamente 32 veces más grande que un terremoto de magnitud 8.

### **2) ¿Subestimaron los japoneses el tamaño máximo creíble del terremoto y tsunami que podrían afectar las centrales nucleares?**

La magnitud del terremoto fue algo mayor de lo esperado para dicha zona de subducción. Sin embargo, las centrales nucleares japonesas se reevaluaron recientemente utilizando niveles de movimiento del suelo similares a los que se cree que se produjeron en la zona donde están situadas las centrales nucleares. Los movimientos del suelo evaluados en las centrales nucleares japonesas fueron para terremotos de menor magnitud, pero más cercanos a las centrales. Actualmente, la NRC no cuenta con información sobre cuál era la altura máxima de tsunami, esperada para la ubicación de las centrales japonesas.

### **3) ¿Cuan alto fue el tsunami en las centrales nucleares de Fukushima?**

Especialistas en modelación de tsunamis de la Administración Nacional Oceánica y Atmosférica (NOAA, por sus siglas en inglés) y de la Administración del Medio Ambiente Marino del Pacífico (PMEL, por sus siglas en inglés), han estimado que la altura de las olas cerca de la costa fue de aproximadamente 8 metros (26 pies) en Fukushima Daiichi y aproximadamente 7 metros (23 pies) en Fukushima Daini. Estos modelos se basan en mediciones de boyas del "Deep-ocean Assessment and Reporting of Tsunamis (DART)" de la NOAA y en un modelo numérico de alta resolución desarrollado para el sistema de alerta de tsunamis. De existir mediciones en las centrales, las mismas no han sido provistas a la NRC.

### **4) ¿El daño a las centrales nucleares de Japón fue causado principalmente por el terremoto o por el tsunami?**

Dado a que este evento tuvo lugar en Japón, es difícil para el personal de la NRC realizar la evaluación necesaria para comprender exactamente lo que sucedió. Cabe la posibilidad de que en las centrales nucleares haya habido algún daño causado por el movimiento vibratorio del suelo y el terremoto causó la pérdida de energía eléctrica externa en las instalaciones. Sin embargo, parece ser que el tsunami jugó un papel clave en la pérdida de otras fuentes energéticas ocasionando un apagón eléctrico total en la central, un problema continuo y actual en las centrales.

### **5) ¿Se ha identificado alguna lección que se pueda compartir con las centrales nucleares de los EE.UU.?**

La NRC está dándole seguimiento y evaluando constantemente el evento. Esto, sin duda, dará lugar a la identificación de asuntos que ameriten mayor atención. Sin embargo, un entendimiento más amplio de

las lecciones aprendidas de lo sucedido requerirá más información de la que actualmente posee la NRC.

**6) ¿Hubo algún daño a los reactores de los EE.UU. debido al terremoto o el tsunami ocurrido en Japón?**

No.

**7) ¿Cuántos reactores de los EE.UU. se encuentran en zonas sísmicas activas?**

A pesar de que a menudo pensamos que los EE.UU. tiene zonas de terremotos "activas" y "no activas", realmente los terremotos pueden ocurrir casi en cualquier lugar. Los sismólogos típicamente categorizan las zonas sísmicas de los EE.UU. como baja, moderada y alta. La NRC requiere que cada central nuclear sea diseñada para resistir movimientos del suelo específicos y propios a su ubicación. Además, la NRC ha definido un nivel de movimiento del suelo mínimo que es preciso utilizar cuando se diseñan las centrales nucleares.

**8) ¿Para qué nivel de peligrosidad sísmica están diseñados los reactores en los EE.UU.?**

Cada reactor está diseñado para un movimiento del suelo distinto y específico para su ubicación. Las centrales nucleares existentes fueron diseñadas de forma determinista, es decir, basándose en una situación de terremoto que considera los terremotos mayores ocurridos en el área que rodea la central. Estos métodos de diseño no consideran la probabilidad de ocurrencia de tales terremotos. Los nuevos reactores se diseñan utilizando técnicas probabilistas que caracterizan tanto el nivel de movimiento del suelo como la incertidumbre asociada con tal movimiento de suelo en la ubicación propuesta para construir la central nuclear. Estas técnicas probabilistas consideran los movimientos del suelo que pudiesen ocurrir en todas las posibles fuentes sísmicas en la región alrededor de la zona de interés. Técnicamente, este es un movimiento del suelo con una frecuencia anual de ocurrencia de  $1 \times 10^{-4}$ ; o sea, un movimiento del suelo que ocurre cada 10,000 años en promedio. Un aspecto importante es que las técnicas que caracterizan la peligrosidad de forma probabilista, y otras técnicas para la evaluación de riesgo, consideran eventos que exceden la base de diseño. El Asunto Genérico número 199 (GI-199) de la NRC implementa las técnicas probabilistas más recientes para evaluar la seguridad de las centrales nucleares existentes. [Ver preguntas 16 a 21 para obtener más información sobre GI-199]

**9) ¿Para qué tipo de magnitud están diseñadas las centrales nucleares que están en funcionamiento actualmente en EE.UU.?**

El movimiento del suelo depende tanto de la magnitud de un terremoto, como de la distancia de la falla sísmica hasta la ubicación en consideración. Las centrales nucleares, y demás estructuras de ingeniería, en realidad se diseñan a base de los niveles de movimiento del suelo y no a base de la magnitud de un terremoto. Las centrales nucleares existentes fueron diseñadas de forma determinista, es decir, basándose en una situación de terremoto que considera los terremotos mayores ocurridos en el área que rodea la central. Posteriormente se añade un margen a los movimientos del suelo para proporcionar una robustez adicional.

**10) ¿Ha cambiado nuestra percepción del riesgo sísmico de las centrales nucleares en los EE.UU. por los eventos ocurridos en Japón?**

La NRC sigue firme en su determinación de que las centrales nucleares en los EE.UU. son seguras. Estos eventos no cambian la percepción de la NRC sobre la peligrosidad sísmica (es decir, los niveles de movimiento del suelo) en las centrales nucleares de los EE.UU. Es demasiado pronto para establecer las lecciones aprendidas de este terremoto. La NRC examinará todos los aspectos del comportamiento de las centrales nucleares ante el terremoto y el tsunami en Japón para definir si es necesario tomar acciones en las centrales nucleares de los EE.UU., y si es necesario hacer algún cambio a las regulaciones de la NRC.

**11) ¿Es posible la ocurrencia de un daño significativo a las centrales nucleares de EE.UU. debido a un terremoto tal como el ocurrido en Japón? ¿Cuán similares son las centrales nucleares japonesas a las de los EE.UU.?**

Todas las centrales nucleares de los EE.UU. están construidas para resistir fenómenos naturales, tales como terremotos y tsunamis. Incluso, las centrales nucleares que se encuentran en zonas sísmicas de baja y moderada actividad están diseñadas para mantener la seguridad en la eventualidad de tal desastre natural. La NRC requiere que las estructuras, sistemas y componentes vitales para la seguridad de la central sean diseñados considerando eventos sísmicos y tsunamis inusuales y extremos. Además del diseño de las centrales nucleares, se dedica un gran esfuerzo a la planificación de respuestas a emergencias y manejo de accidentes. Este enfoque se denomina defensa en profundidad.

El diseño de las instalaciones japonesas es similar a algunas instalaciones en los EE.UU. Sin embargo, desde la construcción de las centrales nucleares existentes en los EE.UU., la NRC ha requerido modificaciones a las mismas, incluyendo cambios en el diseño para controlar la concentración de hidrógeno y la presión dentro del edificio de contención. La NRC también requiere que las centrales nucleares tengan equipo y medidas adicionales para mitigar daños ocasionados por incendios intensos y explosiones relacionados a un evento que exceda la base de diseño. Las medidas de mitigación incluyen el proveer refrigeración al núcleo del reactor y a la piscina de combustible gastado y medios adicionales para suplir energía eléctrica a otros equipos en la central.

**12) ¿Cuál es la probabilidad de que los movimientos del suelo que definen la base de diseño ("SSE") excedan la vida útil de una central nuclear?**

Los movimientos del suelo que se utilizan como bases de diseño sísmico en las centrales nucleares de los EE.UU. se denominan movimientos de suelo de terremoto de base de diseño ("Safe Shutdown Earthquake" o SSE, por sus siglas en inglés). A mediados de la década del 1990, el personal de la NRC revisó la posibilidad de movimientos del suelo que excedían la base de diseño como parte de la evaluación individual de las centrales ante eventos externos (IPEEE, por sus siglas en inglés). De esta revisión, la NRC determinó que los diseños sísmicos de las centrales nucleares en los EE.UU. tienen márgenes de seguridad adecuados para resistir terremotos. Actualmente, la NRC está en el proceso de ejecutar GI-199 para evaluar nuevamente la resistencia de las centrales nucleares de los EE.UU. a terremotos. Basado en los análisis preliminares de la NRC, la probabilidad promedio de movimientos de suelo que exceden el SSE durante la vida útil de las centrales nucleares localizadas en el centro y este de Estados Unidos es menor de 1%.

Es importante recordar que es un requisito para las estructuras, sistemas y componentes el tener un "margen adecuado", lo que significa que los mismos deben resistir los niveles de movimientos vibratorios del suelo que excedan la base de diseño de la central.

**13) ¿Cuales son los reactores a lo largo de las zonas costeras que podrían verse afectados por un tsunami?**

Varias centrales nucleares se encuentran en zonas costeras que podrían verse afectadas por un tsunami. Dos centrales nucleares, Diablo Canyon y San Onofre, se encuentran en la costa del Pacífico la cual cuenta con riesgo de tsunamis. Dos centrales nucleares en la costa del Golfo, South Texas y Crystal River, también podrían verse afectadas por un tsunami. Un mareaje causado por un tsunami podría afectar a varias centrales nucleares en la costa del Atlántico y cerca de ríos: St. Lucie, Turkey Point, New Brunswick, Oyster Creek, Millstone, Pilgrim, Seabrook, Calvert Cliffs, Salem/Hope Creek, y Surry. La ocurrencia de tsunamis en las costas del Golfo y del Atlántico es escasa. Generalmente, la inundación anticipada a causa de la oleada producida por huracanes sobrepasa la inundación anticipada a causa de un tsunami en las centrales nucleares en las costas del Golfo y del Atlántico. En resumen, todas las centrales nucleares están diseñadas para resistir un tsunami.

#### **14) ¿Qué es la magnitud? ¿Qué es la escala Richter? ¿Qué es la intensidad?**

La magnitud de un terremoto es una medida de la fuerza del terremoto determinada a partir de observaciones sismográficas. La magnitud es esencialmente una medida objetiva y cuantitativa del tamaño de un terremoto. La misma se puede expresar de varias formas según los registros sismográficos (por ejemplo, la Magnitud Richter Local, la Magnitud de la Onda Superficial, la Magnitud de la Onda Interna y la Magnitud Momento). Actualmente, la medida de magnitud más común es La Magnitud Momento, Mw, la cual se caracteriza a base de la resistencia de la roca que se fracturó, el área de ruptura de la falla, y el desplazamiento promedio del suelo. En resumen, la magnitud momento es una medida directa de la energía liberada durante un terremoto. Dada la naturaleza logarítmica de la escala, cada incremento unitario en la magnitud representa un aumento por un factor de diez sobre la amplitud medida; en términos de la energía liberada por el terremoto, cada aumento unitario en la escala de magnitud corresponde a una liberación de energía 32 veces mayor que la cantidad asociada con la magnitud anterior.

Charles F. Richter del Instituto de Tecnología de California desarrolló la escala de magnitud Richter en el año 1935. Esta escala se desarrolló en función del comportamiento de un sismógrafo específico que se fabricaba en aquel entonces. Dado que los instrumentos de este tipo ya no se utilizan en la actualidad, la comunidad científica ha dejado de utilizar la escala de magnitud Richter. Sin embargo, la escala Richter es un término tan comúnmente utilizado por el público que los científicos generalmente responden a las preguntas sobre magnitud "Richter" en términos de magnitud momento sin corregir el malentendido.

La intensidad de un terremoto es una evaluación cualitativa de los efectos del terremoto en una ubicación en particular. La intensidad asignada se basa en los efectos observados en los seres humanos, en las estructuras construidas por el hombre, y en la condición de la superficie terrestre en una ubicación en particular. La escala más utilizada en los EE.UU. es la escala de Intensidad de Mercalli Modificada (MMI, por sus siglas en inglés) la cual incluye un rango de valores del I al XII en el orden de gravedad. Un terremoto de intensidad I en la escala MMI indica que no se sintió excepto por unas pocas personas, mientras que un terremoto de intensidad XII indica un daño total de todas las obras de construcción, ya sea daño parcial o total. Mientras que un terremoto tiene una sola magnitud, la intensidad depende de los efectos en cada ubicación específica.

#### **15) ¿Cómo se relacionan entre sí la magnitud y el movimiento del suelo?**

El movimiento del suelo que se siente en un lugar determinado es una función de la magnitud del terremoto, la distancia desde la falla hasta la ubicación de interés, y otros elementos tales como los materiales geológicos a través de los cuales viajan las ondas del terremoto.

#### **16) ¿Sobre qué trata el asunto genérico número 199 (GI-199)?**

GI-199 investiga las implicaciones de seguridad y riesgo que podrían tener datos y modelos actualizados de terremotos. Estos datos y modelos actualizados sugieren que la probabilidad de que un movimiento del suelo, causado por un terremoto, exceda la base de diseño sísmico de algunas centrales nucleares en el centro y este de Estados Unidos, sigue siendo baja, pero es mayor que lo calculado previamente.

#### **17) ¿Provee el GI-199 algún tipo de clasificación de las centrales nucleares de los EE.UU. en términos de seguridad?**

La NRC no clasifica las centrales nucleares a base de riesgo sísmico. El objetivo de la evaluación de seguridad y riesgo asociada con GI-199 fue realizar una evaluación de preselección, conservadora, para determinar si era necesario realizar investigaciones adicionales sobre la seguridad sísmica de los reactores actualmente en servicio en el centro y este de los EE.UU. (CEUS, por sus siglas en inglés), de acuerdo con las directrices de la NRC. Los resultados de la evaluación de seguridad y riesgo asociada con GI-199 no deben interpretarse como estimados finales de riesgo sísmico específico para cada

central dado que algunos análisis fueron sumamente conservadores, resultando en un cálculo de riesgo mayor que el riesgo real. La naturaleza de la información utilizada (tanto datos sobre peligrosidad sísmica, como información sobre la fragilidad a nivel de central) hace que estos estimados sean solamente útiles como una herramienta de preselección.

### **18) ¿Cuáles son los resultados actuales de GI-199?**

En la actualidad las centrales nucleares en los EE.UU. continúan siendo seguras, sin necesidad de acción inmediata. Esta determinación se basa en la evaluación de la NRC de información actualizada sobre la peligrosidad sísmica y en las conclusiones de la primera etapa de GI-199. Las centrales nucleares existentes fueron diseñadas con un margen considerable para resistir movimientos del suelo definidos de forma determinista, es decir, basándose en una situación de terremoto que tomaba en consideración los terremotos mayores ocurridos en el área circundante a la central. Los resultados de la evaluación de GI-199 demuestran que cabe la probabilidad de que haya aumentado el movimiento del suelo base de diseño en algunas ubicaciones, pero sólo por una cantidad relativamente pequeña. Además, las probabilidades de daño sísmico al núcleo del reactor son menores que las directrices para la adopción de medidas inmediatas. A pesar de no tener una preocupación inmediata sobre la seguridad, la NRC se concentra en garantizar la seguridad inclusive para eventos poco comunes y extremos. Por tanto, la NRC ha determinado que la evaluación de la peligrosidad sísmica actualizada y del comportamiento de las centrales debe continuar.

### **19) ¿A qué se refiere la frase "aumento en las estimaciones de la peligrosidad sísmica" en las ubicaciones de centrales nucleares?**

La peligrosidad sísmica (amenaza de un terremoto) representa la posibilidad (o probabilidad) de que un nivel de movimiento del suelo específico pueda ocurrir o ser excedido en una ubicación determinada. Nuestros cálculos aproximados de peligrosidad sísmica en algunas ubicaciones del centro y este de los EE.UU. han cambiado en función de resultados de investigaciones recientes que indican que en ciertas ubicaciones hubo terremotos más frecuentemente que lo previamente estimado. Nuestros cálculos aproximados de peligrosidad sísmica también han cambiado debido a que los modelos utilizados para predecir el nivel de movimiento del suelo, dado una magnitud específica a cierta distancia de la ubicación de interés, han cambiado. El aumento en las aproximaciones de la peligrosidad sísmica en ciertas ubicaciones del centro y este de Estados Unidos se discutieron en un memorando a la Comisión el 26 de julio de 2006. (El memorando está disponible en el Sistema de Manejo y Acceso de Documentos de la Agencia, ADAMS por sus siglas en inglés, bajo el número de acceso ML052360044).

### **20) ¿Representa el daño sísmico al núcleo del reactor una medida del riesgo de escape de radiación o sólo del riesgo de daño al núcleo (sin contar alguna contención adicional)?**

La frecuencia de daño sísmico al núcleo del reactor es la probabilidad de daño al núcleo a causa de un evento iniciado por un terremoto. Esto no implica ni una fusión ni la pérdida de contención, lo cual sería necesario para la ocurrencia de escape radiológico. La probabilidad de escape de radiación es mucho menor.

### **21) ¿Dónde puedo obtener información actualizada acerca de GI-199?**

La página web pública del Programa de Asuntos Genéricos de la NRC (<http://www.nrc.gov/about-nrc/regulatory/gen-issues.html>) contiene información sobre los programas, documentos, información histórica, información sobre el estado de asuntos generales, y enlaces a programas relacionados. El informe trimestral del Sistema de Control para el Manejo de Asuntos Genéricos más reciente, el cual ha actualizado de forma regular la información del GI-199, está disponible al público en . Además, el Servicio Geológico de los Estados Unidos (USGS, por sus siglas en inglés) provee datos y resultados que están a disposición del público en <http://earthquake.usgs.gov/hazards/products/conterminous/2008/>.

## **22) ¿Puede una secuencia de accidentes similar a la de las centrales nucleares de Fukushima Daiichi en Japón ocurrir en los EE.UU.?**

Es difícil responder a esta pregunta hasta que tengamos un mejor entendimiento de los problemas y las condiciones precisas que enfrentaron los operadores en Fukushima Daiichi. Sin embargo, lo que sí sabemos es que las unidades 1 – 3 de Fukushima Daiichi perdieron toda fuente energética externa, al igual que los generadores diesel de emergencia. Esta situación se denomina "apagón eléctrico total en la central". Las centrales nucleares en los EE.UU. están diseñadas para lidiar con una situación que implique la pérdida de la fuente energética externa así como la fuente energética de emergencia. Existen regulaciones detalladas de la NRC que tratan sobre esta posible situación. Se requiere que las centrales nucleares en los EE.UU. realicen una evaluación de "afrontamiento" y que desarrollen una estrategia que demuestre a la NRC que pueden mantener la central nuclear en condiciones seguras durante una situación de apagón eléctrico total en la central. Estas evaluaciones, las modificaciones propuestas para la central, y los procedimientos operativos fueron revisados y aprobados por la NRC. Varias centrales nucleares añadieron fuentes de corriente alterna (AC, por sus siglas en inglés) adicionales para cumplir con esta regulación.

Además, las centrales nucleares de los EE.UU. y las prácticas de operación desde los ataques terroristas del 11 de septiembre del 2001, están diseñadas para mitigar los resultados de accidentes severos, tales como el impacto de aviones, que incluyen la pérdida total de las fuentes energéticas externas y las fuentes energéticas internas de emergencia.

Los diseños de las centrales nucleares de los EE.UU. toman en consideración eventos sísmicos y tsunamis. Es importante no extraer datos de terremotos y tsunamis de una ubicación del mundo a otra para evaluar estos fenómenos naturales. Estos eventos naturales catastróficos son específicos para cada región y ubicación, basados en la ubicación de fallas tectónicas y geológicas.

**From:** [McIntyre, David](#)  
**To:** [Hayden, Elizabeth](#)  
**Subject:** RE: ACRS briefing on April 7th  
**Date:** Thursday, March 31, 2011 8:12:00 AM  
**Attachments:** [image001.png](#)

---

See highlight below.

---

**From:** Hayden, Elizabeth  
**Sent:** Wednesday, March 30, 2011 5:41 PM  
**To:** McIntyre, David  
**Subject:** RE: ACRS briefing on April 7th

I thought it was 2 hours?

*Beth Hayden*  
*Senior Advisor*  
*Office of Public Affairs*  
*U.S. Nuclear Regulatory Commission*  
*--- Protecting People and the Environment*  
*301-415-8202*  
*elizabeth.hayden@nrc.gov*

---

**From:** McIntyre, David  
**Sent:** Wednesday, March 30, 2011 3:49 PM  
**To:** Couret, Ivonne; Hayden, Elizabeth  
**Cc:** Janbergs, Holly  
**Subject:** RE: ACRS briefing on April 7th

They really think people are going to shlep all the way out here for a 20-minute public session??

---

**From:** Couret, Ivonne  
**Sent:** Wednesday, March 30, 2011 3:32 PM  
**To:** Hayden, Elizabeth  
**Cc:** McIntyre, David; Janbergs, Holly  
**Subject:** FW: ACRS briefing on April 7th  
**Importance:** High

Next Thursday they are having a briefing on Japanese event and they are requesting OPA support and attend. I will not be here I thought perhaps Bethany could attend. Please advise. Ivonne

---

**From:** Diaz-Sanabria, Yoira  
**Sent:** Wednesday, March 30, 2011 2:59 PM  
**To:** Couret, Ivonne  
**Cc:** Hackett, Edwin; Santos, Cayetano; Berrios, Ilka  
**Subject:** ACRS briefing on April 7th  
**Importance:** High

Ivonne,

NNNN/80

Per our conversation. ACRS briefing on Events at the Fukushima Reactor Site in Japan (open/closed) will be held on April 7, 2011 from 10:45 am – 12:45 pm. Portions of the briefing will be closed to the public to protect information that is in confidence by the Japan authorities. The open session will be the first 15-20 min. The NRC staff is the only audience allow during the closed session. It will be ideal to have the support from OPA due to the sensitivity and high profile of this subject. Please feel free to contact me if you need further information.

Thanks in advance,

*Yaira K. Diaz-Sanabria*

**Advisory Committee on Reactor Safeguards**

☒ T2-E26 | ☎ 301-415-8064 | FAX 301-415-5589

Yaira.Diaz-Sanabria@nrc.gov



Please consider the environment before printing this e-mail. Thank you.

**From:** McIntyre, David  
**To:** Haney, Catherine; Frazier, Alan; Muessle, Mary  
**Cc:** Kokajko, Lawrence; Kotra, Janet; Mohseni, Aby  
**Subject:** RE: Press Release for YM  
**Date:** Thursday, March 31, 2011 8:32:00 AM

---

You can send it direct to me, please. I don't want to have too many copies/editions/versions of this floating around. I'll incorporate your changes and run it up to OEDO.

---

**From:** Haney, Catherine  
**Sent:** Thursday, March 31, 2011 8:20 AM  
**To:** McIntyre, David; Frazier, Alan; Muessle, Mary  
**Subject:** RE: Press Release for YM

We are working on some revised wording now. Should have it to everyone shortly.

---

**From:** McIntyre, David  
**Sent:** Thursday, March 31, 2011 8:05 AM  
**To:** Frazier, Alan; Haney, Catherine; Muessle, Mary  
**Subject:** RE: Press Release for YM

I was already thinking of tinkering with that graf; and of course, what comes out of the Chairman's office is likely to be totally different anyway.

---

**From:** Frazier, Alan  
**Sent:** Wednesday, March 30, 2011 5:54 PM  
**To:** Haney, Catherine; Muessle, Mary  
**Cc:** McIntyre, David; Weber, Michael  
**Subject:** RE: Press Release for YM

Mary was reviewing it around 5pm.

---

**From:** Haney, Catherine  
**Sent:** Wednesday, March 30, 2011 5:41 PM  
**To:** Frazier, Alan; McIntyre, David  
**Subject:** Press Release for YM

Don't know if the Press Release has made it to OEDO yet but I just had the opportunity to review it. I have great concerns with the second paragraph. We will engage OPA and see if it can be revised.

Cathy

NNNN / 81

**From:** [Harrington, Holly](#)  
**To:** [Hayden, Elizabeth](#); [Courret, Ivonne](#)  
**Cc:** [McIntyre, David](#); [Janbergs, Holly](#)  
**Subject:** RE: ACRS briefing on April 7th  
**Date:** Thursday, March 31, 2011 8:39:52 AM  
**Attachments:** [image001.png](#)

---

No problem.

Ivonne, get with me to discuss at some point

---

**From:** Hayden, Elizabeth  
**Sent:** Wednesday, March 30, 2011 5:47 PM  
**To:** Courret, Ivonne; Harrington, Holly  
**Cc:** McIntyre, David; Janbergs, Holly  
**Subject:** RE: ACRS briefing on April 7th

That may be a bit much to ask of Bethany by herself. We will have you, Scott and Eliot out that day.

Holly, could you help out at the beginning of the meeting to make sure the place isn't overrun by reporters, cameras, etc? If there are very few reporters there, perhaps you can leave Bethany to give the ACRS peace of mind.

*Beth Hayden*  
*Senior Advisor*  
*Office of Public Affairs*  
*U.S. Nuclear Regulatory Commission*  
*--- Protecting People and the Environment*  
*301-415-8202*  
*elizabeth.hayden@nrc.gov*

---

**From:** Courret, Ivonne  
**Sent:** Wednesday, March 30, 2011 3:32 PM  
**To:** Hayden, Elizabeth  
**Cc:** McIntyre, David; Janbergs, Holly  
**Subject:** FW: ACRS briefing on April 7th  
**Importance:** High

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**Sent:** Wednesday, March 30, 2011 2:59 PM  
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**Cc:** Hackett, Edwin; Santos, Cayetano; Berrios, Ilka  
**Subject:** ACRS briefing on April 7th  
**Importance:** High

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Per our conversation. ACRS briefing on Events at the Fukushima Reactor Site in Japan (open/closed) will be held on April 7, 2011 from 10:45 am – 12:45 pm. Portions of the briefing will be closed to the public to protect information that is in confidence by the Japan authorities. The open session will be the first 15-20 min. The NRC staff is the only audience allow during the closed session. It will be ideal to have the support from OPA due to the sensitivity and high profile of this subject. Please feel free to contact me if you need further information.

Thanks in advance,

*Yaira K. Diaz-Sanabria*

**Advisory Committee on Reactor Safeguards**

✉ T2-E26 | ☎ 301-415-8064 | FAX 301-415-5589

Yaira.Diaz-Sanabria@nrc.gov



Please consider the environment before printing this e-mail. Thank you.

**From:** [Champ, Billie](#)  
**To:** [Commission E-Reader Distribution](#); [E-Reader Distribution](#)  
**Subject:** COMMISSION E-READER....THURSDAY, MARCH 31, 2011  
**Date:** Thursday, March 31, 2011 11:36:41 AM  
**Attachments:** [Tab A Cantwell 03-30-11.pdf](#)  
[Tab B 03-23-11 Hazel.pdf](#)  
[Tab C 03-30-11 Ltr to Congress.pdf](#)  
[dailymemos.doc](#)

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**Some of the information contained in the  
Reader is not publicly available.  
If there are any questions, please contact SECY.**

**READING FILE**

**INDEX**

**March 31, 2011**

**INCOMING CORRESPONDENCE**

**Tab "A" 03/30/11 -- Letter from Sen. Maria Cantwell, concerns the level of risk that the accident at Japan's Fukushima Daiichi nuclear complex poses on residents in Washington State.**

**Tab "B" 03/23/11-- Letter from William Hazel, concerns NRC's activities for developing information technology to ensure adequate management and protection of radioactive sources.**

**OUTGOING CORRESPONDENCE**

**Tab "C" 03/31/11 -- Letter to Congress, provides copy of NRC's Fiscal Year 2010 Annual Report on the Notification and Federal Employee Antidiscrimination and Retaliation (No Fear) Act of 2002.**

NNNN/82

# United States Senate

WASHINGTON, DC 20510-4705

March 30, 2011

U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Dear Chairman Jaczko and Commissioners Svinicki, Apostolakis, Magwood, and Ostendorff:

I am writing to request your assistance in assessing the level of risk that the tragedy at Japan's Fukushima Dai-ichi nuclear complex poses to my constituents in Washington State. Public health officials in Washington state have stated that the levels of radiation detected are currently far below those that would constitute a risk to human health, yet the presence of radioactive materials from this accident in any quantity remains a matter of significant public concern.

In this regard, I would ask that you address the following questions in as timely a manner as possible:

- Does the accumulated amount of radioactive contamination from the Fukushima Dai-ichi nuclear complex that has been detected within Washington state so far pose any level of short or long term health risk?
- What is the likelihood that larger amounts of radioactive contamination will reach Washington State and what risk might this radiation pose to human health in both the short and long term?
- What would be the possible impacts of a total reactor core meltdown in one or more of the damaged reactors have on human health, agriculture, fisheries, or ecosystems within Washington state?
- How much monitoring for ionizing radiation is occurring within Washington state and what entities are undertaking these activities? Do monitors only detect amounts of xenon-133, cesium-137, and iodine -131, and if so are there potentially additional risks from other unmonitored radioactive particles?
- Given current risks and uncertainties regarding a fluid situation, what precautionary and preparatory measures do you recommend the public take?

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2530 WETMORE AVENUE  
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(425) 303-0114  
FAX: (425) 303-8351

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875 JAGGIN AVENUE  
SUITE 204/204A  
RICHLAND, WA 99352  
(509) 946-8106  
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WASHINGTON, DC  
511 DIRKSEN SENATE OFFICE BUILDING  
WASHINGTON, DC 20510-4705  
(202) 224-3441  
FAX: (202) 228-0514

- Many of the thousands of U.S. expatriates and military dependents currently being evacuated from Japan will transit through the Seattle-Tacoma International Airport. Is it likely that these refugees will require treatment for exposure to radiation and radioactive materials, and does their return presents any health risk to the broader U.S. public?

Thank you very much for your attention to these questions and for your staff's determined efforts to assist the Japanese government and inform Congress and the general public. I appreciate that this is an extremely busy time for the Commission, but would appreciate a prompt response to these questions which I can forward on to my concerned constituents.

Sincerely,

A handwritten signature in black ink, appearing to read "Maria Cantwell". The signature is fluid and cursive, with a long horizontal stroke at the end.

Maria Cantwell  
United States Senator



# COMMONWEALTH of VIRGINIA

Office of the Governor

William A. Hazel, Jr., MD  
Secretary of Health and Human Resources

March 23, 2010

The Honorable Gregory B. Jaczko  
Chairman  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Dear Chairman Jaczko:

Thank you for your recent letter to Governor McDonnell regarding the Nuclear Regulatory Commission's (NRC) activities for developing information technology to ensure adequate management and protection of radioactive sources.

The NRC recently conducted the first onsite evaluation of Virginia's Radioactive Materials Program since Virginia became an Agreement State. We are very pleased that your Management Review Board concluded that Virginia's program performed at the highest possible level in all performance categories. Virginia's radioactive materials program resides in the Virginia Department of Health's (VDH) Office of Epidemiology.

I want to assure you that Virginia's program is working alongside the other Agreement States and the NRC staff on regulatory issues concerning radioactive materials, including the development of the information technology system mentioned in your letter.

Should you have any questions or concerns, please feel free to contact Keri Hall, M.D., M.S., Director of VDH's Office of Epidemiology by telephone at (804) 864-7901 or by email at [Keri.Hall@VDH.virginia.gov](mailto:Keri.Hall@VDH.virginia.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "William A. Hazel, Jr.", written over a faint circular stamp.

William A. Hazel, Jr., MD

WAH:lf



CHAIRMAN

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

March 30, 2011

The Honorable John Boehner  
Speaker of the United States  
House of Representatives  
Washington, D.C. 20515

Dear Mr. Speaker:

I am pleased to provide a copy of the U.S. Nuclear Regulatory Commission's (NRC's) Fiscal Year 2010 Annual Report on the Notification and Federal Employee Antidiscrimination and Retaliation (No FEAR) Act of 2002. The report is submitted in accordance with the requirements of Section 203 of the No FEAR Act. My Commission colleagues and I continue our commitment and efforts to maintain a model Equal Employment Opportunity program at the NRC.

Sincerely,

A handwritten signature in black ink, appearing to read "G. Jaczko", written over a horizontal line.

Gregory B. Jaczko

Enclosure:  
As stated

Identical letters sent to:

The Honorable John Boehner  
Speaker of the United States  
House of Representatives  
Washington, D.C. 20515

The Honorable Joseph I. Lieberman  
Chairman, Committee on Homeland  
Security and Governmental Affairs  
United States Senate  
Washington, D.C. 20510  
cc: Senator Susan Collins

The Honorable Fred Upton  
Chairman, Committee on Energy  
and Commerce  
United States House of Representatives  
Washington, D.C. 20515  
cc: Representative Henry Waxman

The Honorable John Berry  
Director, United States Office  
of Personnel Management  
Theodore Roosevelt Building  
1900 E Street NW, Room 5A09  
Washington, D.C. 20415

The Honorable Daniel Inouye  
President, Pro Tempore  
United States Senate  
Washington, D.C. 20510

The Honorable Darrell Issa  
Chairman, Committee on Oversight  
and Government Reform  
United States House of Representatives  
Washington, D.C. 20515  
cc: Representative Elijah Cummings

The Honorable Barbara L. Boxer  
Chairman, Committee on Environment  
and Public Works  
United States Senate  
Washington, D.C. 20510  
cc: Senator James M. Inhofe

The Honorable Jacqueline Berrien  
Chairman, United States Equal Employment  
Opportunity Commission  
131 M Street, NE  
Washington, D.C. 20507

The Honorable Eric H. Holder, Jr.  
Attorney General  
United States Department of Justice  
950 Pennsylvania Avenue, NW  
Washington, D.C. 20530

Originating Office: EDO  
REF: CORR-11-0022  
Chairman Correspondence

ADAMS Accession No.: ML110680104

OFC	SECY <i>plm</i>	OCA <i>plm</i>	OCM/GBJ	OCM/GBJ	
NAME	SMcKelvin	<i>plm</i>	<i>W</i> Moninger	GBJaczko	
DATE	03/15/2011	03/17/2011	03/25/2011	03/30/2011	

OFFICIAL RECORD COPY

*Melody Fagan*  
*3/29/11*

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SECY DAILY REPORT – March 31, 2011**

1. **ACRS to Comrs. dtd 03/23/11** – 2011 Quadripartite Meeting Information.
2. **EDO to Comrs. dtd 03/23/11** -- Staff Statement in Support of the Uncontested Hearing for Issuance of a Combined License.
3. **OE to Comrs. dtd 03/30/11** – Calendar Year 2010 Annual Report of the U.S. Nuclear Regulatory Commission Enforcement Program.

**From:** Breskovic, Clarence  
**To:** Breskovic, Clarence  
**Subject:** GNOSIS News 2011-03-31  
**Date:** Thursday, March 31, 2011 2:30:25 PM  
**Attachments:** [Plant-specific safety review of German nuclear power plants - taking into account the events in Fukushima 2011-03-31.pdf](#)

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OIP Portal: <http://portal.nrc.gov/OCM/ip/default.aspx>

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## Energy Policy

### Nepal energy scheme for power crisis

BBC, 2011-03-24

The government of Nepal has launched a \$275m (£169m) initiative to bring an end to the country's energy crisis within five years. It plans to build power plants and give tax breaks for investors. Nepal has about 12 hours of power cuts a day because of its overwhelmed power grid, forcing many industries to close or reduce their operations. Finance Minister Bharat Mohan Adhikari said the aim was to produce an extra 2,500 megawatts of electricity.

### Canada: Japan crisis won't deter New Brunswick nuclear plans: premier

The Canadian Press, Tuesday Mar. 29, 2011 6:47 AM ET

SAINT JOHN, N.B. — The premier of New Brunswick says he has no concerns about resuming nuclear power generation in his province, despite the nuclear crisis in Japan. New Brunswick's Point Lepreau nuclear power plant was taken out of service in early 2008 for a major refurbishment, but the project is running three years behind schedule and is \$1 billion over the original budget. The refurbishment has hit a number of technical snags, but the plant is expected to return to service in the fall of 2012.

### Spain Reports Wind Power as Main Source of Electricity in Mar 11

MADRID, March 31, 2011 (AFP) -- Wind power became Spain's main source of electricity for the first time ever this month, in a country renowned for its focus on renewable energy, the power-generating authority REE said Thursday [ 31 March]. "Wind farms accounted for 21 percent of demand and reached a monthly record," 5.0 percent more than in March 2010, it said in a statement. Overall, renewable energy provided 42.2 percent of electricity demand, a figure that was down 48.5 percent in March 2010, REE said.

### Chile: Never-Ending Nuclear Debate

2011-03-31: Santiago El Mercurio publishes an editorial on the nuclear energy debate in Chile, which it says has focused until now on "the level of preparation, particularly with regard to human resources" that Chile has; recently, however, it says the country has shifted focus to the impact of accidents like that of Japan on its decision-making process. The editorial says both issues "allude to problems of preparation in the general sense," referring both to human resources to manage nuclear energy as well as to the terms demanded of investors who commit to the project. The editorial notes that the human resources "do not necessarily have to be local." It also says that accidents have in the past "been fundamental points of support for improving the operating standards of any productive system."

### Sri Lanka not to turn to atomic energy for next 15 years

Daily Mirror (Sri Lanka), March 31, 2011 Thursday

Sri Lanka, March 31 -- The Power and Energy Ministry will explore each and every options before taking a firm decision on the construction of an atomic power plant in the country but Sri Lanka will not need to turn to atomic energy at least for the next 15 years, Power and Energy Minister Patali Champika Ranawaka said.

### Germany: New Safety Measures Could Hasten Scrapping of Nuclear Plants

Bonn DW-WORLD.DE 0932 GMT 31 Mar 11

The German environment minister has announced criteria for nuclear safety tests to be carried out by mid-June. The results may determine the future of Germany's energy policy amid growing anxiety about nuclear power. Environment Minister Norbert Roettgen on Thursday [ 31 March] announced the details of planned stress tests to assess the stability of Germany's nuclear power plants. The government had already imposed a moratorium on the lifespan extension of the country's oldest nuclear plants in reaction to the unfolding catastrophe in Fukushima. On the basis of the safety checks, to be carried out by mid-June, the government will decide whether the reactors should be closed permanently. Roettgen presented the recommendations put forward by the Reactor Safety Commission, which is made up of a team of 16 physicists, engineers and representatives of the nuclear industry. Roettgen called the work of the commission "an important technical basis" for political decisions about energy policy. [see attached document]

### China will continue promoting its plan to develop nuclear power

NNNN/83

Asia Pulse, March 31, 2011

China will continue promoting its plan to develop nuclear power despite quake-hit Japan's recent nuclear crisis, a high-ranking government official said Wednesday. Xie Zhenhua, deputy director of China's National Development and Reform Commission, said China plans to speed up building nuclear reactors in spite of radiation leaks from a crippled nuclear plant in northeastern Japan, the area struck by a 9.0-magnitude earthquake on March 11. "China's future nuclear energy demand will remain an important source of supply," Xie said while attending a forum in Australia that discussed the two countries' climate change policies. "I believe China will give careful consideration to its nuclear power program after seeing the endangered Fukushima nuclear power plant. The accident will affect nuclear energy development not only in China but also throughout the world, to a certain extent." Xie, however, did not elaborate on how China's future nuclear plans will be affected.

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## Fuel Cycle

### India: BARC develops a novel Spent Fuel Chopper for PHWRs

The Press Trust of India, March 27, 2011 Sunday

Bhabha Atomic Research Centre has developed a novel spent fuel chopper (SFC) for improving the recycling of spent fuel of the Pressurised Heavy Water Reactors (PHWRs). "The indigenous development of the spent fuel chopper based on new gang chopping concept will significantly improve the capacity of head-end process of reprocessing," Scientists from Technology Development Division (TDD) and Nuclear Recycle Board said. The first SFC, designed and manufactured as per the new concept, has undergone cold commission in Reprocessing plant in Tarapur and hot commissioning is in progress, Shaji Karunakaran and KNS Nair of BARC, and D A S Rao of the Nuclear Recycle Board said.

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## Energy

### Siemens CEO Defends New Technologies, Criticizes 'Inconsistency' in Energy Debate

Duesseldorf Handelsblatt (Electronic Edition) 30 Mar 11 pp 6-7

[Interview with Peter Loescher, president and chief executive officer of German engineering group Siemens AG, by Axel Hoepner; place and date not given: "There Must Not Be Protests Against Each and Every Power Pole"]: "There must not be protests against each and every power pole. It is necessary to discuss major infrastructure projects in public. But then we need decisions and legal security, and it is important to implement the projects within a reasonable time frame. A yes to renewable energies, but a no to transmission lines do not go together."

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## Global & Regional Security

### Australia: G-rated full-body scanners for travellers

The Sun Herald (Sydney, Australia), March 27, 2011 Sunday

AUSTRALIAN travellers will be granted an added degree of modesty when full-body scanners are introduced at airports this year. Unlike the "nude" images transmitted by the controversial scanners used in the US, those that will be introduced in Australia, including Sydney Airport, will not reveal details of body contours or private areas. Instead the imaging software will detect potential threats such as weapons and explosives and show their location on a generic outline of a person.

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## Government & Public Sector

### Japan: the aftermath

Lancet, March 26, 2011 - April 1, 2011

Health and aid workers in Japan face multiple challenges in the wake of the earthquake and tsunami that have devastated the country's northeast coast. In the immediate aftermath, the aid and medical response to the earthquake and tsunami that struck Japan on March 11 has been complicated by the sheer scale of the devastation, widespread damage to supply routes, and concerns about radiation leaks from a stricken nuclear power plant. As emergency supplies of fuel, water, food, blankets, and other essentials finally began to get through to the estimated 350,000 people living in 2500 evacuation centres in the northeast of the island, officials were issuing reassurances about food, milk, and tap water found to have been contaminated with radioactive iodine-133.

### Iran jails nuclear scientist

The Australian, March 31, 2011 Thursday

There's a fresh twist in a strange tale of a 'defector' to the US. A NUCLEAR scientist at the centre of a spying row last year between Iran and the US has been jailed in Tehran and could face the death penalty. Shahram Amiri, who returned to Iran in July after apparently defecting to the US, is under investigation for divulging secrets about Iran's clandestine uranium-enrichment program, The Times has learnt. Sources inside Iran have confirmed Mr Amiri's arrest. If convicted of treason, he will almost certainly be executed. The arrest adds a twist to this mysterious tale of claim and counterclaim. Mr Amiri, 33, was given a hero's welcome when he returned to Iran last year, with the regime claiming he had been a double agent leaking false information to the US.

### Germany: Greens Score Big in Key German State

Der Spiegel, 2011-03-28

It is being hailed as the start of a new political era in Germany. The Green Party looks set to appoint its first state governor after Sunday's election in the state of Baden-Württemberg. The result is a huge setback for Chancellor Angela Merkel. The Fukushima disaster has had, and will have, many consequences around the world. One of the more unlikely, however, appears to be the results of Sunday's election in the southwestern German state of Baden-Württemberg, where skepticism about nuclear power helped propel the Green Party to a historic victory over Angela Merkel's conservative Christian Democratic Union (CDU).

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## Industry

### Japan power shortage has far-reaching effects

The Nation (Thailand), March 31, 2011

Japan's shortage of electricity may last two or three years in the wake of its nuclear-power crisis, posing a big challenge for the economy and its people, Professor Shigeyuki Abe of Doshisha University in Kyoto said. Pongsak cited Mitsubishi Gas Chemical's factories near the earthquake-hit areas as an example, as they had to halt production, affecting the delivery of BT (bismaleimide triazine) and other high-performance laminates and related products. Consequently, Taiwan Semiconductor Manufacturing Co had to halt production, while electronics manufacturers in Ayutthaya are also closing down because of the shortage of Japanese input, Pongsak said. In the end, production of hi-tech items such as the Apple iPad and other tablet computers will be affected, as it is unlikely that replacements could be found within the next six months. In the auto industry, Pongsak said each vehicle needed 20,000-30,000 parts and components, so the lack of any of these items could affect the global supply chain.

### Shares in nuclear-reactor maker Areva suspended

MarketWatch, March 31, 2011

LONDON (MarketWatch) -- Trading in Areva's shares (fr:cei) has been suspended on Thursday, a spokeswoman for Euronext told MarketWatch. The suspension came following the request of the company and pending an announcement, she said. Areva is a nuclear-reactor maker that is majority-controlled by the government of France.

### Fukushima Plant Disaster Reveals Shortcomings With Japan's Nuclear Energy

Mainichi Daily News Online 1107 GMT 31 Mar 11

The disaster at the nuclear power plant in northeastern Japan has exposed problems with the road the country has followed in developing nuclear power, including overconcentration of reactors in limited areas, dangerous stockpiles of spent nuclear fuel near reactors, and the inability to easily share electricity across eastern and western Japan.

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## Media

### TV Still Trumps Social Media In Japan As Primary Information Sources During Crisis

Media Blab News Bites, March 31, 2011 Thursday

While millions of Japanese flocked to internet and social media websites following this month's earthquake, tsunami and subsequent nuclear crisis, television retained its place as the primary source of information for most people, according to two surveys released on Tuesday. The data highlights the growing importance of internet-based information sources in Japan, but underlines the continued dominance of traditional media and the trust Japan has in its well-funded public broadcaster, NHK. Major news sites saw big jumps in their audience following the natural disaster that hit on March 11. One of the biggest jumps was recorded by Yahoo Weather, which instantly transmits earthquake information from the Japan Meteorological Agency. Despite the gains, the internet remains far behind television as a primary source of information.

### Japan disaster sparks social media innovation

Associated Press Financial Wire, March 31, 2011

As Japan grapples with an unprecedented triple disaster earthquake, tsunami, nuclear crisis the Web has spawned creativity and innovation online amid a collective desire to ease suffering. Once the magnitude of the March 11 disaster became clear, the online world began asking, "How can we help?" And for that, social media offered the ideal platform for good ideas to spread quickly, supplementing and even rivaling efforts

launched by giants like Google and Facebook. A British teacher living in Abiko city, just east of Tokyo, is leading a volunteer team of bloggers, writers and editors producing "Quakebook," a collection of reflections, essays and images of the earthquake that will be sold in the coming days as a digital publication. Proceeds from the project will go to the Japanese Red Cross, said the 40-year-old, who goes by the pseudonym "Our Man in Abiko."

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## Reactors

### German Reactor Operators Weigh Legal Action Against Reactor Shutdown Order

Der Spiegel, 2011-03-31

Chancellor Angela Merkel's announcement came quickly. Just days after the massive earthquake and resulting tsunami crippled several nuclear reactors at the Fukushima facility in northeastern Japan, she announced an immediate, three-month shutdown of Germany's oldest reactors pending strict safety checks. Increasingly, it looks as though the temporary shutdown may become permanent. Several center-right German politicians, including Merkel herself on Monday, have indicated a profound change of heart when it comes to nuclear power. And on Tuesday, her coalition partners in Berlin, the business-friendly (and formerly atomic energy-friendly) Free Democrats (FDP) said they hoped that eight German reactors would be permanently taken offline. But the schedule for such a shutdown may be up to the courts to decide. According to information obtained by SPIEGEL, German energy giants RWE and E.ON are looking into legal measures to block any permanent order.

### Pakistan: Chashma Nuclear Station Sets Up New Equipment Management Division

.... Foreseeing an expanding need for calibration of MTEs in future NPPs, a new set-up was approved to house Calibration and ISI Laboratories. This internal capability at C-1 reduced dependency on external agencies like National Physical Standard Laboratories (NPSL) Islamabad and INSPECTEST Lahore, resulting in continuing savings of expenditure and turn-around time. It is also widely appreciated and utilized by Chinese Installation & Commissioning Company and Qinshan Nuclear Power Corporation also, during the C-2 Project, besides other PAEC Establishments at Chashma. With the arrival of some more calibration facilities like infrared temperature calibration, GPS based time & frequency standard, RTD/TC temperature bath, expected in a couple of months, EQM will be able to calibrate >95% MTEs of C-1/C-2, as well as most of the calibration needs of other PAEC Establishments.

### India: Japanese events prompt design review of nuclear project

Indian Express, 2011-03-30

In the wake of Fukushima Daiichi nuclear plant mishap in Japan, the Nuclear Power Corporation of India Limited (NPCIL) plans to revamp the entire design of its proposed nuclear plant at Mithi Viridi in Bhavnagar on the Saurashtra coastline to make it more resistant to earthquakes and tsunamis. Moves are afoot to make changes in the preliminary design for this 8,000-MW nuclear power plant for which two reactors will be imported from the US, say officials. Given the gigantic scale of Mithi Viridi project - its capacity of 8,000 MW is double the combined total power generation capacity of 11 operational nuclear power plants in the country - NPCIL does not want to leave anything to chance.

### France's Areva to expand Japan nuclear help

Agence France Presse, March 31, 2011

French nuclear group Areva said Thursday it plans to step up its technical assistance to the operator of a Japanese atomic plant crippled by the massive quake and tsunami earlier this month. Tokyo Electric Power Company, which runs the Fukushima Daiichi plant, has asked for more help, and Areva is likely to provide it, according to Remy Autebert, president of Areva Japan. Areva chief executive Anne Lauvergeon arrived in Tokyo on Wednesday with a team of experts for meetings with Japanese officials on how to manage the unprecedented crisis. Autebert said the most pressing current task at the Fukushima plant was to remove contaminated water that has been accumulating after workers pumped in large amounts to keep the reactors from overheating.

