

From: [Case, Michael](#)
To: [Kammerer, Annie](#)
Subject: RE: M8.9 NEAR THE EAST COAST OF HONSHU, JAPAN
Date: Friday, March 11, 2011 7:45:30 AM

Thanks Annie. Shakecast is nice.

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

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

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

The following New Earthquake occurred:

Location

NEAR THE EAST COAST OF HONSHU, JAPAN

Magnitude

8.9

Time

2011-03-11 06:46:23

Lat

38.322

Lon

142.369

ISSC ShakeCast Notification System
IAEA

=====

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Helton, Donald

From: Helton, Donald
Sent: Friday, March 11, 2011 3:31 PM
To: Helton, Shana
Subject: FW: ***NRC IS RESPONDING TO AN EMERGENCY OUTSIDE OF THE UNITED STATES**

Importance: High

Hey – It is possible that I'm going to get called in to the Operations Center...I'll let you know if that happens, but just wanted to give you a heads up that I might be late for dinner...

From: Operations Center Bulletin
Sent: Friday, March 11, 2011 3:04 PM
To: Operations Center Bulletin
Subject: ***NRC IS RESPONDING TO AN EMERGENCY OUTSIDE OF THE UNITED STATES**
Importance: High

THIS IS NOT A DRILL.

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

Two important reminders:

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

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

No response to this message is required.

THIS IS NOT A DRILL

Murphy, Andrew

M
V
75

From: Richards, Stuart
Sent: Friday, March 11, 2011 3:09 PM
To: Kammerer, Annie; Murphy, Andrew; Pires, Jose; Boyce, Tom (RES); Csontos, Aladar; Gavrilas, Mirela; Hogan, Rosemary; Koshy, Thomas; Sydnor, Russell; Ali, Syed; Birla, Sushil; Santos, Daniel; Tregoning, Robert
Subject: FW: ***NRC IS RESPONDING TO AN EMERGENCY OUTSIDE OF THE UNITED STATES**
Importance: High

See the e-mail below.

Note that if you are requested by colleagues in another country to provide technical advice and assistance during this emergency, all such communications must be handled through the NRC Operations Center.

Information received about the event should be provided to the Operations Center.

Thanks
Stu

From: Operations Center Bulletin
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No response to this message is required.

THIS IS NOT A DRILL

4/3

Kuritzky, Alan

From: ANS Broadcasts [broadcasts@ans.org]
Sent: Friday, March 11, 2011 8:21 PM
To: Kuritzky, Alan
Subject: Go to ANSNUCLEARCAFE.ORG for Japan's Nuclear Plant Status

The ANS Nuclear Cafe blog is posting the latest links to information about the status of Japan's Nuclear Power Plants. Go to <http://ansnuclearcafe.org/> for a collection of sources covering Japan's earthquake and Tsunami.

4/4

From: ANS Broadcasts [broadcasts@ans.org]
Sent: Friday, March 11, 2011 8:35 PM
To: Marksberry, Don
Subject: Go to ANSNUCLEARCAFE.ORG for Japan's Nuclear Plant Status

The ANS Nuclear Cafe blog is posting the latest links to information about the status of Japan's Nuclear Power Plants. Go to <http://ansnuclearcafe.org/> for a collection of sources covering Japan's earthquake and Tsunami.

Scott, Michael

From: ANS Broadcasts [broadcasts@ans.org]
Sent: Friday, March 11, 2011 9:30 PM
To: Scott, Michael
Subject: Go to ANSNUCLEARCAFE.ORG for Japan's Nuclear Plant Status

The ANS Nuclear Cafe blog is posting the latest links to information about the status of Japan's Nuclear Power Plants. Go to <http://ansnuclearcafe.org/> for a collection of sources covering Japan's earthquake and Tsunami.

From: Beall, James *INRR*
To: Ruland, William
Subject: "some really important coolant"??
Date: Friday, March 11, 2011 11:53:27 AM

3.40am Reports indicate the situation at the **Fukushima Daiichi nuclear plant is "under control"**. The World Nuclear Association has said it understands that water is now being pumped into its cooling system. Reuters has also reported the US has transported emergency coolant to the plant. US Secretary of State Hillary Clinton said:

We just had our Air Force assets in Japan transport some really important coolant to one of the nuclear plants. You know Japan is very reliant on nuclear power and they have very high engineering standards, but one of their plants came under a lot of stress with the earthquake and didn't have enough coolant.

Read more: <http://www.news.com.au/world/magnitude-quake-strikes-japan/story-e6frfkyi-1226019903430#ixzz1GJJHAoyj>

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From: Lu, Shanlai *INFO*
To: Donoghue, Joseph; Uises, Anthony; Mendiola, Anthony; Akstulewicz, Frank; Ader, Charles; Lombard, Mark; Ruland, William; Bahadur, Sher; Landry, Ralph; Clifford, Paul
Subject: Japan nuclear site declares state of emergency after quake - plant experienced a mechanical failure in the system needed to cool the reactor
Date: Friday, March 11, 2011 9:21:09 AM

<http://www.chicagotribune.com/news/nationworld/la-fgw-quake-nuclear-20110312,0,6862975.story>

We are safe and lucky this time.

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From: Rodriguez, Veronica *NAR*
To: Astwood, Heather; Boger, Bruce; Cullingford, Michael; Hopkins, Jon; Quinones, Lauren; Regan, Christopher
Subject: RE: INFO Japan: Radioactive Steam Could Be Released From Troubled Plant
Date: Friday, March 11, 2011 3:28:10 PM
Attachments: Status of Fukushima Daiichi NPP 1830_03112011[1].pdf

FYI – see attached.

REL

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

FYI

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

Radioactive Steam Could Be Released From Troubled Plant

Tokyo Kyodo World Service 1819 GMT 11 Mar 11

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

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

4/9



INCIDENT AND EMERGENCY CENTRE

Subject: Status of the Fukushima Daiichi nuclear power plant

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

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

Unit 1

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

Unit 2

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

Unit 3

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

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

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

From: Astwood, Heather *NRP*
To: Leeds, Eric; Boger, Bruce; McGinty, Tim; Valentine, Nicholee; Titus, Brett; Susco, Jeremy; Roquecruz, Carla; Nguyen, Quynh; Meighan, Sean; Heida, Bruce; Fields, Leslie; Cusumano, Victor; Cartwright, William; Azeem, Almas
Cc: Cullingford, Michael; Hopkins, Jon; Quinones, Lauren; Regan, Christopher; Rodriguez, Veronica
Subject: FW: Japan initiates emergency protocol after earthquake
Date: Friday, March 11, 2011 8:33:18 AM

FYI

From: Breskovic, Clarence *OIP*
Sent: Friday, March 11, 2011 6:39 AM
To: Breskovic, Clarence
Subject: Japan initiates emergency protocol after earthquake

Japan initiates emergency protocol after earthquake

11 March 2011

Nuclear Engineering International

Onagawa, Fukushima Daiichi, Fukushima Daini and Tokai nuclear power stations have automatically shut down following a magnitude 8.8 earthquake off the northeast coast of the largest island of Japan, Honshu.

All four operating plants on that coast have automatically shut down, or SCRAMmed, according to Japan Atomic Information Forum (JAIF). Higashidori 1, which is also located on Honshu's northeast coast, was shut down for a periodic inspection.

The earthquake struck at 2:45pm local time. A 6:45 pm local time report from the Japan Nuclear and Industrial Safety Agency contained more information of damage and other problems in a site-by-site report.

-A CO2 fire has broken out at Onagawa nuclear power station.

-Utility TEPCO has requested the establishment of a nuclear emergency response programme for Fukushima Daiichi 1&3 and Fukushima Daini 1.

JAIF reported that Fukushima Daiichi 1, 2 and 3 automatically shut down; units 4, 5 and 6 were in maintenance outages. Fukushima Daini 1, 2, 3 and 4 automatically shut down.

JAIF has reported that TEPCO sent the emergency report because emergency diesel generators at the two sites are out of order. It said that there is no report that the radiation was detected out of the site. It said that an emergency headquarters has been set up and will issue information hourly.

JAIF also reported that the Rokkasho reprocessing facility was being powered by emergency diesel generators. No other unusual events or radiation leaks have been reported. Nuclear power stations at Hamaoka, Kashiwazaki-Kariwa and Tomari are

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continuing normal operation, according to JAIF.

After an accident occurs at a nuclear power plant, the licensee must notify the national Nuclear and Industrial Safety Agency by law.

A minister in its controlling organisation, the Ministry of Economy, Trade and Industry, notifies the prime minister's office. The central nuclear emergency response headquarters (NERHQ) of the national government issues a nuclear emergency declaration, which also includes instructions about preventative measures. It receives technical advice from the Nuclear Safety Commission. The NERHQ sends a specialist and the NSC sends a commissioner to the site.

After the emergency declaration is received, the local office of the national government's NERHQ arranges prevention measures based on factors including facility information, climate and monitoring.

Nuclear emergency response operations are coordinated in one of 20 so-called off-site centres spread across Japan, which are close to, but not inside, nuclear facilities. The off-site centre's role is to be the main centre of information, incident analysis, and emergency plan organisation and direction. Two or three senior specialists for nuclear emergency preparedness work in each OFC. In normal conditions, the specialists work as nuclear power safety inspectors, checking plant operation from the viewpoint of regulation. During an emergency, the specialists organize prevention measures as a secretariat and report it to a joint council for nuclear emergency response. The joint council includes not only the local office of the national government's NERHQ and the senior specialists, but also representatives of the Nuclear Safety Commission and prefectural and municipal NERHQs.

The joint council devises instructions to residents for evacuation and/or sheltering. It also instructs the emergency services and coast guard, self-defence force, Japan Nuclear Energy Safety Organisation (JNES), the National Institute of Radiological Sciences, the Japan Atomic Energy Agency, and other bodies.

JNES has constructed a dedicated high-speed network system connecting the 20 off-site centres and other agencies called Emergency Preparedness Response Network (EPRNet). It includes video conferencing systems, e-mail, telephone, fax, and connections to a meteorological information service, a plant information collection, diagnosis, prognosis and analytical prediction tool (called ERSS), and an emergency environmental dose prediction tool (called SPEEDI).

From: Ruland, William , NRC
To: Beall, James
Subject: RE: Japan earthquakes
Date: Friday, March 11, 2011 12:03:00 PM

It was DE last time. We, DSS, where in a small support role.

Bill

From: Beall, James , NRC
Sent: Friday, March 11, 2011 8:03 AM
To: Ruland, William
Subject: Japan earthquakes

Bill –

I don't recall if any of your division were part of the NRC team(s) that responded to Japan after the last quake, but I would expect that the Commission would want that initiative repeated, if not expanded. That is, the conclusions of the previous teams (both Japanese and NRC) will need to be compared to the more recent data, etc.

I am sorry if this may be obvious, but the recent SE by the staff for GE Hitachi may also get folk to want to compare any Hitachi statements on seismic with what happened to Hitachi over there.

jim

4/11

From: [Case, Michael](#)
To: [Gavrilas, Mirela](#)
Subject: Re: Fukushima
Date: Saturday, March 12, 2011 8:37:46 AM

Hi M. Not a lot of solid info around. Wrt unit 1, "info" seemed to indicate that they were keeping (fire) water on the core at about 2/3 core coverage. Don't know the cause of the explosion other than "info" indicated the containment was at 100#. Unit 1 is an iso condenser plant
Sent from Blackberry
Michael Case.

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

From: Gavrilas, Mirela
To: Gibson, Kathy; Case, Michael
Cc: Lee, Richard
Sent: Sat Mar 12 06:55:28 2011
Subject: FW: Fukushima

Any info that can be shared with our contractor at ANL? He has a very sharp mind and he is probably the world's foremost expert if the core did melt through the vessel.

They may have done exactly what Mitch said: flooded the cavity and then they got a steam explosion-- Mike Corradini could give the best guess as to that. To me, the timeline fits.

M.