### Japan says Fukushima plant to be scrapped

Agence France Presse, March 31, 2011 Thursday

Japan said Thursday its stricken Fukushima Daiichi nuclear plant will have to be scrapped, while pressure also grew for the evacuation zone around the crippled facility to be expanded. Japanese Prime Minister Naoto Kan said the facility at the centre of the worst atomic accident since Chernobyl in 1986 must be decommissioned, Kyodo news reported. Officials have previously hinted the plant would be retired once the situation there is stabilised, given the severe damage it has sustained including likely partial meltdowns and a series of hydrogen blasts.

### South Korea: Nuclear reactor breakdowns cost S. Korea US\$299 million

Yonhap (South Korea), March 28, 2011 Monday

Nuclear reactor breakdowns in South Korea have cost the country 333 billion won (US\$299 million) over the past 10 years, a report by a state-run atomic power company showed Sunday. In the report to the National Assembly, the Korea Hydro & Nuclear Power Co. (KHNP) said there were 89 malfunctions that caused reactors to go off-line temporarily from 2001 onwards. The country currently operates 21 reactors that

generate roughly 36 percent of the country's power output. This makes South Korea the fifth-largest producer of nuclear energy in the world.

### Japan: 'Hot' water removal going slowly; Flooded steam condensers in reactors hamper workers' efforts

The Daily Yomiuri(Tokyo), March 29, 2011 Tuesday

Steam condensers at the Nos. 2 and 3 reactors of the crippled Fukushima No. 1 nuclear power plant are flooded, making it difficult for workers to remove highly radioactive water from inside the turbine buildings, Tokyo Electric Power Co. said Monday. The turbine buildings house equipment indispensable to carrying out full-scale cooling of the troubled reactors. Radioactive water has accumulated at the bottom of the buildings. In the case of the No. 1 reactor, TEPCO could not ascertain when it would be able to completely pump out the water because of a huge quantity of water in the basement of the turbine building. Referring to radiation of more than 1,000 millisieverts per hour that was detected on the surface of the radioactive water at the No. 2 reactor, Chief Cabinet Secretary Yukio Edano said Monday the high level of radiation was caused by water overflowing after coming in contact with nuclear fuel rods that had temporarily melted.

### India: Nuclear Power Corp. to review back-up systems at facilities

Business Line, 2011-03-26

Nuclear Power Corporation (NPCIL) is likely to focus on the reliability of back-up power systems at some of the operational nuclear stations as it looks to reinforce safety measures in the wake of the Japanese nuclear accident. While the results of a safety audit conducted on existing plants are expected in the coming weeks, Government officials indicated that the emphasis is expected to be on strengthening the support infrastructure of the atomic plant that could prove vital in the event of a forced shutdown.

### German Nuclear Plants Not Immune to Safety Risks

Der Spiegel, 2011-03-28

Germany's nuclear power plants suffer from serious safety deficits, with inadequate protections against earthquakes, plane crashes and cyber attacks. Retrofitting the plants would be so complex and costly that their continued operation makes little financial sense.

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## **Regulatory Affairs**

### UK: Statement from HM Chief Inspector of Nuclear Installations on the implications of the Fukushima nuclear accident

HSE: On 12 March 2011, the Secretary of State for Energy and Climate Change, Chris Huhne, requested Mike Weightman, HM Chief Inspector of Nuclear Installations, to produce a report on the implications for the UK nuclear industry of the accident that took place at the Fukushima Dai-ichi nuclear power station in Japan. The purpose of the report is to identify any lessons to be learnt, taking forward this work in co-operation and co-ordination with national stakeholders and international colleagues. The Secretary of State asked for an interim report by the middle of May 2011, with a final report in September. The Secretary of State's request has made clear that Mike Weightman has full independence to determine the scope of the report and the arrangements for conducting it. The Chief Inspector has since indicated that the reports would be: comprehensive and wide in scope; based on firm evidence and facts using the best independent scientific and technical advice available; informed by stakeholders with access to relevant information; and produced in an open and transparent way. The reports will not address nuclear or energy policy issues as these are outside the role and responsibilities of the nuclear regulator.

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## **Safety**

### IAEA to host high-level conference on nuclear safety in June

VIENNA, March 30 (Xinhua) -- Yukiya Amano, director general of the International Atomic Energy Agency (IAEA), announced on Wednesday that he had invited member states to participate in a high-level conference on nuclear safety issues in June. Invitations have been sent to governments of the 151 IAEA members and the conference is scheduled to be held on June 20-24 in Vienna, Amano told the press at the IAEA headquarters. Noting that situation at Japan's Fukushima No.1 nuclear power plant remains very serious, he said it is still early to predict the outcome of the crisis.

### Japan: Fukushima Plant Had Barebones Emergency Plan

WSJ, 2011-03-31

TOKYO—Tokyo Electric Power Co.'s disaster plans greatly underestimated the scope of a potential accident at its Fukushima Daiichi nuclear plant, calling for only one stretcher, one satellite phone and 50 protective suits in case of emergencies. Disaster-response documents for Fukushima Daiichi, examined by The Wall Street Journal, also contain few guidelines for obtaining outside help, providing insight into why Japan struggled to cope with a nuclear crisis after an earthquake and tsunami devastated the facility. The disaster plans, approved by Japanese regulators, offer guidelines for responding to smaller emergencies and outline

in detail how to back up key systems in case of failure. Yet the plans fail to envision the kind of worst-case scenario that befell Japan: damage so extensive that the plant couldn't respond on its own or call for help from nearby plants. There are no references to Tokyo firefighters, Japanese military forces or U.S. equipment, all of which the plant operators eventually relied upon to battle their overheating reactors.

### Bulgarian 'Kozloduy' N-Plant Director Has 'No Concerns' Regarding Stress-Tests

Sofia Focus Online in Bulgarian 1101 GMT 31 Mar 11

[Interview with Kostadin Dimitrov, executive director of the "Kozloduy" Nuclear Power Plant, by Veselina Yordanova; place and date not given: "Kostadin Dimitrov: 'Kozloduy' Nuclear Power Plant Has No Concerns Regarding Stress-Tests"... According to the decisions that have been adopted by the meeting of the Safety Council, the working groups which will begin the immediate work on preparing and conducting the stress-tests will begin by tomorrow. The working groups will comprise expert technocrats, economists, and jurists who will propose as soon as possible changes in the normative regulations related both to the Public Commissions Law and mutual relations with Bulgarian high ranking organizations, perhaps in connection with the Bulgarian Energy Holding, in anything related to the rules of work which have been established. I hope that by 7 April we would have a ready work model.

### China reports military nuclear facilities as safe

China Economic Review - Daily & Industry, March 31, 2011

China's military nuclear facilities are safe, said a senior military officer Thursday in response to security concerns triggered by the Japanese nuclear crisis, China Daily reported. "We thoroughly examined the military nuclear facilities shortly after the nuclear plant accident in Japan," the paper quoted Cai Hualie, senior officer with the People's Liberation Army (PLA) General Staff Headquarters, as saying at a press conference. "Chinese armed forces have always placed great importance on the safety of military nuclear facilities," Cai said. "We have established strict safety protocols and management as well as a professional team of nuclear technicians."

### China Supports IAEA Playing Active Role in Enhancing Cooperation on Nuclear Safety

BEIJING, March 31 (Xinhua) -- China attaches importance to the nuclear safety issue and supports the International Atomic Energy Agency (IAEA) playing an active role in enhancing international cooperation on nuclear safety, a foreign ministry spokesperson said Thursday. "China has noticed the proposal made by IAEA Director General Yukiya Amano to hold a high-level conference on nuclear safety issues," Jiang Yu said at a regular press briefing. China is studying the proposal and will maintain close contact with the IAEA on the issue, Jiang said.

### Kan, Sarkozy Agree To Craft New International Nuclear Safety Standards

Tokyo, March 31 Kyodo -- Japan and France agreed Thursday that the two countries will cooperate in crafting new international nuclear safety standards by the end of this year, following the continuing crisis at the Fukushima Daiichi nuclear power plant triggered by the devastating March 11 earthquake and ensuing tsunami. The agreement was reached during talks in Tokyo between Prime Minister Naoto Kan and French President Nicolas Sarkozy, who became the first foreign leader to visit Japan since the twin natural disasters that obliterated northeastern coastal towns. The two leaders told a joint news conference after their meeting that nuclear issues will top the agenda at the Group of Eight summit in late May, when leaders also from Britain, Canada, Germany, Italy, Russia and the United States will gather in the northwestern French resort city of Deauville. Sarkozy, who is G-8 chair this year, said he will try to release a communique on nuclear safety at the forthcoming summit.

### French nuclear watchdog says new look at safety vital after Japanese accident

Paris, 30 March 2011, AFP: The safety of French nuclear facilities has not yet taken into account the "accumulation" of natural disasters, such as the earthquake and tsunami that struck Japan, the Nuclear Safety Authority (ASN) said on Wednesday [30 March]. "How can a build-up of attacks of this kind be confronted? This is a subject we have not yet reckoned with," admitted ASN President Andre-Claude Lacoste in response to a question about the lessons to be learnt from the accident taking place at the Fukushima power plant. From the evidence, we are going to have to ask ourselves what we can learn from the experience of what happened in Japan," Mr Lacoste went on to say after presenting a report in parliament on the state of nuclear safety and radioprotection in France in 2010. "We have no blithe certainties. Who could, moreover, after what has just happened?" he said, recalling the "permanent stance of the ASN" that "no-one can ever guarantee that there will never be a nuclear accident in France".

### Japan, France call for G20 nuclear regulators meeting

Agence France Presse, March 31, 2011 Thursday

Japan and France pledged Thursday to push for improved international nuclear safety standards as Tokyo struggled to contain an atomic plant disaster caused by a massive earthquake and tsunami. French President Nicolas Sarkozy, the chairman of the Group of Eight and Group of 20, said the forums will take up the issue this year, as Japanese Prime Minister Naoto Kan shares Japan's experience with the rest of the world.

Sarkozy also called for a meeting among nuclear safety agencies from G20 member states. "We call on the independent authorities of G20 members to meet, if possible in Paris, to define an international nuclear safety standard" for power plants, he said in a speech earlier in the day at the French Embassy in Tokyo. "It is absolutely abnormal that these international safety standards do not exist," he said, suggesting the Paris meeting could take place as early as May.

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## Security

### Japan: Truck Runs Into Daini Nuclear Plant

WSJ, 2011-03-31

TOKYO (Dow Jones)--Japan's Nuclear and Industrial Safety Agency said Thursday that a truck had run through the gate of a nuclear power plant in Fukushima prefecture earlier today. The driver has been detained by the police, a spokesman at the agency said at a press conference. The truck, which appeared to belong to right-wing groups, had loudspeakers that would normally be used for political slogans and songs. The agency, known as NISA, said the truck showed up at 0321 GMT in front of the main gate of the quake-damaged Fukushima Daiichi nuclear power plant, demanding entrance to the site. It was turned away. The truck then moved to the Fukushima Daini plant located about 10 kilometer south of the Daiichi plant. It ran through the west gate of the Daini plant at 0408 GMT.

### India: Stuxnet attack fear pushes govt to check IT network

The Economic Times, March 31, 2011 Thursday

NEW DELHI: The government fears a cyber attack on the power transmission lines and air traffic control systems by the new and sophisticated computer program Stuxnet. As a counter measure, the top brass of the country, which includes all chiefs of staff and secretaries of home, telecom, defence, finance and IT, has drafted a plan to thwart any such attack. In a meeting held in the Prime Minister's Office on March 23, minutes of which were reviewed by ET, the country's top brass has made a plan to harden the security around Air Traffic Controllers (ATCs) and PowerGrid. A two-tier team comprising National Technical Research Organisation and ATC officials has been formed. The team would visit all airports shortly to conduct security reviews.

### Letter bomb blast at Swiss nuclear industry group

Agence France Presse, March 31, 2011 Thursday

A letter bomb exploded at the offices of the Swiss nuclear energy association Thursday, injuring two people, police said. The letter exploded at the offices of Swissnuclear in the northern town of Olten, a police spokesman said. Both victims suffered superficial wounds. No-one has claimed responsibility for the attack. Swissnuclear is the nuclear energy offshoot of the Swiss power industry association. It groups major power generating firms in Switzerland, according to the association's website. Swissnuclear was not immediately available for comment.

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Global Nuclear Open Source Information Service (GNOSIS) 2011-03-31

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Security settings or invalid file format do not permit using Plant-specific safety review of German nuclear.pdf (95680 Bytes)

From: EDO Update  
To: Taylor, Renee  
Subject: EDO Update  
Date: Thursday, March 31, 2011 4:29:21 PM

EDO Banner

EDO Banner

## EDO Update

Thursday, March 31, 2011

Once again I would like to keep you informed about a number of significant new developments.

### Continuing Resolution

The current Continuing Resolution passed by Congress will expire next Friday, April 8<sup>th</sup>. As I have mentioned before, we continue to plan for all possible scenarios. Even if there is a lapse in appropriations, we intend to stay open an additional week by using available funds. If it appears that we will face a possible furlough, we will provide you with appropriate information. Please consult the FAQ if you have questions in the meantime:  
<http://portal.nrc.gov/edo/staff/Lists/Announcements/DispForm.aspx?ID=16&Source=http%3A%2F%2Fportal%2Fncrc%2Fgov%2Fedo%2Fstaff%2Fdefault%2F.aspx>. I should mention that even during a furlough, we expect to have sufficient staff to support our activities in response to the events in Japan.

### Congressional Hearings

As you may be aware, the Chairman and other senior NRC leaders have testified before Congress on events in Japan several times in recent weeks. This week alone the House and Senate scheduled four different hearings—some of which you may have watched on C-Span. More hearings are scheduled for next week and beyond. In addition, the Regions have been coordinating briefings, hearings, and plant site visits for Senators, Governors, and other officials. As with the staff in Japan and the Operations (Ops) Centers, these hearings have required people to take on extra duties to get the work done; while others have had to backfill to ensure that our “regular” responsibilities still get met. I appreciate the effort all of you have put in, and I thank you once again for demonstrating our commitment to the NRC Values and an Open, Collaborative Work Environment.

### Monitoring the Situation in Japan

We continue to monitor the developments at the Fukushima-Daiichi site. It is too soon to say when the situation will be sufficiently stable that we can wind down our extra staffing in Japan and the Ops Center. We just sent the 3<sup>rd</sup> wave to Tokyo as others have returned back home to the U.S. Some of the team members have had to endure hundreds of significant aftershocks, food shortages, long work hours, and other difficult working and living conditions. Please make them feel welcome as they return. The Office of Nuclear Reactor Regulation has compiled a collection of Questions and Answers about the events at Fukushima and how they relate to U.S. commercial reactors, which I encourage you to visit here:  
<http://portal.nrc.gov/edo/nrr/dor/japan/Shared%20Documents/Questions%20and%20Answers.aspx>. I will, of course, keep you informed of any significant new developments.

### Review Teams

In response to the Fukushima events, the Commission directed the staff to convene an agency task force of senior leaders and experts to conduct a methodical and systematic review of relevant NRC regulatory requirements, programs, and processes, and their implementation, to recommend whether the agency should make near-term improvements to our regulatory system. The task force, which will report to Deputy Executive Director for Reactor and Preparedness Programs Marty Virgilio, will consist of:

Lead: Charles Miller, FSME  
Senior Managers: Daniel Dorman, NMSS; Jack Grobe, NRR; Gary Holahan, NRO  
Senior Staff: Amy Cabbage, NRO; Nathan Sanfilippo, OEDO  
Administrative Assistant: Cynthia Davidson, OGC

The task force will update the Commission on the near-term review at approximately 30 and 60 days, and provide its observations, findings, and recommendations in the form of a written report and briefing at the completion of the near-term effort occurring at approximately 90 days. Of course, if the task force—or any part of the agency—discovers some urgent action that needs to be taken we will not wait for these deadlines but will act promptly. In addition to this “quick look,” we are also planning a longer, more in-depth examination of what the NRC can learn from the incidents in Japan.

### Review Meeting in Vienna

The Chairman and I will join the NRC team in Vienna, Austria, next week for the triennial review meeting of the Convention on Nuclear Safety. The ongoing events in Japan cast a bright light on the importance of what we do here at the NRC and the role of international cooperation and assistance to ensure global nuclear safety and security. The meeting will include a special session requested by International Atomic Energy Agency (IAEA) Director General Amano with all member states to discuss the current situation and actions that IAEA has planned in response. Thanks again to all who contributed to helping prepare our team for the review meeting. I look forward to sharing insights from the meeting with you upon our return.

NNNN/84

Bill Borchardt, EDO

**From:** McGinty, Tim  
**To:** Nelson, Robert; Howe, Allen; Westreich, Barry; Brown, Frederick; Check, Michael; Hiland, Patrick; Thomas, Eric; Skeen, David; Burnell, Scott; Williamson, Edward; Gitter, Joseph; Evans, Michele  
**Cc:** Boger, Bruce; McDermott, Brian; Leeds, Eric; Blount, Tom; Quay, Theodore; Bowman, Eric; Rosenberg, Stacey  
**Subject:** FYI: Plans to Draft and Issue an NRC Information Notice on the Japanese Earthquake/Tsunami Effects on Japanese Power Plants  
**Date:** Thursday, March 17, 2011 11:17:07 AM

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This is an FYI:

DPR staff (Eric Bowman, lead) is developing an Information Notice on the above Subject for near-term issuance.

I anticipate that it will go into concurrence today, and we will ask concurrence of DIRS, DE, and NSIR.

Upon having the necessary comments and concurrences (by noon tomorrow), we plan to share the draft for "awareness" to ensure full coordination prior to issuance. For awareness, we anticipate sharing with the DRA's, DORL, OPA, OGC and the Executive Team in the Operations Center. Our goal is to be in a position to issue the Information Notice early next week.

We are open to suggestions on this plan, so please don't hesitate. If you want to identify a primary contact for us to work with, in your organization, please respond to Eric Bowman, Stacey Rosenberg or myself.

Thanks in Advance for your Support, Tim

NNNN/BS

**From:** [NRC Announcement](#)  
**To:** [NRC Announcement](#)  
**Subject:** Daily: 5 New Items from Thursday, March 31, 2011  
**Date:** Thursday, March 31, 2011 10:01:13 PM

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NRC Daily Announcements



Highlighted Information and Messages



**Thursday March 31, 2011 -- Headquarters Edition**

**[General Interest: Authorization for Special Solicitation for Victims of the Japanese Earthquake and Tsunami](#)**

**[General Interest: Window Cleaning in the One White Flint North and Two White Flint North Buildings](#)**

**[Employee Resources: Eligible Leave Share list](#)**

**[Employee Resources: Solicitation of Interest - Region III, Senior Resident Inspector, GG-14](#)**

**[Staff Changes: Senior Management Selections in Region IV, RES, and NRO](#)**

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**General Interest: Authorization for Special Solicitation for Victims of the Japanese Earthquake and Tsunami**

**On Friday, March 11, 2011, an 8.9 magnitude earthquake and resulting tsunami devastated parts of northern Japan. Over 10,000 people have lost their lives, and millions of people have been affected by the disaster. We all are deeply saddened by this tragedy.**

As our thoughts and prayers went to the people of Japan and to the many Japanese-Americans whose families and loved ones were affected by this disaster, individual Feds throughout the government asked what they could do. In response to those requests, the U.S. Office of Personnel Management has authorized a special solicitation outside the Combined Federal Campaign to make it easier for NRC workers to give to the organizations that are responding to the relief effort. NRC employees are authorized to engage in fundraising activities, such as collection of office donations or bake sales, if they so desire. For a list of frequently asked questions to help you with this special solicitation, please visit the [Website](#).

The U.S. Agency for International Development (USAID) advises that the fastest, most direct way to process special solicitation contributions is in the form of cash and check payable to the recipient charity. Monetary donations are the most effective form of assistance because they allow humanitarian organizations to purchase (often within the affected region itself) the exact type and quantity of items needed for those affected by the crisis. USAID has provided a list of [relief organizations](#) and [further information](#) on its Website. If you decide to raise funds at work to support the relief effort, we strongly encourage you to select from among the organizations on the USAID website. If you have questions, please contact the NRC-HQ CFC Campaign Manager, [Reinaldo Picon-Colon](#).

All special solicitation activities must conclude by July 31, 2011.

NNNN/86

Miriam L. Cohen, Director  
Office of Human Resources



(2011-03-31 00:00:00.0)

[View item in a new window](#)

### **General Interest: Window Cleaning in the One White Flint North and Two White Flint North Buildings**

Beginning Monday, April 11, through Friday, April 15, 2011, the interior and exterior windows of the One White Flint North and Two White Flint North buildings will be cleaned. Please remove all items away from the windows to provide easy access for the cleaners during this period.

The Office of Administration appreciates your cooperation during this project.

Contact: [Harry Cepura](#), 301-415-7830.



(2011-03-31 00:00:00.0)

[View item in a new window](#)

### **Employee Resources: Eligible Leave Share list**

The Office of Human Resources Web page for Eligible Leave Transfer Program Recipients has been updated to add the following eligible recipients:

Jennie Morrison, Region IV

For more information on the Voluntary Leave Transfer Program and to view the current list of eligible recipients who have exhausted all of their available leave due to personal or family illness, visit the [Eligible Recipient List Web page](#). The Web site also provides the following information about the Leave Transfer Program: Overview, Donor Information, the Application to Become a Leave Recipient, and Time & Labor Reporting Guidance.

Contact: [Terri Barnes](#) (phone 301-415-2805)



(2011-03-31 00:00:00.0)

[View item in a new window](#)

### **Employee Resources: Solicitation of Interest - Region III, Senior Resident Inspector, GG-14**

The **Division Reactor Projects in Region III** is soliciting interest for permanent reassignment to the **Senior Resident Inspector** position at the Palisades Resident Office in Covert, Michigan, **GG-0840-14**.

Detailed information is available on the [NRC internal Web page](#).

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If you have difficulty accessing a Web link in this announcement, contact the [NRC Announcement Coordinator](#), Beverly Martin, ADM/DAS, 301-492-3674.



(2011-03-31 00:00:00.0)

[View item in a new window](#)

## **Staff Changes: Senior Management Selections in Region IV, RES, and NRO**

Yellow Announcement No. 039, "Senior Management Selections in Region IV, the Office of Nuclear Regulatory Research, and the Office of New Reactors," is now available on the [internal Web site](#) under Yellow Announcements.

The following selections are announced:

Thomas B. Blount, Deputy Director, Division of Reactor Safety, Region IV  
Michael L. Scott, Deputy Director, Division of Systems Analysis, Office of Nuclear Regulatory Research  
Mohammed A. Shuaibi, Deputy Director, Division of Engineering, Office of New Reactors

This announcement can also be found in the ADAMS 2011 Yellow Announcements folder in the Main Library of the ADAMS Document Manager. In the folder, Yellow Announcements are arranged in report number order.

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If you have difficulty accessing a Web link in this announcement, contact the [NRC Announcement Coordinator](#), Beverly Martin, ADM/DAS, 301-492-3674.



(2011-03-31 00:00:00.0)

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**[The latest Announcements are always on the NRC@WORK Home Page.](#)**

**[Announcements by Date](#) | [Announcements by Category](#)**

**[Search Announcements:](#)**

**[Frequently Asked Questions About the NRC Daily Announcements Email](#)**

**From:** Johnson, Michael  
**To:** Hayden, Elizabeth; Weber, Michael; Batkin, Joshua  
**Cc:** Loyd, Susan; McIntyre, David; Brenner, Eliot; Harrington, Holly; Couret, Ivonne; Janbergs, Holly; Burnell, Scott; Virgilio, Martin; Casto, Chuck; Collins, Elmo  
**Subject:** RE: RESPONSE - Quick statement on RST 3/26 assessment report  
**Date:** Wednesday, April 06, 2011 10:03:31 AM

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Is it worth noting that we shared our insights with the Japanese regulator and utility.

---

**From:** Hayden, Elizabeth  
**Sent:** Wednesday, April 06, 2011 9:59 AM  
**To:** Weber, Michael; Batkin, Joshua  
**Cc:** Loyd, Susan; McIntyre, David; Brenner, Eliot; Harrington, Holly; Couret, Ivonne; Janbergs, Holly; Burnell, Scott; Virgilio, Martin; Casto, Chuck; Collins, Elmo; Johnson, Michael  
**Subject:** RE: RESPONSE - Quick statement on RST 3/26 assessment report

Thanks. See suggested blue text in your clean version.

*Beth Hayden*  
*Senior Advisor*  
*Office of Public Affairs*  
*U.S. Nuclear Regulatory Commission*  
*--- Protecting People and the Environment*  
*301-415-8202*  
*elizabeth.hayden@nrc.gov*

---

**From:** Weber, Michael  
**Sent:** Wednesday, April 06, 2011 9:54 AM  
**To:** Batkin, Joshua; Hayden, Elizabeth  
**Cc:** Loyd, Susan; McIntyre, David; Brenner, Eliot; Harrington, Holly; Couret, Ivonne; Janbergs, Holly; Burnell, Scott; Virgilio, Martin; Casto, Chuck; Collins, Elmo; Johnson, Michael  
**Subject:** RESPONSE - Quick statement on RST 3/26 assessment report

I would suggest we use something like the following, which I modified from OPA's draft below:

The March 26 document represented an interim snapshot of what NRC staff and other experts ~~considered proposed~~ as possible conditions inside the damaged units at Fukushima-Daiichi. ~~Based on these conditions, This snapshot changed over the next few days as additional information and analysis became available. The the NRC staff's~~ recommendations are considered prudent measures; they are not offered as the only possible solutions. ~~We understand that the Japanese operator and regulator of the plants is pursuing an alternative set of strategies to control the plants and ensure the safety of the people working at the plants and living nearby. We are working with our counterparts to consider these strategies and explore additional steps that could enhance safety.~~ Conditions at the site have improved even further since the assessment was completed, so it is inappropriate to treat the March 26 document as the current understanding of the situation.

Clean text reads:

The March 26 document represented an interim snapshot of what NRC staff and other

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experts considered as possible conditions inside the damaged units at Fukushima-Daiichi. The document does not reflect our understanding of the current situation. Based on these conditions, the NRC staff's recommendations are considered prudent measures; they are not offered as the only possible solutions. We understand that the Japanese operator and regulator of the plants is pursuing an alternative set of strategies to control the plants and ensure the safety of the people working at the plants and living nearby. We are working with our counterparts to consider these strategies and explore additional steps that could enhance safety.

---

**From:** Batkin, Joshua  
**Sent:** Wednesday, April 06, 2011 9:29 AM  
**To:** Hayden, Elizabeth; Virgilio, Martin; Weber, Michael  
**Cc:** Loyd, Susan; McIntyre, David; Brenner, Eliot; Harrington, Holly; Couret, Ivonne; Janbergs, Holly; Burnell, Scott  
**Subject:** Re: Quick statement on RST 3/26 assessment report

Mike/Marty, is that overly optimistic sounding or is it OK?

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

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**From:** Hayden, Elizabeth  
**To:** Batkin, Joshua; Virgilio, Martin; Weber, Michael  
**Cc:** Loyd, Susan; McIntyre, David; Brenner, Eliot; Harrington, Holly; Couret, Ivonne; Janbergs, Holly; Burnell, Scott  
**Sent:** Wed Apr 06 09:23:21 2011  
**Subject:** FW: Quick statement on RST 3/26 assessment report

This is what we plan to say with regard to the NYT story this morning. It is OK with the ET in the Ops Center. We have a slew of reporters asking for the report and as far as I know, it is releasable under a FOIA request.

*Beth Hayden*

**From:** Burnell, Scott

The March 26 document represented an interim snapshot of what NRC staff and other experts proposed as possible conditions inside the damaged units at Fukushima. This snapshot changed over the next few days as additional information and analysis became available. The staff's recommendations are considered prudent measures; they are not offered as the only possible solutions. Conditions at the site have improved even further since the assessment was completed, so it is inappropriate to treat the March 26 document as the current understanding of the situation.

**From:** [Batkin, Joshua](#)  
**To:** [Harrington, Holly](#)  
**Cc:** [Brenner, Eliot](#); [McIntyre, David](#)  
**Subject:** RE: Question about the 50-mile recommendation  
**Date:** Friday, April 08, 2011 11:16:03 AM

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That statement doesn't mean that 50-miles is wrong. It was a prudent precaution based on what could happen, not a decision based on waiting until we had harmful dose levels. Don't think there's a lot of space between us there.

---

**From:** Harrington, Holly  
**Sent:** Friday, April 08, 2011 11:04 AM  
**To:** Batkin, Joshua  
**Subject:** RE: Question about the 50-mile recommendation

See slide 6

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**From:** Batkin, Joshua  
**Sent:** Friday, April 08, 2011 11:02 AM  
**To:** Harrington, Holly  
**Cc:** Brenner, Eliot; McIntyre, David  
**Subject:** RE: Question about the 50-mile recommendation

Who at doe said what?

---

**From:** Harrington, Holly  
**Sent:** Friday, April 08, 2011 11:01 AM  
**To:** Batkin, Joshua  
**Cc:** Brenner, Eliot; McIntyre, David  
**Subject:** Question about the 50-mile recommendation

We're continuing to receive questions related to our 50-mile recommendation, particularly in light of a DOE statement that it's no longer necessary. Below is our response, coordinated with the PMT folks. Eliot wants your OK.

Q. Will NRC be relaxing its Protective Action Recommendation based on the information provided to the public by the Department of Energy that says the radiation levels beyond 25 miles are decreasing and do not support evacuation or relocation?

A. The NRC, in conjunction with other federal agencies, is reviewing current information on environmental conditions as part of its ongoing assessment related to the protective action recommendation for US citizens in Japan. Protective action recommendations are based on many factors, including the progression of plant safety system degradation, the actual or projected occurrence of significant releases of radiological material, and the time necessary to provide notice and implementation of protective actions. The NRC provided recommendations on March 16 based on the deteriorating conditions at Fukushima Daiichi Nuclear Power Plant at the time and a need to provide advance actions in the face of considerable uncertainty about the outcome of events.

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Considerable data collection by Japan government organizations and US government support organizations, including radiological monitoring results in the NISA and the US Department of Energy report that you reference, are being evaluated to determine an appropriate and reasonable timeframe for relaxing the existing protective action recommendations. Comparison to US protective action guidelines regarding radioactive material exposure are ongoing to make sure that returning populations will not exceed those guidelines. Once the NRC and other US government agencies have reasonable assurance that plant conditions will continue to improve and radiological exposure information is thoroughly analyzed, relaxation of the US recommendations will be considered for the area around the Fukushima Daiichi Nuclear Power Plant.

**From:** Mitlyng, Viktoria  
**To:** Harrington, Holly; Brenner, Eliot; Burnell, Scott; Couret, Ivonne; Hayden, Elizabeth; McIntyre, David; Chandrathil, Prema; Dricks, Victor; Hannah, Roger; Ledford, Joey; Screnci, Diane; Sheehan, Neil; Uselding, Lara  
**Cc:** Janbergs, Holly  
**Subject:** Re: Bethany's Quick Review of Testimony  
**Date:** Wednesday, March 16, 2011 9:55:45 PM

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Thank you for providing us with this summary. It's very useful since most of us couldn't take the time to watch the testimony today.  
(Sent from my Blackberry)

---

**From:** Harrington, Holly  
**To:** Brenner, Eliot; Burnell, Scott; Couret, Ivonne; Hayden, Elizabeth; McIntyre, David; Chandrathil, Prema; Dricks, Victor; Hannah, Roger; Ledford, Joey; Mitlyng, Viktoria; Screnci, Diane; Sheehan, Neil; Uselding, Lara  
**Cc:** Janbergs, Holly  
**Sent:** Wed Mar 16 18:57:58 2011  
**Subject:** Bethany's Quick Review of Testimony

Bethany spent most of the day watching the testimony today. I understand we'll be getting full transcript soon (not sure by what process), but I asked Bethany to compile what appeared to be the major questions/comments posed to the Chairman:

Sen. Boxer: You're doing nothing new. Other countries are responding to the situation, but I don't see anything proactive being done in the U.S. I have two plants in California that were built based on 1970s assumptions. It's 2011. I know there's at least one new report on seismic activity we haven't seen action on. My fellow senator and I want to see more leadership from the NRC than we've gotten.

Reps. Whitfield/Markey/Doyle: Have you had an opportunity to review John Ma's concerns on the AP1000 design? What was the process that took place following his objections?

Rep. Shimkus: I don't believe your actions on Yucca Mountain were consistent with your legal authority. Federal position by law is that Yucca should be open, and there is no legal authority to close the repository. The only decision that's been rendered is that of the administration to pull funding. I hope you're well-prepared to have a further debate on the legal authority of the NRC in this regard.

Rep. Markey: Does the NRC recommend use of KI in emergency situations in the United States? It should be your position to recommend it, as State and local government officials don't have the expertise to do so.

Rep. Markey: We need to re-examine the idea of "maximum credible earthquake."

Rep. Dingell: You have an unholy mess on your hands with the Yucca Mountain situation. Are there any long-term plans to handle the repository matter anywhere in the government?

Reps. Rush/Cassidy/Dingell: Do our plants' safety standards adequately address the types

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of problems we've seen in Japan, where there were multiple cascading events?

Reps. Cassidy: Do our plants' safety standards adequately address the problems that can occur with loss of site power?

**From:** Stuckle, Elizabeth  
**To:** Stuckle, Elizabeth; Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; McIntyre, David; Burnell, Scott; Couret, Ivonne  
**Subject:** RE: Updated list of inaccuracies and concerning verbiage  
**Date:** Friday, April 15, 2011 2:38:06 PM  
**Attachments:** Thematic Concerns Repeatedly Expressed after Japanese Nuclear Incident.doc

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I have marked where the new list ends and the old list begins on this copy

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**From:** Stuckle, Elizabeth  
**Sent:** Friday, April 15, 2011 2:17 PM  
**To:** Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; McIntyre, David; Burnell, Scott; Couret, Ivonne  
**Subject:** Updated list of inaccuracies and concerning verbiage

Attached is the latest version of my log of inaccuracies and concerning verbiage. Covers 13 days (through today).

Elizabeth M. Stuckle  
Office of Public Affairs  
U.S. Nuclear Regulatory Commission  
301-415-2169  
elizabeth.stuckle@nrc.gov

NNNN/90

## **Thematic Concerns Repeatedly Expressed after Japanese Nuclear Incident**

1. How can you guarantee that it's not going to happen here?
2. The NRC should do more to protect the public
3. Safety of spent fuel pools versus dry cask storage
4. Re-examination of evacuation zones (EPZs) – are they adequate. Many recommend expanding the EPZs.
5. Re-examination of whether there's sufficient backup power to reactors and to spent fuel pools
6. Fuel pools should be constructed with more safeguards and protection like reactors are.
7. Should there be a moratorium on the construction of new nuclear power plants?
8. Re-examination of what is the safety threshold for radiation amounts. Major fear and misunderstanding of radiation.
9. NRC is in bed with the industry since licensees pay fees to the NRC. They are more concerned about profit than safety.
10. How adequate are the backup plans to keep reactor cooling systems running if power is knocked out? Battery length is way too short, etc.

## **Inaccuracies and/or Concerning Verbiage from 3/30 through 4/15 clips (13 days)**

### **California Lawmakers Press NRC to Halt Relicensing Work Pending Seismic Studies (AP 4/15)**

*Sen. Sam Blakeslee, whose district includes Diablo Canyon, says the commission sees earthquake risk through rose-colored glasses.*

### **(KEYT-TV Santa Barbara, 4/14)**

*California State Senator Same Blakeslee said that the NRC sees earthquake risk through rose colored glasses.*

### **NRC Said To Be Too Close To Nuclear Industry (ProPublica 4/14)**

*Examining the 2002 incident at Davis-Besse station, when NRC regulators agreed to delay an emergency order to shut down for inspection, only to later find a football-sized hole in the reactor vessel's steel side, ProPublica (4/14, Sullivan) reports that according to an NRC inspector general's report, senior officials at the agency held off in part because they did not want to hurt the plant's bottom line. NRC critics say the problems at Davis Besse, are prime examples of the agency's deference to industry.*

**Gundersen Discusses Fukushima Plant Crisis (Huntington News Network 4/14)**  
**Arnie Gunderson, Fairwinds Associate**

*Gunderson also tells how governments limit public access to radiation dose data*

**Lochbaum Faults Spent Fuel Storage Management (Palm Beach Post 4/13)**

David Lochbaum, Union of Concerned Scientists

*...spent fuel pools are among the most vulnerable spots at a nuclear plant, housed as they are in structures that aren't as strong as reactors containment buildings. It would be hard to manage this hazard (more) foolishly. The federal government's ineptitude in disposing of spent fuel has left Americans across the country exposed to elevated and undue risks,' Lochbaum said.*

**Critics Fault Rule for 10-Mile Evacuation Zone (Cape Cod Times, 4/14)**

Mary Lampert, Pilgrim Watch

*... says the zones (10-mile EPZ) are arbitrary.*

**Asbury Park Press Calls For New Tritium Release Penalties (Asbury Park NJ Press, 4/13)**

*When it comes to the release of carcinogenic tritium, the Nuclear Regulatory Commission clearly has failed in its role to ensure the safety of a public at the mercy of nuclear power plants, an Asbury Park Press investigation published Sunday found. The Press says that current regulations don't provide for penalties for tritiated water releases at nuclear plants, which are threatening water supplies in New Jersey and other states.*

**Jaczko Defends Monitoring Mode Authority (Forbes "Ingenuity of the Commons blog, 4/13)**

Senator James Inhofe (R-Okla)

*Sen. James Inhofe (R-Okla.) accused NRC Chairman Gregory Jaczko of "invoking emergency powers without cause and taking authority away from other members of the NRC." Inhofe said "Jaczko has evoked emergency authority and transferred commission functions to himself in the wake of the earthquake in Japan." Inhofe called for transparency and suggested Jaczko may have overstepped his authority. Jaczko said the "NRC went into „monitoring mode “ on March 11," allowing it to "deploy a 24-hour assistance team to Japan. ... „That ’ s an authority the chairman has. “*

**(E&E News, 4/14)**

*Sen. Inhofe said NRC Chairman Jaczko “used emergency authority and transferred commission functions to himself in the wake of the Japanese events and failed to inform the committee,” and said the “law confers emergency authority on the chairman in the wake of an emergency at a particular facility or materials regulated by NRC. But Inhofe said at present he is not aware that an emergency condition exists at any US facility. “ Jaczko said he has been “acting within his current authority, and NRC officials said Inhofe had sent a letter to the agency earlier expressing his concerns, although that letter has not yet been made public.”*

### **Spent Fuel Storage Problems Spread Concerns About Nuclear Power (McClatchy 4/13)**

David Lochbaum, Union of Concerned Scientists

*“The irrefutable bottom line is that we have utterly failed to properly manage the risk from irradiated fuel stored at our nation ’ s nuclear power plants.”*

### **NRC Criticized For Reaffirming 10-Mile Evacuation Zone (Middletown NY Times Herald-Record, 4/10)**

*NRC critics “have long claimed that it sees itself as a part of the nuclear industry, not as the buffer between the interests of that industry and the safety of the nation. At a time when people are skeptical with good reason . . . the NRC has become the boy who won’t cry wolf even if the wolf is in the room.”*

### **NRC Oversight Faulted As “Weak” And “Complacent” (Stamford CT Advocate 4/9)**

New England Center for Investigative Reporting

*“Internal government watchdogs and outside experts alike say the US Nuclear Regulatory Commission is too lenient on the industry it is charged with regulating, often making decisions based on the industry’s profit margins rather than public safety. The article likens the charges to those made about the Mine Health Safety Administration and the Minerals Management Service after disasters last year at the Upper Big Branch Mine and the Deepwater Horizon spill, and while the nuclear industry maintains the NRC is a tough regulator that asks tough questions, critics counter that the agency might ask tough questions, but is all too willing to accept easy answers.*

### **WCVB-TV Boston 4/10**

**David Lochbaum, Union of Concerned Scientists**

*Concerns that the Nuclear Regulatory Commission is weak are nothing new, according to former nuclear engineer, David Lochbaum. In the wake of the Fukushima plant crisis questions about safety concerns are increasing. Lochbaum said, “The NRC is complacent . . .”*

**Group Says NRC May Not Have Learned From Davis Besse Experience (WPTZ-TV Burlington VT. 4/11)**

Hearst Connecticut / New England Center for Investigative Reporting

*. .the NRC allowed First Energy to keep the Davis Besse plant operating for 45 days beyond a required inspection date, during which time workers found a pineapple-sized cavity in the reactor's vessel head caused by leaking boric acid. Shay Totten, a reporter from the station working with the broader investigative journalism team, terms that fairly shocking and says the Hearst Media/NECIR report also raises questions about whether or not the regulatory agency built on the Ohio experience.*

**UCS Suspects NRC Skewed SOARCA Results (Union of Concerned Scientists "All Things Nuclear" blog, 4/9)**

Ed Lyman

*UCS has long been concerned that the NRC imposed constraints on the SOARCA program that would significantly skew its results to ensure an outcome suggesting the public has little to fear from severe nuclear plant accidents. In 2006, UCS requested that the NRC publicly release its guidelines for the program, the constraints it imposed on it, and the assumptions underlying the program's assessment of accident scenarios, but the NRC refused to release that information, despite the fact that the NRC plans to make SOARCA's results public and, earlier in 2006, NRC Commissioner Gregory Jaczko—now the agency's chairman—called for the agency to release the material UCS requested.*

**Tritium Leaks Said To Be Increasing At Plants (Asbury Park NJ Press, 4/10)**

Asbury Park Press

*Millions of gallons of radioactive water have leaked from nuclear power plants throughout the US since the 1970s, threatening water supplies in New Jersey and other states, an Asbury Park Press investigation found. Even though some of the massive leaks have polluted groundwater, the NRC has never fined a violator even plant operators that repeatedly leaked tritium, of which there was an average of one per year in the 1990s. That average increased to five leaks or spills reported in 2010, five in 2009 and three in 2008, according to an NRC document.*

**Fears Over Spent Nuclear Fuel Increasing (Chattanooga TN Times Free Press, 4/11)**

David Lochbaum, Union of Concerned Scientists

*David Lochbaum, who once worked at TVA's Browns Ferry Nuclear Plant and for the Nuclear Regulatory Commission (NRC), noted that the spent fuel pools at the TVA plants and around the country are not cooled by an array of highly reliable emergency systems that can be powered from the grid, diesel generators or batteries.*

- - - - - **End of new list** - - - - -

## **Potassium Iodide Tablets Distributed In Delaware (Wilmington DE News Journal 4/7)**

*..in a report released Wednesday, the Union of Concerned Scientists cited Nuclear Regulatory Commission documents that they believe show NRC analysts' concern about the reliability of a study of reactor accident consequences.// In that study, some NRC analysts questioned the ability of some American reactors to avert severe damage under scenarios that involve problems seen in Japan.*

## **Lawmakers Say NRC Study Points To Vulnerabilities At US Plants (AFP 4/8)**

Congresswoman Diana DeGette

*..a study conducted last year by the Nuclear Regulatory Committee (NRC) raised grave questions about US preparedness to address reactor accidents.'// DeGette cited an NRC study which examined what would happen at Peach Bottom Station in Pennsylvania, and a number of other plants, in the event that the reactors lost both [main] power and back-up generators after an extreme event such as a quake, flood or fire. AFP says the Peach Bottom reactor came —perilously close to meltdown in the simulations.*

## **Time's "Swampland" blog (4/8)**

Henry Waxman (D-CA)

*Committee Ranking Member Henry Waxman (D-Calif.) said yesterday. That result raises questions about whether our reactors may be as vulnerable as those in Fukushima,' he said. The Peach Bottom plant came within one hour of core damage in a severe loss-of-power scenario,'*

## **"All things Nuclear" Blog (4/7)**

Ed Lyman, Union of Concerned Scientists

*..contrary to its assertions that —US nuclear plants are better prepared to withstand a catastrophic event like the March 11 earthquake and tsunami than Japanese plants, according to internal NRC documents, —there is no consensus within the NRC that US plants are sufficiently protected. The documents indicate that technical staff members doubt the effectiveness of key safety measures adopted after the September 11, 2001, terrorist attacks.*

## **Group Wants NRC to Reconsider Approval Of AP1000 Design (WUNC-Radio 4/7)**

John Runkle, AP1000 Oversight Group

*The group argues that the AP-1000 reactor design is flawed and should not be used at Shearon-Harris and other sites. Attorney John Runkle says the group is troubled that the NRC seems poised on approving reactor designs that have not been fully reviewed nor fully resolved.*

## **Op-Ed: Former Senator: Dry Storage Safest Option For Nuclear Waste (Reno News and Review 4/7)**

Former Senator: Dry Storage Safest Option For Nuclear Waste

*"Unlike a repository-at Yucca Mountain or elsewhere-dry storage can be done immediately, as opposed to waiting decades before a disposal or storage location could be ready." Bryan argues that this hasn't already been done.*

## **NRC Focused On VY Safety, Not Shutdown (Bratboro Reformer VT 4/6)**

Robert Bady, Vermont coordinator of the Safe and Green Campaign

*Bady said the problem is financial, however. "The NRC tries to maintain the safety of the nuclear reactor while also maintaining the profitability of the nuclear industry," Bady said. "The profitability shouldn't be the NRC's concern. If the NRC put safety before profit, they wouldn't allow a spent fuel pool to be stored seven feet above ground."*

*He added that through activism, he hopes to effect a change in the NRC that safety be on equal footing of profits. "The NRC is not focusing on the decommissioning of the plant at this time but rather on its continued safe operation," Neil Sheehan, spokesman for NRC said.*

## **NRC: Japanese Crisis Doesn't Support Pulling Oyster Creek's License. (AP 4/6))**

Jeff Tittel, director of the New Jersey Sierra Club

*"The New Jersey Sierra Club says the NRC has not learned anything from the Japanese disaster," and the group's director, Jeff Tittel, called the NRC "a cheerleader for industry" that "looks the other way when it comes to relicensing."*

## **Concerns Expressed Over NRC Allowing Plants To Increase Output. KVNO-FM Omaha 4/4**

*Some groups like the Advisory Committee on Reactor Safeguards have voiced concerns at the ease in which the NRC grants permission to increase power. Questions have also been raised about financial motives possibly outweighing safety factors. But Mitleyng said modifications are put into place at the plants in order to accommodate the power increase in several forms.*

## **Professor Calls For End of Nuclear Power. (The Independent 4/5)**

Chris Williams, professor at Pace University

*...23 of the 104 operational nuclear reactors in the US "are built on the same 1960s design by the same company, General Electric, as the reactors at Fukushima," they "have been recognized to have serious design faults," and "design vulnerabilities...are routinely discovered." Furthermore, many nuclear plants are "on geologically active faults, in coastal locations or close to large sources of fresh water." Finally, Williams argues that nuclear power requires subsidies to be economically practical. Williams argues the reason for nuclear power is to be a justification for researching "the power to destroy life on a planetary scale" and producing plutonium for bombs. He calls for pressuring the government to not new nuclear plants or relicense old ones.*

## **Nuclear Power Said To Not Make Economic Sense (Forbes 4/5)**

Cato Institute senior fellows Jerry Taylor and Peter Van Doren

*. .the current "relatively unshaken" political faith in nuclear power is "unfortunate," as "nuclear power makes no sense from an economic perspective." The electricity produces "is not even remotely competitive in power markets with gas-fired or coal-fired electricity now or in the foreseeable future." Furthermore, there is a high risk of cost overruns. The authors argue, "The political campaign to ram these plants down the market's throat threatens catastrophic harm to both taxpayers and ratepayers."*

## **"Common Ground "program (KCRA-TV Sacramento 4/2)**

Rochelle Becker of the Alliance for Nuclear Responsibility

*calls the Japanese disaster "a huge game changer for California's nuclear industry," and the segment adds that "critics of the other nuclear industry say that Diablo Canyon and the state's other twin reactors San Onofre in San Diego County are just as vulnerable to earthquakes and tsunami damage as the plants in Japan."*

## **Some Fear 10-Mile Evacuation Zone Plans Do Not Reflect Real-World Risks (Miami Herald 4/3)**

*Activists and some political leaders say the NRC's evacuation plans "don't reflect real-world risks"*

## **WCBS-TV (New York 4/2)**

Tom Syracuse, noted protester

*"The Indian Point Power Plant is located near the intersection of two earthquake faults. Nuclear energy cannot be safe. Plutonium can contaminate the environment for hundreds of years. Studies show that New York City could not be evacuated in time."*

## **Indian Point Plant Called Too Dangerous To Continue Operating (Westchester NY 4/2)**

Gary Shaw, Indian Point Safe Energy Coalition

*. .asserts mistakenly that "Indian Point 3 has just been named by the US Nuclear Regulatory Commission as the nuclear reactor in the US that is most likely to suffer reactor core damage due to an earthquake and the stated odds of that happening in any given year are higher than the odds of winning \$100 in the Powerball lottery." Shaw says he is not saying a "catastrophic event will definitely occur," but that one could happen, and "if the worst case happens, the consequences are simply too awful to imagine."*

## **Pasadena CA Weekly (4/1)**

Grula, PhD, Southern California Federation of Scientists

*"The unfolding nuclear disaster in Japan should put an end, once and for all, to recent calls for a nuclear power 'renaissance' in the US." The crisis instead demonstrates that "nuclear power should be phased out completely." Grula added that it will take "many years" to determine how many deaths and cancers will be caused by radiation releases from the apparent Fukushima plant meltdowns, but the casualties may "eventually exceed those caused by the 1986 nuclear accident at the Chernobyl plant in Ukraine." Grula closes by saying that further development of nuclear power should to be "stopped in its tracks."*

## **The Connecticut Post (4/1)**

*"...should something cause water to drain from a cooling pool, well, one doomsday scenario has a fire at the Millstone Nuclear Power Station in Waterford causing 29,000 square miles of land to become uninhabitable.."*

## **WVUE-TV (New Orleans, 3/31)**

*the NRC "issued a report to Congress today suggesting it has concerns with" the natural disaster preparedness of "only three plants in the US." WVUE-TV adds that, according to the NRC, "those plants are in South Carolina, Kansas and Nebraska. NRC workers say the plants are operating safely but they want to conduct a more intense study of them."*

## **Lawmakers, Medical Groups Support Expanding KI Distribution Radius (AP, 3/31)**

The American Thyroid Association

*...the "American Thyroid Association, whose mission is to promote thyroid health, wants to go further - urging that potassium iodide be made available within 200 miles of a nuclear plant."*

## **Columnist Dismisses Claims That Nuclear Power Is Safer Than Coal (Bluefield WV Daily Telegraph, 3/31)**

Charles Owen, columnist

*"given all of the distressing headlines coming out of Japan over the past two weeks, it seemed a little odd for someone to be saying that nuclear energy was 'safer' than coal - go green movement or not." Mentioning the possible contamination of radiation from one of the plants in Japan, Owens says, "I guess the point I'm trying to make is that coal isn't radioactive. It doesn't have the potential to sicken or kill thousands - if not millions,*

**KFOX-TV El Paso TX (3/29)**

*"separate report out today by a consumer interest group found several u-s nuclear power plants had close calls similar to the Japanese crisis - in the past 20 years.*

**NRDC Wants Obama To Order An "Independent" Investigation Of Nuclear Safety (Huffington Post, 3/29)**

Frances Beinecke, Natural Resources Defense Council president

*Beinecke adds that an "autonomous investigation, similar to the Kemeny Commission" should be conducted. Such a review would be "especially challenging for the NRC, which has long been viewed as a weak regulator with insufficient separation from the industry it oversees."*

**From:** [Harrington, Holly](#)  
**To:** [Stuckle, Elizabeth](#); [Brenner, Eliot](#); [Hayden, Elizabeth](#); [McIntyre, David](#); [Burnell, Scott](#); [Courret, Ivonne](#)  
**Subject:** RE: Updated list of inaccuracies and concerning verbiage  
**Date:** Friday, April 15, 2011 2:34:01 PM

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It would help me if I knew which ones on this list were new/different than the last list . . . without me trying to find the previous list! Can you mark them in some way?

---

**From:** Stuckle, Elizabeth  
**Sent:** Friday, April 15, 2011 2:17 PM  
**To:** Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; McIntyre, David; Burnell, Scott; Courret, Ivonne  
**Subject:** Updated list of inaccuracies and concerning verbiage

Attached is the latest version of my log of inaccuracies and concerning verbiage. Covers 13 days (through today).

Elizabeth M. Stuckle  
Office of Public Affairs  
U.S. Nuclear Regulatory Commission  
301-415-2169  
[elizabeth.stuckle@nrc.gov](mailto:elizabeth.stuckle@nrc.gov)

NNNN /91

**From:** Brenner, Eliot  
**To:** Stuckle, Elizabeth; Hayden, Elizabeth; Harrington, Holly; McIntyre, David; Burnell, Scott; Couret, Ivonne  
**Subject:** RE: Updated list of inaccuracies and concerning verbiage  
**Date:** Friday, April 15, 2011 3:21:01 PM

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Wow. That's a really cheerful way to start the weekend. Thanks, I think! Have a good weekend.

Eliot

---

**From:** Stuckle, Elizabeth  
**Sent:** Friday, April 15, 2011 2:17 PM  
**To:** Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; McIntyre, David; Burnell, Scott; Couret, Ivonne  
**Subject:** Updated list of inaccuracies and concerning verbiage

Attached is the latest version of my log of inaccuracies and concerning verbiage. Covers 13 days (through today).

Elizabeth M. Stuckle  
Office of Public Affairs  
U.S. Nuclear Regulatory Commission  
301-415-2169  
elizabeth.stuckle@nrc.gov

NNNN/92

**From:** [David Talbot](#)  
**To:** [McIntyre, David](#)  
**Subject:** RE: map for fact-checking  
**Date:** Wednesday, April 13, 2011 4:19:20 PM

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Thank you

---

**From:** McIntyre, David [David.McIntyre@nrc.gov]  
**Sent:** Wednesday, April 13, 2011 4:16 PM  
**To:** David Talbot  
**Subject:** RE: map for fact-checking

Looks pretty good - I don't know if the space would permit, but in the caption you might say "current and former nuclear reactor sites", as about nine of those are at decommissioned reactor locations. But as it is, I don't think anyone here will complain!

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

**From:** David Talbot [<mailto:David.Talbot@TechnologyReview.com>]  
**Sent:** Wednesday, April 13, 2011 4:01 PM  
**To:** McIntyre, David  
**Subject:** map for fact-checking

David

Last file is the map we are running. Earlier ones are note information to be included.

This is the head/deck. Please let me know if all looks OK.

Thanks  
Dave

HED: Dry Cask Storage Progress in the United States

DEK: In the United States, 63 sites holding nuclear waste (including power plant complexes and government facilities) already have dry cask storage facilities. Another 10 are applying to build them, and 11 haven't yet announced plans. But these casks are only keeping pace with newly generated waste. At most locations, liquid pools for holding and cooling fuel are still full of waste, and in many cases these pools are packed more densely than is the case at the stricken Fukushima reactors.

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NNNN/93

**From:** [Burnell, Scott](#)  
**To:** [Courret, Ivonne](#); [McIntyre, David](#)  
**Subject:** RE: media inquiry regarding Charles Casto  
**Date:** Wednesday, April 20, 2011 3:50:15 PM

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I haven't dealt with Ms. Strickland...

---

**From:** Courret, Ivonne  
**Sent:** Wednesday, April 20, 2011 3:48 PM  
**To:** Burnell, Scott; McIntyre, David  
**Subject:** FW: media inquiry regarding Charles Casto

Who is working with ieee on story? In no one, who want to respond? Ivonne

---

**From:** [e.strickland@ieee.org](mailto:e.strickland@ieee.org) [<mailto:e.strickland@ieee.org>]  
**Sent:** Wednesday, April 20, 2011 3:46 PM  
**To:** Courret, Ivonne  
**Subject:** media inquiry regarding Charles Casto

Dear Ms. Courret,

I'm an editor with the technology magazine IEEE Spectrum. We corresponded briefly about a month ago when I was inquiring about the NRC team that had gone to Japan to provide assistance during the Fukushima Dai-1 crisis. I'm now wondering if the leader of that NRC team, Charles Casto, is back in the U.S., and if he's available for interviews.

In case you're not familiar with our publication, here's a quick overview. IEEE Spectrum is a monthly magazine that goes out to the 400,000 members of IEEE, the Institute of Electrical and Electronics Engineers. It's also a constantly updated website that's free and open to all: <http://spectrum.ieee.org/> It's considered a publication for tech insiders. We're currently working on a special issue about nuclear power in response to the Fukushima Dai-1 incident -- the issue will cover exactly what went wrong, how the plant will be stabilized and cleaned up, and what the implications are for the nuclear power industry.

Please let me know if you need any further information.

Thanks, and best wishes,  
Eliza

-----  
Eliza Strickland  
Associate Editor  
IEEE Spectrum  
<http://spectrum.ieee.org/>  
phone: 212-419-7505  
email: [e.strickland@ieee.org](mailto:e.strickland@ieee.org)

NNNN/94

**From:** [Docket, Hearing](#)  
**To:** [Adler, James](#); [Ammon, Bernice](#); [Bupp, Margaret](#); [Carson, Cecilia](#); [Clark, Lisa](#); [Coggins, Angela](#); [Cordes, John](#); [Davis, Roger](#); [Docket, Hearing](#); [Frye, Roland](#); [Hart, Ken](#); [Krause, Emily](#); [McIntyre, David](#); [Monninger, John](#); [Nieh, Ho](#); [OCAAMAIL Resource](#); [OPA Resource](#); [Poole, Brooke](#); [Reddick, Daranj](#); [Spicer, Susan](#); [Temp, WCO](#); [Temp, WDM](#); [Vietti-Cook, Annette](#); [Zorn, Jason](#)  
**Cc:** [Rothschild, Trip](#); [Hirsch, Patricia](#); [Julian, Emile](#); [Glitter, Rebecca](#)  
**Subject:** Seabrook Station, Docket 50-443-LR - Emergency Petition to Suspend Proceeding  
**Date:** Monday, April 18, 2011 1:15:55 PM  
**Attachments:** [COS Friends and NEC.pdf](#)  
[Emergency Petition to Suspend Proceedings.pdf](#)  
[COS Beyond Nuclear.pdf](#)

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In the matter of the license renewal application for Seabrook Station Unit 1, Docket No. 50-443-LR, the Office of the Secretary has received via EIE the attached filing (on 4/14/11 from petitioners Friends of the Coast and New England Coalition, and on 4/18/11 from petitioners Beyond Nuclear, Seacoast Anti-Pollution league, and Sierra Club of New Hampshire) –

**"EMERGENCY PETITION TO SUSPEND ALL PENDING REACTOR LICENSING DECISIONS AND RELATED RULEMAKING DECISIONS PENDING INVESTIGATION OF LESSONS LEARNED FROM FUKUSHIMA DAIICHI NUCLEAR POWER STATION ACCIDENT"**

**ACTION OFFICE: OCAA**  
**APPROPRIATE**

**ACTION:**

Linda Lewis  
Rulemakings and Adjudications Staff  
Office of the Secretary  
U.S. Nuclear Regulatory Commission  
301-415-1675

NNNN/95

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
BEFORE THE COMMISSION

In the Matter of  
FPL Energy Seabrook, LLC (NextEra, Inc)  
(Seabrook Station, Unit 1 – License Renewal Application)

April 15, 2011  
Docket No. 50-443-LR  
ASLBP No. 0-906-02-LR

**CERTIFICATE OF SERVICE**

I hereby certify that on this 15th day of April, 2011, a copy of FRIENDS OF THE COAST AND NEW ENGLAND COALITION'S EMERGENCY PETITION TO SUSPEND ALL PENDING REACTOR LICENSING DECISIONS AND RELATED RULEMAKING DECISIONS PENDING INVESTIGATION OF LESSONS LEARNED FROM FUKUSHIMA DAIICHI NUCLEAR POWER STATION ACCIDENT regarding the above captioned matter, was filed with the U.S. Nuclear Regulatory Commission and provided to the persons and parties identified in NRC's electronic filing system service list by electronic filing.

Signed (Electronically) by

\_\_\_\_\_  
Raymond Shadis  
Friends of the Coast  
New England Coalition  
Post Office Box 98  
Edgecomb, Maine 04556  
[shadis@prexar.com](mailto:shadis@prexar.com)  
207-882-7801

April 14-18, 2011

UNITED STATES OF AMERICA  
U.S. NUCLEAR REGULATORY COMMISSION  
BEFORE THE COMMISSION

In the Matter of Amerenu (Callaway Plant Unit 2)	) ) )	Docket No. 52-037-COL
In the Matter of AP1000 Design Certification Amendment 10 CFR Part 52	) ) )	NRC-2010-0131 RIN 3150-A18
In the Matter of Calvert Cliffs 3 Nuclear Project, L.L.C. (Calvert Cliffs Nuclear Power Plant, Unit 3)	) ) )	Docket No. 52-016-COL
In the Matter of Detroit Edison Co. (Fermi Nuclear Power Plant, Unit 3)	) ) )	Docket No. 52-033-COL
In the Matter of Duke Energy Carolinas, L.L.C. (William States Lee III Nuclear Station, Units 1 and 2)	) ) ) )	Docket Nos. 52-018 and 52-019
In the Matter of Energy Northwest (Columbia Generating Station)	) ) )	Docket No. 50-397-LR
In the Matter of Entergy Nuclear Generation Co. And Entergy Nuclear Operations, Inc. (Pilgrim Nuclear Power Station)	) ) ) )	Docket No. 50-293-LR
In the Matter of Entergy Nuclear Operations, Inc. (Indian Point Nuclear Generating Station, Units 2 and 3)	) ) ) )	Docket Nos. 50-247-LR and 50-286-LR
In the Matter of ESBWR Design Certification Amendment 10 CFR Part 52	) ) )	NRC-2010-0135 RIN-3150-AI85

In the Matter of FirstEnergy Nuclear Operating Co. (Davis-Besse Nuclear Power Station, Unit 1)	) ) ) )	Docket No. 50-346-LR
In the Matter of Florida Power & Light Co. (Turkey Point Units 6 and 7)	) ) )	Docket Nos. 52-040-COL and 52-041-COL
In the Matter of Luminant Generation, Co., L.L.C. (Comanche Peak Nuclear Power Plant, Units 3 and 4)	) ) ) )	Docket Nos. 52-034-COL and 52-035-COL
In the Matter of Nextera Energy Seabrook, L.L.C. (Seabrook Station, Unit 1)	) ) )	Docket No. 50-443-LR
In the Matter of Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2)	) ) ) )	Docket Nos. 50-275-LR and 50-323-LR
In the Matter of PPL Bell Bend, L.L.C. (Bell Bend Nuclear Power Plant)	) ) )	Docket No. 52-039-COL
In the Matter of Progress Energy Carolinas, Inc. (Shearon Harris Nuclear Power Plant, Units 2 and 3)	) ) ) )	Docket Nos. 52-022-COL and 52-023-COL
In the Matter of Progress Energy Florida, Inc. (Levy County Nuclear Power Plant, Units 1 and 2)	) ) ) )	Docket Nos. 52-029-COL and 52-030-COL
In the Matter of South Carolina Electric and Gas Co. And South Carolina Public Service Authority (Also Referred to as Santee Cooper) (Virgil C. Summer Nuclear Station, Units 1 and 2)	) ) ) ) ) )	Docket Nos. 52-027-COL and 52-028-COL

In the Matter of	)	
Southern Nuclear Operating Co.	)	Docket Nos. 52-025-COL
(Vogtle Electric Generating Plant,	)	and 52-026-COL
Units 3 and 4)	)	
In the Matter of	)	
South Texas Project Nuclear Operating Co.	)	Docket Nos. 52-012-COL
(South Texas Project,	)	and 52-013-COL
Units 3 and 4)	)	
In the Matter of	)	
Tennessee Valley Authority	)	Docket Nos. 50-438-CP
(Bellefonte Nuclear Power Plant,	)	and 50-439-CP
Units 1 and 2)	)	
In the Matter of	)	
Tennessee Valley Authority	)	Docket Nos. 52-014-COL
(Bellefonte Nuclear Power Plant,	)	and 52-015-COL
Units 3 and 4)	)	
In the Matter of	)	
Tennessee Valley Authority	)	Docket No. 50-0391-OL
(Watts Bar Unit 2)	)	
In the Matter of	)	
Virginia Electric and Power Co.	)	
d/b/a/ Dominion Virginia Power and	)	Docket No. 52-017-COL
Old Dominion Electric Cooperative	)	
(North Anna Unit 3)	)	

**EMERGENCY PETITION TO SUSPEND ALL PENDING REACTOR LICENSING  
DECISIONS AND RELATED RULEMAKING DECISIONS  
PENDING INVESTIGATION OF LESSONS LEARNED FROM FUKUSHIMA DAIICHI  
NUCLEAR POWER STATION ACCIDENT**

**I. INTRODUCTION**

Pursuant to the Atomic Energy Act (“AEA”) and the National Environmental Policy Act (“NEPA”), Petitioners hereby request the U.S. Nuclear Regulatory Commission (“NRC” or “Commission”) to exercise its supervisory jurisdiction over all pending proceedings for the consideration of applications for construction permits, new reactor licenses, combined construction permit and operating licenses (“COLs”), early site permits (“ESPs”), license renewals (“LRs”), and standardized design certification rulemakings for nuclear reactors (hereinafter collectively “licensing and related rulemaking proceedings”), to ensure the consideration in those proceedings of new and significant information regarding the safety and environmental implications of the ongoing catastrophic radiological accident at the Fukushima Daiichi Nuclear Power Station, Units 1-6 (“Fukushima”), in Okuma, Japan.

This Petition is filed by Petitioners in each of the above-captioned licensing and rulemaking proceedings now pending before the Commission. The Petition will be filed in each of the above-captioned proceedings between April 14 and April 18, 2011.<sup>1</sup>

Petitioners request the Commission to take the following immediate actions:

- Suspend all decisions regarding the issuance of construction permits, new reactor licenses, COLs, ESPs, license renewals, or standardized design certification pending completion by the NRC’s Task Force to Conduct a Near-Term Evaluation of the Need for

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<sup>1</sup> This Petition is complementary to the Petition to Suspend AP1000 Design Certification Rulemaking Pending Evaluation of Fukushima Accident Implications on Design and Operational Procedures and Request for Expedited Consideration that was filed by the Bellefonte Efficiency and Sustainability Team and other organizations on April 6, 2011.

Agency Actions Following the Events in Japan (“Task Force”) of its investigation of the near-term and long-term lessons of the Fukushima accident and the issuance of any proposed regulatory decisions and/or environmental analyses of those issues;

- Suspend all proceedings with respect to hearings or opportunities for public comment, on any reactor-related or spent fuel pool-related issues that have been identified for investigation in the Task Force’s Charter of April 1, 2011 (NRC Accession No. ML11089A045). These issues include external event issues (i.e., seismic, flooding, fires, severe weather); station blackout; severe accident measures (e.g., combustible gas control, emergency operating procedures, severe accident management guidelines); implementation of 10 C.F.R. § 50.54(hh)(2) regarding response to explosions or fire; and emergency preparedness. *Id.* The Commission should also suspend all licensing and related rulemaking proceedings with regard to any other issues that the Task Force subsequently may identify as significant in the course of its investigation. The proceedings should be suspended pending completion of the Task Force’s investigation into those issues and the issuance of any proposed regulatory decisions and/or environmental analyses of those issues;
- Conduct an analysis, as required by NEPA, of whether the March 11, 2011 Tohoku-Chihou-Taiheiyo-Oki earthquake and ensuing radiological accident poses new and significant information that must be considered in environmental impact statements to support the licensing decisions for all new reactors and renewed licenses;
- Conduct a safety analysis of the regulatory implications of the March 11, 2011 Tohoku-Chihou-Taiheiyo-Oki earthquake and ensuing radiological accident and publish the results of that analysis for public comment;

- Establish procedures and a timetable for raising new issues relevant to the Fukushima accident in pending licensing proceedings. The Commission should allow all current intervenors in NRC licensing proceedings, all petitioners who seek to re-open closed licensing or re-licensing proceedings, and all parties who seek to comment on design certification proposed rules, a period of at least 60 days following the publication of proposed regulatory measures or environmental decisions, in which to raise new issues relating to the Fukushima accident.
- Suspend all decisions and proceedings regarding all licensing and related rulemaking proceedings, as discussed above, pending the outcome of any *independent* investigation of the Fukushima accident that may be ordered by Congress or the President or instigated by the Commission to complement or supersede the work of the Task Force.
- Request that the President establish an independent investigation of the Fukushima accident and its implications for the safety and environmental impacts of U.S. reactors and spent fuel pools similar to the President's Commission on the Accident at Three Mile Island, chaired by John G. Kemeny.

Petitioners respectfully submit that granting of the relief requested above is required by the AEA and NEPA, which forbid the NRC from issuing licenses for which it lacks reasonable assurance of safe operation or for which it has failed to consider all information significantly bearing on the environmental impacts of reactor operation. *See* discussion in Section V.B. below. By establishing the Task Force and ordering the investigation of the regulatory implications of the Fukushima accident for U.S. reactors, the Commission has identified the new information coming out of the Fukushima accident as new and potentially significant; and therefore it is legally obligated to consider the environmental implications of that new

information in all prospective licensing decisions. *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 370-71 (1989). Suspension of licensing decisions pending investigations of lessons learned also would be consistent with the course followed by the Commission following the Three Mile Island accident, when the Commission delayed new licensing actions for a year and a half. *See Statement of Policy: Further Commission Guidance for Power Reactor Operating Licenses*, CLI-80-42, 12 NRC 654 (1980) (“TMI Policy Statement”).<sup>2</sup>

Finally, emergency action by the Commission is necessary because a number of the pending licensing proceedings are approaching completion (e.g., the Pilgrim license renewal proceeding, the AP1000 design certification proceeding, the Vogtle Units 3 and 4 COL proceeding, and the Economic Simplified Boiling Water (“ESBWR” design certification rulemaking proceeding). For these reasons, Petitioners therefore request a decision on this Petition within thirty (30) days.

## **II. DESCRIPTION OF PETITIONERS**

Petitioners are organizations and individuals who seek, through this Petition, to ensure that they will have an opportunity to raise new safety and environmental issues emerging from

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<sup>2</sup> Petitioners believe that by establishing the Task Force and charging it with the task of investigating the implications of the Fukushima Daiichi accident with respect to its regulatory program, the Commission has, as a matter of law, bound itself to evaluate the significance of the information yielded by its investigation under NEPA and to analyze any information that is new and significant in supplemental environmental impact statements for all pending licensing decisions. Therefore, Petitioners do not believe it is necessary to submit an expert declaration in support of this petition.

In any event, Petitioners expect to submit additional expert support for this Petition early next week, in the form of a declaration by Dr. Arjun Makhijani, President of the Institute for Energy and Environmental Research in Takoma Park, Maryland. Because of other conflicting obligations, Dr. Makhijani was unable to complete his declaration in time to submit it by April 14, 2011. Due to the fact that some of the licensing decisions affected by this petition are imminent, however, the majority of the Petitioners are submitting their legal brief and request for relief at their earliest opportunity, starting today.

the Fukushima nuclear accident in licensing and related rulemaking proceedings. Some of the Petitioners have already intervened in pending NRC licensing proceedings and seek an opportunity to participate with respect to the application of new information regarding “lessons learned” from Fukushima to those proceedings. Other petitioners seek a renewed opportunity to participate in licensing proceedings that have been closed to public participation but that are still pending before the agency. Petitioners also seek to ensure that the NRC will not give final approval to the AP1000 and ESBWR standardized designs proposed by the NRC Staff until the agency has considered whether design modifications are necessary in light of the Fukushima accident.

Petitioners are the following individuals and organizations:

AP1000 Group<sup>3</sup>

Beyond Nuclear, Inc.

Blue Ridge Environmental Defense League, Inc. (“BREDL”)

BREDL Chapter Bellefonte Efficiency and Sustainability Team (“BREDL”)

Center for a Sustainable Coast, Inc.

Citizens Allied for Safe Energy, Inc.

Citizens Environmental Alliance of Southwestern Ontario, Inc.

Don’t Waste Michigan, Inc.

Friends of the Earth, Inc.

Friends of the Coast, Inc.

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<sup>3</sup> The AP1000 Oversight Group consists of the Bellefonte Efficiency and Sustainability Team, BREDL, Citizens Allied for Safe Energy, Friends of the Earth, Georgia Women's Action for New Directions, Green Party of Florida, Mothers Against Tennessee River Radiation, North Carolina Waste Awareness and Reduction Network, Nuclear Information and Resource Service, Nuclear Watch South, South Carolina Chapter - Sierra Club, and SACE.

Georgia Women's Action for New Directions, Inc.

Green Party of Florida

Green Party of Ohio

Hudson River Sloop Clearwater, Inc.

Keith Gunter

Michael J. Keegan

Dan Kipnis

Leonard Mandeville

Frank Mantei

Marcee Meyers

Edward McArdle

National Parks Conservation Association, Inc.

Henry Newnan

Mark Oncavage

Missouri Coalition for the Environment, Inc.

Missourians for Safe Energy

Mothers Against Tennessee River Radiation

New England Coalition, Inc.

North Carolina Waste Reduction and Awareness Network, Inc.

Northwest Environmental Advocates, Inc. ("NWEA")

Nuclear Information and Resource Service, Inc.

Nuclear Watch South, Inc.

Public Citizen, Inc.

San Luis Obispo Mothers for Peace, Inc.

Savannah Riverkeeper, Inc.

Seacoast Anti-Pollution League, Inc.

Sierra Club, Inc. (Michigan Chapter)

Sierra Club (South Carolina Chapter)

George Steinman

Shirley Steinman

Southern Alliance for Clean Energy, Inc.

Gene Stilp

Harold L. Stokes

Southern Maryland CARES, Inc. (Citizens Alliance for Renewable Energy Solutions)

Sustainable Energy and Economic Development (“SEED”) Coalition, Inc.

Marilyn R. Timmer

Village of Pinecrest, Florida

**III. DESCRIPTION OF PENDING PROCEEDINGS IN WHICH PETITIONERS HAVE AN INTEREST IN APPLICATION OF LESSONS LEARNED FROM FUKUSHIMA NUCLEAR FACILITY ACCIDENT.**

As discussed above in Section II, Petitioners are organizations and individuals with an interest in pending licensing decisions regarding new or existing nuclear reactors, including rulemakings for certification of standardized designs. A description of those pending proceedings and the Petitioners’ interests in those proceedings follows. These descriptions of Petitioners’ interests are not intended to be a complete representation of those interests nor are they intended to limit Petitioners in raising safety or environmental concerns related to the Fukushima accident in any on-going or future proceedings.

## **A. Construction Permit Proceedings**

**Bellefonte Nuclear Power Plant, Units 1 and 2.** Tennessee Valley Authority's ("TVA's")

Bellefonte site near Scottsboro in northeast Alabama has no operating nuclear reactors.

Although TVA received construction permits for two units in 1974, it asked the NRC to revoke them in 2006. In 2008, TVA reversed course and requested the NRC to reinstate the construction permits for Bellefonte Units 1 and 2. BREDL and its chapter Bellefonte Efficiency and Sustainability Team ("BREDL") and SACE petitioned to intervene, raising concerns about the NRC's statutory authority to re-issue the construction permits and other concerns about site geology, quality assurance, safety requirement upgrades since 1974, and aging plant factors.

On April 2, 2010, the ASLB issued a Memorandum and Order recognizing standing but denying the petition to intervene. On September 29, 2010 the Commission dismissed an appeal but with a dissent in part by Chairman Jaczko. See CLI-10-26. The matter now lies before the US Court of Appeals for the District of Columbia where BREDL filed its latest brief on April 11<sup>th</sup>. *Blue Ridge Environmental Defense League v. Nuclear Regulatory Commission*, Consolidated Cases Nos. 09-1112 and 10-1058.

## **B. Part 50 Operating License Proceedings**

**Watts Bar Unit 2.** TVA has attempted to resurrect the Watts Bar 2 reactor, which was all-but-abandoned in 1985. SACE was admitted as an intervenor to the operating license proceeding that commenced in 2009. While a contention regarding aquatic impacts was admitted, the ASLB rejected contentions regarding the inadequacy of TVA's SAMA analysis, including its analysis of the reliability of AC power backup for resolution of GSI-189, "Susceptibility of Ice Condenser and Mark III Containments to Early Failure From Hydrogen Combustion During a Severe Accident." SACE is very concerned about the implications of the Fukushima accident

with respect to the issues of backup power adequacy, hydrogen explosions, and the vulnerability of the proposed Watts Bar reactor's ice condenser containment.

### **C. Part 50 License Renewal Proceedings**

**Columbia Generating Station.** The license renewal proceeding for the Columbia Generating Station is now pending before the NRC Staff. Under the schedule posted on the NRC's website, publication of a Draft Environmental Impact Statement ("EIS") is scheduled for June 2011. *See* <http://www.nrc.gov/reactors/operating/licensing/renewal/applications/columbia.html#schedule>.

Petitioner Northwest Environmental Advocates ("NWEA") is extremely concerned about the implications of the Fukushima accident with respect to the safety of operating the Columbia Generating Station. They are particularly concerned about the implications of the Fukushima accident in light of earthquake risks to the Columbia Generating Station based on new findings of a structural zone that kinematically connects faults in central Washington with faults in the Puget Sound, the entirety of which may be seismically active. These findings are scheduled for publication later this year. The Fukushima accident also highlights the hazards associated with facility mismanagement which has been a chronic problem at the Columbia Generating Station.

**Davis-Besse Nuclear Power Station, Unit 1.** Beyond Nuclear, Citizens Environment Alliance of Southwestern Ontario, Don't Waste Michigan, and the Green Party of Ohio have submitted four contentions challenging the proposed extension of the Davis-Besse license, including inadequate treatment of alternative of potential for commercial-scale wind power and commercial-scale photovoltaic power generation in the ER, and inadequate Severe Accident Mitigation Alternatives ("SAMA") analysis.

Davis-Besse, a Babcock & Wilcox reactor, has a remarkable history of operational problems, the most recent being the infamous 2002 discovery of a massive corrosion hole in the

reactor head the size of a loaf of bread, where a 3/16" stainless steel liner was all that was holding back the pressurized radioactive water in the vessel. pressure.

**Diablo Canyon Nuclear Power Plant, Units 1 and 2.** The Diablo Canyon license renewal proceeding is now pending before the ASLB. San Luis Obispo Mothers for Peace ("SLOMFP") has intervened and gained admission of safety and environmental contentions, including contentions which challenge Pacific Gas and Electric's failure to adequately address earthquake risks to the reactor and the spent fuel pools. The ASLB has also referred to the Commission SLOMFP's petition for a waiver of NRC regulations precluding consideration of the environmental impacts of pool storage of spent fuel, based on a footnote in the 2009 Draft Revised Generic Environmental Impact Statement for Nuclear Power Plant License Renewal which excludes Diablo Canyon and other western reactors from the NRC's finding that pool storage of spent fuel does not pose significant environmental risks with respect to earthquake vulnerability.

SLOMFP is extremely concerned about the implications of the Fukushima reactor accident for the Diablo Canyon reactors and spent fuel pools, including the reactors' vulnerability to severe earthquakes and tsunamis, the lack of reliable and adequate backup power capability for the site, and the infeasibility of emergency evacuation following an earthquake.

**Indian Point Nuclear Generating Station, Units 2 and 3.** The Indian Point proceeding concerns the relicensing of two pressurized water reactors approximately 35 miles north of New York City. This proceeding has become the most complicated relicensing proceeding ever heard due to the large number of parties and admitted contentions. Hudson Sloop Clearwater, Riverkeeper, and New York State all have multiple contentions admitted in the proceeding. A

number of other municipal entities are participating as interested parties. Clearwater's admitted contention concerns the need to assess the environmental justice implications of severe accidents. Clearwater and Riverkeeper have recently moved to add both environmental and safety contentions regarding waste storage, based upon the recent waste confidence update. In addition, Clearwater, Riverkeeper, and New York State have moved to add environmental contentions based upon the publication of the FSEIS. Initial testimony regarding admitted contentions is now due in approximately 65 days.

**Pilgrim Nuclear Power Station.** The on-going Pilgrim Nuclear Power license renewal proceeding began in 2006. Two Pilgrim Watch contentions were admitted; one challenged the adequacy of the aging management program for buried pipes/tanks within scope containing radioactive liquids; the other challenged the applicant's SAMA analysis. Although the buried pipe contention was dismissed on summary disposition, the SAMA contention is still before the ASLB. In late 2010, Pilgrim Watch filed two Requests for New Hearings regarding the inadequacy of Entergy's aging management of submerged non-environmentally qualified electric cables and the lack of measures for cleanup after a severe nuclear reactor accident. The contentions are before the ASLB. Given the relevance of these issues to the Fukushima accident, and given the fact that the Pilgrim reactor shares the same boiling water reactor ("BWR") design as the Fukushima reactors, Pilgrim Watch seeks to ensure that it will have an opportunity to raise accident-related issues during the Pilgrim re-licensing proceeding.

**Seabrook Station, Unit 1.** In the license renewal proceeding for Seabrook Station Unit 1, the ASLB in this proceeding granted standing and admitted contentions submitted by Beyond Nuclear, Seacoast Anti-Pollution League, Sierra Club-New Hampshire Chapter, Friends of the Coast and New England Coalition. Admitted contentions that are relevant to the Fukushima

accident include Beyond Nuclear's contention challenging the licensee's apparent failure to adequately consider the availability of more environmentally benign and less risk-laden alternatives for the proposed period of extended operation. Early reports from Japan indicate that unanticipated costs to the environment and the regional economy resulting from the release of radiological fission products, activation products, and heavy radioactive elements to the environment from the Fukushima reactors and spent fuel pools will dwarf those risks considered in NRC's Generic Environmental Impact Statement, NRC site specific evaluations or in the license renewal application. Other contentions that appear relevant to the Fukushima accident relate to failure to provide for aging management of transformers, failure to provide for adequate aging management of non-qualified safety-related electrical cables susceptible to wetting or submergence, and inadequate and non-conservative Severe Accident Mitigation Alternatives ("SAMA") analysis.

The flooding phenomena at Fukushima also raise questions about the potential for tsunami impact at Seabrook, something dismissed in the LRA documents. Friends of the Coast and New England Coalition found that tsunamis have indeed occurred in adjacent waters of the North Atlantic; the most pertinent and striking example being a tsunami generated by a 7.2 earthquake epi-centered on Georges Bank at the northeast extreme of the Gulf of Maine. That tsunami, when funneled in to the bays and inlets of Newfoundland, crested at 90 feet. *See* <http://www.maine.gov/doc/nrimc/mgs/explore/hazards/tsunami/jan05.htm>

Clearly, the implications of such examples from recent history, coupled with the Japanese experience, should no longer be ignored when evaluating accident prospects in license renewal proceedings.

#### **D. Part 52 Combined Licensing Proceedings**

**Bell Bend Nuclear Power Plant.** In 2009, Gene Stilp requested a hearing on Pennsylvania Power and Light Co.'s application for a COL for the Bell Bend reactor, to be built adjacent to the two existing Susquehanna reactors. Although the ASLB found that Mr. Stilp had standing, it rejected his contentions as inadmissible. Among Mr. Stilp's rejected contentions was his concern about the safety and environmental risks of storing Bell Bend's spent fuel adjacent to the existing spent fuel storage pools at the Susquehanna site. Mr. Stilp would seek reconsideration of that issue in light of the events at the multi-unit Fukushima facility.

**Bellefonte Nuclear Power Plant, Units 3 and 4.** BREDL AND Southern Alliance for Clean Energy ("SACE") won the admission of four contentions in the COL proceeding regarding the Tennessee Valley Authority's ("TVA's") COL application for Bellefonte Units 3 and 4. There is considerable uncertainty regarding TVA's COL application which continues to delay the NRC's safety and environmental review schedule. In the wake of the Fukushima accident, the organizations are concerned about seismic risks to the proposed reactors: the Bellefonte site is near the Eastern Tennessee Seismic Zone, which is considered to be one of the most active seismic areas east of the Rocky Mountains. Recent studies have indicated that this seismic zone may have the potential to produce large magnitude earthquakes.

**Callaway Plant Unit 2.** The Missouri Coalition for the Environment and Missourians for Safe Energy intervened in the COL proceeding for Callaway Unit 2. The case was suspended after the applicant was unable to obtain construction work in progress funding from the state.

**Calvert Cliffs Nuclear Power Plant, Unit 3.** Calvert Cliffs Nuclear Power Plant, Unit 3. Nuclear Information and Resource Service, Public Citizen, Beyond Nuclear and Southern Maryland CARES are intervenors in this COL proceeding. Contentions on foreign ownership of

the Calvert Cliffs-3 project and on the failure of the NRC's Draft Environmental Impact Statement to adequately consider alternatives to Calvert Cliffs-3 are pending, with no hearing date yet established.

**Comanche Peak Nuclear Power Plant, Units 3 and 4.** Public Citizen, Inc. and the Sustainable Energy and Economic Development (SEED) Coalition, Inc. were admitted as Intervenor and raised several contentions in this COL proceeding for two new reactors on the site of the existing Comanche Peak Units 1 and 2. All of the contentions have been dismissed by the ASLB on motions for summary disposition. Intervenor have filed a petition for review of the ASLB's dismissal of contentions regarding mitigation strategies for loss of large area (LOLA) incidents caused by fires and explosions under 10 C.F.R. 50.54(hh)(2), an issue that is the subject of the Task Force's investigation.

**Fermi Nuclear Power Plant, Unit 3.** In July 2009, intervenors Don't Waste Michigan, Inc., Citizens for Alternatives to Chemical Contamination, Beyond Nuclear, Citizens Environmental Awareness of Southwestern Ontario, Keith Gunter, Michael J. Keegan, Edward McArdle, Leonard Mandeville, Frank Mantei, Marcee Meyers, Henry Newnan, Sierra Club (Michigan Chapter), George Steinman, Shirley Steinman, Harold L. Stokes, and Marilyn R. Timmer were granted standing and won the admission of five contentions in the COL proceeding for Fermi Unit 3. Three of those contentions are still pending.

**Levy County Nuclear Power Plant, Units 1 and 2.** Nuclear Information and Resource Service, The Green Party of Florida and The Ecology Party of Florida have been admitted as joint intervenors in the COL proceeding for Progress Energy Florida's proposal to build two reactors on top of the recharge zone for some of the most pristine freshwater springs on the planet. The ASLB has two contentions before it and a hearing is currently set for January 2012.

**North Anna Unit 3.** BREDL and its chapter People's Alliance for Clean Energy have been admitted as intervenors in the COL proceeding for two proposed reactors on the site of the existing two-unit North Anna nuclear power plant. One of the original proposed plants was cancelled and the application for the other was replaced with one for a pressurized water reactor. On April 6, 2011, in LBP-11-10, the ASLB denied two additional contentions on water use and ability to withstand seismic incidents.

**Shearon Harris Nuclear Power Plant, Units 2 and 3.** NC WARN was admitted as an intervenor to this COL proceeding and submitted safety and environmental contentions on plant design, fire safety, aircraft attacks, spent fuel and emergency planning. One of the contentions on the underestimate of cost for the plants was settled when the applicant revised its cost estimates. The ASLB dismissed all of the other contentions and was affirmed by the Commission in CLI-10-05. The COL application is still pending before the NRC Staff.

**South Texas Project, Units 3 and 4.** Public Citizen and the SEED Coalition were admitted as intervenors and gained admission of a number of contentions, including contentions regarding mitigation strategies for loss of large area (LOLA) incidents caused by fires and explosions under 10 C.F.R. 50.54(hh)(2). Although those contentions were dismissed by the ASLB, Intervenor believe they should now be subject to reconsideration based on the Fukushima accident and the Task Force investigation.

**Turkey Point Units 6 and 7.** SACE, the National Parks Conservation Association, Dan Kipnis and Mark Oncavage have been admitted as joint intervenors in the COL proceeding for proposed new Units 6 and 7 at the Turkey Point Nuclear facility in Homestead, Florida. While the ASLB admitted contentions regarding groundwater impacts, it refused to admit the joint intervenors' eight other contentions, including one regarding sea level rise. That contention, which concerned

the potential environmental impact caused by construction and operation of new reactors in a region threatened by a predicted sea level rise of 1.5 to 5 feet by 2050, has particular relevance in light of the Fukushima disaster. Turkey Point is located less than 25 miles south of Miami on Biscayne Bay along Florida's southeastern coast. The lessons learned from the Task Force's investigation on external events should be applied to these coastal reactors.

**V.C. Summer Units 2 and 3.** Friends of the Earth and the Sierra Club were granted standing in the V.C. Summer COL case but no contentions were admitted. The COL application is still pending before the NRC Staff.

**Vogtle Electric Generating Plant, Units 3 and 4.** BREDL, Center for a Sustainable Coast, Georgia Women's Action for New Directions, Savannah Riverkeeper, and SACE (collectively, "Vogtle Intervenors") intervened in the COL proceeding for Plant Vogtle Units 3 and 4 and gained admission of a contention regarding the onsite storage of low level radioactive waste. In May 2010, the ASLB ruled that the issue was resolved and dismissed the case. New contentions regarding the flaws in AP1000 containment were subsequently raised, dismissed by the ASLB and are under appeal to the Commission.

In April 2011, the NRC Staff issued a Final Supplemental Environmental Impact Statement for the COL, and the Staff plans to release the Final Safety Evaluation Report in June. According to the current schedule, the Plant Vogtle COL may be issued at the end of this year, making Vogtle Units 3 and 4 the first AP1000 reactors to be licensed.

Before the license is issued, and in light of the Fukushima disaster, the following issues must be assessed at Plant Vogtle: the safety and environmental impacts of onsite spent fuel storage at multiple units; the impact of a power failure on the reactor cooling systems for the multiple units; and earthquake risks to the reactors, which lie in an area prone to seismic activity.

*See* NUREG-1923, Vogtle ESP Final Safety Evaluation Report, Chapter 2.5 (2009). Because Plant Vogtle will serve as the “reference” project for future AP1000 plants, the Vogtle Intervenor’s concern about the implications of the Fukushima disaster is heightened. If the lessons learned from Fukushima are not applied to Plant Vogtle, the repercussions will be multiplied by all plants referencing the Plant Vogtle COL in future applications.

**William States Lee III Nuclear Station, Units 1 and 2.** In 2008, BREDL petitioned for leave to intervene in the COL proceeding for Duke Energy Carolinas, LLC’s application to construct and operate two AP1000 pressurized water reactors at the William States Lee III Nuclear Station site. On September 22, 2008, in LBP-08-17, the ASLB ruled that BREDL had standing to intervene but admitted no contentions. Among the contentions dismissed by the ASLB was a contention challenging the adequacy of the proposed reactor’s seismic design, an issue now under investigation by the Task Force.

#### **F. Standardized Design Certification Rulemakings**

**AP1000 Design Certification Amendment (NRC-2010-0131, RIN 3150-A18).** On April 6, 2011 the AP1000 Oversight Group filed a petition to suspend the rulemaking on the certification of the AP1000 design and operational procedures which was noticed on February 24, 2011, at 76 Fed. Reg. 10,269. Currently, the comment period for the AP1000 design certification rulemaking is scheduled to close on May 10, 2011, long before the NRC concludes even its initial inquiry into the implications of the Fukushima accident.

The Petitioners requested suspension of the AP1000 design approval process while the NRC investigates the implications of the ongoing catastrophic accident in Fukushima, Japan, and decides what “lessons learned” must be incorporated into the AP1000 design and operational

procedures to ensure that they do not pose an undue risk to public health and safety or unacceptable environmental risks.

**ESBWR Design Certification Amendment (NRC-2010-01325, RIN 3150-AI85).** The NRC issued a proposed rule for the Economic Simplified Boiling Water Reactor (“ESBWR”) standardized design certification on March 24, 2011, at 76 Fed. Reg. 16,549. The comment period closes on June 7, 2011. The ESBWR design has a particularly troublesome feature in common with the Mark I BWR design, which is the design of the Fukushima reactors: elevated spent fuel pools. Nevertheless, the Commission went ahead with the proposed rulemaking, even as the Fukushima accident unfolded.

#### **IV. FACTUAL BACKGROUND**

##### **A. Fukushima Accident**

Although many details about the Fukushima accident remain unclear, the general contours of the accident are described in NRC in Information Notice No. 2011-08 (March 31, 2011) (NRC Accession No. ML 110830824) as follows:

On March 11, 2011, the Tohoku-Taiheiyou-Oki earthquake occurred near the east coast of Honshu, Japan. This magnitude 9.0 earthquake and the subsequent tsunami caused significant damage to at least four of the six units of the Fukushima Daiichi nuclear power station as the result of a sustained loss of both the offsite and onsite power systems. Efforts to restore power to emergency equipment were hampered and impeded by damage to the surrounding areas due to the tsunami and earthquake.

Units 1, 2 and 3 were operating at the time of the earthquake. Following the loss of electric power to normal and emergency core cooling systems and the subsequent failure of backup decay heat removal systems, water injection into the cores of all three reactors was compromised, and reactor decay heat removal could not be maintained. The operator of the plant, Tokyo Electric Power Company, injected sea water and boric acid into the reactor vessels of these three units, in an effort to cool the fuel and ensure that the reactors remained shut down. However, the fuel in the reactor cores became partially uncovered. Hydrogen gas built up in Units 1 and 3 as a result of exposed, overheated fuel reacting with water. Following gas venting from the primary containment to relieve pressure, hydrogen explosions occurred in both units and damaged the secondary containments. *Id.*

Units 3 and 4 were reported to have low spent fuel pool (SFP) water levels.

Fukushima Daiichi Units 4, 5 and 6 were shut down for refueling outages at the time of the earthquake. *Id.* The fuel assemblies for Unit 4 had recently been offloaded from the reactor core to the SFP. The SFPs for Units 5 and 6 appear to be intact. Emergency power is available to provide cooling water flow through the SFPs for Units 5 and 6.

The damage to Fukushima Daiichi nuclear power station appears to have been caused by initiating events beyond the design basis of the facilities.

*Id.* at 1-2.

In a March 21, 2011, briefing, NRC Chairman also stated that the NRC believes that an accumulation of hydrogen which exploded on March 15 in Units Two and Four originated from overheated fuel in the spent fuel pool. Briefing on NRC Response to Recent Nuclear Events in Japan, Transcript at 11 (NRC ADAMS Accession No. ML110321).

According to Chairman Jaczko's March 21 statement, the NRC believes that Units One, Two, and Three have had some degree of core damage. Cooling systems for the reactors have not been restored. At the outset of the emergency, large volumes of sea water were used to cool the reactors and the spent fuel pools. The salt water injections have now been replaced by fresh water injections.

## **B. NRC Response to Fukushima Accident**

### **1. Formation of Task Force**

In response to the Fukushima reactor accident, the NRC announced the formation of a "senior level task force to conduct a methodical and systematic review" of NRC processes and regulations. COMGBJ-11-0002, Memorandum from Chairman Jaczko to Commissioners, re: NRC Actions Following the Events in Japan (March 21, 2011). The purpose of the task force is

to “determine whether the agency should make additional improvements to our regulatory systems and make recommendations to the Commission for its policy direction.” *Id.*

The Commission instructed the task force to undertake both a near-term review and a longer-term review. For the near-term review, the Commission required the task force to evaluate issues “affecting domestic operating reactors of all designs” in areas that include “protection against earthquake tsunami, flooding, hurricanes; station blackout and a degraded ability to restore power; severe accident mitigation; emergency preparedness; and combustible gas control.” *Id.* at 1. The Commission instructed the task force to complete the report in 90 days. In the meantime, the task force was instructed to provide a 30-day “quick look report” and another “status” report in 60 days. *Id.*

The Commission directed the task force to begin a “longer term” review “as soon as NRC has sufficient technical information from the events in Japan with the goal of no later than the completion of the 90 day near term report.” *Id.* at 2. The longer-term study should “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.” *Id.* For the longer-term effort, the Commission instructed the task force to “receive input from and interact with all key stakeholders.” *Id.* The Commission specified that within 60 days after commencing the longer-term study, the task force should “provide a report with recommendations, as appropriate, to the Commission.” *Id.* The Task Force was established in early April.

## **2. Task Force Charter**

The Task Force charter states that the group’s “objective” is to:

- Evaluate currently available technical and operational information from the events that have occurred at the Fukushima Daiichi nuclear complex in Japan to identify

potential or preliminary near-term/immediate operational or regulatory actions affecting domestic reactors of all designs, including their spent fuel pools. The task force will evaluate, at a minimum, the following technical issues and determine priority for further examination and potential agency action:

- External event issues (e.g. seismic, flooding, fires, severe weather)
- Station blackout
- Severe accident measures (e.g., combustible gas control, emergency operating procedures, severe accident management guidelines)
- 10 CFR 50.54 (hh)(2) which states, “Each licensee shall develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to explosions or fire, to include strategies in the following areas: (i) Fire fighting; (ii) Operations to mitigate fuel damage; and (iii) Actions to minimize radiological release.” Also known as B.5.b.
- Emergency preparedness (e.g., emergency communications, radiological protection, emergency planning zones, dose projections and modeling, protective actions)
- Develop recommendations, as appropriate, for potential changes to NRC’s regulatory requirements, programs, and processes, and recommend whether generic communications, orders, or other regulatory actions are needed.

With respect to the longer-term review, the charter states that the Task Force will make:

“[r]ecommendations for the content, structure, and estimated resource impact.”

### **3. NRC Brief to Third Circuit U.S. Court of Appeals**

By letter dated March 21, 2011, in the context of an appeal of the NRC’s decision to re-license the Oyster Creek reactor, the U.S. Court of Appeals for the Third Circuit directed the NRC to “advise the Court what impact, if any, the damages from the earthquake and tsunami at the Fukushima Daiichi Nuclear Power Station have on the propriety of granting the license renewal application for the Oyster Creek Generating Station.” *New Jersey Environmental Federation et al. v. NRC* (No. 09-2567). The NRC responded that it is:

carefully monitoring those events, and assisting the Japanese government in

understanding, controlling and limiting plant damage. NRC is also evaluating the information from these events for planning both short-term and longer-term responses to ensure the safety of United States reactors. In support of these tasks, NRC is gathering and absorbing data from the Fukushima Daiichi site that will enable NRC, with appropriate public participation, to put in place any new safety measures necessary to protect public health and safety in the United States.

Federal Respondents' Memorandum on the Events at the Fukushima Daiichi Nuclear Power Station, No. 09-2567 (April 4, 2011) ("NRC Memorandum").

In its Memorandum to the Third Circuit, the NRC also described its past "lessons learned" approach to significant events. *Id.* at 8. Following the 1979 accident at the Three Mile Island Unit 2 reactor, for example, the Commission established a "Lessons Learned Task Force." A Task Force "steering group" took recommendations from within *and outside* the NRC and developed a "comprehensive and integrated plan for all actions necessary to correct or improve the regulation and operation of nuclear facilities." In the course of that process, the NRC conducted a number of rulemakings "to update licensing requirements on the basis of TMI 'lessons learned.'" *Id.* at 9. In response to the attacks of September 11, 2001, the NRC also responded by ordering security improvements at all nuclear power plants, and eventually enacted many of those orders as formal regulations. *Id.* at 10.

The Commission's Memorandum to the Third Circuit does not describe one very important feature of the agency's response to the TMI accident: it suspended all licensing decisions until conclusion of the lessons learned process. TMI Policy Statement, 12 NRC 654. The Memorandum merely states that in this case the NRC has "not suspended reactor operations or licensing activity," and points out that the NRC issued a renewed license for the Vermont Yankee Nuclear Power Plant – a boiling water reactor ("BWR") of the same design as the Fukushima reactors – on March 21, 2011, during the accident. According to the NRC, "this

decision reflects NRC's confidence in the robust and redundant safety design and construction of currently operating U.S. nuclear reactors . . ." Memorandum at 13. The Memorandum also omits any discussion of NEPA or its requirement that agencies must consider new and significant information before they take actions that could significantly affect the human environment.