From: Michael Corradini [corradini@engr.wisc.edu]
Sent: Friday, March 11, 2011 9:08 PM
To: Farmer, Mitchell T.
Cc: Gavrilas, Mirela; Tinkler, Charles; Basu, Sudhamay; Lee, Richard; Grandy, Christopher
Subject: Re: Fukushima

I am with Dana and others at ACRS. We have gotten some small info from folks in Japan. Fukushima used up their DC battery energy powering their RCIC pumps after the AC diesel generators started and then failed. As of 7pm EST, portable generators had arrived but yet to have been hooked up. Charlie or Mirela may know more. Dana has been contacted by a DOE emergency response team (and I wished him well to Japan).

--

Michael Corradini, Chair
Engineering Physics
University of Wisconsin
(608)263-1648 [Fax: 3-7451]
corradini@engr.wisc.edu
<http://www.engr.wisc.edu/ep>

Quoting "Farmer, Mitchell T." <farmer@anl.gov>:

> Hi Mirela, Charlie, Sud, Richard,
>
> Don't know if you are out there. I've been watching the situation
> at Fukushima and don't like what I'm seeing, at least based on the
> news reports I have access to. I don't know how long a BWR can go

4/12

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

From: Ruland, William *WR*
To: Nakanishi, Tony; Ulses, Anthony
Subject: Re: My family in Japan is OK
Date: Saturday, March 12, 2011 12:36:20 PM

Glad to hear it!
Bill Ruland, from
USNRC Blackberry

From: Nakanishi, Tony
To: Ulses, Anthony; Ruland, William
Sent: Sat Mar 12 11:14:09 2011
Subject: My family in Japan is OK

Bill, Tony,
My sister just informed me that all of my family in the Sendai area are all okay.
Thank you for all your concern.
Tony N.

4/13

1

Huffert, Anthony

From: Huffert, Anthony
Sent: Saturday, March 12, 2011 9:13 AM
To: Gibson, Kathy
Subject: RE: ***NRC IS RESPONDING TO AN EMERGENCY OUTSIDE OF THE UNITED STATES**

My information would be outdated since 9 hours have past since I left the Ops Ctr - there was supposed to be a hi-level coordination meeting this morning among Federal agencies to discuss status and next steps. My understanding was that (projected) dose assessment information was to play a role in the information exchange.

From: Gibson, Kathy
Sent: Saturday, March 12, 2011 7:42 AM
To: Huffert, Anthony
Subject: Re: ***NRC IS RESPONDING TO AN EMERGENCY OUTSIDE OF THE UNITED STATES**

Thanks Tony. Do you have any information about the Japanese plants that you can share? Status of reactors and releases?

From: Huffert, Anthony
To: Gibson, Kathy
Cc: Scott, Michael; Bush-Goddard, Stephanie; Sheron, Brian
Sent: Sat Mar 12 07:39:20 2011
Subject: FW: ***NRC IS RESPONDING TO AN EMERGENCY OUTSIDE OF THE UNITED STATES**

Kathy,

Yesterday afternoon, I was directed to report to the Ops Center to fill the position of Dose Assessment Analyst for the Protective Measures Team. For this first shift, I was the only Dose Assessment Analyst and worked with members from other teams (no other PMT red team members). We completed all assigned tasks before handing off our work products to a second, more fully staffed, shift before midnight.

Past PMT training and exercise participation proved to be very useful.

Tony

From: Operations Center Bulletin
Sent: Friday, March 11, 2011 3:03 PM
To: Operations Center Bulletin
Subject: ***NRC IS RESPONDING TO AN EMERGENCY OUTSIDE OF THE UNITED STATES**

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No response to this message is required.

THIS IS NOT A DRILL

Kuritzky, Alan

From: Joe Colvin [president@ans.org]
Sent: Saturday, March 12, 2011 7:57 PM
To: Kuritzky, Alan
Subject: Update on Japan Situation
Attachments: ANS Japan Backgrounder.pdf

Dear ANS Members:

I'm sure you are aware of the rapidly developing situation in Japan. The ANS is working on multiple fronts to collect credible information on the incident, and distribute that information through mainstream and social media outlets.

We have communicated with our counterparts at the Atomic Energy Society of Japan to offer any technical or other assistance which may be of help.

We have set up a special page on the ANS blog (<http://ansnuclearcafe.org>) to aggregate media reports and provide additional information when we consider it to be credible.

We are also working to organize television appearances and other media availabilities for our members so that some of the misinformation that has been presented by anti-nuclear groups can be rebutted with facts. Our goal is not necessarily to be the first on the air, but to be the most credible.

Attached you will find some talking points, along with our current analysis of the sequence of events at Fukushima I-1. I encourage you to talk to your social networks to ensure that people have the right facts and the proper perspective on this incident.

Let me know what other actions our Society should be taking during this nuclear incident.

My thoughts and prayers go out to the people of Japan.

Respectfully,

Joe Colvin

American Nuclear Society Backgrounder: Japanese Earthquake/Tsunami; Problems with Nuclear Reactors

3/12/2011 5:22 PM EST

To begin, a sense of perspective is needed... right now, the Japanese earthquake/tsunami is clearly a catastrophe; the situation at impacted nuclear reactors is, in the words of IAEA, an "Accident with Local Consequences."

The Japanese earthquake and tsunami are natural catastrophes of historic proportions. The death toll is likely to be in the thousands. While the information is still not complete at this time, the tragic loss of life and destruction caused by the earthquake and tsunami will likely dwarf the damage caused by the problems associated with the impacted Japanese nuclear plants.

What happened?

Recognizing that information is still not complete due to the destruction of the communication infrastructure, producing reports that are conflicting, here is our best understanding of the sequence of events at the Fukushima I-1 power station.

- The plant was immediately shut down (scrammed) when the earthquake first hit. The automatic power system worked.
- All external power to the station was lost when the sea water swept away the power lines.
- Diesel generators started to provide backup electrical power to the plant's backup cooling system. The backup worked.
- The diesel generators ceased functioning after approximately one hour due to tsunami induced damage, reportedly to their fuel supply.
- An Isolation condenser was used to remove the decay heat from the shutdown reactor.
- Apparently the plant then experienced a small loss of coolant from the reactor.
- Reactor Core Isolation Cooling (RCIC) pumps, which operate on steam from the reactor, were used to replace reactor core water inventory, however, the battery-supplied control valves lost DC power after the prolonged use.
- DC power from batteries was consumed after approximately 8 hours.
- At that point, the plant experienced a complete blackout (no electric power at all).
- Hours passed as primary water inventory was lost and core degradation occurred (through some combination of zirconium oxidation and clad failure).

- Portable diesel generators were delivered to the plant site.
- AC power was restored allowing for a different backup pumping system to replace inventory in reactor pressure vessel (RPV).
- Pressure in the containment drywell rose as wetwell became hotter.
- The Drywell containment was vented to outside reactor building which surrounds the containment.
- Hydrogen produced from zirconium oxidation was vented from the containment into the reactor building.
- Hydrogen in reactor building exploded causing it to collapse around the containment.
- The containment around the reactor and RPV were reported to be intact.
- The decision was made to inject seawater into the RPV to continue to the cooling process, another backup system that was designed into the plant from inception.
- Radioactivity releases from operator initiated venting appear to be decreasing.

Can it happen here in the US?

- While there are risks associated with operating nuclear plants and other industrial facilities, the chances of an adverse event similar to what happened in Japan occurring in the US is small.
- Since September 11, 2001, additional safeguards and training have been put in place at US nuclear reactors which allow plant operators to cool the reactor core during an extended power outage and/or failure of backup generators – “blackout conditions.”

Is a nuclear reactor "meltdown" a catastrophic event?

- Not necessarily. Nuclear reactors are built with redundant safety systems. Even if the fuel in the reactor melts, the reactor's containment systems are designed to prevent the spread of radioactivity into the environment. Should an event like this occur, containing the radioactive materials could actually be considered a "success" given the scale of this natural disaster that had not been considered in the original design. The nuclear power industry will learn from this event, and redesign our facilities as needed to make them safer in the future.

What is the ANS doing?

ANS has reached out to The Atomic Energy Society of Japan (AESJ) to offer technical assistance.

ANS has established an incident communications response team.

This team has compiling relevant news reports and other publicly available information on the ANS blog, which can be found at ansnuclearcafe.org.

The team is also fielding media inquiries and providing reporters with background information and technical perspective as the events unfold.

Finally, the ANS is collecting information from publicly available sources, our sources in government agencies, and our sources on the ground in Japan, to better understand the extent and impact of the incident.

oMarksberry, Don

From: Joe Colvin [president@ans.org]
Sent: Saturday, March 12, 2011 8:08 PM
To: Marksberry, Don
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Respectfully,

Joe Colvin

4/16

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3/12/2011 5:22 PM EST

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- At that point, the plant experienced a complete blackout (no electric power at all).
- Hours passed as primary water inventory was lost and core degradation occurred (through some combination of zirconium oxidation and clad failure).

- Portable diesel generators were delivered to the plant site.
- AC power was restored allowing for a different backup pumping system to replace inventory in reactor pressure vessel (RPV).
- Pressure in the containment drywell rose as wetwell became hotter.
- The Drywell containment was vented to outside reactor building which surrounds the containment.
- Hydrogen produced from zirconium oxidation was vented from the containment into the reactor building.
- Hydrogen in reactor building exploded causing it to collapse around the containment.
- The containment around the reactor and RPV were reported to be intact.
- The decision was made to inject seawater into the RPV to continue to the cooling process, another backup system that was designed into the plant from inception.
- Radioactivity releases from operator initiated venting appear to be decreasing.

Can it happen here in the US?

- While there are risks associated with operating nuclear plants and other industrial facilities, the chances of an adverse event similar to what happened in Japan occurring in the US is small.
- Since September 11, 2001, additional safeguards and training have been put in place at US nuclear reactors which allow plant operators to cool the reactor core during an extended power outage and/or failure of backup generators – “blackout conditions.”

Is a nuclear reactor "meltdown" a catastrophic event?

- Not necessarily. Nuclear reactors are built with redundant safety systems. Even if the fuel in the reactor melts, the reactor's containment systems are designed to prevent the spread of radioactivity into the environment. Should an event like this occur, containing the radioactive materials could actually be considered a "success" given the scale of this natural disaster that had not been considered in the original design. The nuclear power industry will learn from this event, and redesign our facilities as needed to make them safer in the future.

What is the ANS doing?

ANS has reached out to The Atomic Energy Society of Japan (AESJ) to offer technical assistance.

ANS has established an incident communications response team.

This team has compiling relevant news reports and other publicly available information on the ANS blog, which can be found at ansnuclearcafe.org.

The team is also fielding media inquiries and providing reporters with background information and technical perspective as the events unfold.

Finally, the ANS is collecting information from publicly available sources, our sources in government agencies, and our sources on the ground in Japan, to better understand the extent and impact of the incident.

Scott, Michael

From: Joe Colvin [president@ans.org]
Sent: Saturday, March 12, 2011 8:45 PM
To: Scott, Michael
Subject: Update on Japan Situation
Attachments: ANS Japan Backgrounder.pdf

Dear ANS Members:

I'm sure you are aware of the rapidly developing situation in Japan. The ANS is working on multiple fronts to collect credible information on the incident, and distribute that information through mainstream and social media outlets.

We have communicated with our counterparts at the Atomic Energy Society of Japan to offer any technical or other assistance which may be of help.

We have set up a special page on the ANS blog (<http://ansnuclearcafe.org>) to aggregate media reports and provide additional information when we consider it to be credible.

We are also working to organize television appearances and other media availabilities for our members so that some of the misinformation that has been presented by anti-nuclear groups can be rebutted with facts. Our goal is not necessarily to be the first on the air, but to be the most credible.

Attached you will find some talking points, along with our current analysis of the sequence of events at Fukushima I-1. I encourage you to talk to your social networks to ensure that people have the right facts and the proper perspective on this incident.