**V. THE COMMISSION SHOULD EXERCISE ITS SUPERVISORY JURISDICTION TO STAY ALL PENDING LICENSING DECISIONS AND ALL PROCEEDINGS RELATED TO FUKUSHIMA ACCIDENT ISSUES PENDING INVESTIGATION OF REGULATORY IMPLICATIONS OF THE ACCIDENT.**

**A. Exercise of the Commission's Supervisory Jurisdiction is Appropriate.**

This petition invokes the Commission's supervisory authority under the AEA to "oversee all aspects of the regulatory and licensing process and its overriding responsibility for assuring public health and safety in the operation of nuclear power facilities." *Consolidated Edison Co. of N.Y., Inc.* (Indian Point, Units 1, 2 and 3), CLI-75-8, 2 NRC 173 (1975). *See also* 42 U.S.C. §§ 2233(d), 2236(a), 2237. In the extraordinary circumstances of the Fukushima accident, it is appropriate for the Commission to establish clear and uniform procedures for the application of "lessons learned" to pending licensing and rulemaking decisions. Only the Commission has the authority to establish a consistent and broadly applicable set of procedures that comply with NEPA and AEA requirements for consideration of significant new information and that also provides legally required opportunities for public participation.

To leave the establishment of that process entirely to the separate ASLB panels that are now presiding over at least twenty-five separate licensing cases would invite uncertainty and chaos, especially in the administration of the general rule of thumb that significant new issues and information must be raised within thirty days of discovering them. *See, e.g., Shaw Areva MOX Services, Inc.* (Mixed Oxide Fuel Fabrication Facility), LBP-08-11, 67 NRC 460, 493 (2008) and cases cited therein. As illustrated by a recent New York Times article, the NRC's

theories about what exactly has occurred during the Fukushima accident are continuing to change. Matthew L. Wald, “Japan’s Reactors Still Not Stable” (New York Times, page A6, April 13, 2011) (Attachment 1). And, there is extremely little in the way of official documentation from any source upon which Petitioners can rely in order to make a case before an individual ASLB that the unfolding events at Fukushima are relevant to individual licensing or rulemaking proceedings. Therefore it will be very difficult for intervenors or the ASLB panels that must judge motions to re-open the record and new contentions to judge the timeliness of those submissions.

The Commission should also exercise its supervisory jurisdiction to establish an ordered process for the application of “lessons learned” in licensing proceedings and related rulemaking proceedings, because it is the Commission that bears the ultimate legal responsibility for evaluating new and significant information, and it is the Commission that has the resources to carry out that responsibility. If the Commission fails to establish such a process, intervenor groups will be placed in the position of rushing to file contentions, rulemaking comments, and motions to re-open closed hearing records, based on whatever evaluations they are able to make of slowly-emerging and ever-evolving information from the accident. Such a process would not only be cumbersome, but its effectiveness would be limited by whatever limitations the intervenors or petitioners had on their resources for making a technical evaluation of the information yielded by the accident. It would place an unfair burden on intervenors and petitioners by forcing them to perform analyses that should be performed by the government in the first instance. And It would leave open the possibility of inconsistent ASLB decisions, which the Commission eventually would have to resolve.

Finally, the Commission should exercise its supervisory jurisdiction here because this petition seeks action in the non-adjudicatory context as well as the context of pending adjudications. The rulemaking proceedings for certification of the AP1000 and ESBWR designs are being conducted by the NRC Staff, over which only the Commission has authority. In addition, the Staff will be responsible for preparing the environmental and safety analyses requested by this petition.

**B. The NRC Must Comply With NEPA and the AEA in Considering The Lessons Learned From the Fukushima Accident.**

Both the AEA and NEPA place a burden on the NRC to address safety and environmental issues before issuing licensing decisions for nuclear reactors. These statutes preclude the NRC from issuing licenses or approving standardized reactor designs until it has completed its investigation of the Fukushima accident and considered the safety and environmental implications of the accident with respect to its regulatory program. In order to comply with those statutes, the Commission should suspend all licensing decisions, including certification of standardized design applications, pending conclusion of its investigation and issuance of proposed safety measures and environmental decision-making documents. In addition, it should suspend all pending hearings and rulemakings with respect to issues that are related to the Fukushima accident.

**1. AEA**

Under the AEA, the NRC may not issue a license for a reactor if it would pose an “undue risk” to public health and safety or the common security. 42 U.S.C. § 2311. “[P]ublic safety is the first, last, and a permanent consideration in any decision on the issuance of a construction permit or a license to operate a nuclear facility.” *Power Reactor Development Corp. v. International Union of Electrical, Radio and Machine Workers*, 367 U.S. 396, 402 (1961). The

list of issues identified for investigation in the Task Force Charter demonstrates that the Fukushima accident raises significant questions about the adequacy of the NRC's regulatory program on a wide range of important safety issues, including the safety of spent fuel storage, seismic and flooding risks, station blackout, emergency planning, and severe accident management guidelines. In addition the Fukushima accident once more raises longstanding questions about the effectiveness of the GE Mark 1 containment. Even taking into account the degree of discretion granted by federal courts to the NRC, to proceed with reactor licensing without concluding the Task Force's investigation would constitute a abuse of the NRC's discretion in its interpretation of the "adequate assurance" standard, because in the current climate of uncertainty, it would be almost impossible for the NRC to reach the "definitive finding" on safety required by *Power Reactor Development Corp.* It is also grossly inconsistent with the Commission's previous approach to the Three Mile Island accident, where the Commission prudently suspended all licensing actions while it considered the lessons to be learned from the accident.

## 2. NEPA

While the NRC may have some discretion in determining whether to increase its safety regulation of reactors under the Atomic Energy Act, NEPA deprives the NRC of any discretion to consider the environmental impacts of its proposed actions. *Silva v. Romney*, 473 F.2d 287, 292 (1st Cir. 1973) (holding that an agency's NEPA duties are "not discretionary, but are specifically mandated by Congress, and are to be reflected in the procedural process by which agencies render their decisions.") See also *Public Service Co. of New Hampshire v. NRC*, 582 F.2d 77, 81 (1st Cir. 1978) ("NEPA's mandate has been given strict enforcement in the courts,

with frequent admonitions that it is insufficient to give mere lip service to the statute and then proceed in blissful disregard of its requirements.”)

Even where the NRC has concluded that a proposed reactor operation meets its basic safety regulations, NEPA still requires the NRC to consider cost-effective alternatives for avoiding or mitigating environmental impacts that are reasonably foreseeable and yet not covered by safety regulations. *Limerick Ecology Action v. NRC*, 869 F.2d 730-31 (3rd Cir. 1989) (holding that the NRC could not rely on the sufficiency of a reactor license application under its safety regulations to avoid considering the cost-effectiveness of severe accident mitigation alternatives under NEPA). *See also* 40 C.F.R. § 1502.22(b)(1) (requiring consideration of “reasonably foreseeable” impacts which have “catastrophic consequences, even if their probability is low.”)

NEPA’s requirement to consider the environmental impacts of proposed actions continues even after a final EIS has been prepared, if new and significant information arises which could affect the outcome of the environmental analysis. 10 C.F.R. § 51.92(a). *See also Marsh*, 490 U.S. at 370-71. Here, by its own admission, the NRC has new information that concededly could have a significant effect on its regulatory program and the outcome of its licensing decisions for individual reactors. For the NRC to go ahead with licensing decisions and certification of standardized designs, ignoring the potential significance of this new information, would constitute a gross violation of NEPA. Even if the NRC ultimately concludes that the information does not have a significant effect on its licensing decisions, it must nevertheless follow NEPA’s procedures for considering the information, including preparation of an environmental assessment. *Marsh*, 490 U.S. at 385 (“NEPA’s mandate applies “regardless of [the agency’s] eventual assessment of the significance of [the] information.”)

Therefore, the position taken by the Commission in its Memorandum to the Third Circuit, that it may continue with the issuance of licenses and apply the lessons of the Fukushima accident retrospectively, is fundamentally inconsistent with both NEPA and the AEA. Instead, the Commission must take all necessary measures to protect the integrity of the NEPA decision-making process, by immediately suspending all pending licensing and related design-certification rulemaking decisions until it has addressed the significance of the new information revealed by the Fukushima accident in environmental assessments and/or EISs.<sup>4</sup>

**C. Licensing Decisions and Hearings on Issues Related to the Fukushima Accident Must be Suspended and Should be Suspended Pending Completion of the Task Force Investigation and Publication of Proposed Decisions.**

As discussed above, in order to ensure that it complies with the AEA and NEPA in responding to the regulatory implications of the Fukushima accident, the Commission must take action to delay issuance of licensing decisions while it studies and proposes to implement the lessons learned from the Fukushima accident. And even assuming for purposes of argument that such relief is not legally mandated, it is prudent and appropriate for the Commission to delay making licensing decisions until it has studied and proposed measures to implement the lessons of the Fukushima accident. The Commission should suspend its licensing actions, just as it did after the Three Mile Island accident – an event that was much less serious than the Fukushima accident.

Therefore Petitioners respectfully request the Commission to take the following actions:

- The Commission should suspend all decisions regarding the issuance of construction permits, new reactor licenses, COLs, ESPs, license renewals, or standardized design

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<sup>4</sup> Petitioners recognize that the NRC has the discretion to choose between site-specific and generic analyses in evaluating the environmental significance of the new information. *See, e.g., Baltimore Gas and Electric Co. v. Natural Resources Defense Council*, 462 U.S. 87, 101 (1983). The Commission completely lacks discretion, however, to ignore the requirements of NEPA.

certification pending completion by the NRC's Task Force of its investigation of the near-term and long-term lessons of the Fukushima accident and the issuance of any proposed regulatory decisions and/or environmental analyses of those issues;

- The Commission should suspend all proceedings with respect to hearings or opportunities for public comment, on any reactor-related or spent fuel pool-related issues that have been identified for investigation in the Task Force's Charter of April 1, 2011, including external event issues (i.e., seismic, flooding, fires, severe weather); station blackout; severe accident measures (e.g., combustible gas control, emergency operating procedures, severe accident management guidelines); implementation of 10 C.F.R. § 50.54(hh)(2) regarding response to explosions or fire; and emergency preparedness. The Commission should also instruct ASLB panels that are considering contentions to permit the parties an opportunity to make arguments regarding the relevance of their concerns to the Fukushima accident.
- The Commission should suspend all licensing and related rulemaking proceedings with regard to any other issues that are identified by the Task Force as the subject of its investigation. The proceedings should be suspended pending completion of the Task Force's investigation into those issues and the issuance of any proposed regulatory decisions and/or environmental analyses of those issues.
- The Commission should conduct an analysis, as required by NEPA, of whether the March 11, 2011 Tohoku-Chihou-Taiheiyo-Oki earthquake and ensuing radiological accident poses new and significant information that must be considered in environmental impact statements to support the licensing decisions for all new reactors and renewed

licenses. All environmental assessments should be published in draft form for public comment.

- The Commission should conduct a safety analysis of the regulatory implications of the March 11, 2011 Tohoku-Chihou-Taiheiyo-Oki earthquake and ensuing radiological accident. While emergency safety measures that arise from that analysis may be issued as enforcement orders, any long-term requirements should be issued as proposed rules, with appropriate opportunities for comment.
- The Commission should establish procedures and a timetable for raising new issues relevant to the Fukushima accident in pending licensing proceedings. The Commission should allow all current intervenors in NRC licensing proceedings, all petitioners who seek to re-open closed licensing proceedings, and all parties who seek to comment on design certification proposed rules, a period of 60 days following the publication of proposed regulatory measures or environmental decisions, in which to raise new issues relating to the Fukushima reactor accidents. The Commission should suspend requirements to justify the late-filing of new issues if their relevance to the Fukushima accident can be demonstrated.

**D. Emergency Action is Needed in Order to Ensure Compliance with AEA and NEPA.**

Petitioners request the Commission to grant the requested relief on an emergency basis, because several licensing proceedings are scheduled to conclude in the near future, including the COL proceeding for Vogtle Units 3 and 4, the license renewal proceeding for Pilgrim, and the rulemaking proceedings for the AP1000 standardized design and the ESBWR standardized design. In addition, the Commission has signaled its intent to continue with reactor licensing in spite of the emergence of new information from the Fukushima accident, by approving the

renewal of the Vermont Yankee license on March 21, 2011. Petitioners urgently request the Commission to reconsider that policy because of its fundamental inconsistency with NEPA and the AEA.

## VII. CONCLUSION

For the foregoing reasons, Petitioners request the Commission to grant the above-requested relief on an emergency basis.

Respectfully submitted,

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April 14-18, 2011

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FROM THE  
DIRECTOR OF  
THE JOY LUCK CLUB

April 12, 2011

# Japan's Reactors Still 'Not Stable,' U.S. Regulator Says

By MATTHEW L. WALD

WASHINGTON — The condition of the damaged Fukushima Daiichi reactors in Japan is "static," but with improvised cooling efforts they are "not stable," the chairman of the Nuclear Regulatory Commission told a Senate committee on Tuesday.

"We don't see significant changes from day to day," the chairman, Gregory B. Jaczko, said, while adding that the risk of big additional releases gets smaller as each day passes.

Long-term regular cooling of the reactors has not been re-established, nor has a regular way of delivering water to the spent-fuel pools, he told the Senate Environment and Public Works Committee. And when an aftershock hit the site and cut some offshore power supplies, he said, some pumps failed and cooling stopped for 50 minutes.

The situation is "not stable" and will remain so until "that kind of situation would be handled in a predictable manner," he said.

Mr. Jaczko also offered a new theory about the cause of the explosions that destroyed the secondary containment structures of several of the reactors. The prevailing theory has been that hydrogen gas was created when the reactor cores overheated and filled with steam instead of water; the steam reacts with the metal, which turns into a powder and then gives off hydrogen.

The Tokyo Electric Power Company, which operates the nuclear plant, intended to vent the excess steam as well as the hydrogen outside of the plant, but experts have suggested that when operators tried this, the vents ruptured, allowing the hydrogen to enter the secondary containments.

But Mr. Jaczko said Tuesday that the explosions in the secondary containments might have been caused by hydrogen created in the spent-fuel pools within those containments.

If true, that would mean that the introduction of hardened vents at reactors at nuclear plants in the United States — cited as an improvement that would prevent such an explosion from happening — would not in fact make any difference.

That theory also raises the possibility that it may be safer to move some of the spent fuel out of the pools in the containment structures and into dry storage, an idea that is attracting some support in Congress. Spent nuclear fuel must remain in water for the first five years or so to cool but can then be stored in small steel-and-concrete silos with no moving parts.

The industry uses these “dry casks” only when its pools are full. And so far the regulatory commission has said that pool and cask storage are equally safe. Still, some industry executives would like to tap the Nuclear Waste Fund, federal money set aside for a permanent waste repository, to pay for cask storage, an idea that is also favored by some environmentalists.

Mr. Jaczko's statement on the possible source of the hydrogen is the third big reversal in commission statements on the nuclear crisis at Fukushima.

Commission officials have also seemed less certain after stating that the spent-fuel pool in the No. 4 reactor was empty or close to empty, a situation that was evidently the basis for recommending a 50-mile evacuation for Americans in the plant's vicinity. Commission experts also said that radiation readings suggested that core material had slipped out of the vessel of the No. 2 reactor and entered a drywell in the primary containment, only to retreat again on whether that was in fact the case.

Mr. Jaczko also signaled that the regulatory commission itself was shifting from an extreme alert mode to a more sustainable long-term effort to monitor Japan's crisis. Staffing in the commission's round-the-clock emergency center at its headquarters in Rockville, Md., has been reduced, he said, with many staff members returning to their regular duties but available for consultation when events warrant.

He drew praise from the committee's chairwoman, Senator Barbara Boxer, a California Democrat, but criticism as well. She is seeking an especially high level of scrutiny for two twin-reactor plants in her state, the only ones that the commission says are in zones of high seismic activity. Mr. Jaczko said that all reactors were being evaluated.

She countered by saying that those two plants, Diablo Canyon and San Onofre, were at the highest risk. Mr. Jaczko said they were not, explaining that they were designed with the earthquake risk in mind and that risks to American plants generally were small.

Ms. Boxer replied that the Japanese had said the same thing, at least until the March 11 accident. "It's eerie to me," she said. "I don't sense enough humility from all of us here."

Another witness, Charles G. Pardee, the chief operating officer of Exelon Generation, the largest nuclear operator in the United States, also testified that the nation's nuclear plants were designed for the worst natural disaster observed in their areas, plus a substantial margin.

Thomas B. Cochran, a physicist at the Natural Resources Defense Council, gave some credit to American operators. Worldwide, he said, reactors are "not sufficiently safe," but "the next nuclear power plant disaster is more likely to occur abroad than in the U.S."

But the industry will have to rethink its practices nonetheless, he said. "If the nuclear power industry is to have a long-term future, attention must be paid to existing operating reactors," Mr. Cochran said. He ticked off a long list of factors, including American reactors that share Fukushima's basic design, that would be grounds for phasing them out.

April 18, 2011

**UNITED STATES OF AMERICA**  
**NUCLEAR REGULATORY COMMISSION**  
Before the Secretary

\_\_\_\_\_  
In the Matter of )  
 )  
NEXTERA ENERGY SEABROOK (LLC) )  
[Also Known As FLORIDA POWER & LIGHT] )  
 )  
SEABROOK NUCLEAR POWER PLANT )  
 )  
Regarding the Renewal of Facility Operating License )  
No-NFP-86 for a 20-Year Period ) DOCKET NO. 50-443-LR )  
\_\_\_\_\_ )

**CERTIFICATE OF SERVICE**  
**EMERGENCY PETITION TO SUSPEND ALL PENDING REACTOR LICENSING**  
**DECISIONS AND RELATED RULEMAKING DECISIONS**  
**PENDING INVESTIGATION OF LESSONS LEARNED FROM FUKUSHIMA DAIICHI**  
**NUCLEAR POWER STATION ACCIDENT**

The Petitioners certify that a copy of the foregoing “Emergency Petitioner to Suspend all Pending Reactor Licensing Decisions and Related Rulemaking Decisions Pending Investigation of Lessons Learned from Fukushima Daiichi Nuclear Power Station Accident” has been provided to the Electronic Information Exchange by Digital Certificate for service to the listed individuals and all others on the service list in this proceeding on this 18th day of April, 2011.

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April 18, 2011

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**Subject:** Seabrook Station, Docket 50-443-LR - Supporting Documents for Emergency Petition to Suspend Proceeding  
**Date:** Wednesday, April 20, 2011 7:49:59 AM  
**Attachments:** [Declaration of Arjun Makhijani.pdf](#)  
[Letter to Commission.pdf](#)  
[COS Letter to Commission.pdf](#)

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In the matter of the license renewal application for Seabrook Station Unit 1, Docket No. 50-443-LR, the Office of the Secretary has received via EIE the attached filing on 4/20/11 from petitioners Beyond Nuclear, Seacoast Anti-Pollution league, and Sierra Club of New Hampshire) –

**LETTER TO COMMISSIONERS, DECLARATION OF ARJUN MAKHIJANI, AND CERTIFICATE OF SERVICE (IN SUPPORT OF EMERGENCY PETITION TO SUSPEND ALL PENDING REACTOR LICENSING DECISIONS AND RELATED RULEMAKING DECISIONS PENDING INVESTIGATION OF LESSONS LEARNED FROM FUKUSHIMA DAIICHI NUCLEAR POWER STATION ACCIDENT)**

**ACTION OFFICE: OCAA  
APPROPRIATE**

**ACTION:**

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**DECLARATION OF DR. ARJUN MAKHIJANI IN SUPPORT OF  
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DECISIONS AND RELATED RULEMAKING DECISIONS  
PENDING INVESTIGATION OF LESSONS LEARNED FROM FUKUSHIMA DAIICHI  
NUCLEAR POWER STATION ACCIDENT**

I, Arjun Makhijani, declare as follows:

**Introduction and Statement of Qualifications**

1. I am President of the Institute for Energy and Environmental Research (“IEER”) in Takoma Park, Maryland. Under my direction, IEER produces technical studies on a wide range of energy and environmental issues to provide advocacy groups and policy makers with sound scientific information and analyses as applied to environmental and health protection and for the purpose of promoting the understanding and democratization of science. A copy of my curriculum vitae is attached.

2. I am qualified by training and experience as an expert in the fields of plasma physics, electrical engineering, nuclear engineering, the health effects of radiation, radioactive waste management and disposal (including spent fuel), estimation of source terms from nuclear facilities, risk assessment, energy-related technology and policy issues, and the relative costs and benefits of nuclear energy and other energy sources. I am the principal author of a report on the 1959 accident at the Sodium Reactor Experiment facility near Simi Valley in California, prepared as an expert report for litigation involving radioactivity emissions from that site. I am also the principal author of a book, *The Nuclear Power Deception – U.S. Nuclear Mythology from Electricity “Too Cheap to Meter” to “Inherently Safe” Reactors* (Apex Press, New York, 1999, co-author, Scott Saleska), which examines, among other things, the safety of various designs of nuclear reactors.

3. I have written or co-written a number of other books, reports, and publications analyzing the safety, economics, and efficiency of various energy sources, including nuclear power. I am also the author of *Securing the Energy Future of the United States: Oil, Nuclear and Electricity Vulnerabilities and a Post-September 11, 2001 Roadmap for Action* (Institute for Energy and Environmental Research, Takoma Park, Maryland, December 2001). In 2004, I wrote “Atomic

Myths, Radioactive Realities: Why nuclear power is a poor way to meet energy needs,” *Journal of Land, Resources, & Environmental Law*, v. 24, no. 1 at 61-72 (2004). The article was adapted from an oral presentation given on April 18, 2003, at the Eighth Annual Wallace Stegner Center Symposium entitled, “Nuclear West: Legacy and Future,” held at the University of Utah S.J. Quinney College of Law. In 2008, I prepared a report for the Sustainable Energy & Economic Development (SEED) Coalition entitled *Assessing Nuclear Plant Capital Costs for the Two Proposed NRG Reactors at the South Texas Project Site*.

4. I am generally familiar with the basic design and operation of U.S. nuclear reactors and with the safety and environmental risks they pose. I am also generally familiar with materials from the press, the Japanese government, the Tokyo Electric Power Company, the French government safety authorities, and the U.S. Nuclear Regulatory Commission (“NRC”) regarding the Fukushima Daiichi accident and its potential implications for the safety and environmental protection of U.S. reactors.

5. The purpose of my declaration is to explain the reasons I believe that although the causes, evolution, and consequences of the Fukushima accident are not yet fully clear, the accident is already presenting new and significant information regarding the risks to public health and safety and the environment posed by the operation of nuclear reactors. I will also explain why I believe that integration of this new information into the NRC’s licensing process could affect the outcome of safety and environmental analyses for reactor licensing and relicensing decisions by resulting in either the denial of licenses or license extensions or the imposition of new conditions and/or new regulatory requirements. It could also affect the NRC evaluation of the fitness of new reactor designs for certification. It is therefore reasonable and necessary to suspend licensing and re-licensing decisions and standardized design certifications until the NRC completes its review of the safety and regulatory implications of the Fukushima accident.

### **Statement of Facts**

6. Although many details about the Fukushima reactor accident remain unclear, the general contours of the accident are described in NRC Information Notice No. 2011-08 (March 31, 2011) (NRC Accession No. ML 110830824) as follows:

On March 11, 2011, the Tohoku-Taiheiyou-Oki earthquake occurred near the east coast of Honshu, Japan. This magnitude 9.0 earthquake and the subsequent tsunami caused significant damage to at least four of the six units of the Fukushima Daiichi nuclear power station as the result of a sustained loss of both the offsite and onsite power systems. Efforts to restore power to emergency equipment were hampered and impeded by damage to the surrounding areas due to the tsunami and earthquake.

Units 1, 2 and 3 were operating at the time of the earthquake. Following the loss of electric power to normal and emergency core cooling systems and the subsequent failure of backup decay heat removal systems, water injection into the cores of all three reactors was compromised, and reactor decay heat removal could not be maintained. The operator of the plant, Tokyo Electric Power Company, injected sea water and boric acid into the reactor vessels of these three units, in an effort to cool the fuel and ensure that the

reactors remained shut down. However, the fuel in the reactor cores became partially uncovered. Hydrogen gas built up in Units 1 and 3 as a result of exposed, overheated fuel reacting with water. Following gas venting from the primary containment to relieve pressure, hydrogen explosions occurred in both units and damaged the secondary containments.

Units 3 and 4 were reported to have low spent fuel pool (SFP) water levels.

Fukushima Daiichi Units 4, 5 and 6 were shut down for refueling outages at the time of the earthquake. The fuel assemblies for Unit 4 had recently been offloaded from the reactor core to the SFP. The SFPs for Units 5 and 6 appear to be intact. Emergency power is available to provide cooling water flow through the SFPs for Units 5 and 6.

The damage to Fukushima Daiichi nuclear power station appears to have been caused by initiating events beyond the design basis of the facilities.

7. In a March 21, 2011, briefing, Bill Borchardt, the NRC's Executive Director for Operations, stated that the NRC believes that hydrogen explosions occurred on March 12, 14, and 15 in the reactors of Units 1, 3, and 2 respectively, in that order. He also stated that the NRC believed that a hydrogen explosion had occurred at spent fuel pool of Unit 4 on March 15 due to overheated spent fuel in the pool. Briefing on NRC Response to Recent Nuclear Events in Japan, Transcript at 11.

8. According to Mr. Borchardt, the NRC believes that Units 1, 2, and 3 have likely sustained some degree of core damage. *Id.* Further, he stated that the loss of emergency AC power was caused by the tsunami and not the earthquake. Therefore, he concluded that the NRC believes that the "damage in Fukushima was not really caused by the earthquake; it was the tsunami that came afterwards." *Id.*

9. At the outset of the emergency, large volumes of sea water were used to cool the reactors. The salt water injections were then replaced by fresh water injections. While judgments have changed over time, and much remains uncertain, we note here that as of March 21, Mr. Borchardt also stated that "[t]he radiation releases and the dose rates that we've seen on site, I think, were primarily influenced by the condition of the Units Three and Four spent fuel pools." *Id.* at 21.

10. The French authorities also reported that sea water was used to cool spent fuel pools Units 3 and 4. *Communiqué de presse n°17 du mardi 22 mars 2011 à 10h00 Séisme au Japon - L'ASN fait le point sur la situation de la centrale nucléaire de Fukushima Daiichi : Les travaux en vue de rétablir l'alimentation électrique se poursuivent mais la mise sous tension n'est pas réalisée Paris, le 22/03/2011 10:27, <http://japon.asn.fr/index.php/Site-de-l-ASN-Special-Japon/Communiqués-de-presse> (March 22, 2011).* They also reported that three spent fuel pools (of Units 2, 3, and 4) appear to have experienced boiling at some point. *Note d'information : Situation des réacteurs nucléaires au Japon suite au séisme majeur survenu le 11 mars 2011 : Point de situation du 18 mars 2011 à 14 heures, Institut de Radioprotection et de Sécurité Nucléaire (March 18, 2011),*

[http://www.irsn.fr/FR/Actualites\\_presse/Actualites/Documents/IRSN\\_Seisme-Japon\\_Point-situation-18032011-14h.pdf](http://www.irsn.fr/FR/Actualites_presse/Actualites/Documents/IRSN_Seisme-Japon_Point-situation-18032011-14h.pdf) -- hereafter IRSN March 18, 2011)

11. In response to the Fukushima reactor accident, the NRC announced the formation of a “senior level agency task force to conduct a methodical and systematic review” of NRC processes and regulations. COMGBJ-11-0002, Memorandum from Chairman Jaczko to Commissioners, re: NRC Actions Following the Events in Japan at 1 (March 21, 2011) (NRC Accession No. ML110800456). The purpose of the task force is to “determine whether the agency should make additional improvements to our regulatory systems and make recommendations to the Commission for its policy direction.” *Id.*

12. Chairman Jaczko’s memorandum specifies both a near-term review and a longer-term review. For the near-term review, the Commission required the task force to evaluate issues “affecting domestic operating reactors of all designs” in areas that include “protection against earthquake tsunami, flooding, hurricanes; station blackout and a degraded ability to restore power; severe accident mitigation; emergency preparedness; and combustible gas control.” *Id.* at 1. The Commission instructed the task force to complete the report in 90 days. In the meantime, the task force was instructed to provide a 30-day “quick look report” and another “status” report in 60 days. *Id.*

13. The “longer term” review would begin “as soon as NRC has sufficient technical information from the events in Japan with the goal of no later than the completion of the 90 day near term report.” *Id.* at 2. The longer-term study should “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.” *Id.* For the longer-term effort, the Commission instructed the task force to “receive input from and interact with all key stakeholders.” *Id.* The Commission specified that within six months after commencing the evaluation, the task force should “provide a report with recommendations, as appropriate, to the Commission.” *Id.*

14. The “Task Force to Conduct a Near-term Evaluation of the Need for Agency Actions Following the Events in Japan” (“Task Force”) has formed and its charter has been approved. The Task Force aims to accomplish the following:

- “Evaluate currently available technical and operational information from the events that have occurred at the Fukushima Daiichi nuclear complex in Japan to identify potential or preliminary near-term/immediate operational or regulatory actions affecting domestic reactors of all designs, including their spent fuel pools. The task force will evaluate, at a minimum, the following technical issues and determine priority for further examination and potential agency action:
  - External event issues (e.g. seismic, flooding, fires, severe weather)
  - Station blackout
  - Severe accident measures (e.g., combustible gas control, emergency operating

procedures, severe accident management guidelines)

- 10 CFR 50.54 (hh)(2) which states, “Each licensee shall develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to explosions or fire, to include strategies in the following areas: (i) Fire fighting; (ii) Operations to mitigate fuel damage; and (iii) Actions to minimize radiological release.” Also known as B.5.b.
- Emergency preparedness (e.g., emergency communications, radiological protection, emergency planning zones, dose projections and modeling, protective actions)
- Develop recommendations, as appropriate, for potential changes to NRC’s regulatory requirements, programs, and processes, and recommend whether generic communications, orders, or other regulatory actions are needed.”

Charter for the Nuclear Regulatory Commission Task Force to Conduct a Near-Term Evaluation of the Need for Agency Actions Following the Events in Japan at 1 (April 1, 2011) (NRC Accession No. ML11089A045).

15. With respect to the longer-term review, the Charter states that the short-term report will make: “[r]ecommendations for the content, structure, and estimated resource impact....” *Id.* at 1.

#### **Statement of Professional Opinion**

16. I agree with the Commission’s approach of conducting a long-term investigation of the regulatory implications of the Fukushima accident, in addition to its short-term investigation of whether immediate actions are needed. In my opinion, the longer-term investigation is necessary to address a number of respects in which the Fukushima accident is unprecedented in the sense that its characteristics are not anticipated in NRC safety regulations or environmental analyses. Thus, it is providing new and significant insights into the inadequacy of NRC regulations to protect public health and safety and the inadequacy of NRC environmental analyses to evaluate the potential health, environmental and economic costs of reactor and spent fuel pool accidents. This significant new information covers the following major topics:

- Unanticipated compounding effects of simultaneous accidents at multiple co-located reactor units, including spent fuel pools.
- Unanticipated risks of spent fuel pool accidents, including explosions.
- Frequency of severe accidents and explosions.
- Inadequacy of safety systems to respond to long-duration accidents.
- Nuclear crisis management with contaminated control and turbine buildings that have lost power
- Unanticipated aggravating effects of some emergency measures.
- Health effects and costs of severe accidents

- The hydrogen explosions at Fukushima and their implications for aircraft crash evaluations.

**Unanticipated compounding effects of simultaneous accidents at multiple co-located reactor units, including spent fuel pools.**

17. Perhaps the most unprecedented feature of the Fukushima accident is that three reactors and four spent fuel pools have been stricken at the same site. In the entire history of nuclear power, there has not been another major accident (level 5 or above) that has involved multiple major sources of radioactivity -- including multiple reactors and multiple spent fuel pools. For instance, the Fukushima Daiichi complex is the first to have experienced multiple hydrogen explosions in various facilities, all as part of the same event.

18. The NRC has long followed the practice of allowing new reactors to be built at existing sites, without examining the consequences of simultaneous failure of existing and new reactors through common mode failures such as complete station blackouts and loss of fresh water supply. The NRC also proposes to co-locate a significant number of new reactors at existing reactor sites. Examples include Bellefonte, Calvert Cliffs, Comanche Peak, Fermi, North Anna, Shearon Harris, Turkey Point, the South Texas Project, and Vogtle.

19. But the Fukushima accident graphically demonstrates that NRC's failure to evaluate the safety and environmental implications of co-locating multiple reactors was incorrect. Specifically, when a new reactor is to be sited at a location where there are existing reactors, the entire system at the site should be re-examined in addition to whatever additional impacts the new unit(s) might create. The EISs for these new reactors and the designs on which they rely should consider the significant new information revealed by the Fukushima accident about the potential for simultaneous multiple failures and accidents in existing and new reactors and/or spent fuel pools.

**Unanticipated risks of spent fuel pool accidents, including explosions.**

20. Another unprecedented feature of the Fukushima accident is that an explosion occurred in Unit 4 despite the fact that there was no fuel in the reactor. The entire core had been unloaded into the spent fuel pool prior to March 11, 2011; the reactor was down for maintenance. A loss of cooling apparently led to boiling and to hydrogen generation, which appears to be the likely cause of the major explosion and ensuing damage to the reactor building of Unit 4. Further, as noted above the spent fuel pools of Units 2 and 3 also appear to have experienced boiling of the cooling water at some point. It should be noted that much detail remains to be learned about all three spent fuel pools, especially as to what went on in the first week of the accident.

21. The apparent occurrence of spent fuel pool accidents at Fukushima significantly undermines the NRC's conclusion that high-density pool storage of spent fuel poses a "very low risk." *The Attorney General of Commonwealth of Massachusetts; the Attorney General of California; Denial of Petitions for Rulemaking*, 73 Fed. Reg. 46,204, 46,207 (August 8, 2008). That conclusion is all the more subject to question in light of the fact that spent fuel in U.S. pools is typically packed more tightly than in the pools at Fukushima. U.S. reactors, including reactors

that are candidates for license renewal, use high-density pool storage for spent fuel. Fukushima indicates that the NRC policy that allows such storage needs to be revisited. Given that onsite storage of spent fuel may continue for decades, these circumstances also call for a thorough reexamination of the spent fuel storage capacity, spent fuel pool location, and configuration of new reactor designs. For instance, should the construction and use of above ground-level spent fuel pools in reactor buildings be allowed, as is the case with the advanced boiling water reactor (“ABWR”)? The NRC should examine the potentially exacerbating relationship between reactor core accidents and spent fuel pool accidents, for both existing reactor designs and new reactor designs. In addition, environmental impact statements (“EISs”) for license renewal and new reactor licensing should reexamine the relative costs and benefits of measures to mitigate the environmental impacts of pool fires and/or explosions. Measures would include reducing the density at which fuel is stored in pools, using dry storage for as much of each reactor’s inventory of spent fuel as safety will allow, and dry storage of all spent fuel at closed reactors, a few years after closure.

### **Frequency of severe accidents and explosions**

22. The NRC must also re-examine the frequency per reactor per year of spent fuel pool accidents as well as the frequency of core damage events. The NRC’s current spent fuel damage assessments are based on a best estimate of a spent fuel pool fire probability of about  $2 \times 10^{-6}$  per reactor-year, including the probability of structural failure during a seismic event NUREG-1353, *Regulatory Analysis for the Resolution of Generic Issue 82, “Beyond Design Basis Accidents in Spent Fuel Pools”*, at 5-5 and Table 5.1.3 (1989). This means one such accident for every 500,000 reactor-years. The NRC’s estimate of the frequency of spent fuel pool loss of cooling from all causes other than earthquake-induced structural failure is even lower:  $1.5 \times 10^{-7}$ . The conditional probability of a fire in the event of a loss of cooling is estimated to be 1.0 for a PWR and 0.25 for a BWR. *Id.* at 4-36. Based on this, the overall probability estimate in NUREG-1353 for a non-seismic-induced spent fuel pool fire for a PWR is  $1.5 \times 10^{-7} \times 1.0 = 1.5 \times 10^{-7}$ ; for a BWR it is  $1.5 \times 10^{-7} \times 0.25 = 4 \times 10^{-8}$  for a BWR – in the latter case is it one spent fuel pool fire every 25 million reactor-years. Hydrogen explosions originating in the spent fuel pool were not considered. Further, at least two spent fuel pools at Fukushima (Units 3 and 4) that seem to have experienced boiling as well as the destruction of the portions of the reactor building that are a barrier between the pool surface and the environment. According to the French safety authorities, the spent fuel pool in Unit 2 also experienced boiling. IRSN March 18, 2011 *op. cit.* One reactor building, that of Unit 4, appears to have experienced a hydrogen explosion, with the hydrogen apparently emanating from the spent fuel pool (see Paragraph 7 above). The explosion destroyed a good part of the reactor building. Any damage to the spent fuel pool structures and equipment, to the fuel assemblies in the pools, as well as to the racks remains to be fully assessed. It appears that the only way that a significant amount of hydrogen could originate in a spent fuel pool is through uncovering of the spent fuel and the reaction of the zirconium in the fuel rods with steam. Explosions destroyed substantial portions of the reactor buildings of Units 1 and 3 as well; it appears that there were also significant releases of radioactivity from the spent fuel pool of Unit 3. In view of these facts, the NRC’s estimate of loss of cooling probability accompanied by a fire is far too low, probably by orders of magnitude. It appears that the overall principal initiating event in the station blackout and failure of emergency core cooling was not the earthquake but the tsunami, though the earthquake may have caused equipment damage that

led to or contributed to some of the spent fuel pool problems. This indicates that the non-earthquake station blackout probabilities will need to be revisited. Further, the NRC's list of events leading to spent fuel structural failure does not include hydrogen explosions due to loss of emergency core cooling in the reactor (NUREG-1353, *op. cit.*, Table 4.7.1 at 4-36), which appears to have been the cause of the damage to the structures of reactor buildings 1 and 3 and possibly to the spent fuel pool of Unit 3. It may be that many details of the analysis will be different for each of the four spent fuel pools. Whatever the details, the events so far make it quite clear that the NRC needs to thoroughly reevaluate the probability of severe spent fuel pool accidents as well as the kinds of events that could initiate damage and major releases of radioactivity from spent fuel pools. Further, in view of the fact that three BWRs appear to have had core damage, the NRC also needs to evaluate whether presently operating reactors, notably (but not only) BWRs, meet the Commission's target of limiting annual core damage frequency to the  $10^{-4}$  to  $5 \times 10^{-5}$  per reactor-year range for reactors (NUREG-1353, *op. cit.*, at ES-2 and ES-3).

23. In conducting its review, the NRC needs to thoroughly revisit its methods for estimating the probabilities and mechanisms of hydrogen explosions and fires in spent fuel pools (with and without a natural disaster component) as well as the methods for estimating hydrogen explosions, and meltdowns in existing and new light water reactor designs. For instance, the computer code used in evaluating the accidents assumes that "[t]he geometry of the fuel assemblies and racks remains undistorted." NUREG-1353, *op. cit.* at 4-8. To judge by the photographs and videos of the damage, this assumption is unlikely to be correct at least for spent fuel pools in Units 3 and 4. As another example, hydrogen generation due to partial uncovering of spent fuel but with water still remaining in the pool is not included. Rather, the computer program assumes that "[t]he water drains instantaneously from the pool." *Id.* This is important because if the investigation confirms that hydrogen was indeed generated in the spent fuel pool of Unit 4, the exothermic zirconium-steam reaction that creates it would be an additional source of heat for causing the accident to develop more rapidly and destructively than assumed by the NRC.

24. More generally, the events at three reactors and four spent pools have drastically changed the underlying frequency data that should go into the estimation of the probability of severe accidents at light water reactors. As a result, integration of the Fukushima data into NRC analyses of risks could lead to significant changes in design of new reactors and also lead to modifications at existing reactors, as would be required for protection of public health and safety under 10 CFR 50.109. Specifically, the Fukushima accident indicates that the basis of the NRC's conclusion in NUREG-1353 that dense storage of spent fuel in pools is safe and that dry storage is not warranted is incorrect.

### **Inadequacy of safety systems to respond to long-duration accidents**

25. U.S. reactors appear to have insufficient backup power capacity to maintain safety equipment during a prolonged severe accident. The Fukushima accident, in which the emergency diesel generation system started but then failed very soon after the tsunami and the battery backup ran out of power in eight hours. The accident illustrates the serious environmental risk posed by insufficient backup power when catastrophic events destroy both offsite power supplies and onsite infrastructure. These risks need to be taken into account in safety and environmental analyses for all prospective NRC licensing decisions. The fact that

there was a complete station blackout at Fukushima accompanied by a failure of fresh water supply that forced sea water use for days (*Communiqué de presse n°17 du mardi 22 mars 2011 à 10h00 Séisme au Japon - L'ASN fait le point sur la situation de la centrale nucléaire de Fukushima Daiichi : Les travaux en vue de rétablir l'alimentation électrique se poursuivent mais la mise sous tension n'est pas réalisée Paris, le 22/03/2011 10:27, <http://www.asn.fr/index.php/Haut-de-page/Presse/Actualites-ASN/Communique-de-presse-n-17-du-mardi-22-mars-2011-a-10h00>) clearly points to the need for a full review of the depth (in terms of number of levels) of backup systems, the length of time of emergency power supply operability, the location of these power supplies, and the relation of the power supplies to ad hoc emergency pumping and emergency water supplies, including in the context of potential major damage to multiple units at a single site.*

### **Nuclear crisis management with contaminated control and turbine buildings that have lost power**

26. Another critical and unanticipated feature of the Fukushima accident is that the control rooms of Units 1, 2, and 3 became highly contaminated in the course of the first week of the accident, according to the French safety authorities. IRSN March 18, 2011 *op. cit.*. This has made re-establishment of normal cooling more difficult, apart from the question of on-site or offsite power supply. Turbine buildings also became contaminated with radioactive water in the course of the accident. *Fukushima Daiichi Nuclear Power Station: the result of measurement of sub drain, [http://www.tepco.co.jp/en/press/corp-com/release/betu11\\_e/images/110331e18.pdf](http://www.tepco.co.jp/en/press/corp-com/release/betu11_e/images/110331e18.pdf) and The detection of radioactive materials in the water on 1st basement of turbine building at the site of Fukushima Daiichi Nuclear Power Station: Press Release (Mar 31,2011), <http://www.tepco.co.jp/en/press/corp-com/release/11033112-e.html>.*

27. The loss of power in and radioactive contamination of the control rooms and turbine buildings points to the need to review the piping and ventilation arrangements of these facilities, and the likely need to isolate them more thoroughly from contaminated air and water during beyond-design-basis accidents. Based on the information available so far about the Fukushima event, the risks of turbine building contamination would appear to be greater for boiling water reactors than for pressurized water reactors since steam generated from primary water is used to directly drive the turbines; in PWRs the heated primary water is routed to steam generators and not to the turbines.

### **Unanticipated aggravating effects of some emergency measures**

28. Light water reactors are not designed to be cooled by sea water. Thus, the fact that TEPCO was forced to use sea water for emergency cooling for an extended period is a critical feature of the accident that needs evaluation. For instance, salt from sea water deposited on the fuel rods may have blocked or partially blocked some cooling channels during the accident. This raises the question of whether the use of sea water may have aggravated the fuel damage. It also raises the question of whether salt deposits may have interfered with the neutron absorption capacity of the control rods thereby increasing the likelihood of an accidental criticality. An understanding of these issues is important to the understanding of the accident and to any design and or emergency operations changes that may be needed.

## Health effects and costs of severe accidents

29. While a detailed evaluation will take time and more data, the Fukushima accident indicates that the health consequences of a severe reactor accident and/or spent fuel pool fire could be significantly greater than estimated by the NRC in EISs for license renewal and new reactor licensing. For instance, the NRC estimates an average population risk (population dose multiplied by probability) in a 50-mile radius of only 16 person-rem per year per spent fuel pool – or 480 rem in 30 years. The dose estimate was recently used in the 2009 draft Generic Environmental Impact Statement (“GEIS”) by the NRC. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants Appendices, Draft Report for Comment*, NUREG-1437, Volume 2, Rev. 1 at E-35 (July 2009). See also NUREG-1353, *op. cit.*, at ES-3. The estimate of 480 rem in 30 years translates into a probability of just 0.27 fatal cancers over 30 years in a population of more than 2.5 million (using a risk factor of 0.000575 fatal cancers per rem). The NRC’s best estimate of the total population dose in the event of an accident was 8 million person-rem (NUREG-1353, *op. cit.* at 5-4, Table 5.1.2) – which translates into 4,600 excess cancer deaths in a fifty-mile radius. The NRC put the worst case population dose estimate at just over three times the best estimate – 26 million person-rem. NUREG-1353, *op. cit.* Table 5.1.2 at 5-4. But if the probability is much higher for a single failure and if multiple failures can happen at the same site, then the number of expected fatal cancers would be higher, all other things being equal. Further, it is necessary to consider that the spent fuel pools in the United States are more typically full than the ones at Fukushima. In its review of Fukushima, the NRC should revisit the higher of the health damage estimates for spent fuel pool accidents at closed power plants in a 1997 study by Brookhaven National Laboratory. R.J. Travis, R.E. Davis, E.J. Grove, M.A. Azarm, *A Safety and Regulatory Assessment of Generic BWR and PWR Permanently Shutdown Nuclear Power Plants*, BNL-NUREG-52498, NUREG/CR-6451 (Brookhaven National Laboratory, 1997), [http://www.osti.gov/bridge/product.biblio.jsp?osti\\_id=510336](http://www.osti.gov/bridge/product.biblio.jsp?osti_id=510336). NUREG-/CR6451 estimated the worst case population dose in a 50 mile radius at 81 million person-rem for both BWRs and PWRs. *Id.* at Tables 4-1 and 4-2. This is more than three times higher than in the estimate in NUREG-1353 cited above.

30. The Fukushima accident also indicates that the economic costs of a spent fuel pool accidents may be much higher than the current estimates used by the NRC. In NUREG-1353, the worst case property damage was estimated at \$30 billion (1988 dollars) in a 50-mile radius. *Id.* at Table 5.1.2. That amount is about \$50 billion in 2010 dollars (constant 2010 dollar estimates calculated using the Gross Domestic Product deflators of the U.S. Department of Commerce, as published by the St. Louis Federal Reserve at <http://research.stlouisfed.org/fred2/data/GDPDEF.txt> and rounded to the nearest \$10 billion). But in the Brookhaven study, the worst-case property damage in a 50-mile radius was estimated at \$280 billion for BWRs (*Id.* at Table 4-2), which would be about \$370 billion in 2010 dollars – or more than seven times the NUREG-1353 estimate cited above. The worst case damages in a 500-mile radius were estimated at \$546 billion for U.S. boiling water reactors (“BWRs”) plus 138,000 excess cancer deaths (*Id.* at Table 4-2) with a high population density. The damage amount would be about \$720 billion in 2010 dollars. Results were slightly higher for pressurized water reactor spent fuel pools. *Id.* at Table 4-1. The overall 500-mile population density

assumed in the Brookhaven study was lower than the population density near several U.S. reactors, notably in the Northeast. Further, the Brookhaven study itself notes its calculations would not “reasonably envelope” the situation (including projected population growth) at certain locations where there are reactors close to major metropolitan centers. “There are several existing plant sites (i.e., Indian Point, Limerick, and Zion) that precede the issuance of R.G. 4.7 and exceed the site population distributions generally considered acceptable by current NRC policy.”) *Id.* at 3-4 and footnote at 3-4. Moreover, certain assumptions of the 1997 Brookhaven study may prove optimistic especially in densely populated areas. For instance, the study assumes that the population could be evacuated in one day, should evacuation become necessary. *Id.* at 3-8. As another example, the relocation radius was only 10 miles, as per NUREG-1150. *Id.* at 3-8 and NUREG-1150, *An Assessment for Five Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants: Final Summary Report*, U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research Vol. 1 at 2-20 (December 1990), <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1150/v1/sr1150v1-intro-and-part-1.pdf>. The relocation radius around Fukushima is greater than 10 miles. Moreover the U.S. advised its citizens early on to evacuate within a 50-mile radius of Fukushima Daiichi. This indicates that emergency management criteria and procedures need to be revisited.

31. In view of the severe crisis with multiple units at Fukushima in a densely populated industrialized country where there has been both direct and indirect economic damage, the 1997 Brookhaven study provides a reasonable starting point for a reevaluation of spent fuel accident consequences. Of course, Fukushima shows that the results of the Brookhaven study must be reviewed in the context of the potential for multiple failures at a single site in both reactors and spent fuel pools. Evacuation and population assumptions will likely need to be changed. As a result, both the monetary damages and health effects estimates may have to be revised upwards, possibly by substantial amounts in densely populated areas. Further, Fukushima is showing that there has already been indirect economic damage in industries like shipping and manufacturing that are not directly affected by fallout. While, the long-term and overall direct and indirect costs of the reactor and spent fuel damages from the Fukushima accident will take time to be tallied, it is clear that they will be enormous.