Let me know what other actions our Society should be taking during this nuclear incident.

My thoughts and prayers go out to the people of Japan.

Respectfully,

Joe Colvin

American Nuclear Society Backgrounder: Japanese Earthquake/Tsunami; Problems with Nuclear Reactors

3/12/2011 5:22 PM EST

To begin, a sense of perspective is needed... right now, the Japanese earthquake/tsunami is clearly a catastrophe; the situation at impacted nuclear reactors is, in the words of IAEA, an "Accident with Local Consequences."

The Japanese earthquake and tsunami are natural catastrophes of historic proportions. The death toll is likely to be in the thousands. While the information is still not complete at this time, the tragic loss of life and destruction caused by the earthquake and tsunami will likely dwarf the damage caused by the problems associated with the impacted Japanese nuclear plants.

What happened?

Recognizing that information is still not complete due to the destruction of the communication infrastructure, producing reports that are conflicting, here is our best understanding of the sequence of events at the Fukushima I-1 power station.

- The plant was immediately shut down (scrammed) when the earthquake first hit. The automatic power system worked.
- All external power to the station was lost when the sea water swept away the power lines.
- Diesel generators started to provide backup electrical power to the plant's backup cooling system. The backup worked.
- The diesel generators ceased functioning after approximately one hour due to tsunami induced damage, reportedly to their fuel supply.
- An Isolation condenser was used to remove the decay heat from the shutdown reactor.
- Apparently the plant then experienced a small loss of coolant from the reactor.
- Reactor Core Isolation Cooling (RCIC) pumps, which operate on steam from the reactor, were used to replace reactor core water inventory, however, the battery-supplied control valves lost DC power after the prolonged use.
- DC power from batteries was consumed after approximately 8 hours.
- At that point, the plant experienced a complete blackout (no electric power at all).
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From: Operations Center Bulletin
To: OST02_HOC
Subject: NRC IS RESPONDING TO AN EMERGENCY OUTSIDE of the United States
Date: Saturday, March 12, 2011 4:21:13 PM

THIS IS NOT A DRILL.

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

Two important reminders:

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

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

No response to this message is required.

THIS IS NOT A DRILL

4/18

From: OST02 HOC
To: Dorman, Dan; Virgilio, Martin; Borchardt, Bill; Weber, Michael; Ross-Lee, MaryJane; Hurd, Sapna; Pope, Tia; Perin, Vanice; Anderson, James; Chen, Yen-Ju; Kotzalas, Margie; Frazier, Alan; Figueroa, Roberto; Larson, Emily; Crutchley, Mary Glenn; Blount, Tom; Tschiltz, Michael; McGinty, Tim; Franovich, Rani; Turtill, Richard; Smith, Theodore; Chazell, Russell; Reed, Elizabeth; Salter, Susan; Lising, Jason; Shane, Raeann; Dacus, Eugene; Schmidt, Rebecca; Droggitis, Spiros; Powell, Amy; Riley (OCA), Timothy; Foggie, Kirk; Ramsey, Jack; Emche, Danielle; Abrams, Charlotte; Schwartzman, Jennifer; Mamish, Nader; Smith, Brooke; Fragoyannis, Nancy; Chowdhury, Prosanta; Ashkeboussi, Nima; Foster, Jack; Lubinski, John; Brock, Kathryn; Tappert, John; Casto, Greg; Rosenberg, Stacey; Watson, Bruce; Hart, Michelle; Schmidt, Duane; Clement, Richard; Huffert, Anthony; Sun, Casper; Case, Michael; Skeen, David; Ruland, William; Hiland, Patrick; Brown, Frederick; Dudes, Laura; Rini, Brett; Morlang, Gary; Cheok, Michael; Circle, Jeff; Dube, Donald; Brown, Eva; Esmaili, Hossein; Kolb, Timothy; Norton, Charles; Isom, James; Bloom, Steven; Padovan, Mark; Williams, Joseph; Hart, Ken; Williams, Donna
Subject: TAC # for Japan Earthquake and Tsunami Drill
Date: Sunday, March 13, 2011 5:08:59 AM

If you have participated in the "Japan Earthquake and Tsunami Drill" that began today (Friday March 11, 2011), please be sure to apply your time spent on this activity to the TAC Number listed below:

D92374 – Incident Response: Japan Earthquake and Tsunami Drill

4/19

Huffert, Anthony

From: Huffert, Anthony
Sent: Sunday, March 13, 2011 11:15 AM
To: Scott, Michael
Subject: RE: ***NRC IS RESPONDING TO AN EMERGENCY OUTSIDE OF THE UNITED STATES**

Mike - Yes. I received a call from the Ops Center last night re: my continued support on Monday and/or Tuesday. I'm currently awaiting their decision - Tony

From: Scott, Michael
Sent: Saturday, March 12, 2011 6:02 PM
To: Huffert, Anthony; Gibson, Kathy
Cc: Bush-Goddard, Stephanie
Subject: RE: ***NRC IS RESPONDING TO AN EMERGENCY OUTSIDE OF THE UNITED STATES**

Tony:

Thanks for responding. Do they plan to call you back for another shift?

Mike

From: Huffert, Anthony
Sent: Saturday, March 12, 2011 7:39 AM
To: Gibson, Kathy
Cc: Scott, Michael; Bush-Goddard, Stephanie; Sheron, Brian
Subject: FW: ***NRC IS RESPONDING TO AN EMERGENCY OUTSIDE OF THE UNITED STATES**
Importance: High

Kathy,

Yesterday afternoon, I was directed to report to the Ops Center to fill the position of Dose Assessment Analyst for the Protective Measures Team. For this first shift, I was the only Dose Assessment Analyst and worked with members from other teams (no other PMT red team members). We completed all assigned tasks before handing off our work products to a second, more fully staffed, shift before midnight.

Past PMT training and exercise participation proved to be very useful.

Tony

From: Operations Center Bulletin
Sent: Friday, March 11, 2011 3:03 PM
To: Operations Center Bulletin
Subject: ***NRC IS RESPONDING TO AN EMERGENCY OUTSIDE OF THE UNITED STATES**

THIS IS NOT A DRILL.

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

4/20

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No response to this message is required.

THIS IS NOT A DRILL

From: HPS Headquarters [HPS@BurkInc.com]
Sent: Sunday, March 13, 2011 5:32 PM
To: Marksberry, Don
Subject: Japanese Nuclear Plant Problems Continue



Japanese Nuclear Plant Problems Continue

Current News (<http://hps.org/newsandevents/societynews.html>)

13 March 2011

Japanese Nuclear Plant Problems Continue

As you are well aware the Japanese experienced the worst earthquake in their history, followed by a devastating tsunami. These natural disasters have had a serious impact on several Japanese nuclear reactors, principally those at the Fukushima Daiichi site. Although the Health Physics Society has little expertise in nuclear power plant safety, we are concerned about radiation exposures associated with these reactor problems and desire to keep our members and the concerned public advised on current events associated with the Japanese nuclear plants. Consequently, we are recommending that the following sources of useful information. Although we cannot verify the accuracy of all the information that you may find, we believe these sources are generally reliable and trustworthy. As events unfold and the potential radiation exposures become better known, we hope to be able to share additional information with you regarding radiation safety.

- Nuclear Regulatory Commission (<http://www.nrc.gov/>),
- International Atomic Energy Agency (<http://www.iaea.org/>),
- World Health Organization (<http://www.who.int/en/>),
- American Nuclear Society (<http://www.new.ans.org/>),
- International Radiation Protection Association (<http://www.irpa.net/>),
- National Academy of Sciences (<http://www.nationalacademies.org/>),
- Nuclear Energy Agency (<http://www.oecd-nea.org/>) and
- Environmental Protection Agency (<http://www.epa.gov/>)

Additionally, you will find a Facebook icon on our home page that will direct you to the Health Physics Society News Café where we try to post the latest breaking news items, including ones pertinent to the Japanese nuclear situation.

3

Huffert, Anthony

From: Huffert, Anthony
Sent: Sunday, March 13, 2011 8:22 PM
To: Gibson, Kathy
Cc: Scott, Michael; Lewis, Doris; Tomon, John; Wach, Lisa; Wach, Lisa
Subject: FYI: THuffert @ NRC Ops Center 3-14-11

Kathy,

My next shift for the Protective Measures team is tomorrow, Monday the 14th, from 7:00 AM to 3:00 PM.

I'll ask John Tomon to cover the FSME Monday Morning meeting in my absence from HEB, and place Doris Lewis on cc to the email.

Tony

4/22

From: [Rudland, David](#)
To: [Stevens, Gary](#); [RES_DE_CIB](#); [Case, Michael](#); [Richards, Stuart](#)
Subject: RE: Japanese Nuclear Situation
Date: Monday, March 14, 2011 8:15:58 AM

Thanks Gary

I too have several Japanese friends that work for both JNES and Tokyo Gas. I have been in contact with all of them, and am happy to report that everyone is fine. They seem to be getting around by bicycle, and nothing else. Several of my Tokyo gas friends spent three full days without leaving the office, sleeping on the floor of their offices.

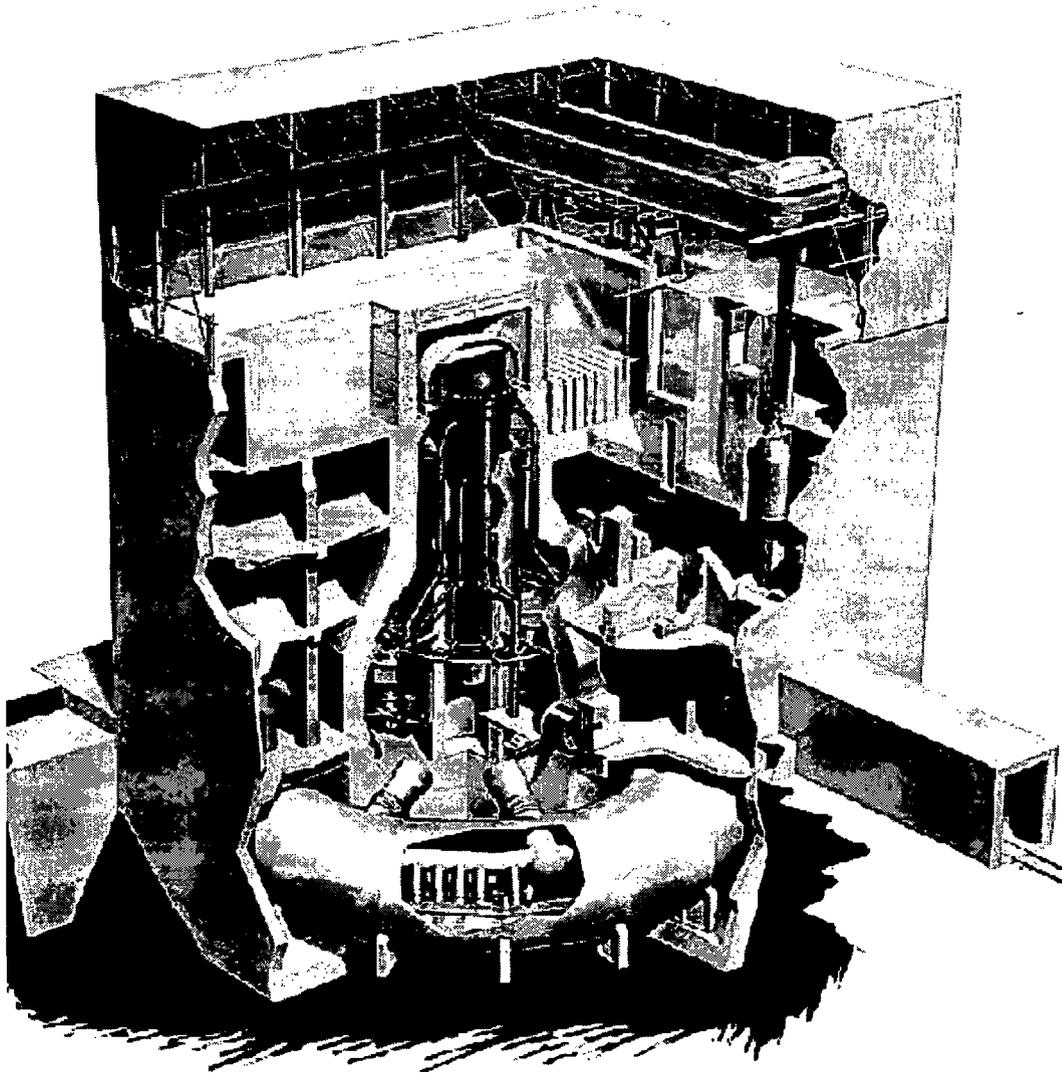
Dave

From: Stevens, Gary
Sent: Monday, March 14, 2011 7:56 AM
To: [RES_DE_CIB](#); [Case, Michael](#); [Richards, Stuart](#)
Subject: Japanese Nuclear Situation

Several folks have been asking me questions on this topic, so I thought I would share some facts with you from my background experience.

Amidst all of the sensationalizing and speculation coming out of Japan, below and attached is the first report I've seen that seems to contain some good rational facts from NEI and ANS about the Fukushima Unit 1 accident in Japan. Note that Fukushima Daiichi Unit 1 is a GE-designed BWR-3, RPV ID = 188", ~500 MWe, that has operated for about 40 years (entered service in 1971). The explosion you saw on TV was the reactor building (see below, top portion of building) due to hydrogen build-up, as explained in the attachment. The plant has a Mark I containment, which looks like this:

4/23



I have several friends in Japan from my days working at GE, some of whom were at the plant performing outage work. I am happy to report, based on an e-mail I received this a.m. containing correspondence from one of them, that GE's crew of about 40 engineers made it out of the area safely. Under a separate e-mail, I will share that first-hand report anonymously with you.

Gary L. Stevens
Senior Materials Engineer
NRC/RES/DE/CIB
✉ Gary.Stevens@nrc.gov
☎ 301-251-7569

March 13, 2011, 7 p.m. EDT Update

Fukushima Daiichi

The hydrogen explosion on March 11 between the primary containment vessel and secondary

containment building of the reactor did not damage the primary containment vessel or the reactor core. To control the pressure of the reactor core, TEPCO began to inject seawater and boric acid into the primary containment vessels of Unit 1 on March 12 and Unit 3 on March 13. There is likely some damage to the fuel rods contained in reactors 1 and 3.

At both reactors 1 and 3, seawater and boric acid is being injected into the reactor using fire pumps. On reactor 3, a pressure relief valve in the containment structure failed to open, but was restored by connecting an air pressure to the line driving valve operation.

The water level in the reactor vessel of reactor 2 reactor is steady.

Personnel from TEPCO are closely monitoring the status of all three reactors.

The highest recorded radiation level at the Fukushima Daiichi site was 155.7 millirem at 1:52 p.m. on March 13. Radiation levels were reduced to 4.4 millirem by the evening of March 13. The NRC's radiation dose limit for the public is 100 millirem per year.

Japanese government officials acknowledged the potential for partial fuel meltdowns at Fukushima Daiichi Unit 1 and 3 reactors, but there is no danger for core explosion, as occurred at the nuclear power station at Chernobyl in 1986. Control rods have been successfully inserted at all of the reactors, thereby ending the chain reaction. The reactor cores at Fukushima Daiichi and Daini power stations are surrounded by steel and concrete containment vessels of 40 to 80 inches thick that are designed to contain radioactive materials.

Fukushima Daini

The Fukushima Daini plants remains in a state of emergency. There is electricity available at all four of the reactors at Fukushima Daini, although there is limited availability of the cooling water pumps at reactors 1, 2 and 4.

TEPCO is working to maintain constant cooling in the primary containment vessels of those reactors. No radioactivity has been recorded outside of the secondary containment buildings at Fukushima Daini, according to TEPCO.

Two other nuclear power plants in the Tohoku region, Onagawa Nuclear Power Station and Tokai Nuclear Power Station, were automatically shut down in response to the earthquake. The four reactors at these plants have functioning cooling systems and are being monitored by plant operators.

The Rokkasho Reprocessing Plant and accompanying facilities, located far north of the tsunami zone in Rokkasho Town, is operating safely on backup power generation systems.

Japanese nuclear facilities are designed to withstand powerful seismic events, such as earthquakes. In this earthquake—the strongest recorded over the past 100 years in Japan—the containment structures of Fukushima Daiichi maintained their structural integrity. These facilities were designed to withstand tsunamis within a range of assumed strength, however the force of the tsunami on March 10 exceeded the assumed range and flooded diesel generators at Fukushima Daiichi power station. This precipitating the loss of power for the reactor cooling systems.

The automatic shutdown of the 11 operating reactors at the Onagawa Nuclear Power Station,

Tokai Nuclear Power Station, Fukushima Daiichi and Daini, represents a loss of 3.5% of electric generation capacity for Japan.

From: [Sheron, Brian](#)
To: [Gibson, Kathy](#); [Case, Michael](#); [Scott, Michael](#)
Cc: [Uhle, Jennifer](#); [Bonaccorso, Amy](#); [Flory, Shirley](#)
Subject: RE: Japanese Earthquake--Ops Center Request
Date: Monday, March 14, 2011 9:49:16 AM

Mike, did you pass on Trish's name to Kathryn?

From: Gibson, Kathy
Sent: Monday, March 14, 2011 8:46 AM
To: Case, Michael; Scott, Michael
Cc: Sheron, Brian; Uhle, Jennifer; Bonaccorso, Amy; Flory, Shirley
Subject: Re: Japanese Earthquake--Ops Center Request

The best person I know of is Trish Milligan in NSIR. Terry Brock should also have some information.

From: Case, Michael
To: Gibson, Kathy
Cc: Sheron, Brian; Uhle, Jennifer; Bonaccorso, Amy; Flory, Shirley
Sent: Mon Mar 14 08:41:08 2011
Subject: Japanese Earthquake--Ops Center Request

Hi Kathy. They are working on what if scenarios in the Ops Center. They are tasked to compare some of the dose assessment results on the Japanese plants to Chernobyl. They need someone or some information on dose results from Chernobyl. Who do you have to help? The request is specifically from Kathryn Brock on the PMT.

4/24

From: [Case, Michael](#)
To: [Lorette, Phillip](#)
Subject: FW: M8.9 NEAR THE EAST COAST OF HONSHU, JAPAN
Date: Monday, March 14, 2011 8:15:00 AM
Attachments: [ISSC Notification Report.pdf](#)

Please print including e-mail.

From: Kammerer, Annie
Sent: Friday, March 11, 2011 7:34 AM
To: RES_DE_SGSEB; Case, Michael; Richards, Stuart; Chokshi, Niles; Munson, Clifford; Karas, Rebecca; Markley, Michael; Manoly, Kamal; Sheron, Brian; Uhle, Jennifer; Cook, Christopher; Bagchi, Goutam; Khanna, Meena
Subject: FW: M8.9 NEAR THE EAST COAST OF HONSHU, JAPAN

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

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

The following New Earthquake occurred:

Location	NEAR THE EAST COAST OF HONSHU, JAPAN
Magnitude	8.9
Time	2011-03-11 06:46:23
Lat	38.322
Lon	142.369

ISSC ShakeCast Notification System
IAEA

=====

4/25

Magnitude 8.9 - NEAR THE EAST COAST OF HONSHU, JAPAN

Version 4

Time: 2011-03-11 05:46:23 GMT

Created: 2011-03-11 09:37:54 GMT

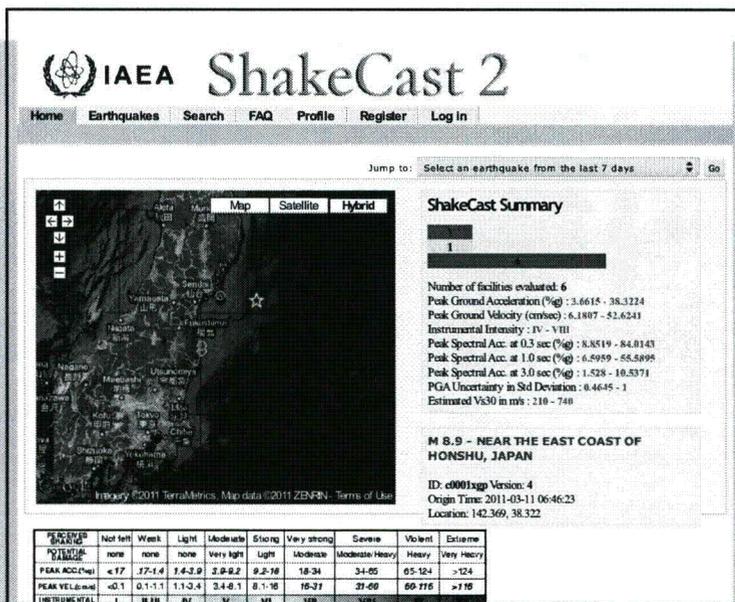
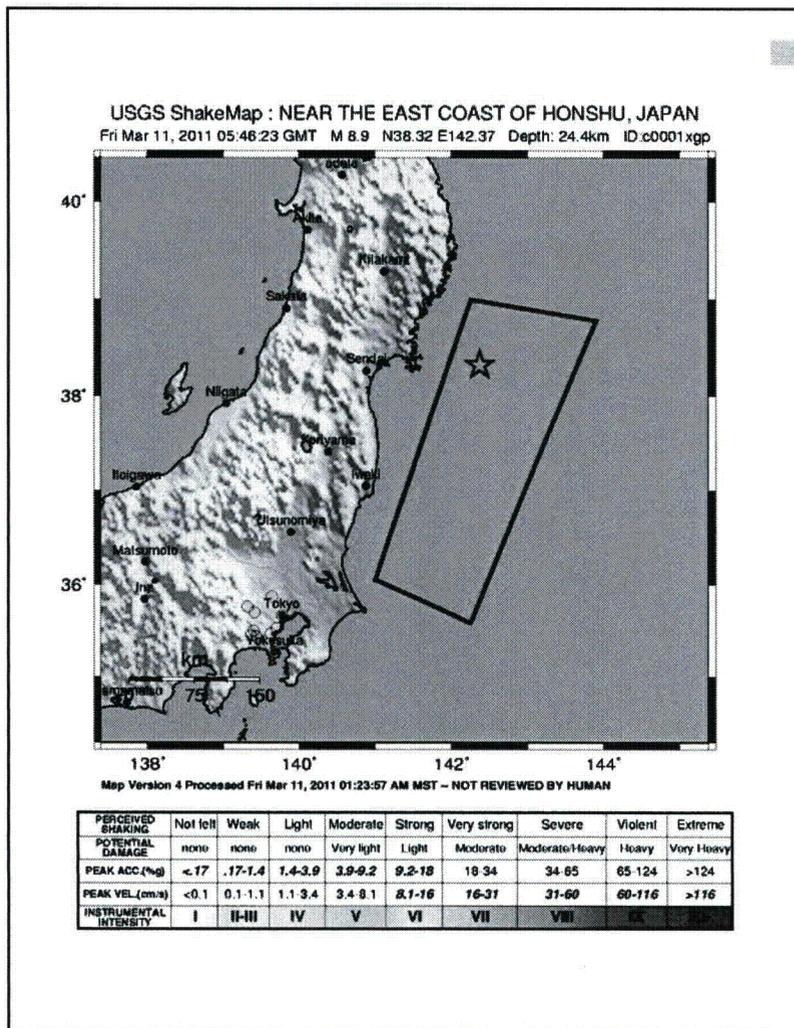
Location: 38.32 N/ 142.37 E

For more information and latest version see

Depth: 24.4 km

<http://earthquake.usgs.gov/shakemap>

These results are from an automated system and users should consider the preliminary nature of this information when making decisions relating to public safety. ShakeCast results are often updated as additional or more accurate earthquake information is reported or derived.