### **Hydrogen explosions and implications for aircraft crash evaluations**

32. The Fukushima accident has revealed significant new information about the potential effects of hydrogen explosions. The estimated Unit 1 generation of hydrogen was 300 to 600 kg; for Units 2 and 3 it was 300 to 1,000 kg. Estimates were by an expert commissioned by AREVA. Matthias Braun, *The Fukushima Daiichi Incident*, AREVA, April 15, 2011, at 18, <http://www.wdr.de/tv/monitor//sendungen/2011/0407/pdf/areva-fukushima-report.pdf>. This indicates an urgent need to revisit the issue of aircraft crashes, deliberate or accidental, at existing reactors and spent fuel pools. The energy of the estimated amounts of hydrogen involved in the Fukushima explosions is far smaller than fuel in fully-loaded commercial jetliner – a type of crash that must be evaluated under NRC regulations. Five thousand gallons of jet fuel (not at all unusual for larger passenger jets -- the largest ones have much larger fuel capacities) have an energy content about four times as large as the largest estimate of the hydrogen explosions (1,000 kilograms of hydrogen gas) at Fukushima. Indeed, in light of Fukushima even a smaller, regional jet crash needs to be taken into account, especially for older

BWRs. Such damage needs to be evaluated both in the safety and environmental analyses. For instance, the Fukushima accident has demonstrated that evacuation planning in the circumstances of a natural disaster that is combined with a reactor accident is far more challenging than assumed by NRC emergency planning regulations.

## Conclusions

33. As discussed above in pars. 16 through 32, the Fukushima accident has already revealed an enormous amount of new information regarding the safety vulnerabilities and environmental risks that need to be taken into account in licensing of new reactors, the re-licensing of existing reactors, early site permits, emergency procedures for protecting the civilian population, and approval of standardized reactor designs in rulemakings.

34. I believe that if the significant new information emanating from the Fukushima Daiichi accident is taken into consideration in NRC safety and environmental analyses, it is likely to fundamentally alter the outcome of those analyses in important ways. In the safety arena, consideration of this new information is likely to result in more rigorous regulation with respect to issues such as loss of offsite power, hydrogen explosion prevention, the siting of more than one reactor at a single site, spent fuel accident and reactor accident probabilities, the re-racking of spent fuel pools, permitting extended storage of spent fuel in pools after decommissioning, and emergency planning.

35. In the environmental and health arenas, consideration of this significant new information is likely to result in higher accident probability estimates, new accident mechanisms for spent fuel pools, higher accident cost estimates, and higher estimates of the health risks posed by light water reactor accidents. These increased risk and cost estimates will lead to much more serious consideration of alternatives for avoidance or mitigation of environmental risks. For instance, although the Commission has long rejected low-density pool storage combined with dry onsite storage as an alternative for mitigating the effects of catastrophic pool fires, that option may now prove to be very cost-beneficial. Present policy also does not require the transfer of all spent fuel from pools into dry casks at closed sites, as soon as safely possible after closure. A change of policy would be indicated by the scale of the disaster at Fukushima. In view of the large variation in potential damage and differences in emergency response needs, a plant-specific analysis will also be needed, including for all reactors in the Northeast.

36. It is likely that more (and more expensive) protective features will be needed to ensure a level of safety and security that will avoid the kinds of disastrous consequences occurring at Fukushima Daiichi. It is also likely that additional measures involving significant costs will have to be taken to reduce the likelihood and consequences of multi-reactor and/or spent fuel disasters. In light of this new information, a comparison between the economic attractiveness of a proposed new nuclear reactor or a proposed re-licensing of an existing reactor that might need modifications with other less risky and less expensive energy sources (such as wind, solar, and storage technologies such as compressed air) may well result in a decision that licensing of new reactors and re-licensing of existing reactors is not cost-effective.

37. Therefore, I believe it is reasonable and necessary for the NRC to suspend licensing and re-licensing decisions and standardized design certifications until the NRC completes its review of the regulatory implications of the Fukushima accident.

The facts presented above are true and correct to the best of my knowledge, and the opinions expressed therein are based on my best professional judgment.



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## Curriculum Vita of Arjun Makhijani

### ***Address and Phone:***

Institute for Energy and Environmental Research  
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Website: [www.ieer.org](http://www.ieer.org)

A recognized authority on energy issues, Dr. Makhijani is the author and co-author of numerous reports and books on energy and environment related issues, including two published by MIT Press. He was the principal author of the first study of the energy efficiency potential of the US economy published in 1971. He is the author of *Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy* (2007).

In 2007, he was elected Fellow of the American Physical Society. He was named a Ploughshares Hero, by the Ploughshares Fund (2006); was awarded the Jane Bagley Lehman Award of the Tides Foundation in 2008 and the Josephine Butler Nuclear Free Future Award in 2001; and in 1989 he received The John Bartlow Martin Award for Public Interest Magazine Journalism of the Medill School of Journalism, Northwestern University, with Robert Alvarez. He has many published articles in journals and magazines as varied as *The Bulletin of the Atomic Scientists*, *Environment*, *The Physics of Fluids*, *The Journal of the American Medical Association*, and *The Progressive*, as well as in newspapers, including the *Washington Post*.

Dr. Makhijani has testified before Congress, and has appeared on ABC World News Tonight, the CBS Evening News, CBS 60 Minutes, NPR, CNN, and BBC, among others. He has served as a consultant on energy issues to utilities, including the Tennessee Valley Authority, the Edison Electric Institute, the Lawrence Berkeley Laboratory, and several agencies of the United Nations.

### ***Education:***

- Ph.D. University of California, Berkeley, 1972, from the Department of Electrical Engineering. Area of specialization: plasma physics as applied to controlled nuclear fusion. Dissertation topic: multiple mirror confinement of plasmas. Minor fields of doctoral study: statistics and physics.
- M.S. (Electrical Engineering) Washington State University, Pullman, Washington, 1967. Thesis topic: electromagnetic wave propagation in the ionosphere.
- Bachelor of Engineering (Electrical), University of Bombay, Bombay, India, 1965.

### ***Current Employment:***

- 1987-present: President and Senior Engineer, Institute for Energy and Environmental Research, Takoma Park, Maryland. (part-time in 1987).
- February 3, 2004-present, Associate, SC&A, Inc., one of the principal investigators in the audit of the reconstruction of worker radiation doses under the Energy Employees Occupational Illness Compensation Program Act under contract to the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services.

### ***Other Long-term Employment***

- 1984-88: Associate Professor, Capitol College, Laurel, Maryland (part-time in 1988).
- 1983-84: Assistant Professor, Capitol College, Laurel, Maryland.
- 1977-79: Visiting Professor, National Institute of Bank Management, Bombay, India. Principal responsibility: evaluation of the Institute's extensive pilot rural development program.
- 1975-87: Independent consultant (see page 2 for details)
- 1972-74: Project Specialist, Ford Foundation Energy Policy Project. Responsibilities included research and writing on the technical and economic aspects of energy conservation and supply in the U.S.; analysis of Third World rural energy problems; preparation of requests for proposals; evaluation of proposals; and the management of grants made by the Project to other institutions.
- 1969-70: Assistant Electrical Engineer, Kaiser Engineers, Oakland California. Responsibilities included the design and checking of the electrical aspects of mineral industries such as cement plants, and plants for processing mineral ores such as lead and uranium ores. Pioneered the use of the desk-top computer at Kaiser Engineers for performing electrical design calculations.

### ***Professional Societies:***

- Institute of Electrical and Electronics Engineers and its Power Engineering Society
- American Physical Society (Fellow)
- Health Physics Society
- American Association for the Advancement of Science

### ***Awards and Honors:***

- The John Bartlow Martin Award for Public Interest Magazine Journalism of the Medill School of Journalism, Northwestern University, 1989, with Robert Alvarez
- The Josephine Butler Nuclear Free Future Award, 2001
- Ploughshares Hero, Ploughshares Fund, 2006
- Elected a Fellow of the American Physical Society, 2007, "*For his tireless efforts to provide the public with accurate and understandable information on energy and environmental issues*"
- Jane Bagley Lehman Award of the Tides Foundation, 2007/2008

***Invited Faculty Member, Center for Health and the Global Environment, Harvard Medical School:*** Annual Congressional Course, *Environmental Change: The Science and Human Health Impacts*, April 18-19, 2006, Lecture Topic: An Update on Nuclear Power - Is it Safe?

***Consulting Experience, 1975-1987***

Consultant on a wide variety of issues relating to technical and economic analyses of alternative energy sources; electric utility rates and investment planning; energy conservation; analysis of energy use in agriculture; US energy policy; energy policy for the Third World; evaluations of portions of the nuclear fuel cycle.

Partial list of institutions to which I was a consultant in the 1975-87 period:

- Tennessee Valley Authority
- Lower Colorado River Authority
- Federation of Rocky Mountain States
- Environmental Policy Institute
- Lawrence Berkeley Laboratory
- Food and Agriculture Organization of the United Nations
- International Labour Office of the United Nations
- United Nations Environment Programme
- United Nations Center on Transnational Corporations
- The Ford Foundation
- Economic and Social Commission for Asia and the Pacific
- United Nations Development Programme

***Languages:*** English, French, Hindi, Sindhi, and Marathi.

***Reports, Books, and Articles (Partial list)***

(Newsletter, newspaper articles, excerpts from publications reprinted in books and magazines or adapted therein, and other similar publications are not listed below)

Hower, G.L., and A. Makhijani, "Further Comparison of Spread-F and Backscatter Sounder Measurements," *Journal of Geophysical Research*, 74, p. 3723, 1969.

Makhijani, A., and A.J. Lichtenberg, *An Assessment of Energy and Materials Utilization in the U.S.A.*, University of California Electronics Research Laboratory, Berkeley, 1971.

Logan, B. G., A.J. Lichtenberg, M. Lieberman, and A. Makhijani, "Multiple-Mirror Confinement of Plasmas," *Physical Review Letters*, 28, 144, 1972.

Makhijani, A., and A.J. Lichtenberg, "Energy and Well-Being," *Environment*, 14, 10, June 1972.

Makhijani, A., A.J. Lichtenberg, M. Lieberman, and B. Logan, "Plasma Confinement in Multiple Mirror Systems. I. Theory," *Physics of Fluids*, 17, 1291, 1974.

*A Time to Choose: America's Energy Future*, final report of the Ford Foundation Energy Policy Project, Ballinger, Cambridge, 1974. One of many co-authors.

Makhijani, A., and A. Poole, *Energy and Agriculture in the Third World*, Ballinger, Cambridge, 1975.

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Kahn, E., M. Davidson, A. Makhijani, P. Caesar, and S. Berman, *Investment Planning in the Energy Sector*, Lawrence Berkeley Laboratory, Berkeley, 1976.

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Makhijani, A., *Energy Use in the Post-Harvest Component of the Food Systems in Ivory Coast and Nicaragua*, Food and Agriculture Organization of the United Nations, Rome, 1982.

Makhijani, A., *Oil Prices and the Crises of Debt and Unemployment: Methodological and Structural Aspects*, International Labour Office of the United Nations, Final Draft Report, Geneva, April 1983.

Makhijani, A., and D. Albright, *The Irradiation of Personnel at Operation Crossroads*, International Radiation Research and Training Institute, Washington, D.C., 1983.

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Makhijani, A., and J. Kelly, *Target: Japan - The Decision to Bomb Hiroshima and Nagasaki*, July 1985, a report published as a book in Japanese under the title, *Why Japan?*, Kyoikusha, Tokyo, 1985.

Makhijani, A., *Experimental Irradiation of Air Force Personnel During Operation Redwing - 1956*, Environmental Policy Institute, Washington, D.C., 1985.

Makhijani, A., and R.S. Browne, "Restructuring the International Monetary System," *World Policy Journal*, New York, Winter, 1985-86.

Makhijani, A., R. Alvarez, and B. Blackwelder, *Deadly Crop in the Tank Farm: An Assessment of Management of High-Level Radioactive Wastes in the Savannah River Plant Tank Farm*, Environmental Policy Institute, Washington, D.C., 1986.

Makhijani, A., "Relative Wages and Productivity in International Competition," *College Industry Conference Proceedings*, American Society for Engineering Education, Washington, D.C., 1987.

Makhijani, A., *An Assessment of the Energy Recovery Aspect of the Proposed Mass Burn Facility at Preston, Connecticut*, Institute for Energy and Environmental Research, Takoma Park, 1987.

Makhijani, A., R. Alvarez, and B. Blackwelder, *Evading the Deadly Issues: Corporate Mismanagement of America's Nuclear Weapons Production*, Environmental Policy Institute, Washington, D.C., 1987.

Franke, B. and A. Makhijani, *Avoidable Death: A Review of the Selection and Characterization of a Radioactive Waste Repository in West Germany*, Health & Energy Institute, Washington, DC; Institute for Energy and Environmental Research, Takoma Park, November 1987.

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Alvarez, R., and A. Makhijani, "The Hidden Nuclear Legacy," *Technology Review*, 91, 42, 1988.

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Makhijani, A., Annie Makhijani, and A. Bickel, *Reducing Ozone-Depleting Chlorine and Bromine Accumulations in the Stratosphere: A Critique of the U.S. Environmental Protection Agency's Analysis and Recommendations*, Institute for Energy and Environmental Research and Environmental Policy Institute/Friends of the Earth, Takoma Park, 1989.

Makhijani, A., and B. Franke, *Addendum to Release Estimates of Radioactive and Non-Radioactive Materials to the Environment by the Feed Materials Production Center, 1951-85*, Institute for Energy and Environmental Research, Takoma Park, 1989.

Makhijani, A., *Global Warming and Ozone Depletion: An Action Program for States*, Institute for Energy and Environmental Research, Takoma Park, 1989.

Makhijani, A., *Managing Municipal Solid Wastes in Montgomery County*, Prepared for the Sugarloaf Citizens Association, Institute for Energy and Environmental Research, Takoma Park, 1990.

Saleska, S., and A. Makhijani, *To Reprocess or Not to Reprocess: The Purex Question - A Preliminary Assessment of Alternatives for the Management of N-Reactor Irradiated Fuel at the*

U.S. Department of Energy's Hanford Nuclear Weapons Production Facility, Institute for Energy and Environmental Research, Takoma Park, 1990.

Makhijani, A., "Common Security is Far Off," *Bulletin of the Atomic Scientists*, May 1990.

Makhijani, A., *Draft Power in South Asian Agriculture: Analysis of the Problem and Suggestions for Policy*, prepared for the Office of Technology Assessment, Institute for Energy and Environmental Research, Takoma Park, 1990.

Mehta, P.S., S.J. Mehta, A.S. Mehta, and A. Makhijani, "Bhopal Tragedy's Health Effects: A Review of Methyl Isocyanate Toxicity," *JAMA* 264, 2781, December 1990.

Special Commission of International Physicians for the Prevention of Nuclear War and the Institute for Energy and Environmental Research, *Radioactive Heaven and Earth: The Health and Environmental Effects of Nuclear Weapons Testing In, On, and Above the Earth*, Apex Press, New York, 1991. One of many co-authors.

Makhijani, A., and S. Saleska, *High Level Dollars Low-Level Sense: A Critique of Present Policy for the Management of Long-Lived Radioactive Waste and Discussion of an Alternative Approach*, Apex Press, New York, 1992.

Makhijani, A., *From Global Capitalism to Economic Justice: An Inquiry into the Elimination of Systemic Poverty, Violence and Environmental Destruction in the World Economy*, Apex Press, New York, 1992.

Special Commission of International Physicians for the Prevention of Nuclear War and the Institute for Energy and Environmental Research, *Plutonium: Deadly Gold of the Nuclear Age*, International Physicians Press, Cambridge, MA, 1992. One of several co-authors.

Makhijani, A., "Energy Enters Guilty Plea," *Bulletin of the Atomic Scientists*, March/April 1994.

Makhijani, A., "Open the Files," *Bulletin of the Atomic Scientists*, Jan./Feb. 1995.

Makhijani, A., "'Always' the Target?" *Bulletin of the Atomic Scientists*, May/June 1995.

Makhijani, A., and Annie Makhijani, *Fissile Materials in a Glass, Darkly: Technical and Policy Aspects of the Disposition of Plutonium and Highly Enriched Uranium*, IEER Press, Takoma Park, 1995.

Makhijani, A., and K. Gurney, *Mending the Ozone Hole: Science, Technology, and Policy*, MIT Press, Cambridge, MA, 1995.

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Zerriffi, H., and A. Makhijani, "The Stewardship Smokescreen," *Bulletin of the Atomic Scientists*, September/October 1996.

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Principal author of three chapters in Schwartz, S., ed., *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940*, Brookings Institution, Washington, D.C., 1998.

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Makhijani, A., and Michele Boyd, *Poison in the Vadose Zone: An examination of the threats to the Snake River Plain aquifer from the Idaho National Engineering and Environmental Laboratory*, Institute for Energy and Environmental Research, Takoma Park, October 2001.

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Makhijani, A., "Some Factors in Assessing the Response to September 11, 2001," *Medicine and Global Survival*, International Physicians for the Prevention of Nuclear War, Cambridge, Mass., February 2002.

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Makhijani, A., *Manifesto for Global Democracy: Two Essays on Imperialism and the Struggle for Freedom*, Apex Press, New York, 2004.

Makhijani, A., "Atomic Myths, Radioactive Realities: Why nuclear power is a poor way to meet energy needs," *Journal of Land, Resources, & Environmental Law*, v. 24, no. 1, 2004, pp. 61-72. Adapted from an oral presentation given on April 18, 2003, at the Eighth Annual Wallace Stegner Center Symposium titled "Nuclear West: Legacy and Future," held at the University of Utah S.J. Quinney College of Law."

Makhijani, A., and Michele Boyd, *Nuclear Dumps by the Riverside: Threats to the Savannah River from Radioactive Contamination at the Savannah River Site*, Institute for Energy and Environmental Research, Takoma Park, Maryland, March 2004.

Makhijani, A., and Brice Smith, *The Role of E.I. du Pont de Nemours and Company (Du Pont) and the General Electric Company in Plutonium Production and the Associated I-131 Emissions from the Hanford Works*, Institute for Energy and Environmental Research, Takoma Park, Maryland, March 30, 2004.

Makhijani, A., Peter Bickel, Aiyou Chen, and Brice Smith, *Cash Crop on the Wind Farm: A New Mexico Case Study of the Cost, Price, and Value of Wind-Generated Electricity*, Institute for Energy and Environmental Research, Takoma Park, Maryland, April 2004.

Makhijani, A., Lois Chalmers, and Brice Smith, *Uranium Enrichment: Just Plain Facts to Fuel an Informed Debate on Nuclear Proliferation and Nuclear Power*, Institute for Energy and Environmental Research, Takoma Park, Maryland, October 15, 2004.

Makhijani, A., and Brice Smith, *Costs and Risks of Management and Disposal of Depleted Uranium from the National Enrichment Facility Proposed to be Built in Lea County New Mexico by LES*, Institute for Energy and Environmental Research, Takoma Park, Maryland, November 24, 2004.

Makhijani, A., project director, *Examen critique du programme de recherche de l'ANDRA pour déterminer l'aptitude du site de Bure au confinement géologique des déchets à haute activité et à vie longue: Rapport final*, prepared for le Comité ocal d'Information et de Suivi; coordinator: Annie Makhijani; authors: Detlef Appel, Jaak Daemen, George Danko, Yuri Dublyansky, Rod Ewing, Gerhard Jentsch, Horst Letz, Arjun Makhijani, Institute for Energy and Environmental Research, Takoma Park, Maryland, December 2004

Institute for Energy and Environmental Research, *Lower Bound for Cesium-137 Releases from the Sodium Burn Pit at the Santa Susana Field Laboratory*, IEER, Takoma Park, Maryland, January 13, 2005. (Authored by A. Makhijani and Brice Smith.)

Institute for Energy and Environmental Research, *Iodine-131 Releases from the July 1959 Accident at the Atomic International Sodium Reactor Experiment*, IEER, Takoma Park, Maryland, January 13, 2005. (Authored by A. Makhijani and Brice Smith.)

Makhijani, A., and Brice Smith. *Update to Costs and Risks of Management and Disposal of Depleted Uranium from the National Enrichment Facility Proposed to be Built in Lea County New Mexico by LES*. Institute for Energy and Environmental Research, Takoma Park, Maryland, July 5, 2005.

Makhijani, A., "A Readiness to Harm: The Health Effects of Nuclear Weapons Complexes," *Arms Control Today*, **35**, July/August 2005.

Makhijani, A., *Bad to the Bone: Analysis of the Federal Maximum Contaminant Levels for Plutonium-239 and Other Alpha-Emitting Transuranic Radionuclides in Drinking Water*, Institute for Energy and Environmental Research, Takoma Park, Maryland, August 2005.

Makhijani, A., and Brice Smith, *Dangerous Discrepancies: Missing Weapons Plutonium in Los Alamos National Laboratory Waste Accounts*, Institute for Energy and Environmental Research, Takoma Park, Maryland, April 21, 2006.

Makhijani, Annie, and A. Makhijani, *Low-Carbon Diet without Nukes in France: An Energy Technology and Policy Case Study on Simultaneous Reduction of Climate Change and Proliferation Risks*, Institute for Energy and Environmental Research, Takoma Park, Maryland, May 4, 2006.

Makhijani, Annie, and A. Makhijani. *Shifting Radioactivity Risks: A Case Study of the K-65 Silos and Silo 3 Remediation and Waste Management at the Fernald Nuclear Weapons Site*, Institute for Energy and Environmental Research, Takoma Park, Maryland, August 2006.

Smith, Brice, and A. Makhijani, "Nuclear is Not the Way," *Wilson Quarterly*, v.30, p. 64, Autumn 2006.

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Makhijani, A., *Assessing Nuclear Plant Capital Costs for the Two Proposed NRG Reactors at the South Texas Project Site*, Institute for Energy and Environmental Research, Takoma Park, Maryland, March 24, 2008.

Makhijani, A., *Energy Efficiency Potential: San Antonio's Bright Energy Future*, Institute for Energy and Environmental Research, Takoma Park, Maryland, October 9, 2008.

Makhijani, A., *The Use of Reference Man in Radiation Protection Standards and Guidance with Recommendations for Change*, Institute for Energy and Environmental Research, Takoma Park, Maryland, December 2008.

Makhijani, A., *Comments of the Institute for Energy and Environmental Research on the U.S. Nuclear Regulatory Commission's Proposed Waste Confidence Rule Update and Proposed Rule Regarding Environmental Impacts of Temporary Spent Fuel Storage*, Institute for Energy and Environmental Research, Takoma Park, Maryland, February 6, 2009.

Makhijani, A., *Technical and Economic Feasibility of a Carbon-Free and Nuclear-Free Energy System in the United States*, Institute for Energy and Environmental Research, Takoma Park, Maryland, March 4, 2009.

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CV updated October 11, 2010

April 19, 2011

Gregory B. Jaczko, Chair  
Kristine L. Svinicki, Commissioner  
William D. Magwood IV, Commissioner  
George Apostolakis, Commissioner  
William C. Ostendorff, Commissioner  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

SUBJECT: *Seabrook Nuclear Generating Station License Renewal*

Dear Commissioners:

On behalf of Beyond Nuclear, Seacoast Anti-Pollution League and the Sierra Club of New Hampshire, I am submitting the Declaration of Dr. Arjun Makhijani in Support of Emergency Petition to Suspend all Pending Reactor Licensing Decisions and Relating Rulemaking Decisions Pending Investigation of Lessons Learned from Fukushima Daiichi Nuclear Power Station Accident (April 19, 2011). The Emergency Petition was submitted on April 14, 2011, and a corrected copy of the Emergency Petition was submitted on April 18, 2011. The joint filings of Beyond Nuclear, Seacoast Anti-Pollution League and Sierra Club of New Hampshire were subsequently filed from France through the EIE.

Sincerely,

(Electronically signed by)  
Paul Gunter, Director  
Reactor Oversight Project  
Beyond Nuclear  
6930 Carroll Avenue Suite 400  
Takoma Park, Maryland 20912

----/s/-----

Doug Bogen  
Seacoast Anti-Pollution League  
PO Box 1136  
Portsmouth, NH 03802  
603-431-5089

----/s/-----

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April 20, 2011

**UNITED STATES OF AMERICA**  
**NUCLEAR REGULATORY COMMISSION**  
Before the Secretary

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In the Matter of )  
)  
NEXTERA ENERGY SEABROOK (LLC) )  
[Also Known As FLORIDA POWER & LIGHT] )  
)  
SEABROOK NUCLEAR POWER PLANT )  
)  
Regarding the Renewal of Facility Operating License )  
No-NFP-86 for a 20-Year Period ) DOCKET NO. 50-443-LR )  
)  

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**CERTIFICATE OF SERVICE OF THE DECLARATION AND CV OF DR. ARJUN  
MAKHJANI AND COVER LETTER TO THE COMMISSIONERS**

I certify that on April 20, 2011, I posted the foregoing Declaration and CV of Dr. Arjun Makhijani in Support of Emergency Petition to Suspend all Pending Reactor Licensing Decisions and Related Rulemaking Decisions Pending Investigation of Lessons Learned From Fukushima Daiichi Nuclear Power Station and Cover Letter to the Commissioners on the NRC's Electronic Information Exchange. It is my understanding that as a result, the following persons were served:

Secretary  
Attention: Rulemakings and Adjudications Staff  
Mail Stop O-16 C1  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001  
[hearingdocket@nrc.gov](mailto:hearingdocket@nrc.gov)

Office of Commission Appellate  
Adjudication  
Mail Stop O-16 C1  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001  
E-mail: [OCAAMAIL@nrc.gov](mailto:OCAAMAIL@nrc.gov)

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April 20, 2011

## Docket, Hearing

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**From:** Hearingdocket@nrc.gov  
**Sent:** Tuesday, April 19, 2011 6:50 PM  
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**Subject:** Re: NRC Proceeding "Shearon Harris 2 and 3 52-022 and 52-023"

MESSAGE FROM THE OFFICE OF THE SECRETARY, NUCLEAR REGULATORY COMMISSION

Re: NRC Proceeding "Shearon Harris 2 and 3 52-022 and 52-023"

The Office of the Secretary has received a document entitled

"Supplement to Emergency Petition"

submitted by John Runkle who is affiliated with NC WARN.

It is intended for inclusion in the referenced proceeding. It was submitted through the NRC Electronic Information Exchange (EIE) system and arrived on 04/19/11 at 18:50 EDT.

As a hearing participant, you are entitled to view and/or retrieve this document by visiting the following web link:

Supplement to Emergency Petition -  
<https://eieprod.nrc.gov/EIE25L1/downloadAttachment.do?submissionID=19986&docID=4585> (354 KB)

The document will remain available through this link for 90 day(s) after which it will be removed from the EIE system. Not later than 3 days from the date of this message the document will also be available through NRC Electronic Hearing Docket (EHD) web site. The web link for this site is:

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Receipt of this message constitutes completion of service of this filing.

**PARTIES SERVED WITH THIS SUBMISSION:**

Abramson, Paul; Baratta, Anthony; Belser, Florence P.; Carter, Lorraine; Crane, Alison; Curran, Diane; Deavers, Ronald; Eitreim, Anthony ; Francis, Karin; Gendelman, Adam; George, Stefanie; Giitter, Rebecca; Gilman, Joseph; Golshan, KG; Greathead, Nancy; Haemer, Robert; hawkens, roy; Hearing Docket, Hearing Docket; Julian, Emile; Julian, Emile; Kastenber, William E; Kennedy, Michael; Kirkwood, Sara; LaPlante, Erica; Lepre, Michael G.; Lewis, Linda; Martin, Circe; Ngbea, Evangeline S. ; OCAAMAIL, OCAAMAIL; O'Neill, John H.; Parker, Jason B.; Pierpoint, Christine; Price, Sarah; Remsburg, Kristy; Rund, Jonathan M.; Runkle, John; Ryan, Tom; Watson, Louis S.; Webb, Maria; Welkie, Andrew; Zabler, Marian

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**DECLARATION OF DR. ARJUN MAKHIJANI IN SUPPORT OF  
EMERGENCY PETITION TO SUSPEND ALL PENDING REACTOR LICENSING  
DECISIONS AND RELATED RULEMAKING DECISIONS  
PENDING INVESTIGATION OF LESSONS LEARNED FROM FUKUSHIMA DAIICHI  
NUCLEAR POWER STATION ACCIDENT**

I, Arjun Makhijani, declare as follows:

**Introduction and Statement of Qualifications**

1. I am President of the Institute for Energy and Environmental Research ("IEER") in Takoma Park, Maryland. Under my direction, IEER produces technical studies on a wide range of energy and environmental issues to provide advocacy groups and policy makers with sound scientific information and analyses as applied to environmental and health protection and for the purpose of promoting the understanding and democratization of science. A copy of my curriculum vitae is attached.

2. I am qualified by training and experience as an expert in the fields of plasma physics, electrical engineering, nuclear engineering, the health effects of radiation, radioactive waste management and disposal (including spent fuel), estimation of source terms from nuclear facilities, risk assessment, energy-related technology and policy issues, and the relative costs and benefits of nuclear energy and other energy sources. I am the principal author of a report on the 1959 accident at the Sodium Reactor Experiment facility near Simi Valley in California, prepared as an expert report for litigation involving radioactivity emissions from that site. I am also the principal author of a book, *The Nuclear Power Deception – U.S. Nuclear Mythology from Electricity "Too Cheap to Meter" to "Inherently Safe" Reactors* (Apex Press, New York, 1999, co-author, Scott Saleska), which examines, among other things, the safety of various designs of nuclear reactors.

3. I have written or co-written a number of other books, reports, and publications analyzing the safety, economics, and efficiency of various energy sources, including nuclear power. I am also the author of *Securing the Energy Future of the United States: Oil, Nuclear and Electricity Vulnerabilities and a Post-September 11, 2001 Roadmap for Action* (Institute for Energy and Environmental Research, Takoma Park, Maryland, December 2001). In 2004, I wrote "Atomic

Myths, Radioactive Realities: Why nuclear power is a poor way to meet energy needs,” *Journal of Land, Resources, & Environmental Law*, v. 24, no. 1 at 61-72 (2004). The article was adapted from an oral presentation given on April 18, 2003, at the Eighth Annual Wallace Stegner Center Symposium entitled, “Nuclear West: Legacy and Future,” held at the University of Utah S.J. Quinney College of Law. In 2008, I prepared a report for the Sustainable Energy & Economic Development (SEED) Coalition entitled *Assessing Nuclear Plant Capital Costs for the Two Proposed NRG Reactors at the South Texas Project Site*.

4. I am generally familiar with the basic design and operation of U.S. nuclear reactors and with the safety and environmental risks they pose. I am also generally familiar with materials from the press, the Japanese government, the Tokyo Electric Power Company, the French government safety authorities, and the U.S. Nuclear Regulatory Commission (“NRC”) regarding the Fukushima Daiichi accident and its potential implications for the safety and environmental protection of U.S. reactors.

5. The purpose of my declaration is to explain the reasons I believe that although the causes, evolution, and consequences of the Fukushima accident are not yet fully clear, the accident is already presenting new and significant information regarding the risks to public health and safety and the environment posed by the operation of nuclear reactors. I will also explain why I believe that integration of this new information into the NRC’s licensing process could affect the outcome of safety and environmental analyses for reactor licensing and relicensing decisions by resulting in either the denial of licenses or license extensions or the imposition of new conditions and/or new regulatory requirements. It could also affect the NRC evaluation of the fitness of new reactor designs for certification. It is therefore reasonable and necessary to suspend licensing and re-licensing decisions and standardized design certifications until the NRC completes its review of the safety and regulatory implications of the Fukushima accident.

#### **Statement of Facts**

6. Although many details about the Fukushima reactor accident remain unclear, the general contours of the accident are described in NRC Information Notice No. 2011-08 (March 31, 2011) (NRC Accession No. ML 110830824) as follows:

On March 11, 2011, the Tohoku-Taiheiyou-Oki earthquake occurred near the east coast of Honshu, Japan. This magnitude 9.0 earthquake and the subsequent tsunami caused significant damage to at least four of the six units of the Fukushima Daiichi nuclear power station as the result of a sustained loss of both the offsite and onsite power systems. Efforts to restore power to emergency equipment were hampered and impeded by damage to the surrounding areas due to the tsunami and earthquake.

Units 1, 2 and 3 were operating at the time of the earthquake. Following the loss of electric power to normal and emergency core cooling systems and the subsequent failure of backup decay heat removal systems, water injection into the cores of all three reactors was compromised, and reactor decay heat removal could not be maintained. The operator of the plant, Tokyo Electric Power Company, injected sea water and boric acid into the reactor vessels of these three units, in an effort to cool the fuel and ensure that the

reactors remained shut down. However, the fuel in the reactor cores became partially uncovered. Hydrogen gas built up in Units 1 and 3 as a result of exposed, overheated fuel reacting with water. Following gas venting from the primary containment to relieve pressure, hydrogen explosions occurred in both units and damaged the secondary containments.

Units 3 and 4 were reported to have low spent fuel pool (SFP) water levels.

Fukushima Daiichi Units 4, 5 and 6 were shut down for refueling outages at the time of the earthquake. The fuel assemblies for Unit 4 had recently been offloaded from the reactor core to the SFP. The SFPs for Units 5 and 6 appear to be intact. Emergency power is available to provide cooling water flow through the SFPs for Units 5 and 6.

The damage to Fukushima Daiichi nuclear power station appears to have been caused by initiating events beyond the design basis of the facilities.

7. In a March 21, 2011, briefing, Bill Borchardt, the NRC's Executive Director for Operations, stated that the NRC believes that hydrogen explosions occurred on March 12, 14, and 15 in the reactors of Units 1, 3, and 2 respectively, in that order. He also stated that the NRC believed that a hydrogen explosion had occurred at spent fuel pool of Unit 4 on March 15 due to overheated spent fuel in the pool. Briefing on NRC Response to Recent Nuclear Events in Japan, Transcript at 11.

8. According to Mr. Borchardt, the NRC believes that Units 1, 2, and 3 have likely sustained some degree of core damage. *Id.* Further, he stated that the loss of emergency AC power was caused by the tsunami and not the earthquake. Therefore, he concluded that the NRC believes that the "damage in Fukushima was not really caused by the earthquake; it was the tsunami that came afterwards." *Id.*

9. At the outset of the emergency, large volumes of sea water were used to cool the reactors. The salt water injections were then replaced by fresh water injections. While judgments have changed over time, and much remains uncertain, we note here that as of March 21, Mr. Borchardt also stated that "[t]he radiation releases and the dose rates that we've seen on site, I think, were primarily influenced by the condition of the Units Three and Four spent fuel pools." *Id.* at 21.

10. The French authorities also reported that sea water was used to cool spent fuel pools Units 3 and 4. *Communiqué de presse n°17 du mardi 22 mars 2011 à 10h00 Séisme au Japon - L'ASN fait le point sur la situation de la centrale nucléaire de Fukushima Daiichi : Les travaux en vue de rétablir l'alimentation électrique se poursuivent mais la mise sous tension n'est pas réalisée Paris, le 22/03/2011 10:27, <http://japon.asn.fr/index.php/Site-de-l-ASN-Special-Japon/Communiqués-de-presse> (March 22, 2011).* They also reported that three spent fuel pools (of Units 2, 3, and 4) appear to have experienced boiling at some point. *Note d'information : Situation des réacteurs nucléaires au Japon suite au séisme majeur survenu le 11 mars 2011 : Point de situation du 18 mars 2011 à 14 heures, Institut de Radioprotection et de Sécurité Nucléaire (March 18, 2011),*

[http://www.irsn.fr/FR/Actualites\\_presse/Actualites/Documents/IRSN\\_Seisme-Japon\\_Point-situation-18032011-14h.pdf](http://www.irsn.fr/FR/Actualites_presse/Actualites/Documents/IRSN_Seisme-Japon_Point-situation-18032011-14h.pdf) -- hereafter IRSN March 18, 2011)

11. In response to the Fukushima reactor accident, the NRC announced the formation of a “senior level agency task force to conduct a methodical and systematic review” of NRC processes and regulations. COMGBJ-11-0002, Memorandum from Chairman Jaczko to Commissioners, re: NRC Actions Following the Events in Japan at 1 (March 21, 2011) (NRC Accession No. ML110800456). The purpose of the task force is to “determine whether the agency should make additional improvements to our regulatory systems and make recommendations to the Commission for its policy direction.” *Id.*

12. Chairman Jaczko’s memorandum specifies both a near-term review and a longer-term review. For the near-term review, the Commission required the task force to evaluate issues “affecting domestic operating reactors of all designs” in areas that include “protection against earthquake tsunami, flooding, hurricanes; station blackout and a degraded ability to restore power; severe accident mitigation; emergency preparedness; and combustible gas control.” *Id.* at 1. The Commission instructed the task force to complete the report in 90 days. In the meantime, the task force was instructed to provide a 30-day “quick look report” and another “status” report in 60 days. *Id.*

13. The “longer term” review would begin “as soon as NRC has sufficient technical information from the events in Japan with the goal of no later than the completion of the 90 day near term report.” *Id.* at 2. The longer-term study should “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.” *Id.* For the longer-term effort, the Commission instructed the task force to “receive input from and interact with all key stakeholders.” *Id.* The Commission specified that within six months after commencing the evaluation, the task force should “provide a report with recommendations, as appropriate, to the Commission.” *Id.*

14. The “Task Force to Conduct a Near-term Evaluation of the Need for Agency Actions Following the Events in Japan” (“Task Force”) has formed and its charter has been approved. The Task Force aims to accomplish the following:

- “Evaluate currently available technical and operational information from the events that have occurred at the Fukushima Daiichi nuclear complex in Japan to identify potential or preliminary near-term/immediate operational or regulatory actions affecting domestic reactors of all designs, including their spent fuel pools. The task force will evaluate, at a minimum, the following technical issues and determine priority for further examination and potential agency action:
  - External event issues (e.g. seismic, flooding, fires, severe weather)
  - Station blackout
  - Severe accident measures (e.g., combustible gas control, emergency operating

procedures, severe accident management guidelines)

- 10 CFR 50.54 (hh)(2) which states, “Each licensee shall develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to explosions or fire, to include strategies in the following areas: (i) Fire fighting; (ii) Operations to mitigate fuel damage; and (iii) Actions to minimize radiological release.” Also known as B.5.b.
- Emergency preparedness (e.g., emergency communications, radiological protection, emergency planning zones, dose projections and modeling, protective actions)
- Develop recommendations, as appropriate, for potential changes to NRC’s regulatory requirements, programs, and processes, and recommend whether generic communications, orders, or other regulatory actions are needed.”

Charter for the Nuclear Regulatory Commission Task Force to Conduct a Near-Term Evaluation of the Need for Agency Actions Following the Events in Japan at 1 (April 1, 2011) (NRC Accession No. ML11089A045).

15. With respect to the longer-term review, the Charter states that the short-term report will make: “[r]ecommendations for the content, structure, and estimated resource impact....” *Id.* at 1.

#### **Statement of Professional Opinion**

16. I agree with the Commission’s approach of conducting a long-term investigation of the regulatory implications of the Fukushima accident, in addition to its short-term investigation of whether immediate actions are needed. In my opinion, the longer-term investigation is necessary to address a number of respects in which the Fukushima accident is unprecedented in the sense that its characteristics are not anticipated in NRC safety regulations or environmental analyses. Thus, it is providing new and significant insights into the inadequacy of NRC regulations to protect public health and safety and the inadequacy of NRC environmental analyses to evaluate the potential health, environmental and economic costs of reactor and spent fuel pool accidents. This significant new information covers the following major topics:

- Unanticipated compounding effects of simultaneous accidents at multiple co-located reactor units, including spent fuel pools.
- Unanticipated risks of spent fuel pool accidents, including explosions.
- Frequency of severe accidents and explosions.
- Inadequacy of safety systems to respond to long-duration accidents.
- Nuclear crisis management with contaminated control and turbine buildings that have lost power
- Unanticipated aggravating effects of some emergency measures.
- Health effects and costs of severe accidents

- The hydrogen explosions at Fukushima and their implications for aircraft crash evaluations.

**Unanticipated compounding effects of simultaneous accidents at multiple co-located reactor units, including spent fuel pools.**

17. Perhaps the most unprecedented feature of the Fukushima accident is that three reactors and four spent fuel pools have been stricken at the same site. In the entire history of nuclear power, there has not been another major accident (level 5 or above) that has involved multiple major sources of radioactivity -- including multiple reactors and multiple spent fuel pools. For instance, the Fukushima Daiichi complex is the first to have experienced multiple hydrogen explosions in various facilities, all as part of the same event.

18. The NRC has long followed the practice of allowing new reactors to be built at existing sites, without examining the consequences of simultaneous failure of existing and new reactors through common mode failures such as complete station blackouts and loss of fresh water supply. The NRC also proposes to co-locate a significant number of new reactors at existing reactor sites. Examples include Bellefonte, Calvert Cliffs, Comanche Peak, Fermi, North Anna, Shearon Harris, Turkey Point, the South Texas Project, and Vogtle.

19. But the Fukushima accident graphically demonstrates that NRC's failure to evaluate the safety and environmental implications of co-locating multiple reactors was incorrect. Specifically, when a new reactor is to be sited at a location where there are existing reactors, the entire system at the site should be re-examined in addition to whatever additional impacts the new unit(s) might create. The EISs for these new reactors and the designs on which they rely should consider the significant new information revealed by the Fukushima accident about the potential for simultaneous multiple failures and accidents in existing and new reactors and/or spent fuel pools.

**Unanticipated risks of spent fuel pool accidents, including explosions.**

20. Another unprecedented feature of the Fukushima accident is that an explosion occurred in Unit 4 despite the fact that there was no fuel in the reactor. The entire core had been unloaded into the spent fuel pool prior to March 11, 2011; the reactor was down for maintenance. A loss of cooling apparently led to boiling and to hydrogen generation, which appears to be the likely cause of the major explosion and ensuing damage to the reactor building of Unit 4. Further, as noted above the spent fuel pools of Units 2 and 3 also appear to have experienced boiling of the cooling water at some point. It should be noted that much detail remains to be learned about all three spent fuel pools, especially as to what went on in the first week of the accident.

21. The apparent occurrence of spent fuel pool accidents at Fukushima significantly undermines the NRC's conclusion that high-density pool storage of spent fuel poses a "very low risk." *The Attorney General of Commonwealth of Massachusetts; the Attorney General of California; Denial of Petitions for Rulemaking*, 73 Fed. Reg. 46,204, 46,207 (August 8, 2008). That conclusion is all the more subject to question in light of the fact that spent fuel in U.S. pools is typically packed more tightly than in the pools at Fukushima. U.S. reactors, including reactors

that are candidates for license renewal, use high-density pool storage for spent fuel. Fukushima indicates that the NRC policy that allows such storage needs to be revisited. Given that onsite storage of spent fuel may continue for decades, these circumstances also call for a thorough reexamination of the spent fuel storage capacity, spent fuel pool location, and configuration of new reactor designs. For instance, should the construction and use of above ground-level spent fuel pools in reactor buildings be allowed, as is the case with the advanced boiling water reactor (“ABWR”)? The NRC should examine the potentially exacerbating relationship between reactor core accidents and spent fuel pool accidents, for both existing reactor designs and new reactor designs. In addition, environmental impact statements (“EISs”) for license renewal and new reactor licensing should reexamine the relative costs and benefits of measures to mitigate the environmental impacts of pool fires and/or explosions. Measures would include reducing the density at which fuel is stored in pools, using dry storage for as much of each reactor’s inventory of spent fuel as safety will allow, and dry storage of all spent fuel at closed reactors, a few years after closure.

### **Frequency of severe accidents and explosions**

22. The NRC must also re-examine the frequency per reactor per year of spent fuel pool accidents as well as the frequency of core damage events. The NRC’s current spent fuel damage assessments are based on a best estimate of a spent fuel pool fire probability of about  $2 \times 10^{-6}$  per reactor-year, including the probability of structural failure during a seismic event NUREG-1353, *Regulatory Analysis for the Resolution of Generic Issue 82, “Beyond Design Basis Accidents in Spent Fuel Pools”*, at 5-5 and Table 5.1.3 (1989). This means one such accident for every 500,000 reactor-years. The NRC’s estimate of the frequency of spent fuel pool loss of cooling from all causes other than earthquake-induced structural failure is even lower:  $1.5 \times 10^{-7}$ . The conditional probability of a fire in the event of a loss of cooling is estimated to be 1.0 for a PWR and 0.25 for a BWR. *Id.* at 4-36. Based on this, the overall probability estimate in NUREG-1353 for a non-seismic-induced spent fuel pool fire for a PWR is  $1.5 \times 10^{-7} \times 1.0 = 1.5 \times 10^{-7}$ ; for a BWR it is  $1.5 \times 10^{-7} \times 0.25 = 4 \times 10^{-8}$  for a BWR – in the latter case is it one spent fuel pool fire every 25 million reactor-years. Hydrogen explosions originating in the spent fuel pool were not considered. Further, at least two spent fuel pools at Fukushima (Units 3 and 4) that seem to have experienced boiling as well as the destruction of the portions of the reactor building that are a barrier between the pool surface and the environment. According to the French safety authorities, the spent fuel pool in Unit 2 also experienced boiling. IRSN March 18, 2011 *op. cit.* One reactor building, that of Unit 4, appears to have experienced a hydrogen explosion, with the hydrogen apparently emanating from the spent fuel pool (see Paragraph 7 above). The explosion destroyed a good part of the reactor building. Any damage to the spent fuel pool structures and equipment, to the fuel assemblies in the pools, as well as to the racks remains to be fully assessed. It appears that the only way that a significant amount of hydrogen could originate in a spent fuel pool is through uncovering of the spent fuel and the reaction of the zirconium in the fuel rods with steam. Explosions destroyed substantial portions of the reactor buildings of Units 1 and 3 as well; it appears that there were also significant releases of radioactivity from the spent fuel pool of Unit 3. In view of these facts, the NRC’s estimate of loss of cooling probability accompanied by a fire is far too low, probably by orders of magnitude. It appears that the overall principal initiating event in the station blackout and failure of emergency core cooling was not the earthquake but the tsunami, though the earthquake may have caused equipment damage that

led to or contributed to some of the spent fuel pool problems. This indicates that the non-earthquake station blackout probabilities will need to be revisited. Further, the NRC's list of events leading to spent fuel structural failure does not include hydrogen explosions due to loss of emergency core cooling in the reactor (NUREG-1353, *op. cit.*, Table 4.7.1 at 4-36), which appears to have been the cause of the damage to the structures of reactor buildings 1 and 3 and possibly to the spent fuel pool of Unit 3. It may be that many details of the analysis will be different for each of the four spent fuel pools. Whatever the details, the events so far make it quite clear that the NRC needs to thoroughly reevaluate the probability of severe spent fuel pool accidents as well as the kinds of events that could initiate damage and major releases of radioactivity from spent fuel pools. Further, in view of the fact that three BWRs appear to have had core damage, the NRC also needs to evaluate whether presently operating reactors, notably (but not only) BWRs, meet the Commission's target of limiting annual core damage frequency to the  $10^{-4}$  to  $5 \times 10^{-5}$  per reactor-year range for reactors (NUREG-1353, *op. cit.*, at ES-2 and ES-3).

23. In conducting its review, the NRC needs to thoroughly revisit its methods for estimating the probabilities and mechanisms of hydrogen explosions and fires in spent fuel pools (with and without a natural disaster component) as well as the methods for estimating hydrogen explosions, and meltdowns in existing and new light water reactor designs. For instance, the computer code used in evaluating the accidents assumes that "[t]he geometry of the fuel assemblies and racks remains undistorted." NUREG-1353, *op. cit.* at 4-8. To judge by the photographs and videos of the damage, this assumption is unlikely to be correct at least for spent fuel pools in Units 3 and 4. As another example, hydrogen generation due to partial uncovering of spent fuel but with water still remaining in the pool is not included. Rather, the computer program assumes that "[t]he water drains instantaneously from the pool." *Id.* This is important because if the investigation confirms that hydrogen was indeed generated in the spent fuel pool of Unit 4, the exothermic zirconium-steam reaction that creates it would be an additional source of heat for causing the accident to develop more rapidly and destructively than assumed by the NRC.

24. More generally, the events at three reactors and four spent pools have drastically changed the underlying frequency data that should go into the estimation of the probability of severe accidents at light water reactors. As a result, integration of the Fukushima data into NRC analyses of risks could lead to significant changes in design of new reactors and also lead to modifications at existing reactors, as would be required for protection of public health and safety under 10 CFR 50.109. Specifically, the Fukushima accident indicates that the basis of the NRC's conclusion in NUREG-1353 that dense storage of spent fuel in pools is safe and that dry storage is not warranted is incorrect.

### **Inadequacy of safety systems to respond to long-duration accidents**

25. U.S. reactors appear to have insufficient backup power capacity to maintain safety equipment during a prolonged severe accident. The Fukushima accident, in which the emergency diesel generation system started but then failed very soon after the tsunami and the battery backup ran out of power in eight hours. The accident illustrates the serious environmental risk posed by insufficient backup power when catastrophic events destroy both offsite power supplies and onsite infrastructure. These risks need to be taken into account in safety and environmental analyses for all prospective NRC licensing decisions. The fact that

there was a complete station blackout at Fukushima accompanied by a failure of fresh water supply that forced sea water use for days (*Communiqué de presse n°17 du mardi 22 mars 2011 à 10h00 Séisme au Japon - L'ASN fait le point sur la situation de la centrale nucléaire de Fukushima Daiichi : Les travaux en vue de rétablir l'alimentation électrique se poursuivent mais la mise sous tension n'est pas réalisée Paris, le 22/03/2011 10:27*, <http://www.asn.fr/index.php/Haut-de-page/Presse/Actualites-ASN/Communique-de-presse-n-17-du-mardi-22-mars-2011-a-10h00>) clearly points to the need for a full review of the depth (in terms of number of levels) of backup systems, the length of time of emergency power supply operability, the location of these power supplies, and the relation of the power supplies to ad hoc emergency pumping and emergency water supplies, including in the context of potential major damage to multiple units at a single site.

### **Nuclear crisis management with contaminated control and turbine buildings that have lost power**

26. Another critical and unanticipated feature of the Fukushima accident is that the control rooms of Units 1, 2, and 3 became highly contaminated in the course of the first week of the accident, according to the French safety authorities. IRSN March 18, 2011 *op. cit.*. This has made re-establishment of normal cooling more difficult, apart from the question of on-site or offsite power supply. Turbine buildings also became contaminated with radioactive water in the course of the accident. *Fukushima Daiichi Nuclear Power Station: the result of measurement of sub drain*, [http://www.tepco.co.jp/en/press/corp-com/release/betu11\\_e/images/110331e18.pdf](http://www.tepco.co.jp/en/press/corp-com/release/betu11_e/images/110331e18.pdf) and *The detection of radioactive materials in the water on 1st basement of turbine building at the site of Fukushima Daiichi Nuclear Power Station: Press Release* (Mar 31,2011), <http://www.tepco.co.jp/en/press/corp-com/release/11033112-e.html>.

27. The loss of power in and radioactive contamination of the control rooms and turbine buildings points to the need to review the piping and ventilation arrangements of these facilities, and the likely need to isolate them more thoroughly from contaminated air and water during beyond-design-basis accidents. Based on the information available so far about the Fukushima event, the risks of turbine building contamination would appear to be greater for boiling water reactors than for pressurized water reactors since steam generated from primary water is used to directly drive the turbines; in PWRs the heated primary water is routed to steam generators and not to the turbines.

### **Unanticipated aggravating effects of some emergency measures**

28. Light water reactors are not designed to be cooled by sea water. Thus, the fact that TEPCO was forced to use sea water for emergency cooling for an extended period is a critical feature of the accident that needs evaluation. For instance, salt from sea water deposited on the fuel rods may have blocked or partially blocked some cooling channels during the accident. This raises the question of whether the use of sea water may have aggravated the fuel damage. It also raises the question of whether salt deposits may have interfered with the neutron absorption capacity of the control rods thereby increasing the likelihood of an accidental criticality. An understanding of these issues is important to the understanding of the accident and to any design and or emergency operations changes that may be needed.

## Health effects and costs of severe accidents

29. While a detailed evaluation will take time and more data, the Fukushima accident indicates that the health consequences of a severe reactor accident and/or spent fuel pool fire could be significantly greater than estimated by the NRC in EISs for license renewal and new reactor licensing. For instance, the NRC estimates an average population risk (population dose multiplied by probability) in a 50-mile radius of only 16 person-rem per year per spent fuel pool – or 480 rem in 30 years. The dose estimate was recently used in the 2009 draft Generic Environmental Impact Statement (“GEIS”) by the NRC. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants Appendices, Draft Report for Comment*, NUREG-1437, Volume 2, Rev. 1 at E-35 (July 2009). See also NUREG-1353, *op. cit.*, at ES-3. The estimate of 480 rem in 30 years translates into a probability of just 0.27 fatal cancers over 30 years in a population of more than 2.5 million (using a risk factor of 0.000575 fatal cancers per rem). The NRC’s best estimate of the total population dose in the event of an accident was 8 million person-rem (NUREG-1353, *op. cit.* at 5-4, Table 5.1.2) – which translates into 4,600 excess cancer deaths in a fifty-mile radius. The NRC put the worst case population dose estimate at just over three times the best estimate – 26 million person-rem. NUREG-1353, *op. cit.* Table 5.1.2 at 5-4. But if the probability is much higher for a single failure and if multiple failures can happen at the same site, then the number of expected fatal cancers would be higher, all other things being equal. Further, it is necessary to consider that the spent fuel pools in the United States are more typically full than the ones at Fukushima. In its review of Fukushima, the NRC should revisit the higher of the health damage estimates for spent fuel pool accidents at closed power plants in a 1997 study by Brookhaven National Laboratory. R.J. Travis, R.E. Davis, E.J. Grove, M.A. Azarm, *A Safety and Regulatory Assessment of Generic BWR and PWR Permanently Shutdown Nuclear Power Plants*, BNL-NUREG-52498, NUREG/CR-6451 (Brookhaven National Laboratory, 1997), [http://www.osti.gov/bridge/product.biblio.jsp?osti\\_id=510336](http://www.osti.gov/bridge/product.biblio.jsp?osti_id=510336). NUREG-/CR6451 estimated the worst case population dose in a 50 mile radius at 81 million person-rem for both BWRs and PWRs. *Id.* at Tables 4-1 and 4-2. This is more than three times higher than in the estimate in NUREG-1353 cited above.

30. The Fukushima accident also indicates that the economic costs of a spent fuel pool accidents may be much higher than the current estimates used by the NRC. In NUREG-1353, the worst case property damage was estimated at \$30 billion (1988 dollars) in a 50-mile radius. *Id.* at Table 5.1.2. That amount is about \$50 billion in 2010 dollars (constant 2010 dollar estimates calculated using the Gross Domestic Product deflators of the U.S. Department of Commerce, as published by the St. Louis Federal Reserve at <http://research.stlouisfed.org/fred2/data/GDPDEF.txt> and rounded to the nearest \$10 billion). But in the Brookhaven study, the worst-case property damage in a 50-mile radius was estimated at \$280 billion for BWRs (*Id.* at Table 4-2), which would be about \$370 billion in 2010 dollars – or more than seven times the NUREG-1353 estimate cited above. The worst case damages in a 500-mile radius were estimated at \$546 billion for U.S. boiling water reactors (“BWRs”) plus 138,000 excess cancer deaths (*Id.* at Table 4-2) with a high population density. The damage amount would be about \$720 billion in 2010 dollars. Results were slightly higher for pressurized water reactor spent fuel pools. *Id.* at Table 4-1. The overall 500-mile population density

assumed in the Brookhaven study was lower than the population density near several U.S. reactors, notably in the Northeast. Further, the Brookhaven study itself notes its calculations would not “reasonably envelope” the situation (including projected population growth) at certain locations where there are reactors close to major metropolitan centers. “There are several existing plant sites (i.e., Indian Point, Limerick, and Zion) that precede the issuance of R.G. 4.7 and exceed the site population distributions generally considered acceptable by current NRC policy.”) *Id.* at 3-4 and footnote at 3-4. Moreover, certain assumptions of the 1997 Brookhaven study may prove optimistic especially in densely populated areas. For instance, the study assumes that the population could be evacuated in one day, should evacuation become necessary. *Id.* at 3-8. As another example, the relocation radius was only 10 miles, as per NUREG-1150. *Id.* at 3-8 and NUREG-1150, *An Assessment for Five Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants: Final Summary Report*, U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research Vol. 1 at 2-20 (December 1990), <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1150/v1/sr1150v1-intro-and-part-1.pdf>. The relocation radius around Fukushima is greater than 10 miles. Moreover the U.S. advised its citizens early on to evacuate within a 50-mile radius of Fukushima Daiichi. This indicates that emergency management criteria and procedures need to be revisited.

31. In view of the severe crisis with multiple units at Fukushima in a densely populated industrialized country where there has been both direct and indirect economic damage, the 1997 Brookhaven study provides a reasonable starting point for a reevaluation of spent fuel accident consequences. Of course, Fukushima shows that the results of the Brookhaven study must be reviewed in the context of the potential for multiple failures at a single site in both reactors and spent fuel pools. Evacuation and population assumptions will likely need to be changed. As a result, both the monetary damages and health effects estimates may have to be revised upwards, possibly by substantial amounts in densely populated areas. Further, Fukushima is showing that there has already been indirect economic damage in industries like shipping and manufacturing that are not directly affected by fallout. While, the long-term and overall direct and indirect costs of the reactor and spent fuel damages from the Fukushima accident will take time to be tallied, it is clear that they will be enormous.

### **Hydrogen explosions and implications for aircraft crash evaluations**

32. The Fukushima accident has revealed significant new information about the potential effects of hydrogen explosions. The estimated Unit 1 generation of hydrogen was 300 to 600 kg; for Units 2 and 3 it was 300 to 1,000 kg. Estimates were by an expert commissioned by AREVA. Matthias Braun, *The Fukushima Daiichi Incident*, AREVA, April 15, 2011, at 18, <http://www.wdr.de/tv/monitor//sendungen/2011/0407/pdf/areva-fukushima-report.pdf>. This indicates an urgent need to revisit the issue of aircraft crashes, deliberate or accidental, at existing reactors and spent fuel pools. The energy of the estimated amounts of hydrogen involved in the Fukushima explosions is far smaller than fuel in fully-loaded commercial jetliner – a type of crash that must be evaluated under NRC regulations. Five thousand gallons of jet fuel (not at all unusual for larger passenger jets -- the largest ones have much larger fuel capacities) have an energy content about four times as large as the largest estimate of the hydrogen explosions (1,000 kilograms of hydrogen gas) at Fukushima. Indeed, in light of Fukushima even a smaller, regional jet crash needs to be taken into account, especially for older

BWRs. Such damage needs to be evaluated both in the safety and environmental analyses. For instance, the Fukushima accident has demonstrated that evacuation planning in the circumstances of a natural disaster that is combined with a reactor accident is far more challenging than assumed by NRC emergency planning regulations.

## Conclusions

33. As discussed above in pars. 16 through 32, the Fukushima accident has already revealed an enormous amount of new information regarding the safety vulnerabilities and environmental risks that need to be taken into account in licensing of new reactors, the re-licensing of existing reactors, early site permits, emergency procedures for protecting the civilian population, and approval of standardized reactor designs in rulemakings.

34. I believe that if the significant new information emanating from the Fukushima Daiichi accident is taken into consideration in NRC safety and environmental analyses, it is likely to fundamentally alter the outcome of those analyses in important ways. In the safety arena, consideration of this new information is likely to result in more rigorous regulation with respect to issues such as loss of offsite power, hydrogen explosion prevention, the siting of more than one reactor at a single site, spent fuel accident and reactor accident probabilities, the re-racking of spent fuel pools, permitting extended storage of spent fuel in pools after decommissioning, and emergency planning.

35. In the environmental and health arenas, consideration of this significant new information is likely to result in higher accident probability estimates, new accident mechanisms for spent fuel pools, higher accident cost estimates, and higher estimates of the health risks posed by light water reactor accidents. These increased risk and cost estimates will lead to much more serious consideration of alternatives for avoidance or mitigation of environmental risks. For instance, although the Commission has long rejected low-density pool storage combined with dry onsite storage as an alternative for mitigating the effects of catastrophic pool fires, that option may now prove to be very cost-beneficial. Present policy also does not require the transfer of all spent fuel from pools into dry casks at closed sites, as soon as safely possible after closure. A change of policy would be indicated by the scale of the disaster at Fukushima. In view of the large variation in potential damage and differences in emergency response needs, a plant-specific analysis will also be needed, including for all reactors in the Northeast.

36. It is likely that more (and more expensive) protective features will be needed to ensure a level of safety and security that will avoid the kinds of disastrous consequences occurring at Fukushima Daiichi. It is also likely that additional measures involving significant costs will have to be taken to reduce the likelihood and consequences of multi-reactor and/or spent fuel disasters. In light of this new information, a comparison between the economic attractiveness of a proposed new nuclear reactor or a proposed re-licensing of an existing reactor that might need modifications with other less risky and less expensive energy sources (such as wind, solar, and storage technologies such as compressed air) may well result in a decision that licensing of new reactors and re-licensing of existing reactors is not cost-effective.

37. Therefore, I believe it is reasonable and necessary for the NRC to suspend licensing and re-licensing decisions and standardized design certifications until the NRC completes its review of the regulatory implications of the Fukushima accident.

The facts presented above are true and correct to the best of my knowledge, and the opinions expressed therein are based on my best professional judgment.



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Dr. Arjun Makhijani

19 April 2011

Date

## Curriculum Vita of Arjun Makhijani

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A recognized authority on energy issues, Dr. Makhijani is the author and co-author of numerous reports and books on energy and environment related issues, including two published by MIT Press. He was the principal author of the first study of the energy efficiency potential of the US economy published in 1971. He is the author of *Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy* (2007).

In 2007, he was elected Fellow of the American Physical Society. He was named a Ploughshares Hero, by the Ploughshares Fund (2006); was awarded the Jane Bagley Lehman Award of the Tides Foundation in 2008 and the Josephine Butler Nuclear Free Future Award in 2001; and in 1989 he received The John Bartlow Martin Award for Public Interest Magazine Journalism of the Medill School of Journalism, Northwestern University, with Robert Alvarez. He has many published articles in journals and magazines as varied as *The Bulletin of the Atomic Scientists*, *Environment*, *The Physics of Fluids*, *The Journal of the American Medical Association*, and *The Progressive*, as well as in newspapers, including the *Washington Post*.

Dr. Makhijani has testified before Congress, and has appeared on ABC World News Tonight, the CBS Evening News, CBS 60 Minutes, NPR, CNN, and BBC, among others. He has served as a consultant on energy issues to utilities, including the Tennessee Valley Authority, the Edison Electric Institute, the Lawrence Berkeley Laboratory, and several agencies of the United Nations.

### ***Education:***

- Ph.D. University of California, Berkeley, 1972, from the Department of Electrical Engineering. Area of specialization: plasma physics as applied to controlled nuclear fusion. Dissertation topic: multiple mirror confinement of plasmas. Minor fields of doctoral study: statistics and physics.
- M.S. (Electrical Engineering) Washington State University, Pullman, Washington, 1967. Thesis topic: electromagnetic wave propagation in the ionosphere.
- Bachelor of Engineering (Electrical), University of Bombay, Bombay, India, 1965.

### ***Current Employment:***

- 1987-present: President and Senior Engineer, Institute for Energy and Environmental Research, Takoma Park, Maryland. (part-time in 1987).
- February 3, 2004-present, Associate, SC&A, Inc., one of the principal investigators in the audit of the reconstruction of worker radiation doses under the Energy Employees Occupational Illness Compensation Program Act under contract to the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services.

### ***Other Long-term Employment***

- 1984-88: Associate Professor, Capitol College, Laurel, Maryland (part-time in 1988).
- 1983-84: Assistant Professor, Capitol College, Laurel, Maryland.
- 1977-79: Visiting Professor, National Institute of Bank Management, Bombay, India. Principal responsibility: evaluation of the Institute's extensive pilot rural development program.
- 1975-87: Independent consultant (see page 2 for details)
- 1972-74: Project Specialist, Ford Foundation Energy Policy Project. Responsibilities included research and writing on the technical and economic aspects of energy conservation and supply in the U.S.; analysis of Third World rural energy problems; preparation of requests for proposals; evaluation of proposals; and the management of grants made by the Project to other institutions.
- 1969-70: Assistant Electrical Engineer, Kaiser Engineers, Oakland California. Responsibilities included the design and checking of the electrical aspects of mineral industries such as cement plants, and plants for processing mineral ores such as lead and uranium ores. Pioneered the use of the desk-top computer at Kaiser Engineers for performing electrical design calculations.

### ***Professional Societies:***

- Institute of Electrical and Electronics Engineers and its Power Engineering Society
- American Physical Society (Fellow)
- Health Physics Society
- American Association for the Advancement of Science

### ***Awards and Honors:***

- The John Bartlow Martin Award for Public Interest Magazine Journalism of the Medill School of Journalism, Northwestern University, 1989, with Robert Alvarez
- The Josephine Butler Nuclear Free Future Award, 2001
- Ploughshares Hero, Ploughshares Fund, 2006
- Elected a Fellow of the American Physical Society, 2007, "*For his tireless efforts to provide the public with accurate and understandable information on energy and environmental issues*"
- Jane Bagley Lehman Award of the Tides Foundation, 2007/2008

**Invited Faculty Member, Center for Health and the Global Environment, Harvard Medical School:** Annual Congressional Course, *Environmental Change: The Science and Human Health Impacts*, April 18-19, 2006, Lecture Topic: An Update on Nuclear Power - Is it Safe?

***Consulting Experience, 1975-1987***

Consultant on a wide variety of issues relating to technical and economic analyses of alternative energy sources; electric utility rates and investment planning; energy conservation; analysis of energy use in agriculture; US energy policy; energy policy for the Third World; evaluations of portions of the nuclear fuel cycle.

Partial list of institutions to which I was a consultant in the 1975-87 period:

- Tennessee Valley Authority
- Lower Colorado River Authority
- Federation of Rocky Mountain States
- Environmental Policy Institute
- Lawrence Berkeley Laboratory
- Food and Agriculture Organization of the United Nations
- International Labour Office of the United Nations
- United Nations Environment Programme
- United Nations Center on Transnational Corporations
- The Ford Foundation
- Economic and Social Commission for Asia and the Pacific
- United Nations Development Programme

***Languages:*** English, French, Hindi, Sindhi, and Marathi.

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Makhijani, A., and Brice Smith, *The Role of E.I. du Pont de Nemours and Company (Du Pont) and the General Electric Company in Plutonium Production and the Associated I-131 Emissions from the Hanford Works*, Institute for Energy and Environmental Research, Takoma Park, Maryland, March 30, 2004.

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CV updated October 11, 2010

CERTIFICATE OF SERVICE

I hereby certify that copies of this SUPPLEMENT EMERGENCY PETITION TO SUSPEND ALL PENDING REACTOR LICENSING DECISIONS AND RELATED RULEMAKING DECISIONS PENDING INVESTIGATION OF LESSONS LEARNED FROM FUKUSHIMA DAIICHI NUCLEAR POWER STATION ACCIDENT were served on the following via the EIE system:

Office of the Secretary  
Office of the Secretary  
ATTN: Docketing and Service  
Mail Stop 0-16C1  
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Washington, DC 20555-0001  
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This is the 19<sup>th</sup> day of April 2011.

FOR NORTH CAROLINA WASTE AWARENESS & REDUCTION NETWORK

\_\_\_\_\_/signed electronically by/\_\_\_\_\_

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**From:** [Sarah Anderson](#)  
**To:** [McIntyre, David](#)  
**Subject:** This week!  
**Date:** Monday, April 18, 2011 12:11:43 PM

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Hey Dave, how are you? Thanks so much for getting those Vermont answers for me last week.

This week I'm hoping to look into Fukushima a little more, from the perspective of figuring out how exactly Japan is regulating and disposing of its LLRW normally, and what possibilities there are for where this waste might end up. Is there someone at the NRC I can talk to about current regulations there?

Thanks again!

Sarah Anderson  
Reporter, RadWaste Monitor  
(202) 296-2814 x110

NNNN/98

**From:** [Docket, Hearing](#)  
**To:** [Adler, James](#); [Ammon, Bernice](#); [Bupp, Margaret](#); [Carson, Cecilia](#); [Clark, Lisa](#); [Coggins, Angela](#); [Cordes, John](#); [Davis, Roger](#); [Docket, Hearing](#); [Frye, Roland](#); [Hart, Ken](#); [Krause, Emily](#); [McIntyre, David](#); [Monninger, John](#); [Nieh, Ho](#); [OCAAMAIL Resource](#); [OPA Resource](#); [Poole, Brooke](#); [Reddick, Darani](#); [Spicer, Susan](#); [Temp, WCO](#); [Temp, WDM](#); [Vietti-Cook, Annette](#); [Zorn, Jason](#)  
**Subject:** Two Attachments: (1)-04-18-11-Emergency Petition; (2) -04-19-11-Supplement to Emergency Petition - North Anna  
**Date:** Wednesday, April 20, 2011 5:43:55 PM  
**Attachments:** [4-18-11-CORRECTED PETITION.pdf](#)  
[04-19-11-Supplement to Emergency Petition.pdf](#)

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Attached are copies of two versions of the Emergency Petition submitted on behalf of North Anna, Unit 3 (Docket No. 52-017-COL).

**ACTION OFFICE: OCAA**

**ACTION: APPROPRIATE**

Christine Pierpoint  
Rulemakings and Adjudications Staff  
Office of the Secretary

MNNN/99

Corrected April 18, 2011  
(Original version submitted April 14-18, 2011)

UNITED STATES OF AMERICA  
U.S. NUCLEAR REGULATORY COMMISSION  
BEFORE THE COMMISSION

In the Matter of AmerenUE (Callaway Plant Unit 2)	) ) )	Docket No. 52-037-COL
In the Matter of AP1000 Design Certification Amendment 10 CFR Part 52	) ) )	NRC-2010-0131 RIN 3150-A18
In the Matter of Calvert Cliffs 3 Nuclear Project, L.L.C. (Calvert Cliffs Nuclear Power Plant, Unit 3)	) ) )	Docket No. 52-016-COL
In the Matter of Detroit Edison Co. (Fermi Nuclear Power Plant, Unit 3)	) ) )	Docket No. 52-033-COL
In the Matter of Duke Energy Carolinas, L.L.C. (William States Lee III Nuclear Station, Units 1 and 2)	) ) ) )	Docket Nos. 52-018 and 52-019
In the Matter of Energy Northwest (Columbia Generating Station)	) ) )	Docket No. 50-397-LR
In the Matter of Entergy Nuclear Generation Co. And Entergy Nuclear Operations, Inc. (Pilgrim Nuclear Power Station)	) ) ) )	Docket No. 50-293-LR
In the Matter of Entergy Nuclear Operations, Inc. (Indian Point Nuclear Generating Station, Units 2 and 3)	) ) ) )	Docket Nos. 50-247-LR and 50-286-LR
In the Matter of ESBWR Design Certification Amendment 10 CFR Part 52	) ) )	NRC-2010-0135 RIN-3150-AI85

In the Matter of FirstEnergy Nuclear Operating Co. (Davis-Besse Nuclear Power Station, Unit 1)	) ) ) )	Docket No. 50-346-LR
In the Matter of Florida Power & Light Co. (Turkey Point Units 6 and 7)	) ) )	Docket Nos. 52-040-COL and 52-041-COL
In the Matter of Luminant Generation, Co., L.L.C. (Comanche Peak Nuclear Power Plant, Units 3 and 4)	) ) ) )	Docket Nos. 52-034-COL and 52-035-COL
In the Matter of Nextera Energy Seabrook, L.L.C. (Seabrook Station, Unit 1)	) ) )	Docket No. 50-443-LR
In the Matter of Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2)	) ) ) )	Docket Nos. 50-275-LR and 50-323-LR
In the Matter of PPL Bell Bend, L.L.C. (Bell Bend Nuclear Power Plant)	) ) )	Docket No. 52-039-COL
In the Matter of Progress Energy Carolinas, Inc. (Shearon Harris Nuclear Power Plant, Units 2 and 3)	) ) ) )	Docket Nos. 52-022-COL and 52-023-COL
In the Matter of Progress Energy Florida, Inc. (Levy County Nuclear Power Plant, Units 1 and 2)	) ) ) )	Docket Nos. 52-029-COL and 52-030-COL
In the Matter of South Carolina Electric and Gas Co. And South Carolina Public Service Authority (Also Referred to as Santee Cooper) (Virgil C. Summer Nuclear Station, Units 1 and 2)	) ) ) ) ) )	Docket Nos. 52-027-COL and 52-028-COL

In the Matter of	)	
Southern Nuclear Operating Co.	)	Docket Nos. 52-025-COL
(Vogtle Electric Generating Plant,	)	and 52-026-COL
Units 3 and 4)	)	
In the Matter of	)	
South Texas Project Nuclear Operating Co.	)	Docket Nos. 52-012-COL
(South Texas Project,	)	and 52-013-COL
Units 3 and 4)	)	
In the Matter of	)	
Tennessee Valley Authority	)	Docket Nos. 52-014-COL
(Bellefonte Nuclear Power Plant,	)	and 52-015-COL
Units 3 and 4)	)	
In the Matter of	)	
Tennessee Valley Authority	)	Docket No. 50-0391-OL
(Watts Bar Unit 2)	)	
In the Matter of	)	
Virginia Electric and Power Co.	)	
d/b/a/ Dominion Virginia Power and	)	Docket No. 52-017-COL
Old Dominion Electric Cooperative	)	
(North Anna Unit 3)	)	

**EMERGENCY PETITION TO SUSPEND ALL PENDING REACTOR LICENSING  
DECISIONS AND RELATED RULEMAKING DECISIONS  
PENDING INVESTIGATION OF LESSONS LEARNED FROM FUKUSHIMA DAIICHI  
NUCLEAR POWER STATION ACCIDENT**

**I. INTRODUCTION**

Pursuant to the Atomic Energy Act (“AEA”) and the National Environmental Policy Act (“NEPA”), Petitioners hereby request the U.S. Nuclear Regulatory Commission (“NRC” or “Commission”) to exercise its supervisory jurisdiction over all pending proceedings for the consideration of applications for construction permits, new reactor licenses, combined construction permit and operating licenses (“COLs”), early site permits (“ESPs”), license renewals (“LRs”), and standardized design certification rulemakings for nuclear reactors (hereinafter collectively “licensing and related rulemaking proceedings”), to ensure the consideration in those proceedings of new and significant information regarding the safety and environmental implications of the ongoing catastrophic radiological accident at the Fukushima Daiichi Nuclear Power Station, Units 1-6 (“Fukushima”), in Okumu, Japan.

This Petition is filed by Petitioners in each of the above-captioned licensing and rulemaking proceedings now pending before the Commission. The Petition will be filed in each of the above-captioned proceedings between April 14 and April 18, 2011.<sup>1</sup>

Petitioners request the Commission to take the following immediate actions:

- Suspend all decisions regarding the issuance of construction permits, new reactor licenses, COLs, ESPs, license renewals, or standardized design certification pending completion by the NRC’s Task Force to Conduct a Near-Term Evaluation of the Need for

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<sup>1</sup> This Petition is complementary to the Petition to Suspend AP1000 Design Certification Rulemaking Pending Evaluation of Fukushima Accident Implications on Design and Operational Procedures and Request for Expedited Consideration that was filed by the Bellefonte Efficiency and Sustainability Team and other organizations on April 6, 2011.

Agency Actions Following the Events in Japan (“Task Force”) of its investigation of the near-term and long-term lessons of the Fukushima accident and the issuance of any proposed regulatory decisions and/or environmental analyses of those issues;

- Suspend all proceedings with respect to hearings or opportunities for public comment, on any reactor-related or spent fuel pool-related issues that have been identified for investigation in the Task Force’s Charter of April 1, 2011 (NRC Accession No. ML11089A045). These issues include external event issues (i.e., seismic, flooding, fires, severe weather); station blackout; severe accident measures (e.g., combustible gas control, emergency operating procedures, severe accident management guidelines); implementation of 10 C.F.R. § 50.54(hh)(2) regarding response to explosions or fire; and emergency preparedness. *Id.* The Commission should also suspend all licensing and related rulemaking proceedings with regard to any other issues that the Task Force subsequently may identify as significant in the course of its investigation. The proceedings should be suspended pending completion of the Task Force’s investigation into those issues and the issuance of any proposed regulatory decisions and/or environmental analyses of those issues;
- Conduct an analysis, as required by NEPA, of whether the March 11, 2011 Tohoku-Chihou-Taiheiyo-Oki earthquake and ensuing radiological accident poses new and significant information that must be considered in environmental impact statements to support the licensing decisions for all new reactors and renewed licenses;
- Conduct a safety analysis of the regulatory implications of the March 11, 2011 Tohoku-Chihou-Taiheiyo-Oki earthquake and ensuing radiological accident and publish the results of that analysis for public comment;

- Establish procedures and a timetable for raising new issues relevant to the Fukushima accident in pending licensing proceedings. The Commission should allow all current intervenors in NRC licensing proceedings, all petitioners who seek to re-open closed licensing or re-licensing proceedings, and all parties who seek to comment on design certification proposed rules, a period of at least 60 days following the publication of proposed regulatory measures or environmental decisions, in which to raise new issues relating to the Fukushima accident.
- Suspend all decisions and proceedings regarding all licensing and related rulemaking proceedings, as discussed above, pending the outcome of any *independent* investigation of the Fukushima accident that may be ordered by Congress or the President or instigated by the Commission to complement or supersede the work of the Task Force.
- Request that the President establish an independent investigation of the Fukushima accident and its implications for the safety and environmental impacts of U.S. reactors and spent fuel pools similar to the President's Commission on the Accident at Three Mile Island, chaired by John G. Kemeny.

Petitioners respectfully submit that granting of the relief requested above is required by the AEA and NEPA, which forbid the NRC from issuing licenses for which it lacks reasonable assurance of safe operation or for which it has failed to consider all information significantly bearing on the environmental impacts of reactor operation. *See* discussion in Section V.B. below. By establishing the Task Force and ordering the investigation of the regulatory implications of the Fukushima accident for U.S. reactors, the Commission has identified the new information coming out of the Fukushima accident as new and potentially significant; and therefore it is legally obligated to consider the environmental implications of that new

information in all prospective licensing decisions. *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 370-71 (1989). Suspension of licensing decisions pending investigations of lessons learned also would be consistent with the course followed by the Commission following the Three Mile Island accident, when the Commission delayed new licensing actions for a year and a half. *See Statement of Policy: Further Commission Guidance for Power Reactor Operating Licenses*, CLI-80-42, 12 NRC 654 (1980) (“TMI Policy Statement”).<sup>2</sup>

Finally, emergency action by the Commission is necessary because a number of the pending licensing proceedings are approaching completion (e.g., the Pilgrim license renewal proceeding, the AP1000 design certification proceeding, the Vogtle Units 3 and 4 COL proceeding, and the Economic Simplified Boiling Water (“ESBWR”) design certification rulemaking proceeding). For these reasons, Petitioners therefore request a decision on this Petition within thirty (30) days.

## **II. DESCRIPTION OF PETITIONERS**

Petitioners are organizations and individuals who seek, through this Petition, to ensure that they will have an opportunity to raise new safety and environmental issues emerging from

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<sup>2</sup> Petitioners believe that by establishing the Task Force and charging it with the task of investigating the implications of the Fukushima Daiichi accident with respect to its regulatory program, the Commission has, as a matter of law, bound itself to evaluate the significance of the information yielded by its investigation under NEPA and to analyze any information that is new and significant in supplemental environmental impact statements for all pending licensing decisions. Therefore, Petitioners do not believe it is necessary to submit an expert declaration in support of this petition.

In any event, Petitioners expect to submit additional expert support for this Petition early next week, in the form of a declaration by Dr. Arjun Makhijani, President of the Institute for Energy and Environmental Research in Takoma Park, Maryland. Because of other conflicting obligations, Dr. Makhijani was unable to complete his declaration in time to submit it by April 14, 2011. Due to the fact that some of the licensing decisions affected by this petition are imminent, however, the majority of the Petitioners are submitting their legal brief and request for relief at their earliest opportunity, starting today.

the Fukushima nuclear accident in licensing and related rulemaking proceedings. Some of the Petitioners have already intervened in pending NRC licensing proceedings and seek an opportunity to participate with respect to the application of new information regarding “lessons learned” from Fukushima to those proceedings. Other petitioners seek a renewed opportunity to participate in licensing proceedings that have been closed to public participation but that are still pending before the agency. Petitioners also seek to ensure that the NRC will not give final approval to the AP1000 and ESBWR standardized designs proposed by the NRC Staff until the agency has considered whether design modifications are necessary in light of the Fukushima accident.

Petitioners are the following individuals and organizations:

AP1000 Group<sup>3</sup>

Beyond Nuclear, Inc.

Blue Ridge Environmental Defense League, Inc. (“BREDL”)

BREDL Chapters Bellefonte Efficiency and Sustainability Team, Peoples Alliance for  
Clean Energy and Concerned Citizens of Shell Bluff

Center for a Sustainable Coast, Inc.

Citizens Allied for Safe Energy, Inc.

Citizens Environmental Alliance of Southwestern Ontario, Inc.

Don’t Waste Michigan, Inc.

Ecology Party of Florida

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<sup>3</sup> The AP1000 Oversight Group consists of the Bellefonte Efficiency and Sustainability Team, BREDL, Citizens Allied for Safe Energy, Friends of the Earth, Georgia Women's Action for New Directions, Green Party of Florida, Mothers Against Tennessee River Radiation, North Carolina Waste Awareness and Reduction Network, Nuclear Information and Resource Service, Nuclear Watch South, South Carolina Chapter - Sierra Club, and SACE.

Friends of the Earth, Inc.

Friends of the Coast, Inc.

Georgia Women's Action for New Directions, Inc.

Green Party of Florida

Green Party of Ohio

Hudson River Sloop Clearwater, Inc.

Keith Gunter

Michael J. Keegan

Dan Kipnis

Leonard Mandeville

Frank Mantei

Marcee Meyers

Edward McArdle

National Parks Conservation Association, Inc.

Henry Newnan

Mark Oncavage

Missouri Coalition for the Environment, Inc.

Missourians for Safe Energy

Mothers Against Tennessee River Radiation

New England Coalition, Inc.

North Carolina Waste Reduction and Awareness Network, Inc.

Northwest Environmental Advocates, Inc. ("NWEA")

Nuclear Information and Resource Service, Inc.

Nuclear Watch South, Inc.

Public Citizen, Inc.

San Luis Obispo Mothers for Peace, Inc.

Savannah Riverkeeper, Inc.

Seacoast Anti-Pollution League, Inc.

Sierra Club, Inc. (Michigan Chapter)

Sierra Club (South Carolina Chapter)

George Steinman

Shirley Steinman

Southern Alliance for Clean Energy, Inc.

Gene Stilp

Harold L. Stokes

Southern Maryland CARES, Inc. (Citizens Alliance for Renewable Energy Solutions)

Sustainable Energy and Economic Development (“SEED”) Coalition, Inc.

Marilyn R. Timmer

Village of Pinecrest, Florida

**III. DESCRIPTION OF PENDING PROCEEDINGS IN WHICH PETITIONERS HAVE AN INTEREST IN APPLICATION OF LESSONS LEARNED FROM FUKUSHIMA NUCLEAR FACILITY ACCIDENT.**

As discussed above in Section II, Petitioners are organizations and individuals with an interest in pending licensing decisions regarding new or existing nuclear reactors, including rulemakings for certification of standardized designs. A description of those pending proceedings and the Petitioners’ interests in those proceedings follows. These descriptions of Petitioners’ interests are not intended to be a complete representation of those interests nor are

they intended to limit Petitioners in raising safety or environmental concerns related to the Fukushima accident in any on-going or future proceedings.

**A. Construction Permit Proceedings**

**B. Part 50 Operating License Proceedings**

**Watts Bar Unit 2.** TVA has attempted to resurrect the Watts Bar 2 reactor, which was all-but-abandoned in 1985. SACE was admitted as an intervenor to the operating license proceeding that commenced in 2009. While a contention regarding aquatic impacts was admitted, the ASLB rejected contentions regarding the inadequacy of TVA's SAMA analysis, including its analysis of the reliability of AC power backup for resolution of GSI-189, "Susceptibility of Ice Condenser and Mark III Containments to Early Failure From Hydrogen Combustion During a Severe Accident." SACE is very concerned about the implications of the Fukushima accident with respect to the issues of backup power adequacy, hydrogen explosions, and the vulnerability of the proposed Watts Bar reactor's ice condenser containment.

**C. Part 50 License Renewal Proceedings**

**Columbia Generating Station.** The license renewal proceeding for the Columbia Generating Station is now pending before the NRC Staff. Under the schedule posted on the NRC's website, publication of a Draft Environmental Impact Statement ("EIS") is scheduled for June 2011. *See* <http://www.nrc.gov/reactors/operating/licensing/renewal/applications/columbia.html#schedule>.

Petitioner Northwest Environmental Advocates ("NWEA") is extremely concerned about the implications of the Fukushima accident with respect to the safety of operating the Columbia Generating Station. They are particularly concerned about the implications of the Fukushima accident in light of earthquake risks to the Columbia Generating Station based on new findings of a structural zone that kinematically connects faults in central Washington with faults in the

Puget Sound, the entirety of which may be seismically active. These findings are scheduled for publication later this year. The Fukushima accident also highlights the hazards associated with facility mismanagement which has been a chronic problem at the Columbia Generating Station.

**Davis-Besse Nuclear Power Station, Unit 1.** Beyond Nuclear, Citizens Environment Alliance of Southwestern Ontario, Don't Waste Michigan, and the Green Party of Ohio have submitted four contentions challenging the proposed extension of the Davis-Besse license, including inadequate treatment of alternative of potential for commercial-scale wind power and commercial-scale photovoltaic power generation in the Environmental Report ("ER), and inadequate Severe Accident Mitigation Alternatives ("SAMA") analysis.

Davis-Besse, a Babcock & Wilcox reactor, has a remarkable history of operational problems, the most recent being the infamous 2002 discovery of a massive corrosion hole in the reactor head the size of a loaf of bread, where a 3/16" stainless steel liner was all that was holding back the pressurized radioactive water in the vessel.

**Diablo Canyon Nuclear Power Plant, Units 1 and 2.** The Diablo Canyon license renewal proceeding is now pending before the ASLB. San Luis Obispo Mothers for Peace ("SLOMFP") has intervened and gained admission of safety and environmental contentions, including contentions which challenge Pacific Gas and Electric's failure to adequately address earthquake risks to the reactor and the spent fuel pools. The ASLB has also referred to the Commission SLOMFP's petition for a waiver of NRC regulations precluding consideration of the environmental impacts of pool storage of spent fuel, based on a footnote in the 2009 Draft Revised Generic Environmental Impact Statement for Nuclear Power Plant License Renewal which excludes Diablo Canyon and other western reactors from the NRC's finding that pool

storage of spent fuel does not pose significant environmental risks with respect to earthquake vulnerability.

SLOMFP is extremely concerned about the implications of the Fukushima reactor accident for the Diablo Canyon reactors and spent fuel pools, including the reactors' vulnerability to severe earthquakes and tsunamis, the lack of reliable and adequate backup power capability for the site, and the infeasibility of emergency evacuation following an earthquake.

**Indian Point Nuclear Generating Station, Units 2 and 3.** The Indian Point proceeding concerns the relicensing of two pressurized water reactors approximately 35 miles north of New York City. This proceeding has become the most complicated relicensing proceeding ever heard due to the large number of parties and admitted contentions. Hudson Sloop Clearwater, Riverkeeper, and New York State all have multiple contentions admitted in the proceeding. A number of other municipal entities are participating as interested parties. Clearwater's admitted contention concerns the need to assess the environmental justice implications of severe accidents. Clearwater and Riverkeeper have recently moved to add both environmental and safety contentions regarding waste storage, based upon the recent waste confidence update. In addition, Clearwater, Riverkeeper, and New York State have moved to add environmental contentions based upon the publication of the FSEIS. Initial testimony regarding admitted contentions is now due in approximately 65 days.

**Pilgrim Nuclear Power Station.** The on-going Pilgrim Nuclear Power license renewal proceeding began in 2006. Two Pilgrim Watch contentions were admitted; one challenged the adequacy of the aging management program for buried pipes/tanks within scope containing radioactive liquids; the other challenged the applicant's SAMA analysis. Although the buried pipe contention was dismissed on summary disposition, the SAMA contention is still before the

ASLB. In late 2010, Pilgrim Watch filed two Requests for New Hearings regarding the inadequacy of Entergy's aging management of submerged non-environmentally qualified electric cables and the lack of measures for cleanup after a severe nuclear reactor accident. The contentions are before the ASLB. Given the relevance of these issues to the Fukushima accident, and given the fact that the Pilgrim reactor shares the same boiling water reactor ("BWR") design as the Fukushima reactors, Pilgrim Watch seeks to ensure that it will have an opportunity to raise accident-related issues during the Pilgrim re-licensing proceeding.

**Seabrook Station, Unit 1.** In the license renewal proceeding for Seabrook Station Unit 1, the ASLB in this proceeding granted standing and admitted contentions submitted by Beyond Nuclear, Seacoast Anti-Pollution League, Sierra Club-New Hampshire Chapter, Friends of the Coast and New England Coalition. Admitted contentions that are relevant to the Fukushima accident include Beyond Nuclear's contention challenging the licensee's apparent failure to adequately consider the availability of more environmentally benign and less risk-laden alternatives for the proposed period of extended operation. Early reports from Japan indicate that unanticipated costs to the environment and the regional economy resulting from the release of radiological fission products, activation products, and heavy radioactive elements to the environment from the Fukushima reactors and spent fuel pools will dwarf those risks considered in NRC's Generic Environmental Impact Statement for License Renewal, NRC site specific evaluations or in the license renewal application. Other contentions that appear relevant to the Fukushima accident relate to failure to provide for aging management of transformers, failure to provide for adequate aging management of non-qualified safety-related electrical cables susceptible to wetting or submergence, and inadequate and non-conservative Severe Accident Mitigation Alternatives ("SAMA") analysis.

The flooding phenomena at Fukushima also raise questions about the potential for tsunami impact at Seabrook, something dismissed in the LRA documents. Friends of the Coast and New England Coalition found that tsunamis have indeed occurred in adjacent waters of the North Atlantic; the most pertinent and striking example being a tsunami generated by a 7.2 earthquake epi-centered on Georges Bank at the northeast extreme of the Gulf of Maine. That tsunami, when funneled in to the bays and inlets of Newfoundland, crested at 90 feet. *See* <http://www.maine.gov/doc/nrimc/mgs/explore/hazards/tsunami/jan05.htm>

Clearly, the implications of such examples from recent history, coupled with the Japanese experience, should no longer be ignored when evaluating accident prospects in license renewal proceedings.

#### **D. Part 52 Combined Licensing Proceedings**

**Bell Bend Nuclear Power Plant.** In 2009, Gene Stilp requested a hearing on Pennsylvania Power and Light Co.'s application for a COL for the Bell Bend reactor, to be built adjacent to the two existing Susquehanna reactors. Although the ASLB found that Mr. Stilp had standing, it rejected his contentions as inadmissible. Among Mr. Stilp's rejected contentions was his concern about the safety and environmental risks of storing Bell Bend's spent fuel adjacent to the existing spent fuel storage pools at the Susquehanna site. Mr. Stilp would seek reconsideration of that issue in light of the events at the multi-unit Fukushima facility.

**Bellefonte Nuclear Power Plant, Units 3 and 4.** BREDL and Southern Alliance for Clean Energy ("SACE") won the admission of four contentions in the COL proceeding regarding the Tennessee Valley Authority's ("TVA's") COL application for Bellefonte Units 3 and 4. There is considerable uncertainty regarding TVA's COL application which continues to delay the NRC's safety and environmental review schedule. In the wake of the Fukushima accident, the

organizations are concerned about seismic risks to the proposed reactors: the Bellefonte site is near the Eastern Tennessee Seismic Zone, which is considered to be one of the most active seismic areas east of the Rocky Mountains. Recent studies have indicated that this seismic zone may have the potential to produce large magnitude earthquakes.

**Callaway Plant Unit 2.** The Missouri Coalition for the Environment and Missourians for Safe Energy intervened in the COL proceeding for Callaway Unit 2. The case was suspended after the applicant was unable to obtain construction work in progress funding from the state.

**Calvert Cliffs Nuclear Power Plant, Unit 3.** Calvert Cliffs Nuclear Power Plant, Unit 3. Nuclear Information and Resource Service, Public Citizen, Beyond Nuclear and Southern Maryland CARES are intervenors in this COL proceeding. Contentions on foreign ownership of the Calvert Cliffs-3 project and on the failure of the NRC's Draft Environmental Impact Statement to adequately consider alternatives to Calvert Cliffs-3 are pending, with no hearing date yet established.

**Comanche Peak Nuclear Power Plant, Units 3 and 4.** Public Citizen, Inc. and the Sustainable Energy and Economic Development (SEED) Coalition, Inc. were admitted as Intervenor and raised several contentions in this COL proceeding for two new reactors on the site of the existing Comanche Peak Units 1 and 2. All of the contentions have been dismissed by the ASLB on motions for summary disposition. Intervenor have filed a petition for review of the ASLB's dismissal of contentions regarding mitigation strategies for loss of large area (LOLA) incidents caused by fires and explosions under 10 C.F.R. 50.54(hh)(2), an issue that is the subject of the Task Force's investigation.

**Fermi Nuclear Power Plant, Unit 3.** In July 2009, intervenors Don't Waste Michigan, Inc., Citizens for Alternatives to Chemical Contamination, Beyond Nuclear, Citizens Environmental

Awareness of Southwestern Ontario, Keith Gunter, Michael J. Keegan, Edward McArdle, Leonard Mandeville, Frank Mantei, Marcee Meyers, Henry Newnan, Sierra Club (Michigan Chapter), George Steinman, Shirley Steinman, Harold L. Stokes, and Marilyn R. Timmer were granted standing and won the admission of five contentions in the COL proceeding for Fermi Unit 3. Three of those contentions are still pending.

**Levy County Nuclear Power Plant, Units 1 and 2.** Nuclear Information and Resource Service, The Green Party of Florida and The Ecology Party of Florida have been admitted as joint interveners in the COL proceeding for Progress Energy Florida's proposal to build two reactors on top of the recharge zone for some of the most pristine freshwater springs on the planet. The ASLB has two contentions before it and a hearing is currently set for January 2012.

**North Anna Unit 3.** BREDL and its chapter People's Alliance for Clean Energy have been admitted as intervenors in the COL proceeding for two proposed reactors on the site of the existing two-unit North Anna nuclear power plant. One of the original proposed plants was cancelled and the application for the other was replaced with one for a pressurized water reactor. On April 6, 2011, in LBP-11-10, the ASLB denied two additional contentions on water use and ability to withstand seismic incidents.

**Shearon Harris Nuclear Power Plant, Units 2 and 3.** NC WARN was admitted as an intervenor to this COL proceeding and submitted safety and environmental contentions on plant design, fire safety, aircraft attacks, spent fuel and emergency planning. One of the contentions on the underestimate of cost for the plants was settled when the applicant revised its cost estimates. The ASLB dismissed all of the other contentions and was affirmed by the Commission in CLI-10-05. The COL application is still pending before the NRC Staff.

**South Texas Project, Units 3 and 4.** Public Citizen and the SEED Coalition were admitted as intervenors and gained admission of a number of contentions, including contentions regarding mitigation strategies for loss of large area (LOLA) incidents caused by fires and explosions under 10 C.F.R. 50.54(hh)(2). Although those contentions were dismissed by the ASLB, Intervenor believe they should now be subject to reconsideration based on the Fukushima accident and the Task Force investigation.

**Turkey Point Units 6 and 7.** SACE, the National Parks Conservation Association, Dan Kipnis and Mark Oncavage have been admitted as joint intervenors in the COL proceeding for proposed new Units 6 and 7 at the Turkey Point Nuclear facility in Homestead, Florida. While the ASLB admitted contentions regarding groundwater impacts, it refused to admit the joint intervenors' eight other contentions, including one regarding sea level rise. That contention, which concerned the potential environmental impact caused by construction and operation of new reactors in a region threatened by a predicted sea level rise of 1.5 to 5 feet by 2050, has particular relevance in light of the Fukushima disaster. Turkey Point is located less than 25 miles south of Miami on Biscayne Bay along Florida's southeastern coast. The lessons learned from the Task Force's investigation on external events should be applied to these coastal reactors.

**V.C. Summer Units 2 and 3.** Friends of the Earth and the Sierra Club were granted standing in the V.C. Summer COL case but no contentions were admitted. The COL application is still pending before the NRC Staff.

**Vogtle Electric Generating Plant, Units 3 and 4.** BREDL, Center for a Sustainable Coast, Georgia Women's Action for New Directions, Savannah Riverkeeper, and SACE (collectively, "Vogtle Intervenor") intervened in the COL proceeding for Plant Vogtle Units 3 and 4 and gained admission of a contention regarding the onsite storage of low level radioactive waste. In

May 2010, the ASLB ruled that the issue was resolved and dismissed the case. New contentions regarding the flaws in AP1000 containment were subsequently raised, dismissed by the ASLB and are under appeal to the Commission.

In April 2011, the NRC Staff issued a Final Supplemental Environmental Impact Statement for the COL, and the Staff plans to release the Final Safety Evaluation Report in June. According to the current schedule, the Plant Vogtle COL may be issued at the end of this year, making Vogtle Units 3 and 4 the first AP1000 reactors to be licensed.

Before the license is issued, and in light of the Fukushima disaster, the following issues must be assessed at Plant Vogtle: the safety and environmental impacts of onsite spent fuel storage at multiple units; the impact of a power failure on the reactor cooling systems for the multiple units; and earthquake risks to the reactors, which lie in an area prone to seismic activity. *See* NUREG-1923, Vogtle ESP Final Safety Evaluation Report, Chapter 2.5 (2009). Because Plant Vogtle will serve as the “reference” project for future AP1000 plants, the Vogtle Intervenor’s concern about the implications of the Fukushima disaster is heightened. If the lessons learned from Fukushima are not applied to Plant Vogtle, the repercussions will be multiplied by all plants referencing the Plant Vogtle COL in future applications.

**William States Lee III Nuclear Station, Units 1 and 2.** In 2008, BREDL petitioned for leave to intervene in the COL proceeding for Duke Energy Carolinas, LLC’s application to construct and operate two AP1000 pressurized water reactors at the William States Lee III Nuclear Station site. On September 22, 2008, in LBP-08-17, the ASLB ruled that BREDL had standing to intervene but admitted no contentions. Among the contentions dismissed by the ASLB was a contention challenging the adequacy of the proposed reactor’s seismic design, an issue now under investigation by the Task Force.

## **F. Standardized Design Certification Rulemakings**

**AP1000 Design Certification Amendment (NRC-2010-0131, RIN 3150-A18).** On April 6, 2011 the AP1000 Oversight Group filed a petition to suspend the rulemaking on the certification of the AP1000 design and operational procedures which was noticed on February 24, 2011, at 76 Fed. Reg. 10,269. Currently, the comment period for the AP1000 design certification rulemaking is scheduled to close on May 10, 2011, long before the NRC concludes even its initial inquiry into the implications of the Fukushima accident.

The Petitioners requested suspension of the AP1000 design approval process while the NRC investigates the implications of the ongoing catastrophic accident in Fukushima, Japan, and decides what “lessons learned” must be incorporated into the AP1000 design and operational procedures to ensure that they do not pose an undue risk to public health and safety or unacceptable environmental risks.

**ESBWR Design Certification Amendment (NRC-2010-01325, RIN 3150-A185).** The NRC issued a proposed rule for the Economic Simplified Boiling Water Reactor (“ESBWR”) standardized design certification on March 24, 2011, at 76 Fed. Reg. 16,549. The comment period closes on June 7, 2011. The ESBWR design has a particularly troublesome feature in common with the Mark I BWR design, which is the design of the Fukushima reactors: elevated spent fuel pools. Nevertheless, the Commission went ahead with the proposed rulemaking, even as the Fukushima accident unfolded.