Recent significant earthquakes in the region

- M7.7 Miyagi-Oki, Japan at 6/12/1978 8:14
- M7.4 NEAR THE EAST COAST OF HONSHU, JAPAN at 11/1/1989 18:25
- M7.2 Miyagi-Oki, Japan at 8/16/2005 2:46
- M7 NEAR THE EAST COAST OF HONSHU, JAPAN at 1/18/1981 18:11
- M7 Miyagi-Oki, Japan at 5/26/2003 9:24

FACILITY TYPE	FACILITY ID	FACILITY NAME	LATITUDE	LONGITUDE	DAMAGE LEVEL	MMI	PGA	PGV	PSA03	PSA10	PSA30
NPP	JPN1	Fukushima Daiichi	37.4215	141.034	RED	7.72	25.8708	35.5119	57.8466	37.5128	7.4042
NPP	JPN2	Fukushima Daini	37.3163	141.025	RED	7.76	26.6768	36.4785	59.5783	38.5339	7.5874
NPP	JPN10	Onagawa	38.3998	141.501	RED	7.34	23.483	27.6412	52.4778	29.1987	5.7565
NPP	JPN4	Hamaoka	34.6242	138.14	GREEN	4.96	6.5016	10.322	15.3754	10.9036	2.4143
NPP	JPN7	Kashiwazaki - Kariwa	37.4317	138.598	YELLOW	5.53	8.5166	13.0735	19.9327	13.8102	2.9935
NPP	JPN15	Tokai	36.4654	140.607	RED	7.72	25.8298	35.4623	57.7583	37.4606	7.3948

* - MMI level extends beyond map boundary, actual population exposure may be much larger
 ** - Some facilities may not appear on the map due to space restriction

From: [Case, Michael](#)
To: N.Tricot@iaea.org
Cc: [Rini, Brett](#)
Subject: DS-367 on Safety Classification
Date: Monday, March 14, 2011 10:29:00 AM

Dear Mr. Tricot.

Thanks for calling last Friday. I've been involved in our agency's response to the Japanese earthquake so I apologize for not being able to get back to you yet. I'm eager to speak with you so we can work together on completing DS 367. Could you be so kind as to send me your number again so I can give an initial call when I get a break? Thanks. Looking forward to working with you on this.

Best regards,

Mike Case.

4/26

From: [Case, Michael](#)
To: [Murphy, Andrew](#)
Subject: FW: ANS Japan Backgrounder
Date: Monday, March 14, 2011 7:33:00 AM
Attachments: [ANS Japan Backgrounder.pdf](#)

Can't remember if I sent it or not.

From: Csontos, Aladar
Sent: Sunday, March 13, 2011 9:45 PM
To: Case, Michael; Richards, Stuart; Tregoning, Robert
Subject: ANS Japan Backgrounder

I know you probably already know or got this, but, it's a nice synopsis of the Japan events.

Aladar A. Csontos, Ph.D
Chief, Component Integrity Branch
Division of Engineering
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
21 Church Street M/S 0507M
Rockville, MD 20852

Office: (301) 251-7640
Fax: (301) 251-7425
Email: aladar.csontos@nrc.gov

4/27

American Nuclear Society Backgrounder: Japanese Earthquake/Tsunami; Problems with Nuclear Reactors

3/12/2011 5:22 PM EST

To begin, a sense of perspective is needed... right now, the Japanese earthquake/tsunami is clearly a catastrophe; the situation at impacted nuclear reactors is, in the words of IAEA, an "Accident with Local Consequences."

The Japanese earthquake and tsunami are natural catastrophes of historic proportions. The death toll is likely to be in the thousands. While the information is still not complete at this time, the tragic loss of life and destruction caused by the earthquake and tsunami will likely dwarf the damage caused by the problems associated with the impacted Japanese nuclear plants.

What happened?

Recognizing that information is still not complete due to the destruction of the communication infrastructure, producing reports that are conflicting, here is our best understanding of the sequence of events at the Fukushima I-1 power station.

- The plant was immediately shut down (scrammed) when the earthquake first hit. The automatic power system worked.
- All external power to the station was lost when the sea water swept away the power lines.
- Diesel generators started to provide backup electrical power to the plant's backup cooling system. The backup worked.
- The diesel generators ceased functioning after approximately one hour due to tsunami induced damage, reportedly to their fuel supply.
- An Isolation condenser was used to remove the decay heat from the shutdown reactor.
- Apparently the plant then experienced a small loss of coolant from the reactor.
- Reactor Core Isolation Cooling (RCIC) pumps, which operate on steam from the reactor, were used to replace reactor core water inventory, however, the battery-supplied control valves lost DC power after the prolonged use.
- DC power from batteries was consumed after approximately 8 hours.
- At that point, the plant experienced a complete blackout (no electric power at all).
- Hours passed as primary water inventory was lost and core degradation occurred (through some combination of zirconium oxidation and clad failure).

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- AC power was restored allowing for a different backup pumping system to replace inventory in reactor pressure vessel (RPV).
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- The decision was made to inject seawater into the RPV to continue to the cooling process, another backup system that was designed into the plant from inception.
- Radioactivity releases from operator initiated venting appear to be decreasing.

Can it happen here in the US?

- While there are risks associated with operating nuclear plants and other industrial facilities, the chances of an adverse event similar to what happened in Japan occurring in the US is small.
- Since September 11, 2001, additional safeguards and training have been put in place at US nuclear reactors which allow plant operators to cool the reactor core during an extended power outage and/or failure of backup generators – “blackout conditions.”

Is a nuclear reactor "meltdown" a catastrophic event?

- Not necessarily. Nuclear reactors are built with redundant safety systems. Even if the fuel in the reactor melts, the reactor's containment systems are designed to prevent the spread of radioactivity into the environment. Should an event like this occur, containing the radioactive materials could actually be considered a "success" given the scale of this natural disaster that had not been considered in the original design. The nuclear power industry will learn from this event, and redesign our facilities as needed to make them safer in the future.

What is the ANS doing?

ANS has reached out to The Atomic Energy Society of Japan (AESJ) to offer technical assistance.

ANS has established an incident communications response team.

This team has compiling relevant news reports and other publicly available information on the ANS blog, which can be found at ansnuclearcafe.org.

The team is also fielding media inquiries and providing reporters with background information and technical perspective as the events unfold.

Finally, the ANS is collecting information from publicly available sources, our sources in government agencies, and our sources on the ground in Japan, to better understand the extent and impact of the incident.

From: Case, Michael
To: Csontos, Aladar; Richards, Stuart; Tregoning, Robert
Subject: RE: ANS Japan Backgrounder
Date: Monday, March 14, 2011 6:42:00 AM

You're right. Pretty nice.

From: Csontos, Aladar
Sent: Sunday, March 13, 2011 9:45 PM
To: Case, Michael; Richards, Stuart; Tregoning, Robert
Subject: ANS Japan Backgrounder

I know you probably already know or got this, but, it's a nice synopsis of the Japan events.

Aladar A. Csontos, Ph.D
Chief, Component Integrity Branch
Division of Engineering
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
21 Church Street M/S 0507M
Rockville, MD 20852

Office: (301) 251-7640
Fax: (301) 251-7425
Email: aladar.csontos@nrc.gov

4/28

American Nuclear Society Backgrounder: Japanese Earthquake/Tsunami; Problems with Nuclear Reactors

3/12/2011 5:22 PM EST

To begin, a sense of perspective is needed... right now, the Japanese earthquake/tsunami is clearly a catastrophe; the situation at impacted nuclear reactors is, in the words of IAEA, an "Accident with Local Consequences."

The Japanese earthquake and tsunami are natural catastrophes of historic proportions. The death toll is likely to be in the thousands. While the information is still not complete at this time, the tragic loss of life and destruction caused by the earthquake and tsunami will likely dwarf the damage caused by the problems associated with the impacted Japanese nuclear plants.

What happened?

Recognizing that information is still not complete due to the destruction of the communication infrastructure, producing reports that are conflicting, here is our best understanding of the sequence of events at the Fukushima I-1 power station.

- The plant was immediately shut down (scrammed) when the earthquake first hit. The automatic power system worked.
- All external power to the station was lost when the sea water swept away the power lines.
- Diesel generators started to provide backup electrical power to the plant's backup cooling system. The backup worked.
- The diesel generators ceased functioning after approximately one hour due to tsunami induced damage, reportedly to their fuel supply.
- An Isolation condenser was used to remove the decay heat from the shutdown reactor.
- Apparently the plant then experienced a small loss of coolant from the reactor.
- Reactor Core Isolation Cooling (RCIC) pumps, which operate on steam from the reactor, were used to replace reactor core water inventory, however, the battery-supplied control valves lost DC power after the prolonged use.
- DC power from batteries was consumed after approximately 8 hours.
- At that point, the plant experienced a complete blackout (no electric power at all).
- Hours passed as primary water inventory was lost and core degradation occurred (through some combination of zirconium oxidation and clad failure).

- Portable diesel generators were delivered to the plant site.
- AC power was restored allowing for a different backup pumping system to replace inventory in reactor pressure vessel (RPV).
- Pressure in the containment drywell rose as wetwell became hotter.
- The Drywell containment was vented to outside reactor building which surrounds the containment.
- Hydrogen produced from zirconium oxidation was vented from the containment into the reactor building.
- Hydrogen in reactor building exploded causing it to collapse around the containment.
- The containment around the reactor and RPV were reported to be intact.
- The decision was made to inject seawater into the RPV to continue to the cooling process, another backup system that was designed into the plant from inception.
- Radioactivity releases from operator initiated venting appear to be decreasing.

Can it happen here in the US?

- While there are risks associated with operating nuclear plants and other industrial facilities, the chances of an adverse event similar to what happened in Japan occurring in the US is small.
- Since September 11, 2001, additional safeguards and training have been put in place at US nuclear reactors which allow plant operators to cool the reactor core during an extended power outage and/or failure of backup generators – “blackout conditions.”

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From: [Kammerer, Annie](#)
To: [Sheron, Brian](#); [Case, Michael](#); [Richards, Stuart](#); [Ake, Jon](#); [Murphy, Andrew](#)
Cc: [Weber, Michael](#)
Subject: RE: Seismic regulations summarization
Date: Thursday, March 17, 2011 9:45:25 PM

Will do.

From: Sheron, Brian
Sent: Thursday, March 17, 2011 8:28 PM
To: Kammerer, Annie; Case, Michael; Richards, Stuart; Ake, Jon; Murphy, Andrew
Cc: Weber, Michael
Subject: RE: Seismic regulations summarization

OK. Can you e-mail Pete Lyons early tomorrow and let him know that the one-pager will be coming but it will be around COB.

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

I have sent the Q&As.

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

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

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

Cheers,
Annie

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

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

Remember, he is just looking for a high level summary sufficient to answer likely questions he might get

4/29

during the interviews.

2.) Can you please e-mail the latest version of your seismic Q&As to Mike Weber.

Thanks.

From: Case, Michael
To: Sheron, Brian
Subject: FW: Neutron Absorber Testing Issues
Date: Monday, March 14, 2011 7:34:00 AM

FYI

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

From: Case, Michael
Sent: Monday, March 14, 2011 7:33 AM
To: Harris, Charles; Richards, Stuart
Subject: RE: Neutron Absorber Testing Issues

Thanks for the feedback Charlie. As you know, Stu is out this week. Mirela has some great insights in doing research work and shares the same high safety ethic that you have. Our short term objective is to get NRR a focused (and reasonably high quality for this stage) document on this issue.

I'll be a little crazy this week with all the Japanese earthquake items, but let's set a target for a progress update at the end of this week.

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

From: Harris, Charles
Sent: Friday, March 11, 2011 9:24 PM
To: Richards, Stuart
Cc: Case, Michael
Subject: RE: Neutron Absorber Testing Issues

Stu,

I think you completely missed my concerns.

The mini-Pirt was being arranged on January 15th, to begin on January 31st.

My issue is that Mirela has delayed this mini-Pirt needlessly from February 1st until March 16th or later. I most strongly disagree that a 45 day delay on a significant safety issue, for no important reason, is a satisfactory pace for work to proceed.

I am the principle investigator, and originator of the entire issue; no one has discussed a single item with me in the past 45 days. My NRR colleagues were informed to "stop looking at my writing", pending Mirela's "blessing." That is not a collaborative safety atmosphere.

Also, no one has seen my latest draft which has been revised twice since February 15th, so I have no idea how my draft can be delivered to anyone on before March 16th, and I have no idea what is being delivered, such as the other relevant information, nor by whom it will be delivered.

Charles

From: Richards, Stuart
Sent: Friday, March 11, 2011 4:48 PM
To: Harris, Charles
Cc: Case, Michael
Subject: Neutron Absorber Testing Issues

Charles

4/30

I came by to talk with you, however it appears that you are out of the office today. I'm on annual leave next week, so I want to update you on the neutron absorber testing issues which we discussed this week. First, I appreciate the open discussion we had on the issues, and the information you provided me. I read the draft evaluation which you gave me, and the other materials. I agree that you raise technical issues that need to be resolved.

I spoke with Mirela and my understanding is that your draft evaluation, along with other related information, will be provided to Rob Taylor by e-mail before a meeting scheduled to occur on Wednesday, March 16th. The status of our work will be discussed at the Wednesday meeting. Of course you are invited to attend and participate in the discussion, if your duties with your rotation allow.

I am comfortable with the pace with which the work is proceeding. I understand that the issues were discussed with NRR during the training session in mid-February, so they are aware of the concerns. I believe NRR plans to conduct a "mini-PIRT" after they receive our input.

I'll be glad to discuss this in more detail with you when I return.

Thanks
Stu

From: [Gavrilas, Mirela](#)
To: [Case, Michael](#)
Subject: Re: Assessment of cooling requirements for Fukushima units 1-3
Date: Monday, March 14, 2011 2:53:06 PM

These are real severe accident folk.

From: Case, Michael
To: Gavrilas, Mirela; Gibson, Kathy
Sent: Mon Mar 14 14:52:05 2011
Subject: RE: Assessment of cooling requirements for Fukushima units 1-3

Thanks. That's actually very helpful to me.

From: Gavrilas, Mirela
Sent: Monday, March 14, 2011 2:37 PM
To: Case, Michael; Gibson, Kathy
Subject: Fw: Assessment of cooling requirements for Fukushima units 1-3

From: Farmer, Mitchell T. <farmer@anl.gov>
To: Tinkler, Charles; Basu, Sudhamay; Lee, Richard; Gavrilas, Mirela
Sent: Mon Mar 14 14:31:28 2011
Subject: FW: Assessment of cooling requirements for Fukushima units 1-3

FYI.
Mitch

itchell T.
rched 14, 2011 1:22 PM
stopher; Khalil, Hussein S.; Peters, Mark T.; Sattelberger, Alfred P.
e.wisc.edu'; Seidensticker, Ralph W.
sessment of cooling requirements for Fukushima units 1-3

All,

I did a few back of the envelope calculations to scope out what the cooling requirements will be at Fukushima units 1-3 in the event that they are not able to reestablish power to the site and, thereby, normal cooling functions at these plants.

The limited information I have suggests that they are supplying 30 MT/hour of seawater to unit 1, and so I'll assume that the same is currently going to units 2 and 3. To put this in perspective, that amount of cooling flow can remove 2.8 MW while remaining subcooled at atmospheric conditions, and up to 21.7 MW if this amount of water is completely boiled off. Ideally, you would like to get to subcooled outlet core conditions so you'll stop forming steam and then you can stop the venting that is causing concern right now.

That amount of heat removal needs to be compared to the decay heat levels in these reactors to determine when subcooled conditions can be reached. Unit 1 was 460 Mwe and Units 2- 3 were 784 Mwe per Chris's previous email. Thus, I estimate the thermal power levels of these reactors to be 1200 MWt and 2000 MWt, respectively. After three days (or currently), the power level for a U core would fall to about 0.4 % assuming that the reactors had operated for 200 full-power days before the earthquake (a little higher for the MOX core but I don't have data to assess that). Thus, decay heat in

4/31

Unit 1 is now about 4.8 MW and for Units 2/3 it's about 8 MWt. Thus, I suspect they're still venting steam at all three units. I then looked at the times when the decay heat will fall below the level at which subcooling can be achieved (ie 2.8 MWt core decay heat level) and for unit 1 that is 6 days total (ie 3 days from now) and for units 2 and 3 it will be about 16 days (ie 13 more days).

This is a worst case scenario that assumes they can't get electricit back to the site and establish normal cooling function; ie they have to rely on sea water injection. Also, I assumed 200 full power days; the power level could be less or a little more if I overestimated/understimated operation times.

As far as coolability of the degraded cores, my opinion is that units 1 and 3 are in coolable configurations; it's been 3 days now and if the configuraiton was not coolable the material most likely would have failed the reactor pressure vessel. I guess the jury is still out on Unit 2; I think the entire core has gone dry at least once. The good news is that the decay heat is way down from what it was a few hours after the accident was initiated.

Mitch

From: [Murphy, Andrew](#)
To: [Kammerer, Annie](#); [Case, Michael](#); [Skeen, David](#); [Hiland, Patrick](#)
Cc: [Pires, Jose](#); [Hogan, Rosemary](#); [Sheron, Brian](#); [Uhle, Jennifer](#)
Subject: RE: Japanese Earthquake Questions
Date: Monday, March 14, 2011 3:10:52 PM

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

Andy

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

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

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

What kind of experts do you have?

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

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

4/32

From: [Hiland, Patrick](#)
To: [Case, Michael](#); [Skeen, David](#); [McDermott, Brian](#)
Cc: [Murphy, Andrew](#); [Pires, Jose](#); [Kammerer, Annie](#); [Hogan, Rosemary](#); [Sheron, Brian](#); [Uhle, Jennifer](#)
Subject: RE: Japanese Earthquake Questions
Date: Monday, March 14, 2011 8:13:45 AM

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

From: Case, Michael
Sent: Monday, March 14, 2011 7:51 AM
To: Skeen, David; Hiland, Patrick
Cc: Murphy, Andrew; Pires, Jose; Kammerer, Annie; Hogan, Rosemary; Sheron, Brian; Uhle, Jennifer
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4/33

From: [Case, Michael](#)
To: [Kammerer, Annie](#)
Subject: RE: Japanese Earthquake Questions
Date: Monday, March 14, 2011 2:25:00 PM

Hi Annie. Yes you can get help. My experts are just the RES staff over here.

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

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Kuritzky, Alan

From: Joe Colvin [president@ans.org]
Sent: Monday, March 14, 2011 1:06 AM
To: Kuritzky, Alan
Subject: Talking Points on Implications of Fukushima Accident to U.S. Nuclear Plants
Attachments: ANS Talking Points - 2011-03-13 R1_2.pdf

Dear ANS Members:

Over the last two days, the ANS Crisis Communications team has been very proactive and has handled a multitude of media and press calls. ANS spokespersons have participated in national television, radio and press interviews providing the views of the nuclear science and technology experts within the Society. We are particularly grateful to Dr. Dale Klein who has given tremendous support to the Society and the public in response to the events at Fukushima.

We have begun fielding media inquiries about the implications of the problems at Fukushima on the US program. We have prepared the attached talking points to assist responders to this line of questions. The talking points are consistent with the talking points prepared by the Nuclear Energy Institute (NEI) on the same subject.

Thank you all for your strong support!

Joe

The predominance of ANS members reside in the U.S. As we interact with our family, neighbors and citizens in our communities many questions will come based on news coverage of the nuclear power plant situation in Japan. These talking points key on the theme 'could it happen in the U.S.?' *

ANS Member Talking Points

Implications to U.S. nuclear energy program from the Japanese earthquake

It is premature for the technical community to draw conclusions from the earthquake and tsunami tragedy in Japan with regard to the U.S. nuclear energy program. Many opposed to nuclear power will try to use this event to call for changes in the U.S. Japan is facing beyond a "worst case" disaster since we, the technical community, did not hypothesize an event of this magnitude. Thus far, even the most seriously damaged of Japan's 54 reactors have not released radiation at levels that would harm the public. That is testament to the way professionals in our profession operate: our philosophy of defense in-depth, excellent designs, high standards of construction, conduct of operations, and most important the effectiveness of employees in following emergency preparedness planning.

The Nuclear Science and Technology (NS&T) community takes very seriously our commitment to safe operation of any nuclear facility and will incorporate lessons learned based on this experience into our safety and operating procedures. The ANS will facilitate the sharing of technical information so that these lessons receive wide distribution and be archived for future stewards of this technology. Some points to remember from this week:

- Nuclear power plants have proven their value to society in Japan, the United States and elsewhere. They provide large amounts of base load electricity on an around-the-clock basis, and they do so cost-effectively with the lowest electricity production costs of any large energy source. Both Japan and the United States have benefited greatly from nuclear energy; it has been instrumental in the nations' economic success over the past half century and their high standard of living.
- Our hallmark as a NS&T organization is to incorporate operating experience and lessons learned. When we fully understand the facts surrounding the event in Japan, we will share, document and use those insights to make NS&T even safer.
- Nuclear energy has been and will continue to be a key element in meeting America's energy needs. The nuclear industry sets the highest standards for safety and, through our focus on continuous learning, we will incorporate lessons learned from the events in Japan. The dominant factors determining technology used for new generation will be demand for new generation, the competitiveness of nuclear energy in comparison with other sources of electricity generation, and the continued safe operation of U.S. nuclear power plants.

- There has not been a rush to judgment on the part of U.S. policymakers during the first few days of this situation. We believe that is due in part to the recognition on their part that nuclear energy must continue to play a key role in a diversified energy portfolio that strengthens U.S. energy security and fuels economic growth.

* The genesis of this document is the NEI "Talking Points - Implications to U.S. nuclear energy program of the Japanese earthquake" dated March 13, 2011

Marksberry, Don

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Sent: Monday, March 14, 2011 1:20 AM
To: Marksberry, Don
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4/36

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Scott, Michael

From: Scott, Michael
Sent: Monday, March 14, 2011 7:48 AM
To: RES_DSA
Subject: Japan's Nuclear Plant Status

Good morning.

I know you have heard a lot in the press about the challenging situation for the reactors in Japan nearby last week's quake. NRC does not post status on these reactors. A good clearinghouse for information on the status of the Japanese reactors can be found on the website of the American Nuclear Society at:

<http://ansnuclearcafe.org/>

At least one of the DSA staff (Tony Huffert) has been called in as the NRC Command Center has been partially stood up to provide whatever support we can to Japan. It is possible more of us will be tapped as the event progresses. I'm sure we all share concern about this event and its impacts, and want to do all we can to help.

Mike

Scott, Michael

From: Scott, Michael
Sent: Monday, March 14, 2011 8:08 AM
To: RES_DSA
Subject: FW: FYI - Japan Situation
Attachments: ANS Japan Backgrounder.pdf

More info courtesy of Stu Rubin.

From: Rubin, Stuart
Sent: Sunday, March 13, 2011 11:23 PM
To: Gibson, Kathy; Scott, Michael
Subject: FW: FYI - Japan Situation

FYI

From: Inn Seock Kim [<mailto:isk@issatechinc.com>]
Sent: Saturday, March 12, 2011 11:35 PM
Subject: FYI - Japan Situation

FYI -

(1) Most Likely Accident Scenario at Fukushima Dai-ichi Unit 1 (as of noon 3/13, Korea time)

See attached (from Joe Colvin of ANS).