## **IV. FACTUAL BACKGROUND**

### **A. Fukushima Accident**

Although many details about the Fukushima accident remain unclear, the general contours of the accident are described in NRC in Information Notice No. 2011-08 (March 31,

2011) (NRC Accession No. ML 110830824) as follows:

On March 11, 2011, the Tohoku-Taiheiyou-Oki earthquake occurred near the east coast of Honshu, Japan. This magnitude 9.0 earthquake and the subsequent tsunami caused significant damage to at least four of the six units of the Fukushima Daiichi nuclear power station as the result of a sustained loss of both the offsite and onsite power systems. Efforts to restore power to emergency equipment were hampered and impeded by damage to the surrounding areas due to the tsunami and earthquake.

Units 1, 2 and 3 were operating at the time of the earthquake. Following the loss of electric power to normal and emergency core cooling systems and the subsequent failure of backup decay heat removal systems, water injection into the cores of all three reactors was compromised, and reactor decay heat removal could not be maintained. The operator of the plant, Tokyo Electric Power Company, injected sea water and boric acid into the reactor vessels of these three units, in an effort to cool the fuel and ensure that the reactors remained shut down. However, the fuel in the reactor cores became partially uncovered. Hydrogen gas built up in Units 1 and 3 as a result of exposed, overheated fuel reacting with water. Following gas venting from the primary containment to relieve pressure, hydrogen explosions occurred in both units and damaged the secondary containments. *Id.*

Units 3 and 4 were reported to have low spent fuel pool (SFP) water levels.

Fukushima Daiichi Units 4, 5 and 6 were shut down for refueling outages at the time of the earthquake. *Id.* The fuel assemblies for Unit 4 had recently been offloaded from the reactor core to the SFP. The SFPs for Units 5 and 6 appear to be intact. Emergency power is available to provide cooling water flow through the SFPs for Units 5 and 6.

The damage to Fukushima Daiichi nuclear power station appears to have been caused by initiating events beyond the design basis of the facilities.

*Id.* at 1-2.

In a March 21, 2011, briefing, NRC Chairman also stated that the NRC believes that an accumulation of hydrogen which exploded on March 15 in Units Two and Four originated from overheated fuel in the spent fuel pool. Briefing on NRC Response to Recent Nuclear Events in Japan, Transcript at 11 (NRC ADAMS Accession No. ML110321).

According to Chairman Jaczko's March 21 statement, the NRC believes that Units One, Two, and Three have had some degree of core damage. Cooling systems for the reactors have

not been restored. At the outset of the emergency, large volumes of sea water were used to cool the reactors and the spent fuel pools. The salt water injections have now been replaced by fresh water injections.

## **B. NRC Response to Fukushima Accident**

### **1. Formation of Task Force**

In response to the Fukushima reactor accident, the NRC announced the formation of a “senior level task force to conduct a methodical and systematic review” of NRC processes and regulations. COMGBJ-11-0002, Memorandum from Chairman Jaczko to Commissioners, re: NRC Actions Following the Events in Japan (March 21, 2011). The purpose of the task force is to “determine whether the agency should make additional improvements to our regulatory systems and make recommendations to the Commission for its policy direction.” *Id.*

The Commission instructed the task force to undertake both a near-term review and a longer-term review. For the near-term review, the Commission required the task force to evaluate issues “affecting domestic operating reactors of all designs” in areas that include “protection against earthquake tsunami, flooding, hurricanes; station blackout and a degraded ability to restore power; severe accident mitigation; emergency preparedness; and combustible gas control.” *Id.* at 1. The Commission instructed the task force to complete the report in 90 days. In the meantime, the task force was instructed to provide a 30-day “quick look report” and another “status” report in 60 days. *Id.*

The Commission directed the task force to begin a “longer term” review “as soon as NRC has sufficient technical information from the events in Japan with the goal of no later than the completion of the 90 day near term report.” *Id.* at 2. The longer-term study should “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.” *Id.* For the longer-term effort, the Commission instructed the task force to “receive input from and interact with all key stakeholders.” *Id.* The Commission specified that within 60 days after commencing the longer-term study, the task force should “provide a report with recommendations, as appropriate, to the Commission.” *Id.* The Task Force was established in early April.

## **2. Task Force Charter**

The Task Force charter states that the group’s “objective” is to:

- Evaluate currently available technical and operational information from the events that have occurred at the Fukushima Daiichi nuclear complex in Japan to identify potential or preliminary near-term/immediate operational or regulatory actions affecting domestic reactors of all designs, including their spent fuel pools. The task force will evaluate, at a minimum, the following technical issues and determine priority for further examination and potential agency action:
  - External event issues (e.g. seismic, flooding, fires, severe weather)
  - Station blackout
  - Severe accident measures (e.g., combustible gas control, emergency operating procedures, severe accident management guidelines)
  - 10 CFR 50.54 (hh)(2) which states, “Each licensee shall develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to explosions or fire, to include strategies in the following areas: (i) Fire fighting; (ii) Operations to mitigate fuel damage; and (iii) Actions to minimize radiological release.” Also known as B.5.b.
  - Emergency preparedness (e.g., emergency communications, radiological protection, emergency planning zones, dose projections and modeling, protective actions)
- Develop recommendations, as appropriate, for potential changes to NRC’s regulatory requirements, programs, and processes, and recommend whether generic communications, orders, or other regulatory actions are needed.

With respect to the longer-term review, the charter states that the Task Force will make:

“[r]ecommendations for the content, structure, and estimated resource impact.”

### 3. NRC Brief to Third Circuit U.S. Court of Appeals

By letter dated March 21, 2011, in the context of an appeal of the NRC’s decision to re-license the Oyster Creek reactor, the U.S. Court of Appeals for the Third Circuit directed the NRC to “advise the Court what impact, if any, the damages from the earthquake and tsunami at the Fukushima Daiichi Nuclear Power Station have on the propriety of granting the license renewal application for the Oyster Creek Generating Station.” *New Jersey Environmental Federation et al. v. NRC* (No. 09-2567). The NRC responded that it is:

carefully monitoring those events, and assisting the Japanese government in understanding, controlling and limiting plant damage. NRC is also evaluating the information from these events for planning both short-term and longer-term responses to ensure the safety of United States reactors. In support of these tasks, NRC is gathering and absorbing data from the Fukushima Daiichi site that will enable NRC, with appropriate public participation, to put in place any new safety measures necessary to protect public health and safety in the United States.

Federal Respondents’ Memorandum on the Events at the Fukushima Daiichi Nuclear Power Station, No. 09-2567 (April 4, 2011) (“NRC Memorandum”).

In its Memorandum to the Third Circuit, the NRC also described its past “lessons learned” approach to significant events. *Id.* at 8. Following the 1979 accident at the Three Mile Island Unit 2 reactor, for example, the Commission established a “Lessons Learned Task Force.” A Task Force “steering group” took recommendations from within *and outside* the NRC and developed a “comprehensive and integrated plan for all actions necessary to correct or improve the regulation and operation of nuclear facilities.” In the course of that process, the NRC conducted a number of rulemakings “to update licensing requirements on the basis of TMI ‘lessons learned.’” *Id.* at 9. In response to the attacks of September 11, 2001, the NRC also

responded by ordering security improvements at all nuclear power plants, and eventually enacted many of those orders as formal regulations. *Id.* at 10.

The Commission's Memorandum to the Third Circuit does not describe one very important feature of the agency's response to the TMI accident: it suspended all licensing decisions until conclusion of the lessons learned process. TMI Policy Statement, 12 NRC 654. The Memorandum merely states that in this case the NRC has "not suspended reactor operations or licensing activity," and points out that the NRC issued a renewed license for the Vermont Yankee Nuclear Power Plant – a boiling water reactor ("BWR") of the same design as the Fukushima reactors – on March 21, 2011, during the accident. According to the NRC, "this decision reflects NRC's confidence in the robust and redundant safety design and construction of currently operating U.S. nuclear reactors . . ." Memorandum at 13. The Memorandum also omits any discussion of NEPA or its requirement that agencies must consider new and significant information before they take actions that could significantly affect the human environment.

**V. THE COMMISSION SHOULD EXERCISE ITS SUPERVISORY JURISDICTION TO STAY ALL PENDING LICENSING DECISIONS AND ALL PROCEEDINGS RELATED TO FUKUSHIMA ACCIDENT ISSUES PENDING INVESTIGATION OF REGULATORY IMPLICATIONS OF THE ACCIDENT.**

**A. Exercise of the Commission's Supervisory Jurisdiction is Appropriate.**

This petition invokes the Commission's supervisory authority under the AEA to "oversee all aspects of the regulatory and licensing process and its overriding responsibility for assuring public health and safety in the operation of nuclear power facilities." *Consolidated Edison Co. of N.Y., Inc.* (Indian Point, Units 1, 2 and 3), CLI-75-8, 2 NRC 173 (1975). *See also* 42 U.S.C. §§ 2233(d), 2236(a), 2237. In the extraordinary circumstances of the Fukushima accident, it is appropriate for the Commission to establish clear and uniform procedures for the application of "lessons learned" to pending licensing and rulemaking decisions. Only the Commission has the

authority to establish a consistent and broadly applicable set of procedures that comply with NEPA and AEA requirements for consideration of significant new information and that also provides legally required opportunities for public participation.

To leave the establishment of that process entirely to the separate ASLB panels that are now presiding over at least twenty-five separate licensing cases would invite uncertainty and chaos, especially in the administration of the general rule of thumb that significant new issues and information must be raised within thirty days of discovering them. *See, e.g., Shaw Areva MOX Services, Inc.* (Mixed Oxide Fuel Fabrication Facility), LBP-08-11, 67 NRC 460, 493 (2008) and cases cited therein. As illustrated by a recent New York Times article, the NRC's theories about what exactly has occurred during the Fukushima accident are continuing to change. Matthew L. Wald, "Japan's Reactors Still Not Stable" (New York Times, page A6, April 13, 2011) (Attachment 1). And, there is extremely little in the way of official documentation from any source upon which Petitioners can rely in order to make a case before an individual ASLB that the unfolding events at Fukushima are relevant to individual licensing or rulemaking proceedings. Therefore it will be very difficult for intervenors or the ASLB panels that must judge motions to re-open the record and new contentions to judge the timeliness of those submissions.

The Commission should also exercise its supervisory jurisdiction to establish an ordered process for the application of "lessons learned" in licensing proceedings and related rulemaking proceedings, because it is the Commission that bears the ultimate legal responsibility for evaluating new and significant information, and it is the Commission that has the resources to carry out that responsibility. If the Commission fails to establish such a process, intervenor groups will be placed in the position of rushing to file contentions, rulemaking comments, and

motions to re-open closed hearing records, based on whatever evaluations they are able to make of slowly-emerging and ever-evolving information from the accident. Such a process would not only be cumbersome, but its effectiveness would be limited by whatever limitations the intervenors or petitioners had on their resources for making a technical evaluation of the information yielded by the accident. It would place an unfair burden on intervenors and petitioners by forcing them to perform analyses that should be performed by the government in the first instance. And It would leave open the possibility of inconsistent ASLB decisions, which the Commission eventually would have to resolve.

Finally, the Commission should exercise its supervisory jurisdiction here because this petition seeks action in the non-adjudicatory context as well as the context of pending adjudications. The rulemaking proceedings for certification of the AP1000 and ESBWR designs are being conducted by the NRC Staff, over which only the Commission has authority. In addition, the Staff will be responsible for preparing the environmental and safety analyses requested by this petition.

**B. The NRC Must Comply With NEPA and the AEA in Considering The Lessons Learned From the Fukushima Accident.**

Both the AEA and NEPA place a burden on the NRC to address safety and environmental issues before issuing licensing decisions for nuclear reactors. These statutes preclude the NRC from issuing licenses or approving standardized reactor designs until it has completed its investigation of the Fukushima accident and considered the safety and environmental implications of the accident with respect to its regulatory program. In order to comply with those statutes, the Commission should suspend all licensing decisions, including certification of standardized design applications, pending conclusion of its investigation and issuance of proposed safety measures and environmental decision-making documents. In

addition, it should suspend all pending hearings and rulemakings with respect to issues that are related to the Fukushima accident.

## 1. AEA

Under the AEA, the NRC may not issue a license for a reactor if it would pose an “undue risk” to public health and safety or the common security. 42 U.S.C. § 2311. “[P]ublic safety is the first, last, and a permanent consideration in any decision on the issuance of a construction permit or a license to operate a nuclear facility.” *Power Reactor Development Corp. v. International Union of Electrical, Radio and Machine Workers*, 367 U.S. 396, 402 (1961). The list of issues identified for investigation in the Task Force Charter demonstrates that the Fukushima accident raises significant questions about the adequacy of the NRC’s regulatory program on a wide range of important safety issues, including the safety of spent fuel storage, seismic and flooding risks, station blackout, emergency planning, and severe accident management guidelines. In addition the Fukushima accident once more raises longstanding questions about the effectiveness of the GE Mark 1 containment. Even taking into account the degree of discretion granted by federal courts to the NRC, to proceed with reactor licensing without concluding the Task Force’s investigation would constitute a abuse of the NRC’s discretion in its interpretation of the “adequate assurance” standard, because in the current climate of uncertainty, it would be almost impossible for the NRC to reach the “definitive finding” on safety required by *Power Reactor Development Corp.* It is also grossly inconsistent with the Commission’s previous approach to the Three Mile Island accident, where the Commission prudently suspended all licensing actions while it considered the lessons to be learned from the accident.

## 2. NEPA

While the NRC may have some discretion in determining whether to increase its safety regulation of reactors under the Atomic Energy Act, NEPA deprives the NRC of any discretion to consider the environmental impacts of its proposed actions. *Silva v. Romney*, 473 F.2d 287, 292 (1st Cir. 1973) (holding that an agency's NEPA duties are "not discretionary, but are specifically mandated by Congress, and are to be reflected in the procedural process by which agencies render their decisions.") *See also Public Service Co. of New Hampshire v. NRC*, 582 F.2d 77, 81 (1st Cir. 1978) ("NEPA's mandate has been given strict enforcement in the courts, with frequent admonitions that it is insufficient to give mere lip service to the statute and then proceed in blissful disregard of its requirements.")

Even where the NRC has concluded that a proposed reactor operation meets its basic safety regulations, NEPA still requires the NRC to consider cost-effective alternatives for avoiding or mitigating environmental impacts that are reasonably foreseeable and yet not covered by safety regulations. *Limerick Ecology Action v. NRC*, 869 F.2d 730-31 (3rd Cir. 1989) (holding that the NRC could not rely on the sufficiency of a reactor license application under its safety regulations to avoid considering the cost-effectiveness of severe accident mitigation alternatives under NEPA). *See also* 40 C.F.R. § 1502.22(b)(1) (requiring consideration of "reasonably foreseeable" impacts which have "catastrophic consequences, even if their probability is low.")

NEPA's requirement to consider the environmental impacts of proposed actions continues even after a final EIS has been prepared, if new and significant information arises which could affect the outcome of the environmental analysis. 10 C.F.R. § 51.92(a). *See also Marsh*, 490 U.S. at 370-71. Here, by its own admission, the NRC has new information that concededly could have a significant effect on its regulatory program and the outcome of its

licensing decisions for individual reactors. For the NRC to go ahead with licensing decisions and certification of standardized designs, ignoring the potential significance of this new information, would constitute a gross violation of NEPA. Even if the NRC ultimately concludes that the information does not have a significant effect on its licensing decisions, it must nevertheless follow NEPA's procedures for considering the information, including preparation of an environmental assessment. *Marsh*, 490 U.S. at 385 ("NEPA's mandate applies "regardless of [the agency's] eventual assessment of the significance of [the] information.")

Therefore, the position taken by the Commission in its Memorandum to the Third Circuit, that it may continue with the issuance of licenses and apply the lessons of the Fukushima accident retrospectively, is fundamentally inconsistent with both NEPA and the AEA. Instead, the Commission must take all necessary measures to protect the integrity of the NEPA decision-making process, by immediately suspending all pending licensing and related design-certification rulemaking decisions until it has addressed the significance of the new information revealed by the Fukushima accident in environmental assessments and/or EISs.<sup>4</sup>

**C. Licensing Decisions and Hearings on Issues Related to the Fukushima Accident Must be Suspended and Should be Suspended Pending Completion of the Task Force Investigation and Publication of Proposed Decisions.**

As discussed above, in order to ensure that it complies with the AEA and NEPA in responding to the regulatory implications of the Fukushima accident, the Commission must take action to delay issuance of licensing decisions while it studies and proposes to implement the lessons learned from the Fukushima accident. And even assuming for purposes of argument that such relief is not legally mandated, it is prudent and appropriate for the Commission to delay

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<sup>4</sup> Petitioners recognize that the NRC has the discretion to choose between site-specific and generic analyses in evaluating the environmental significance of the new information. *See, e.g., Baltimore Gas and Electric Co. v. Natural Resources Defense Council*, 462 U.S. 87, 101 (1983). The Commission completely lacks discretion, however, to ignore the requirements of NEPA.

making licensing decisions until it has studied and proposed measures to implement the lessons of the Fukushima accident. The Commission should suspend its licensing actions, just as it did after the Three Mile Island accident – an event that was much less serious than the Fukushima accident.

Therefore Petitioners respectfully request the Commission to take the following actions:

- The Commission should suspend all decisions regarding the issuance of construction permits, new reactor licenses, COLs, ESPs, license renewals, or standardized design certification pending completion by the NRC's Task Force of its investigation of the near-term and long-term lessons of the Fukushima accident and the issuance of any proposed regulatory decisions and/or environmental analyses of those issues;
- The Commission should suspend all proceedings with respect to hearings or opportunities for public comment, on any reactor-related or spent fuel pool-related issues that have been identified for investigation in the Task Force's Charter of April 1, 2011, including external event issues (i.e., seismic, flooding, fires, severe weather); station blackout; severe accident measures (e.g., combustible gas control, emergency operating procedures, severe accident management guidelines); implementation of 10 C.F.R. § 50.54(hh)(2) regarding response to explosions or fire; and emergency preparedness. The Commission should also instruct ASLB panels that are considering contentions to permit the parties an opportunity to make arguments regarding the relevance of their concerns to the Fukushima accident.
- The Commission should suspend all licensing and related rulemaking proceedings with regard to any other issues that are identified by the Task Force as the subject of its investigation. The proceedings should be suspended pending completion of the Task

Force's investigation into those issues and the issuance of any proposed regulatory decisions and/or environmental analyses of those issues.

- The Commission should conduct an analysis, as required by NEPA, of whether the March 11, 2011 Tohoku-Chihou-Taiheiyo-Oki earthquake and ensuing radiological accident poses new and significant information that must be considered in environmental impact statements to support the licensing decisions for all new reactors and renewed licenses. All environmental assessments should be published in draft form for public comment.
- The Commission should conduct a safety analysis of the regulatory implications of the March 11, 2011 Tohoku-Chihou-Taiheiyo-Oki earthquake and ensuing radiological accident. While emergency safety measures that arise from that analysis may be issued as enforcement orders, any long-term requirements should be issued as proposed rules, with appropriate opportunities for comment.
- The Commission should establish procedures and a timetable for raising new issues relevant to the Fukushima accident in pending licensing proceedings. The Commission should allow all current intervenors in NRC licensing proceedings, all petitioners who seek to re-open closed licensing proceedings, and all parties who seek to comment on design certification proposed rules, a period of 60 days following the publication of proposed regulatory measures or environmental decisions, in which to raise new issues relating to the Fukushima reactor accidents. The Commission should suspend requirements to justify the late-filing of new issues if their relevance to the Fukushima accident can be demonstrated.

**D. Emergency Action is Needed in Order to Ensure Compliance with AEA and NEPA.**

Petitioners request the Commission to grant the requested relief on an emergency basis, because several licensing proceedings are scheduled to conclude in the near future, including the COL proceeding for Vogtle Units 3 and 4, the license renewal proceeding for Pilgrim, and the rulemaking proceedings for the AP1000 standardized design and the ESBWR standardized design. In addition, the Commission has signaled its intent to continue with reactor licensing in spite of the emergence of new information from the Fukushima accident, by approving the renewal of the Vermont Yankee license on March 21, 2011. Petitioners urgently request the Commission to reconsider that policy because of its fundamental inconsistency with NEPA and the AEA.

## **VII. CONCLUSION**

For the foregoing reasons, Petitioners request the Commission to grant the above-requested relief on an emergency basis.

Respectfully submitted,

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April 14-18, 2011

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FROM THE  
DIRECTOR OF  
THE JOY LUCK CLUB

April 12, 2011

# Japan's Reactors Still 'Not Stable,' U.S. Regulator Says

By MATTHEW L. WALD

WASHINGTON — The condition of the damaged Fukushima Daiichi reactors in Japan is "static," but with improvised cooling efforts they are "not stable," the chairman of the Nuclear Regulatory Commission told a Senate committee on Tuesday.

"We don't see significant changes from day to day," the chairman, Gregory B. Jaczko, said, while adding that the risk of big additional releases gets smaller as each day passes.

Long-term regular cooling of the reactors has not been re-established, nor has a regular way of delivering water to the spent-fuel pools, he told the Senate Environment and Public Works Committee. And when an aftershock hit the site and cut some offshore power supplies, he said, some pumps failed and cooling stopped for 50 minutes.

The situation is "not stable" and will remain so until "that kind of situation would be handled in a predictable manner," he said.

Mr. Jaczko also offered a new theory about the cause of the explosions that destroyed the secondary containment structures of several of the reactors. The prevailing theory has been that hydrogen gas was created when the reactor cores overheated and filled with steam instead of water; the steam reacts with the metal, which turns into a powder and then gives off hydrogen.

The Tokyo Electric Power Company, which operates the nuclear plant, intended to vent the excess steam as well as the hydrogen outside of the plant, but experts have suggested that when operators tried this, the vents ruptured, allowing the hydrogen to enter the secondary containments.

But Mr. Jaczko said Tuesday that the explosions in the secondary containments might have been caused by hydrogen created in the spent-fuel pools within those containments.

If true, that would mean that the introduction of hardened vents at reactors at nuclear plants in the United States — cited as an improvement that would prevent such an explosion from happening — would not in fact make any difference.

That theory also raises the possibility that it may be safer to move some of the spent fuel out of the pools in the containment structures and into dry storage, an idea that is attracting some support in Congress. Spent nuclear fuel must remain in water for the first five years or so to cool but can then be stored in small steel-and-concrete silos with no moving parts.

The industry uses these “dry casks” only when its pools are full. And so far the regulatory commission has said that pool and cask storage are equally safe. Still, some industry executives would like to tap the Nuclear Waste Fund, federal money set aside for a permanent waste repository, to pay for cask storage, an idea that is also favored by some environmentalists.

Mr. Jaczko's statement on the possible source of the hydrogen is the third big reversal in commission statements on the nuclear crisis at Fukushima.

Commission officials have also seemed less certain after stating that the spent-fuel pool in the No. 4 reactor was empty or close to empty, a situation that was evidently the basis for recommending a 50-mile evacuation for Americans in the plant's vicinity. Commission experts also said that radiation readings suggested that core material had slipped out of the vessel of the No. 2 reactor and entered a drywell in the primary containment, only to retreat again on whether that was in fact the case.

Mr. Jaczko also signaled that the regulatory commission itself was shifting from an extreme alert mode to a more sustainable long-term effort to monitor Japan's crisis. Staffing in the commission's round-the-clock emergency center at its headquarters in Rockville, Md., has been reduced, he said, with many staff members returning to their regular duties but available for consultation when events warrant.

He drew praise from the committee's chairwoman, Senator Barbara Boxer, a California Democrat, but criticism as well. She is seeking an especially high level of scrutiny for two twin-reactor plants in her state, the only ones that the commission says are in zones of high seismic activity. Mr. Jaczko said that all reactors were being evaluated.

She countered by saying that those two plants, Diablo Canyon and San Onofre, were at the highest risk. Mr. Jaczko said they were not, explaining that they were designed with the earthquake risk in mind and that risks to American plants generally were small.

Ms. Boxer replied that the Japanese had said the same thing, at least until the March 11 accident. "It's eerie to me," she said. "I don't sense enough humility from all of us here."

Another witness, Charles G. Pardee, the chief operating officer of Exelon Generation, the largest nuclear operator in the United States, also testified that the nation's nuclear plants were designed for the worst natural disaster observed in their areas, plus a substantial margin.

Thomas B. Cochran, a physicist at the Natural Resources Defense Council, gave some credit to American operators. Worldwide, he said, reactors are "not sufficiently safe," but "the next nuclear power plant disaster is more likely to occur abroad than in the U.S."

But the industry will have to rethink its practices nonetheless, he said. "If the nuclear power industry is to have a long-term future, attention must be paid to existing operating reactors," Mr. Cochran said. He ticked off a long list of factors, including American reactors that share Fukushima's basic design, that would be grounds for phasing them out.

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

\_\_\_\_\_  
In the Matter of )  
 )  
 )  
VIRGINIA ELECTRIC AND POWER CO., )  
dba DOMINION VIRGINIA POWER and )  
OLD DOMINION ELECTRIC COOPERATIVE ) Docket No. 52-017-COL  
 )  
(North Anna Power Station, Unit 3) )  
\_\_\_\_\_)

CERTIFICATE OF SERVICE

I hereby certify that copies of the forgoing EMERGENCY PETITION TO SUSPEND ALL PENDING REACTOR LICENSING DECISIONS AND RELATED RULEMAKING DECISIONS PENDING INVESTIGATION OF LESSONS LEARNED FROM FUKUSHIMA DAIICHI NUCLEAR POWER STATION ACCIDENT on behalf of the Blue Ridge Environmental Defense Fund, Inc., have been served upon the following persons by Electronic Information Exchange:

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**DECLARATION OF DR. ARJUN MAKHIJANI IN SUPPORT OF  
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DECISIONS AND RELATED RULEMAKING DECISIONS  
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I, Arjun Makhijani, declare as follows:

**Introduction and Statement of Qualifications**

1. I am President of the Institute for Energy and Environmental Research ("IEER") in Takoma Park, Maryland. Under my direction, IEER produces technical studies on a wide range of energy and environmental issues to provide advocacy groups and policy makers with sound scientific information and analyses as applied to environmental and health protection and for the purpose of promoting the understanding and democratization of science. A copy of my curriculum vitae is attached.

2. I am qualified by training and experience as an expert in the fields of plasma physics, electrical engineering, nuclear engineering, the health effects of radiation, radioactive waste management and disposal (including spent fuel), estimation of source terms from nuclear facilities, risk assessment, energy-related technology and policy issues, and the relative costs and benefits of nuclear energy and other energy sources. I am the principal author of a report on the 1959 accident at the Sodium Reactor Experiment facility near Simi Valley in California, prepared as an expert report for litigation involving radioactivity emissions from that site. I am also the principal author of a book, *The Nuclear Power Deception – U.S. Nuclear Mythology from Electricity "Too Cheap to Meter" to "Inherently Safe" Reactors* (Apex Press, New York, 1999, co-author, Scott Saleska), which examines, among other things, the safety of various designs of nuclear reactors.

3. I have written or co-written a number of other books, reports, and publications analyzing the safety, economics, and efficiency of various energy sources, including nuclear power. I am also the author of *Securing the Energy Future of the United States: Oil, Nuclear and Electricity Vulnerabilities and a Post-September 11, 2001 Roadmap for Action* (Institute for Energy and Environmental Research, Takoma Park, Maryland, December 2001). In 2004, I wrote "Atomic

Myths, Radioactive Realities: Why nuclear power is a poor way to meet energy needs,” *Journal of Land, Resources, & Environmental Law*, v. 24, no. 1 at 61-72 (2004). The article was adapted from an oral presentation given on April 18, 2003, at the Eighth Annual Wallace Stegner Center Symposium entitled, “Nuclear West: Legacy and Future,” held at the University of Utah S.J. Quinney College of Law. In 2008, I prepared a report for the Sustainable Energy & Economic Development (SEED) Coalition entitled *Assessing Nuclear Plant Capital Costs for the Two Proposed NRG Reactors at the South Texas Project Site*.

4. I am generally familiar with the basic design and operation of U.S. nuclear reactors and with the safety and environmental risks they pose. I am also generally familiar with materials from the press, the Japanese government, the Tokyo Electric Power Company, the French government safety authorities, and the U.S. Nuclear Regulatory Commission (“NRC”) regarding the Fukushima Daiichi accident and its potential implications for the safety and environmental protection of U.S. reactors.

5. The purpose of my declaration is to explain the reasons I believe that although the causes, evolution, and consequences of the Fukushima accident are not yet fully clear, the accident is already presenting new and significant information regarding the risks to public health and safety and the environment posed by the operation of nuclear reactors. I will also explain why I believe that integration of this new information into the NRC’s licensing process could affect the outcome of safety and environmental analyses for reactor licensing and relicensing decisions by resulting in either the denial of licenses or license extensions or the imposition of new conditions and/or new regulatory requirements. It could also affect the NRC evaluation of the fitness of new reactor designs for certification. It is therefore reasonable and necessary to suspend licensing and re-licensing decisions and standardized design certifications until the NRC completes its review of the safety and regulatory implications of the Fukushima accident.

#### **Statement of Facts**

6. Although many details about the Fukushima reactor accident remain unclear, the general contours of the accident are described in NRC Information Notice No. 2011-08 (March 31, 2011) (NRC Accession No. ML 110830824) as follows:

On March 11, 2011, the Tohoku-Taiheiyou-Okai earthquake occurred near the east coast of Honshu, Japan. This magnitude 9.0 earthquake and the subsequent tsunami caused significant damage to at least four of the six units of the Fukushima Daiichi nuclear power station as the result of a sustained loss of both the offsite and onsite power systems. Efforts to restore power to emergency equipment were hampered and impeded by damage to the surrounding areas due to the tsunami and earthquake.

Units 1, 2 and 3 were operating at the time of the earthquake. Following the loss of electric power to normal and emergency core cooling systems and the subsequent failure of backup decay heat removal systems, water injection into the cores of all three reactors was compromised, and reactor decay heat removal could not be maintained. The operator of the plant, Tokyo Electric Power Company, injected sea water and boric acid into the reactor vessels of these three units, in an effort to cool the fuel and ensure that the

reactors remained shut down. However, the fuel in the reactor cores became partially uncovered. Hydrogen gas built up in Units 1 and 3 as a result of exposed, overheated fuel reacting with water. Following gas venting from the primary containment to relieve pressure, hydrogen explosions occurred in both units and damaged the secondary containments.

Units 3 and 4 were reported to have low spent fuel pool (SFP) water levels.

Fukushima Daiichi Units 4, 5 and 6 were shut down for refueling outages at the time of the earthquake. The fuel assemblies for Unit 4 had recently been offloaded from the reactor core to the SFP. The SFPs for Units 5 and 6 appear to be intact. Emergency power is available to provide cooling water flow through the SFPs for Units 5 and 6.

The damage to Fukushima Daiichi nuclear power station appears to have been caused by initiating events beyond the design basis of the facilities.

7. In a March 21, 2011, briefing, Bill Borchardt, the NRC's Executive Director for Operations, stated that the NRC believes that hydrogen explosions occurred on March 12, 14, and 15 in the reactors of Units 1, 3, and 2 respectively, in that order. He also stated that the NRC believed that a hydrogen explosion had occurred at spent fuel pool of Unit 4 on March 15 due to overheated spent fuel in the pool. Briefing on NRC Response to Recent Nuclear Events in Japan, Transcript at 11.

8. According to Mr. Borchardt, the NRC believes that Units 1, 2, and 3 have likely sustained some degree of core damage. *Id.* Further, he stated that the loss of emergency AC power was caused by the tsunami and not the earthquake. Therefore, he concluded that the NRC believes that the "damage in Fukushima was not really caused by the earthquake; it was the tsunami that came afterwards." *Id.*

9. At the outset of the emergency, large volumes of sea water were used to cool the reactors. The salt water injections were then replaced by fresh water injections. While judgments have changed over time, and much remains uncertain, we note here that as of March 21, Mr. Borchardt also stated that "[t]he radiation releases and the dose rates that we've seen on site, I think, were primarily influenced by the condition of the Units Three and Four spent fuel pools." *Id.* at 21.

10. The French authorities also reported that sea water was used to cool spent fuel pools Units 3 and 4. *Communiqué de presse n°17 du mardi 22 mars 2011 à 10h00 Séisme au Japon - L'ASN fait le point sur la situation de la centrale nucléaire de Fukushima Daiichi : Les travaux en vue de rétablir l'alimentation électrique se poursuivent mais la mise sous tension n'est pas réalisée Paris, le 22/03/2011 10:27, <http://japon.asn.fr/index.php/Site-de-l-ASN-Special-Japon/Communiqués-de-presse> (March 22, 2011).* They also reported that three spent fuel pools (of Units 2, 3, and 4) appear to have experienced boiling at some point. *Note d'information : Situation des réacteurs nucléaires au Japon suite au séisme majeur survenu le 11 mars 2011 : Point de situation du 18 mars 2011 à 14 heures, Institut de Radioprotection et de Sûreté Nucléaire (March 18, 2011),*

[http://www.irsn.fr/FR/Actualites\\_presse/Actualites/Documents/IRSN\\_Seisme-Japon\\_Point-situation-18032011-14h.pdf](http://www.irsn.fr/FR/Actualites_presse/Actualites/Documents/IRSN_Seisme-Japon_Point-situation-18032011-14h.pdf) -- hereafter IRSN March 18, 2011)

11. In response to the Fukushima reactor accident, the NRC announced the formation of a “senior level agency task force to conduct a methodical and systematic review” of NRC processes and regulations. COMGBJ-11-0002, Memorandum from Chairman Jaczko to Commissioners, re: NRC Actions Following the Events in Japan at 1 (March 21, 2011) (NRC Accession No. ML110800456). The purpose of the task force is to “determine whether the agency should make additional improvements to our regulatory systems and make recommendations to the Commission for its policy direction.” *Id.*

12. Chairman Jaczko’s memorandum specifies both a near-term review and a longer-term review. For the near-term review, the Commission required the task force to evaluate issues “affecting domestic operating reactors of all designs” in areas that include “protection against earthquake tsunami, flooding, hurricanes; station blackout and a degraded ability to restore power; severe accident mitigation; emergency preparedness; and combustible gas control.” *Id.* at 1. The Commission instructed the task force to complete the report in 90 days. In the meantime, the task force was instructed to provide a 30-day “quick look report” and another “status” report in 60 days. *Id.*

13. The “longer term” review would begin “as soon as NRC has sufficient technical information from the events in Japan with the goal of no later than the completion of the 90 day near term report.” *Id.* at 2. The longer-term study should “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.” *Id.* For the longer-term effort, the Commission instructed the task force to “receive input from and interact with all key stakeholders.” *Id.* The Commission specified that within six months after commencing the evaluation, the task force should “provide a report with recommendations, as appropriate, to the Commission.” *Id.*

14. The “Task Force to Conduct a Near-term Evaluation of the Need for Agency Actions Following the Events in Japan” (“Task Force”) has formed and its charter has been approved. The Task Force aims to accomplish the following:

- “Evaluate currently available technical and operational information from the events that have occurred at the Fukushima Daiichi nuclear complex in Japan to identify potential or preliminary near-term/immediate operational or regulatory actions affecting domestic reactors of all designs, including their spent fuel pools. The task force will evaluate, at a minimum, the following technical issues and determine priority for further examination and potential agency action:
  - External event issues (e.g. seismic, flooding, fires, severe weather)
  - Station blackout
  - Severe accident measures (e.g., combustible gas control, emergency operating

procedures, severe accident management guidelines)

- 10 CFR 50.54 (hh)(2) which states, “Each licensee shall develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to explosions or fire, to include strategies in the following areas: (i) Fire fighting; (ii) Operations to mitigate fuel damage; and (iii) Actions to minimize radiological release.” Also known as B.5.b.
- Emergency preparedness (e.g., emergency communications, radiological protection, emergency planning zones, dose projections and modeling, protective actions)
- Develop recommendations, as appropriate, for potential changes to NRC’s regulatory requirements, programs, and processes, and recommend whether generic communications, orders, or other regulatory actions are needed.”

Charter for the Nuclear Regulatory Commission Task Force to Conduct a Near-Term Evaluation of the Need for Agency Actions Following the Events in Japan at 1 (April 1, 2011) (NRC Accession No. ML11089A045).

15. With respect to the longer-term review, the Charter states that the short-term report will make: “[r]ecommendations for the content, structure, and estimated resource impact....” *Id.* at 1.

#### **Statement of Professional Opinion**

16. I agree with the Commission’s approach of conducting a long-term investigation of the regulatory implications of the Fukushima accident, in addition to its short-term investigation of whether immediate actions are needed. In my opinion, the longer-term investigation is necessary to address a number of respects in which the Fukushima accident is unprecedented in the sense that its characteristics are not anticipated in NRC safety regulations or environmental analyses. Thus, it is providing new and significant insights into the inadequacy of NRC regulations to protect public health and safety and the inadequacy of NRC environmental analyses to evaluate the potential health, environmental and economic costs of reactor and spent fuel pool accidents. This significant new information covers the following major topics:

- Unanticipated compounding effects of simultaneous accidents at multiple co-located reactor units, including spent fuel pools.
- Unanticipated risks of spent fuel pool accidents, including explosions.
- Frequency of severe accidents and explosions.
- Inadequacy of safety systems to respond to long-duration accidents.
- Nuclear crisis management with contaminated control and turbine buildings that have lost power
- Unanticipated aggravating effects of some emergency measures.
- Health effects and costs of severe accidents

- The hydrogen explosions at Fukushima and their implications for aircraft crash evaluations.

**Unanticipated compounding effects of simultaneous accidents at multiple co-located reactor units, including spent fuel pools.**

17. Perhaps the most unprecedented feature of the Fukushima accident is that three reactors and four spent fuel pools have been stricken at the same site. In the entire history of nuclear power, there has not been another major accident (level 5 or above) that has involved multiple major sources of radioactivity -- including multiple reactors and multiple spent fuel pools. For instance, the Fukushima Daiichi complex is the first to have experienced multiple hydrogen explosions in various facilities, all as part of the same event.

18. The NRC has long followed the practice of allowing new reactors to be built at existing sites, without examining the consequences of simultaneous failure of existing and new reactors through common mode failures such as complete station blackouts and loss of fresh water supply. The NRC also proposes to co-locate a significant number of new reactors at existing reactor sites. Examples include Bellefonte, Calvert Cliffs, Comanche Peak, Fermi, North Anna, Shearon Harris, Turkey Point, the South Texas Project, and Vogtle.

19. But the Fukushima accident graphically demonstrates that NRC's failure to evaluate the safety and environmental implications of co-locating multiple reactors was incorrect. Specifically, when a new reactor is to be sited at a location where there are existing reactors, the entire system at the site should be re-examined in addition to whatever additional impacts the new unit(s) might create. The EISs for these new reactors and the designs on which they rely should consider the significant new information revealed by the Fukushima accident about the potential for simultaneous multiple failures and accidents in existing and new reactors and/or spent fuel pools.

**Unanticipated risks of spent fuel pool accidents, including explosions.**

20. Another unprecedented feature of the Fukushima accident is that an explosion occurred in Unit 4 despite the fact that there was no fuel in the reactor. The entire core had been unloaded into the spent fuel pool prior to March 11, 2011; the reactor was down for maintenance. A loss of cooling apparently led to boiling and to hydrogen generation, which appears to be the likely cause of the major explosion and ensuing damage to the reactor building of Unit 4. Further, as noted above the spent fuel pools of Units 2 and 3 also appear to have experienced boiling of the cooling water at some point. It should be noted that much detail remains to be learned about all three spent fuel pools, especially as to what went on in the first week of the accident.

21. The apparent occurrence of spent fuel pool accidents at Fukushima significantly undermines the NRC's conclusion that high-density pool storage of spent fuel poses a "very low risk." *The Attorney General of Commonwealth of Massachusetts; the Attorney General of California; Denial of Petitions for Rulemaking*, 73 Fed. Reg. 46,204, 46,207 (August 8, 2008). That conclusion is all the more subject to question in light of the fact that spent fuel in U.S. pools is typically packed more tightly than in the pools at Fukushima. U.S. reactors, including reactors

that are candidates for license renewal, use high-density pool storage for spent fuel. Fukushima indicates that the NRC policy that allows such storage needs to be revisited. Given that onsite storage of spent fuel may continue for decades, these circumstances also call for a thorough reexamination of the spent fuel storage capacity, spent fuel pool location, and configuration of new reactor designs. For instance, should the construction and use of above ground-level spent fuel pools in reactor buildings be allowed, as is the case with the advanced boiling water reactor (“ABWR”)? The NRC should examine the potentially exacerbating relationship between reactor core accidents and spent fuel pool accidents, for both existing reactor designs and new reactor designs. In addition, environmental impact statements (“EISs”) for license renewal and new reactor licensing should reexamine the relative costs and benefits of measures to mitigate the environmental impacts of pool fires and/or explosions. Measures would include reducing the density at which fuel is stored in pools, using dry storage for as much of each reactor’s inventory of spent fuel as safety will allow, and dry storage of all spent fuel at closed reactors, a few years after closure.

### **Frequency of severe accidents and explosions**

22. The NRC must also re-examine the frequency per reactor per year of spent fuel pool accidents as well as the frequency of core damage events. The NRC’s current spent fuel damage assessments are based on a best estimate of a spent fuel pool fire probability of about  $2 \times 10^{-6}$  per reactor-year, including the probability of structural failure during a seismic event NUREG-1353, *Regulatory Analysis for the Resolution of Generic Issue 82, “Beyond Design Basis Accidents in Spent Fuel Pools”*, at 5-5 and Table 5.1.3 (1989). This means one such accident for every 500,000 reactor-years. The NRC’s estimate of the frequency of spent fuel pool loss of cooling from all causes other than earthquake-induced structural failure is even lower:  $1.5 \times 10^{-7}$ . The conditional probability of a fire in the event of a loss of cooling is estimated to be 1.0 for a PWR and 0.25 for a BWR. *Id.* at 4-36. Based on this, the overall probability estimate in NUREG-1353 for a non-seismic-induced spent fuel pool fire for a PWR is  $1.5 \times 10^{-7} \times 1.0 = 1.5 \times 10^{-7}$ ; for a BWR it is  $1.5 \times 10^{-7} \times 0.25 = 4 \times 10^{-8}$  for a BWR – in the latter case is it one spent fuel pool fire every 25 million reactor-years. Hydrogen explosions originating in the spent fuel pool were not considered. Further, at least two spent fuel pools at Fukushima (Units 3 and 4) that seem to have experienced boiling as well as the destruction of the portions of the reactor building that are a barrier between the pool surface and the environment. According to the French safety authorities, the spent fuel pool in Unit 2 also experienced boiling. IRSN March 18, 2011 *op. cit.* One reactor building, that of Unit 4, appears to have experienced a hydrogen explosion, with the hydrogen apparently emanating from the spent fuel pool (see Paragraph 7 above). The explosion destroyed a good part of the reactor building. Any damage to the spent fuel pool structures and equipment, to the fuel assemblies in the pools, as well as to the racks remains to be fully assessed. It appears that the only way that a significant amount of hydrogen could originate in a spent fuel pool is through uncovering of the spent fuel and the reaction of the zirconium in the fuel rods with steam. Explosions destroyed substantial portions of the reactor buildings of Units 1 and 3 as well; it appears that there were also significant releases of radioactivity from the spent fuel pool of Unit 3. In view of these facts, the NRC’s estimate of loss of cooling probability accompanied by a fire is far too low, probably by orders of magnitude. It appears that the overall principal initiating event in the station blackout and failure of emergency core cooling was not the earthquake but the tsunami, though the earthquake may have caused equipment damage that

led to or contributed to some of the spent fuel pool problems. This indicates that the non-earthquake station blackout probabilities will need to be revisited. Further, the NRC's list of events leading to spent fuel structural failure does not include hydrogen explosions due to loss of emergency core cooling in the reactor (NUREG-1353, *op. cit.*, Table 4.7.1 at 4-36), which appears to have been the cause of the damage to the structures of reactor buildings 1 and 3 and possibly to the spent fuel pool of Unit 3. It may be that many details of the analysis will be different for each of the four spent fuel pools. Whatever the details, the events so far make it quite clear that the NRC needs to thoroughly reevaluate the probability of severe spent fuel pool accidents as well as the kinds of events that could initiate damage and major releases of radioactivity from spent fuel pools. Further, in view of the fact that three BWRs appear to have had core damage, the NRC also needs to evaluate whether presently operating reactors, notably (but not only) BWRs, meet the Commission's target of limiting annual core damage frequency to the  $10^{-4}$  to  $5 \times 10^{-5}$  per reactor-year range for reactors (NUREG-1353, *op. cit.*, at ES-2 and ES-3).

23. In conducting its review, the NRC needs to thoroughly revisit its methods for estimating the probabilities and mechanisms of hydrogen explosions and fires in spent fuel pools (with and without a natural disaster component) as well as the methods for estimating hydrogen explosions, and meltdowns in existing and new light water reactor designs. For instance, the computer code used in evaluating the accidents assumes that "[t]he geometry of the fuel assemblies and racks remains undistorted." NUREG-1353, *op. cit.* at 4-8. To judge by the photographs and videos of the damage, this assumption is unlikely to be correct at least for spent fuel pools in Units 3 and 4. As another example, hydrogen generation due to partial uncovering of spent fuel but with water still remaining in the pool is not included. Rather, the computer program assumes that "[t]he water drains instantaneously from the pool." *Id.* This is important because if the investigation confirms that hydrogen was indeed generated in the spent fuel pool of Unit 4, the exothermic zirconium-steam reaction that creates it would be an additional source of heat for causing the accident to develop more rapidly and destructively than assumed by the NRC.

24. More generally, the events at three reactors and four spent pools have drastically changed the underlying frequency data that should go into the estimation of the probability of severe accidents at light water reactors. As a result, integration of the Fukushima data into NRC analyses of risks could lead to significant changes in design of new reactors and also lead to modifications at existing reactors, as would be required for protection of public health and safety under 10 CFR 50.109. Specifically, the Fukushima accident indicates that the basis of the NRC's conclusion in NUREG-1353 that dense storage of spent fuel in pools is safe and that dry storage is not warranted is incorrect.

### **Inadequacy of safety systems to respond to long-duration accidents**

25. U.S. reactors appear to have insufficient backup power capacity to maintain safety equipment during a prolonged severe accident. The Fukushima accident, in which the emergency diesel generation system started but then failed very soon after the tsunami and the battery backup ran out of power in eight hours. The accident illustrates the serious environmental risk posed by insufficient backup power when catastrophic events destroy both offsite power supplies and onsite infrastructure. These risks need to be taken into account in safety and environmental analyses for all prospective NRC licensing decisions. The fact that

there was a complete station blackout at Fukushima accompanied by a failure of fresh water supply that forced sea water use for days (*Communiqué de presse n°17 du mardi 22 mars 2011 à 10h00 Séisme au Japon - L'ASN fait le point sur la situation de la centrale nucléaire de Fukushima Daiichi : Les travaux en vue de rétablir l'alimentation électrique se poursuivent mais la mise sous tension n'est pas réalisée Paris, le 22/03/2011 10:27*, <http://www.asn.fr/index.php/Haut-de-page/Presse/Actualites-ASN/Communique-de-presse-n-17-du-mardi-22-mars-2011-a-10h00>) clearly points to the need for a full review of the depth (in terms of number of levels) of backup systems, the length of time of emergency power supply operability, the location of these power supplies, and the relation of the power supplies to ad hoc emergency pumping and emergency water supplies, including in the context of potential major damage to multiple units at a single site.

### **Nuclear crisis management with contaminated control and turbine buildings that have lost power**

26. Another critical and unanticipated feature of the Fukushima accident is that the control rooms of Units 1, 2, and 3 became highly contaminated in the course of the first week of the accident, according to the French safety authorities. IRSN March 18, 2011 *op. cit.*. This has made re-establishment of normal cooling more difficult, apart from the question of on-site or offsite power supply. Turbine buildings also became contaminated with radioactive water in the course of the accident. *Fukushima Daiichi Nuclear Power Station: the result of measurement of sub drain*, [http://www.tepco.co.jp/en/press/corp-com/release/betu11\\_e/images/110331e18.pdf](http://www.tepco.co.jp/en/press/corp-com/release/betu11_e/images/110331e18.pdf) and *The detection of radioactive materials in the water on 1st basement of turbine building at the site of Fukushima Daiichi Nuclear Power Station: Press Release* (Mar 31,2011), <http://www.tepco.co.jp/en/press/corp-com/release/11033112-e.html>.

27. The loss of power in and radioactive contamination of the control rooms and turbine buildings points to the need to review the piping and ventilation arrangements of these facilities, and the likely need to isolate them more thoroughly from contaminated air and water during beyond-design-basis accidents. Based on the information available so far about the Fukushima event, the risks of turbine building contamination would appear to be greater for boiling water reactors than for pressurized water reactors since steam generated from primary water is used to directly drive the turbines; in PWRs the heated primary water is routed to steam generators and not to the turbines.

### **Unanticipated aggravating effects of some emergency measures**

28. Light water reactors are not designed to be cooled by sea water. Thus, the fact that TEPCO was forced to use sea water for emergency cooling for an extended period is a critical feature of the accident that needs evaluation. For instance, salt from sea water deposited on the fuel rods may have blocked or partially blocked some cooling channels during the accident. This raises the question of whether the use of sea water may have aggravated the fuel damage. It also raises the question of whether salt deposits may have interfered with the neutron absorption capacity of the control rods thereby increasing the likelihood of an accidental criticality. An understanding of these issues is important to the understanding of the accident and to any design and or emergency operations changes that may be needed.