(2) Fukushima Dai-ichi Unit 1 reactor schematic

<http://www.beyondnuclear.org/home/2011/3/12/fukushima-dai-ichi-unit-1-reactor-schematic.html>

(3) BWR Info

<http://holbert.faculty.asu.edu/eee463/NUCLEAR.HTML>

<http://www.iaea.org/NuclearPower/Downloads/Simulators/Conventional.BWR.Manual.2009-10-05.pdf>

(4) Latest Updated Info on All Japanese NPPs

<http://www.nisa.meti.go.jp/english/index.html>

<http://ansnuclearcafe.org>

<http://www.google.com/crisisresponse/japanquake2011.html>

Best regards,

4/38

ISK

--

*Inn Seock Kim, PhD, President
ISSA Technology, Inc.
Maryland, USA*

American Nuclear Society Backgrounder: Japanese Earthquake/Tsunami; Problems with Nuclear Reactors

3/12/2011 5:22 PM EST

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- The plant was immediately shut down (scrammed) when the earthquake first hit. The automatic power system worked.
- All external power to the station was lost when the sea water swept away the power lines.
- Diesel generators started to provide backup electrical power to the plant's backup cooling system. The backup worked.
- The diesel generators ceased functioning after approximately one hour due to tsunami induced damage, reportedly to their fuel supply.
- An Isolation condenser was used to remove the decay heat from the shutdown reactor.
- Apparently the plant then experienced a small loss of coolant from the reactor.
- Reactor Core Isolation Cooling (RCIC) pumps, which operate on steam from the reactor, were used to replace reactor core water inventory, however, the battery-supplied control valves lost DC power after the prolonged use.
- DC power from batteries was consumed after approximately 8 hours.
- At that point, the plant experienced a complete blackout (no electric power at all).
- Hours passed as primary water inventory was lost and core degradation occurred (through some combination of zirconium oxidation and clad failure).

- Portable diesel generators were delivered to the plant site.
- AC power was restored allowing for a different backup pumping system to replace inventory in reactor pressure vessel (RPV).
- Pressure in the containment drywell rose as wetwell became hotter.
- *The Drywell containment was vented to outside reactor building which surrounds the containment.*
- Hydrogen produced from zirconium oxidation was vented from the containment into the reactor building.
- Hydrogen in reactor building exploded causing it to collapse around the containment.
- The containment around the reactor and RPV were reported to be intact.
- The decision was made to inject seawater into the RPV to continue to the cooling process, another backup system that was designed into the plant from inception.
- Radioactivity releases from operator initiated venting appear to be decreasing.

Can it happen here in the US?

- While there are risks associated with operating nuclear plants and other industrial facilities, the chances of an adverse event similar to what happened in Japan occurring in the US is small.
- Since September 11, 2001, additional safeguards and training have been put in place at US nuclear reactors which allow plant operators to cool the reactor core during an extended power outage and/or failure of backup generators – “blackout conditions.”

Is a nuclear reactor "meltdown" a catastrophic event?

- Not necessarily. Nuclear reactors are built with redundant safety systems. Even if the fuel in the reactor melts, the reactor's containment systems are designed to prevent the spread of radioactivity into the environment. Should an event like this occur, containing the radioactive materials could actually be considered a "success" given the scale of this natural disaster that had not been considered in the original design. The nuclear power industry will learn from this event, and redesign our facilities as needed to make them safer in the future.

What is the ANS doing?

ANS has reached out to The Atomic Energy Society of Japan (AESJ) to offer technical assistance.

ANS has established an incident communications response team.

This team has compiling relevant news reports and other publicly available information on the ANS blog, which can be found at ansnuclearcafe.org.

The team is also fielding media inquiries and providing reporters with background information and technical perspective as the events unfold.

Finally, the ANS is collecting information from publicly available sources, our sources in government agencies, and our sources on the ground in Japan, to better understand the extent and impact of the incident.

From: Cullingford, Michael *INCR*
To: Leeds, Eric; Boger, Bruce; Grobe, Jack; Grobe, Jack; McGinty, Tim; Ruland, William; Lubinski, John; Cheok, Michael; Holian, Brian; Brown, Frederick; Giitter, Joseph; Hiland, Patrick
Subject: FW: Seismic Damage Information News Release in English
Date: Monday, March 14, 2011 8:35:46 AM
Importance: High

fyi

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

From: tomita-kazuhide@jnes.go.jp [<mailto:tomita-kazuhide@jnes.go.jp>]
Sent: Monday, March 14, 2011 12:58 AM
To: tomita-kazuhide@jnes.go.jp
Subject: Seismic Damage Information News Release in English
Importance: High

Dear All

Please find the NISA News Release in English from the NISA HP web as shown below.

<http://www.nisa.meti.go.jp/english/index.html>

This is the best way you could obtain the quick official release on the Seismic Damage Information from Japan.

Sincerely Yours,

Kazuhide TOMITA (Mr.)
Assistant Director-General
Office of International Programs
Japan Nuclear Energy Safety Organization (JNES)
3-17-1, Toranomon, Minato-ku, Tokyo, 105-0001, JAPAN
Tel: +81-3-4511-1910
Fax: +81-3-4511-1998
E-mail: tomita-kazuhide@jnes.go.jp

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Kuritzky, Alan

From: Appignani, Peter
Sent: Monday, March 14, 2011 12:13 PM
To: Bone, Alysia; Coyne, Kevin; Gonzalez, Michelle; Helton, Donald; Kuritzky, Alan; Leschek, Walter; Nelson-Wilson, Carlyleamaryllis; ONeal, Daniel; Sancaktar, Selim; Tobin, Margaret; Wood, Jeffery
Subject: FW: Seismic Damage Information News Release in English
Importance: High

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

From: Salley, MarkHenry
Sent: Monday, March 14, 2011 11:54 AM
To: Hartz, J.; Appignani, Peter; Stutzke, Martin; McGrattan, Kevin B. Dr.; Stroup, David; Woods, Hugh; Hill, Kendra; Hyslop, JS; Taylor, Gabriel; Melly, Nicholas; Gonzalez, Felix
Cc: Tony; Jose L. Torero; 'Sanderson, Iain'
Subject: FW: Seismic Damage Information News Release in English
Importance: High

FYI ~ This is the Official News releases from Japan's NRC

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

From: tomita-kazuhide@jnes.go.jp [<mailto:tomita-kazuhide@jnes.go.jp>]
Sent: Monday, March 14, 2011 12:58 AM
To: tomita-kazuhide@jnes.go.jp
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Kazuhide TOMITA (Mr.)
Assistant Director-General
Office of International Programs
Japan Nuclear Energy Safety Organization (JNES) 3-17-1, Toranomon, Minato-ku, Tokyo, 105-0001, JAPAN
Tel: +81-3-4511-1910
Fax: +81-3-4511-1998
E-mail: tomita-kazuhide@jnes.go.jp

Kuritzky, Alan

From: Coyne, Kevin
Sent: Monday, March 14, 2011 2:03 PM
To: Uhle, Jennifer
Cc: Johnson, Michael; Stutzke, Martin; Helton, Donald; Kuritzky, Alan
Subject: RE: assistance in ops center

Jennifer --

Marty could do the 3-11pm shift on March 16; however, he has been in the office all day today and would not be able to stay until 11 pm tonight. Marty is willing to go over to the Ops Center for a few hours this afternoon if it would help.

Don Helton is down at the PSA-2011 conference in Wilmington, NC this week, so covering the evening shift today is not an option. Don is willing to come back from the conference early to help out in the ops center if needed (though he's scheduled to present on Wednesday morning). However, since Marty can handle the Wednesday shift, I don't think it would be worth bringing him back (he drove down so he'd have a few hours on the road to get back to DC).

So, let me know if you need Marty, or if you believe that the situation warrants bringing Don back from the PSA conference early.

Kevin

From: Uhle, Jennifer
Sent: Monday, March 14, 2011 1:40 PM
To: Coyne, Kevin
Cc: Johnson, Michael
Subject: assistance in ops center

Kevin,

Is Marty Stutzke or Don Helton able to do the 3:00 pm to 11pm shift today and the 16th in risk/severe accident area to cover for Mike Cheek. Don Dube will also be asked.

J

Schaperow, Jason

From: Schaperow, Jason
Sent: Monday, March 14, 2011 8:36 AM
To: Tinkler, Charles
Subject: FW: Protracted RST Watch Bill - Extended to Friday March 18th

Looks like I will be on watch in the Ops Center twice this week. Please see schedule below.

From: RST01 Hoc
Sent: Sunday, March 13, 2011 9:47 PM
To: Case, Michael; Skeen, David; Ruland, William; Hiland, Patrick; Brown, Frederick; Dudes, Laura; Rini, Brett; Alter, Peter; Hasselberg, Rick; Morlang, Gary; Collins, Frank; Thomas, Eric; Cheok, Michael; Circle, Jeff; Dube, Donald; Brown, Eva; Circle, Jeff; Esmaili, Hossein; Dube, Donald; Laur, Steven; Schaperow, Jason; Fuller, Edward; Salay, Michael; Kolb, Timothy; Shea, James; Isom, James; Bloom, Steven; Padovan, Mark; Williams, Joseph; Williams, Donna; Hart, Ken; Dozier, Jerry
Subject: Protracted RST Watch Bill - Extended to Friday March 18th

RST Members...

We have been instructed to expand the list of RST responders that we are pulling into shift work. The shifts have been extended until Friday night. Here is the proposed watch bill. PLEASE DROP BY THE RST ROOM OR CALL THE RST ON-DUTY COORDINATOR AT 301-816-5100 WITH ISSUES AND CONCERNS. Don't call Rick - He'll be sleeping!!!!

Reactor Safety Team Protracted Event Staffing for Japanese Earthquake Response

Team Position	RST Director	RST Coordinator	Accident Analyst	BWR Expert	RST Communicator
03/13/11 Day 0700 - 1500	Pat Hiland	Peter Alter	Jeff Circle	Tim Kolb	Joe Williams
03/13/11 Swing 1500 - 2300	Fred Brown	R. Hasselberg	Hossein Esmaili	C. Norton	Ken Hart
03/13/11 Mid 2300 - 0700	Dave Skeen	Mike Morlang	Mike Cheok	Eva Brown	none
03/14/11 Day 0700 - 1500	Laura Dudes	Peter Alter	Jeff Circle	Tim Kolb	Steve Bloom
03/14/11 Swing 1500 - 2300	Bill Ruland	R. Hasselberg	Don Dube	C. Norton	Mark Padovan
03/14/11 Mid 2300 - 0700	Mike Case	Brett Rini	Steve Laur	Eva Brown	Jerry Dozier
03/15/11 Day 0700 - 1500	Dave Skeen	Peter Alter	Jeff Circle	Jim Shea	Donna Williams
03/15/11 Swing 1500 - 2300	Fred Brown	Frank Collins	Hossein Esmaili	C. Norton	Jim Isom
03/15/11 Mid 2300 - 0700	Pat Hiland	Mike Morlang	J. Schaperow	Eva Brown	Ken Hart
03/16/11 Day 0700 - 1500	Laura Dudes	R. Hasselberg	Ed Fuller	Tim Kolb	Joe Williams
03/16/11 Swing 1500 - 2300	Bill Ruland	Eric Thomas	Mike Salay	C. Norton	Steve Bloom
03/16/11 Mid 2300 - 0700	Mike Case	Brett Rini	Mike Cheok	Eva Brown	Mark Padovan
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03/18/11 Day 0700 - 1500	Laura Dudes	Peter Alter	Hossein Esmaili	Tim Kolb	Jim Isom
03/18/11 Swing 1500 - 2300	Bill Ruland	Brett Rini	J. Schaperow	C. Norton	Steve Bloom

Schaperow, Jason

From: Schaperow, Jason
Sent: Monday, March 14, 2011 4:49 PM
To: Berry, Rollie
Subject: FW: Protracted RST Watch Bill - Extended to Friday March 18th

As we discussed on the phone, I would really appreciate getting a shift that doesn't start at 2300. I would much rather have a shift that starts at 0700 or 1500.