## Health effects and costs of severe accidents

29. While a detailed evaluation will take time and more data, the Fukushima accident indicates that the health consequences of a severe reactor accident and/or spent fuel pool fire could be significantly greater than estimated by the NRC in EISs for license renewal and new reactor licensing. For instance, the NRC estimates an average population risk (population dose multiplied by probability) in a 50-mile radius of only 16 person-rem per year per spent fuel pool – or 480 rem in 30 years. The dose estimate was recently used in the 2009 draft Generic Environmental Impact Statement (“GEIS”) by the NRC. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants Appendices*, Draft Report for Comment, NUREG-1437, Volume 2, Rev. 1 at E-35 (July 2009). See also NUREG-1353, *op. cit.*, at ES-3. The estimate of 480 rem in 30 years translates into a probability of just 0.27 fatal cancers over 30 years in a population of more than 2.5 million (using a risk factor of 0.000575 fatal cancers per rem). The NRC’s best estimate of the total population dose in the event of an accident was 8 million person-rem (NUREG-1353, *op. cit.* at 5-4, Table 5.1.2) – which translates into 4,600 excess cancer deaths in a fifty-mile radius. The NRC put the worst case population dose estimate at just over three times the best estimate – 26 million person-rem. NUREG-1353, *op. cit.* Table 5.1.2 at 5-4. But if the probability is much higher for a single failure and if multiple failures can happen at the same site, then the number of expected fatal cancers would be higher, all other things being equal. Further, it is necessary to consider that the spent fuel pools in the United States are more typically full than the ones at Fukushima. In its review of Fukushima, the NRC should revisit the higher of the health damage estimates for spent fuel pool accidents at closed power plants in a 1997 study by Brookhaven National Laboratory. R.J. Travis, R.E. Davis, E.J. Grove, M.A. Azarm, *A Safety and Regulatory Assessment of Generic BWR and PWR Permanently Shutdown Nuclear Power Plants*, BNL-NUREG-52498, NUREG/CR-6451 (Brookhaven National Laboratory, 1997), [http://www.osti.gov/bridge/product.biblio.jsp?osti\\_id=510336](http://www.osti.gov/bridge/product.biblio.jsp?osti_id=510336). NUREG-/CR6451 estimated the worst case population dose in a 50 mile radius at 81 million person-rem for both BWRs and PWRs. *Id.* at Tables 4-1 and 4-2. This is more than three times higher than in the estimate in NUREG-1353 cited above.

30. The Fukushima accident also indicates that the economic costs of a spent fuel pool accidents may be much higher than the current estimates used by the NRC. In NUREG-1353, the worst case property damage was estimated at \$30 billion (1988 dollars) in a 50-mile radius. *Id.* at Table 5.1.2. That amount is about \$50 billion in 2010 dollars (constant 2010 dollar estimates calculated using the Gross Domestic Product deflators of the U.S. Department of Commerce, as published by the St. Louis Federal Reserve at <http://research.stlouisfed.org/fred2/data/GDPDEF.txt> and rounded to the nearest \$10 billion). But in the Brookhaven study, the worst-case property damage in a 50-mile radius was estimated at \$280 billion for BWRs (*Id.* at Table 4-2), which would be about \$370 billion in 2010 dollars – or more than seven times the NUREG-1353 estimate cited above. The worst case damages in a 500-mile radius were estimated at \$546 billion for U.S. boiling water reactors (“BWRs”) plus 138,000 excess cancer deaths (*Id.* at Table 4-2) with a high population density. The damage amount would be about \$720 billion in 2010 dollars. Results were slightly higher for pressurized water reactor spent fuel pools. *Id.* at Table 4-1. The overall 500-mile population density

assumed in the Brookhaven study was lower than the population density near several U.S. reactors, notably in the Northeast. Further, the Brookhaven study itself notes its calculations would not “reasonably envelope” the situation (including projected population growth) at certain locations where there are reactors close to major metropolitan centers. “There are several existing plant sites (i.e., Indian Point, Limerick, and Zion) that precede the issuance of R.G. 4.7 and exceed the site population distributions generally considered acceptable by current NRC policy.”) *Id.* at 3-4 and footnote at 3-4. Moreover, certain assumptions of the 1997 Brookhaven study may prove optimistic especially in densely populated areas. For instance, the study assumes that the population could be evacuated in one day, should evacuation become necessary. *Id.* at 3-8. As another example, the relocation radius was only 10 miles, as per NUREG-1150. *Id.* at 3-8 and NUREG-1150, *An Assessment for Five Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants: Final Summary Report*, U.S. Nuclear Regulatory Commission, Office of Nuclear Regulatory Research Vol. 1 at 2-20 (December 1990), <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1150/v1/sr1150v1-intro-and-part-1.pdf>. The relocation radius around Fukushima is greater than 10 miles. Moreover the U.S. advised its citizens early on to evacuate within a 50-mile radius of Fukushima Daiichi. This indicates that emergency management criteria and procedures need to be revisited.

31. In view of the severe crisis with multiple units at Fukushima in a densely populated industrialized country where there has been both direct and indirect economic damage, the 1997 Brookhaven study provides a reasonable starting point for a reevaluation of spent fuel accident consequences. Of course, Fukushima shows that the results of the Brookhaven study must be reviewed in the context of the potential for multiple failures at a single site in both reactors and spent fuel pools. Evacuation and population assumptions will likely need to be changed. As a result, both the monetary damages and health effects estimates may have to be revised upwards, possibly by substantial amounts in densely populated areas. Further, Fukushima is showing that there has already been indirect economic damage in industries like shipping and manufacturing that are not directly affected by fallout. While, the long-term and overall direct and indirect costs of the reactor and spent fuel damages from the Fukushima accident will take time to be tallied, it is clear that they will be enormous.

### **Hydrogen explosions and implications for aircraft crash evaluations**

32. The Fukushima accident has revealed significant new information about the potential effects of hydrogen explosions. The estimated Unit 1 generation of hydrogen was 300 to 600 kg; for Units 2 and 3 it was 300 to 1,000 kg. Estimates were by an expert commissioned by AREVA. Matthias Braun, *The Fukushima Daiichi Incident*, AREVA, April 15, 2011, at 18, <http://www.wdr.de/tv/monitor//sendungen/2011/0407/pdf/areva-fukushima-report.pdf>. This indicates an urgent need to revisit the issue of aircraft crashes, deliberate or accidental, at existing reactors and spent fuel pools. The energy of the estimated amounts of hydrogen involved in the Fukushima explosions is far smaller than fuel in fully-loaded commercial jetliner – a type of crash that must be evaluated under NRC regulations. Five thousand gallons of jet fuel (not at all unusual for larger passenger jets -- the largest ones have much larger fuel capacities) have an energy content about four times as large as the largest estimate of the hydrogen explosions (1,000 kilograms of hydrogen gas) at Fukushima. Indeed, in light of Fukushima even a smaller, regional jet crash needs to be taken into account, especially for older

BWRs. Such damage needs to be evaluated both in the safety and environmental analyses. For instance, the Fukushima accident has demonstrated that evacuation planning in the circumstances of a natural disaster that is combined with a reactor accident is far more challenging than assumed by NRC emergency planning regulations.

## **Conclusions**

33. As discussed above in pars. 16 through 32, the Fukushima accident has already revealed an enormous amount of new information regarding the safety vulnerabilities and environmental risks that need to be taken into account in licensing of new reactors, the re-licensing of existing reactors, early site permits, emergency procedures for protecting the civilian population, and approval of standardized reactor designs in rulemakings.

34. I believe that if the significant new information emanating from the Fukushima Daiichi accident is taken into consideration in NRC safety and environmental analyses, it is likely to fundamentally alter the outcome of those analyses in important ways. In the safety arena, consideration of this new information is likely to result in more rigorous regulation with respect to issues such as loss of offsite power, hydrogen explosion prevention, the siting of more than one reactor at a single site, spent fuel accident and reactor accident probabilities, the re-racking of spent fuel pools, permitting extended storage of spent fuel in pools after decommissioning, and emergency planning.

35. In the environmental and health arenas, consideration of this significant new information is likely to result in higher accident probability estimates, new accident mechanisms for spent fuel pools, higher accident cost estimates, and higher estimates of the health risks posed by light water reactor accidents. These increased risk and cost estimates will lead to much more serious consideration of alternatives for avoidance or mitigation of environmental risks. For instance, although the Commission has long rejected low-density pool storage combined with dry onsite storage as an alternative for mitigating the effects of catastrophic pool fires, that option may now prove to be very cost-beneficial. Present policy also does not require the transfer of all spent fuel from pools into dry casks at closed sites, as soon as safely possible after closure. A change of policy would be indicated by the scale of the disaster at Fukushima. In view of the large variation in potential damage and differences in emergency response needs, a plant-specific analysis will also be needed, including for all reactors in the Northeast.

36. It is likely that more (and more expensive) protective features will be needed to ensure a level of safety and security that will avoid the kinds of disastrous consequences occurring at Fukushima Daiichi. It is also likely that additional measures involving significant costs will have to be taken to reduce the likelihood and consequences of multi-reactor and/or spent fuel disasters. In light of this new information, a comparison between the economic attractiveness of a proposed new nuclear reactor or a proposed re-licensing of an existing reactor that might need modifications with other less risky and less expensive energy sources (such as wind, solar, and storage technologies such as compressed air) may well result in a decision that licensing of new reactors and re-licensing of existing reactors is not cost-effective.

37. Therefore, I believe it is reasonable and necessary for the NRC to suspend licensing and re-licensing decisions and standardized design certifications until the NRC completes its review of the regulatory implications of the Fukushima accident.

The facts presented above are true and correct to the best of my knowledge, and the opinions expressed therein are based on my best professional judgment.



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A recognized authority on energy issues, Dr. Makhijani is the author and co-author of numerous reports and books on energy and environment related issues, including two published by MIT Press. He was the principal author of the first study of the energy efficiency potential of the US economy published in 1971. He is the author of *Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy* (2007).

In 2007, he was elected Fellow of the American Physical Society. He was named a Ploughshares Hero, by the Ploughshares Fund (2006); was awarded the Jane Bagley Lehman Award of the Tides Foundation in 2008 and the Josephine Butler Nuclear Free Future Award in 2001; and in 1989 he received The John Bartlow Martin Award for Public Interest Magazine Journalism of the Medill School of Journalism, Northwestern University, with Robert Alvarez. He has many published articles in journals and magazines as varied as *The Bulletin of the Atomic Scientists*, *Environment*, *The Physics of Fluids*, *The Journal of the American Medical Association*, and *The Progressive*, as well as in newspapers, including the *Washington Post*.

Dr. Makhijani has testified before Congress, and has appeared on ABC World News Tonight, the CBS Evening News, CBS 60 Minutes, NPR, CNN, and BBC, among others. He has served as a consultant on energy issues to utilities, including the Tennessee Valley Authority, the Edison Electric Institute, the Lawrence Berkeley Laboratory, and several agencies of the United Nations.

### *Education:*

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- M.S. (Electrical Engineering) Washington State University, Pullman, Washington, 1967. Thesis topic: electromagnetic wave propagation in the ionosphere.
- Bachelor of Engineering (Electrical), University of Bombay, Bombay, India, 1965.

### ***Current Employment:***

- 1987-present: President and Senior Engineer, Institute for Energy and Environmental Research, Takoma Park, Maryland. (part-time in 1987).
- February 3, 2004-present, Associate, SC&A, Inc., one of the principal investigators in the audit of the reconstruction of worker radiation doses under the Energy Employees Occupational Illness Compensation Program Act under contract to the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services.

### ***Other Long-term Employment***

- 1984-88: Associate Professor, Capitol College, Laurel, Maryland (part-time in 1988).
- 1983-84: Assistant Professor, Capitol College, Laurel, Maryland.
- 1977-79: Visiting Professor, National Institute of Bank Management, Bombay, India. Principal responsibility: evaluation of the Institute's extensive pilot rural development program.
- 1975-87: Independent consultant (see page 2 for details)
- 1972-74: Project Specialist, Ford Foundation Energy Policy Project. Responsibilities included research and writing on the technical and economic aspects of energy conservation and supply in the U.S.; analysis of Third World rural energy problems; preparation of requests for proposals; evaluation of proposals; and the management of grants made by the Project to other institutions.
- 1969-70: Assistant Electrical Engineer, Kaiser Engineers, Oakland California. Responsibilities included the design and checking of the electrical aspects of mineral industries such as cement plants, and plants for processing mineral ores such as lead and uranium ores. Pioneered the use of the desk-top computer at Kaiser Engineers for performing electrical design calculations.

### ***Professional Societies:***

- Institute of Electrical and Electronics Engineers and its Power Engineering Society
- American Physical Society (Fellow)
- Health Physics Society
- American Association for the Advancement of Science

### ***Awards and Honors:***

- The John Bartlow Martin Award for Public Interest Magazine Journalism of the Medill School of Journalism, Northwestern University, 1989, with Robert Alvarez
- The Josephine Butler Nuclear Free Future Award, 2001
- Ploughshares Hero, Ploughshares Fund, 2006
- Elected a Fellow of the American Physical Society, 2007, "*For his tireless efforts to provide the public with accurate and understandable information on energy and environmental issues*"
- Jane Bagley Lehman Award of the Tides Foundation, 2007/2008

***Invited Faculty Member, Center for Health and the Global Environment, Harvard Medical School:*** Annual Congressional Course, *Environmental Change: The Science and Human Health Impacts*, April 18-19, 2006, Lecture Topic: An Update on Nuclear Power - Is it Safe?

***Consulting Experience, 1975-1987***

Consultant on a wide variety of issues relating to technical and economic analyses of alternative energy sources; electric utility rates and investment planning; energy conservation; analysis of energy use in agriculture; US energy policy; energy policy for the Third World; evaluations of portions of the nuclear fuel cycle.

Partial list of institutions to which I was a consultant in the 1975-87 period:

- Tennessee Valley Authority
- Lower Colorado River Authority
- Federation of Rocky Mountain States
- Environmental Policy Institute
- Lawrence Berkeley Laboratory
- Food and Agriculture Organization of the United Nations
- International Labour Office of the United Nations
- United Nations Environment Programme
- United Nations Center on Transnational Corporations
- The Ford Foundation
- Economic and Social Commission for Asia and the Pacific
- United Nations Development Programme

***Languages:*** English, French, Hindi, Sindhi, and Marathi.

***Reports, Books, and Articles (Partial list)***

(Newsletter, newspaper articles, excerpts from publications reprinted in books and magazines or adapted therein, and other similar publications are not listed below)

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*A Time to Choose: America's Energy Future*, final report of the Ford Foundation Energy Policy Project, Ballinger, Cambridge, 1974. One of many co-authors.

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Makhijani, A., and Brice Smith, *Costs and Risks of Management and Disposal of Depleted Uranium from the National Enrichment Facility Proposed to be Built in Lea County New Mexico by LES*, Institute for Energy and Environmental Research, Takoma Park, Maryland, November 24, 2004.

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Institute for Energy and Environmental Research, *Lower Bound for Cesium-137 Releases from the Sodium Burn Pit at the Santa Susana Field Laboratory*, IEER, Takoma Park, Maryland, January 13, 2005. (Authored by A. Makhijani and Brice Smith.)

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CV updated October 11, 2010

## CERTIFICATE OF SERVICE

I hereby certify that copies of the forgoing SUPPLEMENT TO EMERGENCY PETITION TO SUSPEND ALL PENDING REACTOR LICENSING DECISIONS AND RELATED RULEMAKING DECISIONS PENDING INVESTIGATION OF LESSONS LEARNED FROM FUKUSHIMA DAIICHI NUCLEAR POWER STATION ACCIDENT on behalf of the Blue Ridge Environmental Defense Fund, Inc., have been served upon the following persons by Electronic Information Exchange:

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This is the 19<sup>th</sup> day of April 2011.

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## Cooperation

### Taiwan and mainland nuclear power firms forge cooperative ties

Asia Pulse, March 25, 2011 Friday 2:13 PM EST

Taiwan's No. 3 nuclear power plant will foster sisterhood relations with China's GUANGDONG NUCLEAR POWER GROUP as part of efforts to increase atomic energy safety, the plant's operator said Thursday. State-owned TAIWAN POWER CO. (Taipower), announced the plan amid the nuclear crisis in Japan, where emergency workers are still struggling to regain control of a nuclear power plant crippled by the magnitude 9.0 earthquake and subsequent tsunami that devastated the country on March 11.

### Russia, U.S. starting detailed talks on uranium enrichment Joint Venture

WASHINGTON. March 24 (Interfax) - Russia and the United States are launching detailed talks on plans to establish a joint venture to build a plant in the U.S. that will enrich uranium using Russian technologies. The chief of the Russian atomic energy corporation Rosatom, Sergei Kiriyenko, told journalists in Washington that an appropriate memorandum was signed by the sides in January 2010, but it came into force only after Russia's Techsnabexport and the U.S. company USEC signed a long-term contract on the delivery of low-enriched uranium starting from 2013.

### Israel: French Diplomats Confirm Nuclear Cooperation, Know-How Exchange With Israel

Tel Aviv Haaretz.com 24 Mar 11

The nuclear catastrophe in Japan has reignited the Israeli debate in Israel over the safety of the nuclear reactor in Dimona. In response to warnings that the 50-something-year-old reactor was old, unsafe and an environmental hazard, the Israel Atomic Energy Commission (IAEC) several years ago insisted that the reactor was secure and that it had undergone renovations and upgrades to guarantee its safety. Yet it refused to divulge details and explanations about what exactly had been upgraded and renovated. France is the country that sold Israel its nuclear reactor. French experts built it in the late 1950s and early 1960s, and French companies supplied Israel with the required know-how, technology and equipment....there is indeed cooperation and exchange of know-how on nuclear issues between the two countries.

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## Energy Policy

### Germany: Fukushima May Spell Failure for Merkel in Sunday Vote

Der Spiegel, 2011-03-24

Things couldn't get much worse for Chancellor Merkel. Or could they? Her party stands to lose power in the southwestern German state of Baden-Württemberg for the first time in 60 years this Sunday. And if it does, she will largely have only herself to blame. On Sunday, voters go to the polls in the economic-powerhouse state of Baden-Württemberg, in southwestern Germany. Polls in February had already indicated that the state's CDU governor, Stefan Mappus, was by no means assured of hanging on to his position. Now, in the face of rising concerns about nuclear power in Germany resulting from the ongoing catastrophe in Japan, ballot-box success for Mappus, a long-time supporter of atomic energy, is looking increasingly unlikely.

### EU: Energy savings could mothball plans to build 98 nuclear reactors

Euractiv, 2011-03-24

If the EU's 2009 Eco-design Directive were to be implemented fully, the end-use energy savings by 2020 could alleviate the need for another 98 Fukushima-sized nuclear reactors, according to

*NNNN/100*

calculations by the European Environmental Citizens' Organisation for Standardisation (ECOS).

### **Thailand Needs Nuke Power**

Bangkok Post Online 24 Mar 11

Thailand needs to build a nuclear power plant as the country might not be able to generate enough electricity from fossil fuels in the next 20 to 30 years, Foundation for National Disaster Warning Council chairman Smith Dharmasaroja said on Thursday. Nuclear power is a clean energy and can be used for maximum benefit, he said.

### **UAE 'Unlikely' To Order Changes to Nuclear Plans in Light of Crisis in Japan**

Abu Dhabi The National Online in English 24 Mar 11

Abu Dhabi is closely watching the nuclear crisis in Japan, but is unlikely to order any major changes to its ambitious nuclear plans, say the heads of the programme. The emirate's first nuclear reactors will be perched on a platform 6 metres above sea level - higher than a tsunami wave, engineers believe, if one were to make it to the emirate's shores. The engineers behind Abu Dhabi's nuclear programme, a US\$20 billion (Dh73.45bn) plan scheduled to start producing nuclear energy within seven years, have taken into account scenarios ranging from earthquakes to plane crashes.

### **Tanzania: President Directs Government To Form Policy on Uranium Mining in Country**

Dar es Salaam Daily News Online in English 23 Mar 11

President Jakaya Kikwete has directed the Ministry of Communication, Science and Technology to expedite formulation of a policy on uranium mining in the country. Speaking to officials at the ministry in Dar es Salaam on Wednesday, Mr Kikwete also urged the ministry to prepare the nation for nuclear energy, saying its application in power generation in the future was inevitable

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## **Fuel Cycle**

### **Russia Wants to Use U.S.' Spent Nuclear Fuel Dry Storage Technology**

WASHINGTON. March 25 (Interfax) - Russia is keen to apply the spent nuclear fuel (SNF) dry storage technology, Rosatom chief Sergei Kiriyenko said. "Among the technologies that are well developed in the U.S., I think in the nearest future we will be interested in the SNF dry storage in containers. I think, following the tests that we are carrying out today under existing projects, one of the conclusions will be to replace SNF wet storage facilities by dry ones," Kiriyenko said at a meeting with representatives from the U.S. nuclear industry and media outlets at the Russian Embassy in Washington on Wednesday.

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## **Energy**

### **Seismic Considerations for Solar Plants**

2011-03-22, Waller Lansden Dortch & Davis, LLC

In its efforts to become a national model for sustainability, the Los Angeles Community College System has learned that solar arrays and seismic faults are a bad combination: But major blunders and miscalculations over the last six years cost the program \$10 million, including \$4 million for designs of solar and wind installations that would never move to construction. One of the biggest problems: Three solar arrays had to be abandoned because they were planned to be built above seismic faults. The missteps, uncovered as part of a six-part Los Angeles Times investigation of the college construction program, offer a sobering lesson to builders of public and commercial buildings who plan arrays of photovoltaic panels: Check nearby seismic faults beforehand.

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## **Global & Regional Security**

### **West Africa's Growing Terrorist Threat: Confronting AQIM's Sahelian Strategy**

Africa Center for Strategic Studies Security Brief Number 11, March 2011

•Al Qaeda in the Islamic Maghreb (AQIM) is increasingly well integrated with local communities and criminal networks in the Sahel.

- Counterterrorism efforts among Sahelian governments remain uncoordinated and too narrowly focused to contain and confront AQIM's long-term and sophisticated strategy in the region.
  - To prevent AQIM from further consolidating its presence in the Sahel, regional policies must be harmonized and security forces refocused so as to minimize collateral impacts on local communities
- 

## **Government & Public Sector**

### **Canada: Nuclear liability act dies again**

The Toronto Star, March 25, 2011 Friday

The end of the current Parliament will mean that an act increasing the liability of nuclear operators for accidents will die. Now, an operator's liability is limited to \$75 million. The act would have upped potential damages to \$650 million. The act was supported by the nuclear industry, since it would bring Canada's act more in line with that of other countries. Given a new nuclear reactor costs about of \$10 billion, the liability amount is relatively small. With the exception of Bruce Power, which leases the Bruce reactors, Canada's nuclear operators are government owned.

### **Czech Poll: Support for Nuclear Power Exceeds Opposition Even After Fukushima**

Prague CZECHPOSITION.COM in English 1248 GMT 23 Mar 11

The earthquake in Japan has shaken Czechs' support for nuclear power, but most still favor it as a means of energy independence. Despite the nuclear incident in Japan, a majority of Czechs support increased reliance on nuclear energy -- but would want to see a security review of domestic plants and say they lack information on what to do if there were a nuclear crisis -- according to a poll by the Center for Analysis and Empirical Studies (SANEP).

### **Central Asia and the Shifting Patterns of India's Relations With Russia**

Jaipur Indian Journal of Asian Affairs in English 01 Jun 10 - 31 Dec 10 Vol. 23 No. 1-2 pp 1-20

"... India's encounter of Russia in Central Asia reflects not merely the altered contexts of their relations, but also the challenges facing India in its attempt to 'offer an alternative vision of a new world order'. Thus, while the discourses of the 'Look North' policy reinforce the desire that India becomes 'a kind of a model for other countries', the Central Asian context reveals that the narrative construction of New Delhi's current external affairs does not project a specific vision of world order that would distinguish it from the other participants in the 'new great game'. The implication from the discursive perceptions of New Delhi's encounter with Moscow in Central Asia is not only that India might remain a 'rising power' for longer than its pundits portend, but also that the cognitive framework of its strategic culture puts it in 'the class of countries that are always emerging but never quite arriving'."

### **Germany's Brüderle Tells Business Leaders Nuclear Moratorium is Election Stunt**

Bonn DW-WORLD.DE 1109 GMT 24 Mar 11

A German newspaper has reported that at least one member of the German government regarded the moratorium on extending the life of the country's nuclear reactors as merely an election ploy. When Chancellor Angela Merkel announced the move she said it was motivated by the new information and risks revealed by the problems at Japan's Fukushima nuclear power plant. The three month freeze would allow time for more stringent safety checks at German nuclear plants, the chancellor said. But the Thursday [ 24 March] edition of the Süddeutsche Zeitung daily reported that Economy Minister Rainer Brüderle had told worried business leaders that the decision was an election stunt. He was addressing the Federation of German Industry (BDI) on the day that Chancellor Merkel announced the freeze. Süddeutsche Zeitung said it had obtained a copy of the minutes from the meeting on Monday, 14 March, which paraphrased what the economy minister said.

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## **Industry**

### **Uranium bull unfazed by Japan crisis**

MarketWatch, March 25, 2011 Friday 1:51 AM EST

HONG KONG (MarketWatch) - Nuclear power's credentials as a green technology will weather the current Japanese nuclear crisis, according to one industry proponent, who outlined his bullish case

for uranium to a Hong Kong audience Thursday. Scarce energy resources throughout much of East Asia, apart from coal, mean there are few realistic alternatives to uranium, said Warwick Grigor, chairman of Sydney-based BGF Securities.

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## Mining

### Niger: China National Nuclear Corp starts trial production at its first overseas uranium mine

China Daily Online 0301 GMT 24 Mar 11

BEIJING - China National Nuclear Corp (CNNC), the country's largest nuclear plant operator, has started trial production at its first overseas uranium mine. The move comes as China increases efforts to secure more of the metal used in nuclear power production, from overseas acquisitions. The Azelik mine in Niger, 37.2 percent owned by CNNC, will be capable of producing 700 tons of uranium annually when it begins full operations. The operator said earlier that it would increase annual overseas uranium capacity to 5,000 tons within 10 years to secure supplies.

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## Policy

### US foreign aid faces cuts as China's reach grows

Associated Press Online, March 25, 2011 Friday 7:40 AM GMT

U.S. efforts to counter China's growing influence in the developing world are a likely casualty of the budget battles dominating Washington's politics, as chunks of the foreign aid program face the ax. That could hurt not just the world's poor, but America's reach in emerging markets where China has ramped up investment and provided easy credit. The Obama administration has sought to step up its engagement in Asia, the Pacific, Africa, Central Asia and Latin America. Development aid is a key plank of its strategy. The State Department argues it is "as central to advancing America's interests as diplomacy and defense." But that aid, like all federal spending, is under pressure as lawmakers debate how to reel in the government's deficit, forecast at \$1.5 trillion this year. Much of the red ink is financed by China.

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## Reactors

### Mexico: Laguna Verde risks, such as Fukushima, warn experts

Periódico La Jornada, Viernes 25 de marzo de 2011, p. 45

Although federal and state governments have said the Laguna Verde nuclear plant is safe, experts in the field and environmentalists disagree, arguing that presents a "very similar situation to that of Fukushima, and reactor design that is defective, near the sea and located in a seismic zone. " Warned that this is added an extra variable "has an irresponsible and corrupt administration," which affects maintenance.

### France: Sarkozy: any reactor that fails stress test will close

BRUSSELS, March 25 (Reuters) - French President Nicolas Sarkozy said on Friday any European nuclear reactor that fails planned stress tests will be closed. "If they don't pass these tests, they will be closed," he said. Sarkozy said European leaders had decided that all nuclear reactors would undergo stress tests. "The commission will establish the framework of the controls, the independent nuclear authorities will carry them out and make them public and then European nuclear regulators will say how serious these results are," Sarkozy said at a news conference following a meeting of European leaders in Brussels.

### EU leaders to debate nuclear "stress tests" in wake of Japan scare

Deutsche Presse-Agentur, March 25, 2011 Friday 10:22 AM EST

EU leaders to debate nuclear "stress tests" in wake of Japan scare European Union leaders gathered for a second day of talks in Brussels at their annual spring summit, with nuclear safety expected to dominate Friday's conversation after they found common ground on economic reforms and Libya the night before. EU leaders have been consistent in expressing their sympathy with Japan, but have differed on what measures should be put in place as part of the lessons learned from the Asian country's troubles.

### **Japan: Fukushima shutdown could take one month: TEPCO**

Agence France Presse, March 25, 2011 Friday 5:41 AM GMT

Tokyo Electric Power Co (TEPCO) admitted Friday it may take at least another month to achieve a cold shutdown of all reactors -- when temperatures inside fall below boiling point and its cooling systems are back at atmospheric pressure.

"We are still in the process of assessing the damage at the plant, so we can't put a deadline on when the cooling operations will work again. It may take more than a month, who knows," a TEPCO spokesman told AFP. Temperatures at one reactor spiked at one point to 400 degrees Celsius (752 degrees Fahrenheit) this week before stabilising. Temperatures inside reactors one to four remain around boiling point, a nuclear safety agency official said.

### **Japan Fukushima reactor vessel may be damaged: operator**

Agence France Presse, March 25, 2011 Friday 7:46 AM GMT

One of the reactor vessels at a stricken Fukushima nuclear power station in Japan may be damaged, the plant's operator said Friday, after high levels of radiation were detected. "It is possible that the pressure vessel containing the fuel rods in the reactor is damaged," a spokesman from Tokyo Electric Power Co. told AFP. The new safety scare is a setback to urgent efforts to restore power to the all-important cooling systems at the Fukushima No. 1 plant, located 250 kilometres (155 miles) north of Tokyo.

### **Russia: Historic Documents Show Politburo Skepticism of Chernobyl Safety**

Der Spiegel, 2011-03-24

Lies and deception were commonplace in the Soviet nuclear industry. Now Kremlin records which have been obtained by SPIEGEL reveal that Russian experts already had their doubts about the Chernobyl reactor before the 1986 disaster... G.A. Shasharin (deputy energy minister): "The personnel had no idea that this type of reactor can release so much energy. We didn't know it either. We were enthusiastic about this reactor but never truly convinced of its safety. There was only one protective system, and everyone assumed that it was no good. The Smolensk and Kursk nuclear power plants, as well as the two near Leningrad, should also be shut down. They can't even be refurbished anymore." Mikhail Solomentsev (politburo member): "You knew that the reactor wasn't safe?" Shasharin: "Yes. But it was never documented in writing. There was a great deal of resistance to letting this become known. The Academy of Sciences and the Ministry of Medium Machine Building (responsible for nuclear energy) demanded a constant increase in the production of nuclear energy until the year 2000."

### **Spain: Calls to shut down 'Europe's Fukushima'**

Euractiv, 2011-03-21

A 40-year old Spanish nuclear power plant built to the same design model as Fukushima's disaster-struck reactor number one has become engulfed by calls for it to be shut down, while Brussels is questioning the safety of EU installations and has pushed for stress tests of nuclear power plants. Antonio Cornado, communications manager for Spain's Consejo de Seguridad Nuclear (Nuclear Safety Council) regulator, confirmed to EurActiv that the Santa Maria de Garona plant, about 70 miles south of Bilbao, contains a General Electric Mark 1 Boiling Water Reactor (BWR) system, of a similar variety to that in Fukushima's reactor number one. "It's the same type," he said. "It is a Mark 1, but there are several performance [enhancements] that are better than the original design. There have been a lot of safety modifications." Questions about the model's safety were "closed" 20 years ago, he added.

### **Russia Ready to Vouch For Safety of NPPs Built in Home Country, Abroad**

MOSCOW. March 24 (Interfax) - Russia is ready to vouch for the safety of nuclear power plants built on the national territory and abroad, President Dmitry Medvedev said in a video-blog posted on the Kremlin website. "I think we should build new nuclear power units with the maximum degree of safety rather than extend the useful life of the existent units. Our atomic energy specialists are ready to vouch for the nuclear power plants they built on the domestic territory and in countries that signed related contracts with Russia," Medvedev said. The nuclear power plant Russia is building in Turkey will have a brand new control system with the operation period equal to the plant's service life, he said.

### **Japan: Kyushu Electric Defers Restart of Two Nuclear Reactors**

Fukuoka, March 24 Kyodo -- (EDS: CORRECTING DATE IN 4TH GRAF, ADDING CRITIC'S COMMENT IN LAST GRAF) Kyushu Electric Power Co. said Thursday it has decided to delay rebooting two nuclear reactors at its Genkai nuclear power plant in Saga Prefecture that it had suspended for servicing in view of the accident at the Fukushima Daiichi nuclear plant. Toshio Manabe, the regional utility's president, told a news conference his company has decided to postpone rebooting the No. 2 and No. 3 reactors from their originally scheduled times of late March and early April.

#### **Japan: Three Workers Exposed to High Radiation; 2 Sustain Possible Burns**

Tokyo, March 24 Kyodo -- (EDS: ADDING INFO) Three workers were exposed to high-level radiation Thursday while laying cable at the troubled Fukushima Daiichi nuclear plant, and two of them were taken to hospital due to possible radiation burns to their feet, the nuclear safety agency and the plant operator said. The three men in their 20s and 30s were exposed to radiation amounting to 173 to 180 millisieverts at around 12:10 p.m. while laying cable underground at the No. 3 reactor's turbine building. The two hospitalized are workers of plant operator Tokyo Electric Power Co.'s affiliated firm and had their feet under water while carrying out the work from 10 a.m., according to the utility known as TEPCO and the Nuclear and Industrial Safety Agency. The two, who were diagnosed with possible beta ray burns at a Fukushima hospital, will later be sent to the National Institute of Radiological Sciences in Chiba Prefecture, the agency said. TEPCO said radioactive water may have seeped through the workers' radiation protective gear, causing radioactive materials in the water to stick to their skin. The burns are caused by direct exposure to beta rays, the utility added.

#### **Ukraine, China Could Supply Nuclear Fuel to Belarus Besides Russia**

MINSK. March 24 (Interfax) - Belarus will not veer away from an opportunity to draw alternative suppliers of nuclear fuel, if this is good for the economy, said Nikolai Grusha, director of the Belarusian Energy Ministry's Nuclear Energy Department. "The agreement on the construction of a nuclear plant says that Russia will supply fuel to the nuclear power plant through its service life, which does not mean, however, that we will not consider drawing other suppliers, if this has sense," Grusha said at a press conference in Minsk on Wednesday. Ukraine and China could supply nuclear fuel to Belarus in the future besides Russia, he said.

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## **Safety**

#### **China: Daya Bay reactor operator reassures Hong Kong residents**

South China Morning Post, March 25, 2011 Friday

The operator of the Daya Bay nuclear power plant has gone on a public relations blitz to reassure Hongkongers a nuclear accident similar to Japan's present crisis is virtually impossible. The plant was built to stringent designs and standards, which enabled it to withstand a powerful earthquake, the operator said yesterday. Moreover, its location meant tidal waves were highly unlikely. Chen Tai, a nuclear safety specialist at the plant, said tsunamis were unlikely to develop in shallow coastal waters. The biggest recorded in Guangdong waters was less than 50 centimetres. "The only serious casualty I can recall is that one person suffered from a broken finger," he said.

#### **Japan: Don't let fear beat nuclear science; Despite a classic once-in-a-lifetime Black Swan event, Japan's Fukushima plant has not witnessed a meltdown**

The Business Times Singapore, March 25, 2011 Friday

AS BATTERED Japan struggles to cool down the radioactive cores of its nuclear reactors at Fukushima Daiichi, renewed questions about the safety of nuclear power have emerged. There are even predictions that this disaster would end what was seen as a nuclear renaissance, 25 years after the Chernobyl nuclear accident in what is now Ukraine. In the midst of this media glare and concern, the compelling question is: Does the Fukushima Daiichi emergency prove that nuclear power reactors are inherently unsafe? If not, then this question needs to be answered: Does the incident show just how robust designs are with multiple fail-safe systems built in?

#### **Russia: Fast reactors will better respond to present-day challenges - Kiriyyenko**

Moscow Interfax-AVN Online 0920 GMT 25 Mar 11

"They may have a stable active zone, work on natural uranium and be used as afterburners of their own spent nuclear fuel or spent nuclear fuel from thermal reactors. We have made the decision here in Russia, in the context of new technological platform, to put the stake primarily on

fast reactors," Kiriyenko told U.S. nuclear industry representatives and reporters at the Russian embassy in Washington on Wednesday.

### Japan's TEPCO under pressure over injured workers

Agence France Presse, March 25, 2011 Friday 8:35 AM GMT

Japan ordered the operator of a stricken nuclear plant to step up safety Friday after three workers in ill-fitting shoes suffered burns when they sloshed through highly radioactive water. The trio, aged in their 20s and 30s, were placing electric cables in a basement as part of efforts to rebuild cooling systems at the quake and tsunami damaged reactor three to prevent high-level radiation from spewing out. Two of the men, who were employed by a subcontractor, were hospitalised after suffering radiation burns from beta rays, which are powerful enough to transform a person's DNA makeup and cause potential cancer and death. The workers stepped into a pool of water containing iodine, caesium and cobalt 10,000 times the normal level, said the operator, the Tokyo Electric Power Company (TEPCO), which runs the stricken Fukushima plant. All were exposed to radiation of up to 180 millisieverts -- more than triple the usual limit for plant workers and close to the recently hiked government-imposed 250 millisievert limit for emergency duty.

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## Security

### How Iran Controlled Stuxnet

Tabriz Azarbayjan in Persian 06 Dec 10

Azerbaijan News Service: Informed experts in Iran are saying Iran has acquired the necessary knowledge to contain the Stuxnet virus and is prepared to convey it to applicant nations. Some Iranian officials have told Nuclear Iran that Stuxnet was seen for the first time 15 years ago in Bushehr in the computers of some operators but it never caused any harm to installations because the power plant's internal networks are completely isolated and protected. In Natanz also the 2010 Yukiya Amano report showed that production continued until four days after the report's publication and nothing stopped working.

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Global Nuclear Open Source Information Service (GNOSIS) 2011-03-25

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**From:** [Harrington, Holly](#)  
**To:** [McIntyre, David](#)  
**Subject:** for the insurance guy with questions  
**Date:** Friday, April 15, 2011 10:13:38 AM

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2. What is the NRC's position on the current state of the emergency response programs it oversees for nuclear incidents in the US?

All U.S. nuclear power plants have an emergency plan approved by the NRC (plant actions) and FEMA (offsite response). Licensee compliance with the emergency plan is inspected annually by NRC and response is demonstrated to NRC and FEMA inspectors every two years. NRC regulations for emergency planning are strictly enforced and all plants must comply with NRC regulations. In addition, the NRC relies on FEMA's assessments of local community preparedness to protect public health and safety in the event of a radiological release. There is a high level of emergency preparedness around U.S. nuclear plants and NRC believes that these plans provide protection of public health and safety.

The NRC has formed a Task Force to review the adequacy of our current requirements for Nuclear Power Plants in light of the events at the Fukushima site in Japan. The Task Force will report on short term enhancements as well as recommend longer term changes over the next 90 days.

3. From what we understand, individual states (could be local communities, counties, etc.) are largely responsible for formulating their own emergency response plan, using certain criteria set forth by both the NRC and FEMA. Given that the NRC is likely to review nuclear emergency preparedness models across the US, what are the elements of the existing arrangement that are could be included in that review?

Yes, offsite response organizations develop site specific plans for response within nuclear plant emergency planning zones. However, those plans must be compliant with NRC and FEMA regulations and consistent with supporting guidance. Each plan has been individually reviewed and approved by FEMA. The newly formed NRC taskforce will be conducting a near-term review in 90 days to identify near-term actions that could affect U.S. nuclear power plants and to identify topics for a longer-term assessment. One of the specific elements under review is emergency preparedness. The Task Force is empowered to review all aspects of emergency preparedness for adequacy in light of the Fukushima accident. However, it's premature to speculate what the taskforce report will say on the subject.

NNNN/101

**From:** [EUCI Events](#)  
**To:** [McIntyre, David](#)  
**Subject:** The Lessons of Fukushima Daiichi Webinar, April 26  
**Date:** Tuesday, April 19, 2011 2:06:14 PM

## The Lessons of Fukushima Daiichi: An In-Depth Technical Analysis



**April 26, 2011 :: 12:00 - 1:30 PM Eastern Time**

As the events at the Fukushima Daiichi Nuclear Power Plant continue to unfold, this webinar will address:

- The design of the plant, including its safety systems
- Damage to the plant caused by the earthquake and tsunami
- What it means to safely shut down a nuclear reactor
- How hydrogen gas is generated and the resulting explosions
- A timeline of events that occurred at Fukushima
- How different countries and agencies have responded to these events, including the U.S. NRC
- How the Fukushima event will impact the nuclear power industry in the U.S. and worldwide

As this is an ongoing event, the latest information and detail available will be incorporated into the webinar.

[PDF Brochure](#) | [Pricing and Registration](#)

### Topics Include

- The water-steam relation inside the BWR reactor
- What it means when the heat sink is lost by a combination of tripping the turbine and the loss of both normal and emergency core cooling capability
- The steam-pressure build-up inside the reactor vessel, resulting in uncovering the nuclear fuel
- The subsequent oxidation of the zircalloy fuel cladding
- The attempts to relieve the pressure, which also released explosive hydrogen gas
- Release of volatile radioactive fission products
- The design of the spent fuel pool and why it became another challenge to maintain it within its design basis

[Full Agenda](#)

### Instructed By

**Howard L. Sobel, PE**, Nuclear Consultant

[Instructor Bio](#)

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NNNN/102

**Matakas, Gina**

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**From:** Tift, Doug  
**Sent:** Saturday, March 12, 2011 8:02 PM  
**To:** Dean, Bill; Lew, David  
**Cc:** McNamara, Nancy  
**Subject:** SLO update

Bill / Dave,

I wanted to make sure you are up-to-date on what Nancy and I have been doing with respect to the event in Japan. Earlier today HQ operations center staffed the State Liaison position. (Previously, only the Federal Liaison and Congressional Liaison were staffed.) As you are aware, the Regional SLOs are responsible for state communications when HQ has the lead for the agency response. Therefore, Nancy and I supported teleconferences with the HQ state liaison and the other Regional State Liaison Officers. HQ is working on putting together talking points / Q&A's that are specifically tailored to the states. In the interim, we put out an email to our states pointing them towards the Press Releases and the NRC Blog, and requesting their input for Q&A's. All of our emails were authorized by the liaison team in the HQ Ops Center.

So far, we have received questions from Pennsylvania, Massachusetts, Vermont, New York, and Rhode Island. (The RSLO's in the other regions have been receiving questions from their states as well.)

-Doug

**From:** LIA08 Hoc  
**To:** Correia, Richard  
**Subject:** RE: clarification on LT assignments  
**Date:** Sunday, March 27, 2011 6:53:57 PM

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Thanks Rich. I have emailed Col. Erik Price on Adm Willards staff to discuss the call. If it's a staff level briefing, I proposed (ok with RST and PMT) to have the admirals staff join the 9 PM daily call between the PMT, the RST and our team in Japan. If it's a briefing of the admiral himself, then we need to set up a time with the ET. Should hear back from Col. Price soon. Just briefed Brian McDermott about the call and associated logistics.

Marissa and I met with the PMT and the RST and provided them a copy of the list that Janelle or Rani. We are starting to get responses back. I am putting all info and responses in a file folder available at the LT Coordinators desk. Jeff

---

**From:** Correia, Richard  
**Sent:** Sunday, March 27, 2011 6:29 PM  
**To:** LIA08 Hoc  
**Subject:** Re: clarification on LT assignments

Jeff. The call with PACOM is primary with the PMT so they can discuss rad conditions at the plant so if conditions are worsening, PACOM can plan for US military & citizen evacuations. Vince Holahan's role is to advise Admiral Willard on logistics for material & equipment etc. I know it can be confusing since we have been dialoguing with two primary contacts at PACOM. The 2nd item is correct. Rani F. 'S email last night got those actions initiated. Refer to her email. Thanks again.

Rich Correia, Director  
Division of Risk Analysis  
RES

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**From:** LIA08 Hoc  
**To:** Correia, Richard  
**Cc:** LIA06 Hoc  
**Sent:** Sun Mar 27 16:00:22 2011  
**Subject:** clarification on LT assignments

If I understand your emails correctly, we have two assignments in the LT

1. Set up a daily conference call with the PACOM and NRC liaison rep to the PACOM. Do you envision this being an ET call, or led by the PMT, providing PACOM with the latest rad data, or led by the LT, and involving all components of our HQ response.
2. Compile a list of all actions ordered by the Deputies Committee, and discuss how each action item has been dispositioned, whether we own the item or not.

Thanks

Jeff

NNNN/104

## **Kock, Andrea**

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**From:** Franovich, Mike  
**Sent:** Sunday, March 13, 2011 11:51 PM  
**To:** Ostendorff, William  
**Cc:** Nieh, Ho; Warnick, Greg; Kock, Andrea; Zorn, Jason  
**Subject:** UPDATE from 23:30 call

### Weber led the call

- Focus is on Fukushima Daiichi Unit 3
- Secondary containment/reactor building explosion attributed to hydrogen buildup during vent of primary containment. NRC did receive confirmation from Japanese that the explosion was from hydrogen detonation.
- Presence of significant amounts of hydrogen tends to confirm suspected fuel damage
- Primary containment is intact
- Video footage available, explosion didn't appear as severe but the damage to the reactor building appears greater than that of Unit 1.
- Jim Trapp & Tony Ulses continues to provide updates to NRC ops center based on their interactions with Japanese officials.
- Earlier in the day info from US Navy sampling and assessment from NRC provided feedback to US Ambassador to share with Japanese to help confirm their plume dispersal.
- NRC continues to assess the Fukushima Daiichi & Daini sites, and Onagawa.
- Next telecon update at 07:30

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**From:** RST01 Hoc  
**Sent:** Friday, April 08, 2011 6:06 PM  
**To:** RST06 Hoc  
**Subject:** FW: PACOM SVTCs

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**From:** Holahan, Vincent  
**Sent:** Friday, April 08, 2011 5:59 PM  
**To:** Holahan, Patricia; RST01 Hoc  
**Cc:** Masse, Todd  
**Subject:** RE: PACOM SVTCs

Trish/Todd,

First, many on the PACOM staff appreciate the heroic efforts to establish connectivity between the IC and NRC. The frustration with the WH situation room was picked up quickly. The push to get a Tandberg into NRC was no small task given all the politics. PACOM is hoping to ease your pain.

Second, the contributions Tony is providing to the Thermometry group was praised by the DNI once again this afternoon on the Radiological COI. RADM Train was fishing for any additional information that NRC HQs could provide to assist them with their assessments. I shared the information that Trish gave me and it was greatly appreciated. Whether that information comes from me or an RST representative really doesn't matter as long as the PACOM liaison is kept update on activities.

The op tempo will decrease over the weekend for some. NRC participation is not expected but they want to ensure WH Situation room access is available in case a contingency comes up. The Tandberg will relieve all of us of this concern in the future.

Have a good weekend.

Vince

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**From:** Holahan, Patricia  
**Sent:** Friday, April 08, 2011 7:20 AM  
**To:** Holahan, Vincent  
**Cc:** Masse, Todd  
**Subject:** FW: PACOM SVTCs

I think this is a possible workable solution so long as Tony can keep supporting it. In addition, we are working on documents that when they are finalized, we can possibly share it with you.

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**From:** Masse, Todd  
**Sent:** Thursday, April 07, 2011 6:42 PM  
**To:** Holahan, Patricia  
**Cc:** Whitney, James  
**Subject:** PACOM SVTCs

Trisha,

I am willing to continue to serve PACOM's need for NRC technical (reactor safety) analysis in these SVTCs – but only up to the extent that ILTAB has Tony or another RST member participating in them. We're burning lots of resources...and with no end in sight.

Currently there are two separate, but related COIs: Rad, and Thermometry. The thermometry COI seems to be the area where the NRC has the most to offer. This is also the function to which the new machine – to be delivered and installed tomorrow at 9:00 in our SCIF, will be dedicated. My suggestion – let's rationalize our resources, let Vince handle the high level stuff (Rad), and let the technical experts (Tony and RST as available) and Jim Whitney handle the thermometry COI.

Thanks,  
Todd

Todd Masse  
Chief, Intelligence Liaison and Threat Assessment Branch  
Office of Nuclear Security and Incident Response  
Nuclear Regulatory Commission  
(301) 415-7518

**From:** [Taylor, Robert](#)  
**To:** "???"  
**Subject:** RE: Radiation Dose Map  
**Date:** Friday, April 01, 2011 5:44:00 PM

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Satoh-san,

Thank you for the information.

Regards,  
Rob

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

From: 佐藤 隆 [<mailto:satoh.takashi@tepcoco.jp>]  
Sent: Friday, April 01, 2011 10:00 AM  
To: Taylor, Robert  
Subject: Radiation Dose Map

Dear Mr. Taylor

Attached contains the revised dose map of Fukushima Daiichi site.

I appreciate your support.

Best regards,

Takashi Sato  
TEPCO

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東京電力株式会社  
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**From:** Caldwell, Robert  
**Sent:** Wednesday, March 30, 2011 6:45 AM  
**To:** LIA06 Hoc; LIA08 Hoc  
**Subject:** FW: ACTION: WE'VE CONTACTE VINCE HOLAHAN

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**From:** Wiggins, Jim  
**Sent:** Wednesday, March 30, 2011 5:24 AM  
**To:** Virgilio, Martin; Weber, Michael; Zimmerman, Roy; ET05 Hoc; Boger, Bruce  
**Cc:** Caldwell, Robert; LIA01 Hoc; ET07 Hoc; Holahan, Patricia; Masse, Todd; Stapleton, Bernard; Hoc, PMT12; Morris, Scott  
**Subject:** ACTION: WE'VE CONTACTE VINCE HOLAHAN

Confirmed that Vince Holahan is on-station at PACOM. He's working out of a large SCIF so he can't use his BB. We would need to establish comm windows to talk to him.....reminds some of us of our former lives.

Days needs to work on other options....e.g. have ILTAB or ISB identify a STE phone number in the PACOM SCIF that we could use or develop some sort of ability to email him real-time.

ET05 – open a tasker on this, assigned to LT.