Thanks,
Jason

From: RST01 Hoc
Sent: Sunday, March 13, 2011 9:47 PM
To: Case, Michael; Skeen, David; Ruland, William; Hiland, Patrick; Brown, Frederick; Dudes, Laura; Rini, Brett; Alter, Peter; Hasselberg, Rick; Morlang, Gary; Collins, Frank; Thomas, Eric; Cheok, Michael; Circle, Jeff; Dube, Donald; Brown, Eva; Circle, Jeff; Esmaili, Hossein; Dube, Donald; Laur, Steven; Schaperow, Jason; Fuller, Edward; Salay, Michael; Kolb, Timothy; Shea, James; Isom, James; Bloom, Steven; Padovan, Mark; Williams, Joseph; Williams, Donna; Hart, Ken; Dozier, Jerry
Subject: Protracted RST Watch Bill - Extended to Friday March 18th

RST Members...

We have been instructed to expand the list of RST responders that we are pulling into shift work. The shifts have been extended until Friday night. Here is the proposed watch bill. PLEASE DROP BY THE RST ROOM OR CALL THE RST ON-DUTY COORDINATOR AT 301-816-5100 WITH ISSUES AND CONCERNS. Don't call Rick – He'll be sleeping!!!

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03/13/11 Mid 2300 - 0700	Dave Skeen	Mike Morlang	Mike Cheok	Eva Brown	none
03/14/11 Day 0700 - 1500	Laura Dudes	Peter Alter	Jeff Circle	Tim Kolb	Steve Bloom
03/14/11 Swing 1500 - 2300	Bill Ruland	R. Hasselberg	Don Dube	C. Norton	Mark Padovan
03/14/11 Mid 2300 - 0700	Mike Case	Brett Rini	Steve Laur	Eva Brown	Jerry Dozier
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03/15/11 Mid 2300 - 0700	Pat Hiland	Mike Morlang	J. Schaperow	Eva Brown	Ken Hart
03/16/11 Day 0700 - 1500	Laura Dudes	R. Hasselberg	Ed Fuller	Tim Kolb	Joe Williams
03/16/11 Swing	Bill Ruland	Eric Thomas	Mike Salay	C. Norton	Steve Bloom

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1500 - 2300					
03/16/11 Mid 2300 - 0700	Mike Case	Brett Rini	Mike Cheok	Eva Brown	Mark Padovan
03/17/11 Day 0700 - 1500	Dave Skeen	Frank Collins	Don Dube	Jim Shea	Donna Williams
03/17/11 Swing 1500 - 2300	Fred Brown	Mike Morlang	Steve Laur	C. Norton	Jerry Dozier
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03/18/11 Swing 1500 - 2300	Bill Ruland	Brett Rini	J. Schaperow	C. Norton	Steve Bloom

Scott, Michael

From: Scott, Michael
Sent: Monday, March 14, 2011 4:51 PM
To: RES_DSA
Subject: FW: Japanese update

FYI – good news

From: Uhle, Jennifer
Sent: Monday, March 14, 2011 4:50 PM
To: Case, Michael; Coe, Doug; Coyne, Kevin; Gibson, Kathy; Scott, Michael; Richards, Stuart
Cc: Sheron, Brian
Subject: Japanese update

Based on a recent call at 3:30, sea water injection has been restored to each of the 3 Diachii units and containments are in tact. I will update you as I hear more. Jennifer

4/24

From: Evans, Michele *MSR*
To: Ruland, William; Leeds, Eric; Boger, Bruce
Cc: Schwarz, Sherry
Subject: RE: Confirmation of names for Japan
Date: Monday, March 14, 2011 2:18:09 PM

Bruce,

If there is an additional person going, please provide that name to the IRC Liaison team at these email addresses.

LIA02 HOC and

LIA03 HOC

Thanks

Michele

From: Ruland, William *MSR*
Sent: Monday, March 14, 2011 2:11 PM
To: Evans, Michele; Christensen, Harold
Subject: FW: Confirmation of names for Japan

From: Leeds, Eric *MSR*
Sent: Monday, March 14, 2011 1:11 PM
To: Collins, Elmo; Satorius, Mark; McCree, Victor; Dean, Bill; Sheron, Brian; Tracy, Glenn; Hudson, Jody; Johnson, Michael; Miller, Charles; Haney, Catherine; Zimmerman, Roy; Stewart, Sharon; Virgilio, Martin; Weber, Michael; Borchardt, Bill; Mamish, Nader; Doane, Margaret; Muessle, Mary
Cc: Boger, Bruce; Grobe, Jack; Ruland, William; Meighan, Sean
Subject: Confirmation of names for Japan

Folks –

Thanks so much for your help – we have a strong database of names/expertise to support the Japanese. For this first wave, we are sending Chuck Casto, John Monninger, Tony Nakanishi, Tim Kolb, Jack Foster and Richard Devercelly. I believe that Bruce Boger has contacted all those going to join Tony Ulsis and Jim Trapp in Japan.

I imagine that at some point we may need to send a second wave of responders to relieve our first wave. We will let you know as soon as we know if this needs to be done. We are also sensitive not to over-burden any one office.

Thanks again for your support!

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

W/K/S

Scott, Michael

From: Scott, Michael
Sent: Monday, March 14, 2011 4:57 PM
To: Uhle, Jennifer
Subject: RE: Confirmation of names for Japan

So I guess Johnson's intervention did not work out... We should file a DPO on the travel list or send our own slate. ☺

Course maybe the Japanese have it all in hand now.

From: Uhle, Jennifer
Sent: Monday, March 14, 2011 4:52 PM
To: Coyne, Kevin; Coe, Doug; Scott, Michael; Gibson, Kathy; Richards, Stuart; Case, Michael
Subject: FW: Confirmation of names for Japan

Everyone, here are the names, see below. Thanks for your help. I contacted BNL and DSA contact SNL so everyone from RES' list is standing down. Thanks,

J

From: Leeds, Eric
Sent: Monday, March 14, 2011 1:11 PM
To: Collins, Elmo; Satorius, Mark; McCree, Victor; Dean, Bill; Sheron, Brian; Tracy, Glenn; Hudson, Jody; Johnson, Michael; Miller, Charles; Haney, Catherine; Zimmerman, Roy; Stewart, Sharon; Virgilio, Martin; Weber, Michael; Borchardt, Bill; Mamish, Nader; Doane, Margaret; Muessle, Mary
Cc: Boger, Bruce; Grobe, Jack; Ruland, William; Meighan, Sean
Subject: Confirmation of names for Japan

Folks –

Thanks so much for your help – we have a strong database of names/expertise to support the Japanese. For this first wave, we are sending Chuck Casto, John Monninger, Tony Nakanishi, Tim Kolb, Jack Foster and Richard Devercelly. I believe that Bruce Boger has contacted all those going to join Tony Ulsis and Jim Trapp in Japan.

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Thanks again for your support!

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

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MR
From: Bailey, Stewart
To: Bahadur, Sher; Ruland, William
Subject: old news on Japan
Date: Monday, March 14, 2011 9:44:42 AM

Information Sheet Regarding the Tohoku Earthquake

The Federation of Electric Power Companies of Japan (FEPC) Washington DC Office
As of 4:30PM (EST), March 13, 2011

At 2:46PM (JST) on March 11, 2011, a 9.0-magnitude earthquake occurred near the Tohoku region of Northeast Japan. The epicenter of the earthquake lies 17 miles below the earth's surface in the Pacific Ocean, 81 miles off the coast from Sendai City. Intense shaking could be felt from Tokyo to Kamaishi, an arc of roughly 360 miles.

The earthquake generated a tsunami with waves of more than 30 feet that caused widespread damage to a swath of the northeast Japan coastline. In addition to the significant destruction of buildings, infrastructure, and human property, two of Japan's 17 nuclear power stations (sites)—Fukushima Daiichi and Fukushima Daini—suffered damage due to the tsunami. All three of the six operating reactors at Fukushima Daiichi Nuclear Power Station and all four reactors at Fukushima Daini Nuclear Power Station, both operated by Tokyo Electric Power Company (TEPCO), shut down automatically in response to the earthquake. TEPCO is one of ten member companies of The Federation of Electric Power Companies of Japan (FEPC).

A state of emergency was declared at Fukushima Daiichi at 7:03PM March 11. Unit 1 and 3 reactors at Fukushima Daiichi lost primary reactor cooling because of a loss of all electrical power. Emergency cooling systems were engaged to lower the core reactor temperature. In order to alleviate the buildup of pressure, slightly radioactive vapor, that posed no health threat, was passed through a filtration system and emitted outside via a ventilation stack from Unit 1 reactor vessel at 9:07AM on March 12 and Unit 3 reactor vessel at 9:20PM on March 13. At 3:36PM on March 12, an explosion occurred at Fukushima Daiichi Unit 1 reactor damaging the roof of the secondary containment building. The explosion—caused by the interaction of hydrogen and oxygen vapor between the primary containment vessel and secondary containment building—**did not damage the primary containment vessel** or the reactor core. Four workers who were injured by the explosion were transported to a nearby hospital.

In order to control the pressure of the reactor core, TEPCO began to inject seawater and boric acid into the primary containment vessels of Unit 1 (8:20PM, March 12) and Unit 3 (1:12PM, March 13). There is likely some damage to the fuel rods contained the reactor core of Unit 1 and 3 reactors. The water level in the reactor vessel of Unit 2 reactor is steady. Personnel from TEPCO are closely monitoring the status of Unit 1, 2, and 3 reactors. The highest recorded radiation level at the Fukushima Daiichi site was 1557 micro sievert (1:52PM, March 13). The most recent reported level at Fukushima Daiichi is 44 micro sievert (7:33PM, March 13).

While representatives of the Japanese government have acknowledged the potential for partial meltdowns at Fukushima Daiichi Unit 1 and 3 reactors, there is no danger for core explosion, as occurred at the nuclear power station at Chernobyl in 1986. Control rods have been successfully inserted at all of the reactors, thereby ending the chain reaction. The reactor cores at Fukushima Daiichi and Daini power stations are surrounded by steel and concrete containment vessels of 40 to 80 inches thick that are designed to contain radioactive

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materials.

At 7:45AM on March 12, a state of emergency was declared for Fukushima Daini. There is electricity available at all four of the reactors at Fukushima Daini, including Unit 3 reactor. Although there is limited availability of the cooling water pumps at Unit 1, 2, and 4 reactors, TEPCO is working effectively to maintain constant cooling in the primary containment vessels. TEPCO confirms that no radioactivity has been recorded outside of the secondary containment buildings at Fukushima Daini.

Two other plants in the Tohoku region, Onagawa Nuclear Power Station and Tokai Nuclear Power Station, were automatically shut down in response to the earthquake. The four reactors at these plants have functioning cooling systems and are being monitored by plant operators. The Rokkasho Reprocessing Plant and accompanying facilities, located far north of the tsunami zone in Rokkasho Town, is operating safely on backup power generation systems. Japan Nuclear Fuel Limited (JNFL), which operates the Rokkasho facilities, drained a 600-liter spill from the containment pool for spent fuel through a specialized wastewater treatment system. Two casks of low-level nuclear waste (LLW), which were being prepared for transport from Mutsu Ogawara Port when the earthquake occurred, have been successfully received at the Rokkasho facility.

Japanese nuclear facilities are built to exacting safety standards. They are designed to withstand powerful seismic events, such as earthquakes. In this earthquake—the strongest recorded over the past 100 years in Japan—the containment structures of Fukushima Daiichi maintained their structural integrity. These facilities were designed to withstand tsunamis within a range of assumed strength. In this event, however, the force of the tsunami exceeded the assumed range and flooded diesel generators at Fukushima Daiichi power station, thus precipitating the loss of power for the reactor cooling systems.

In order to minimize adverse health effects of any potential radioactive release, the Japanese government issued an evacuation order at 9:23PM on March 11 for a radius of 1.86 miles around Fukushima Daiichi. By 6:25PM on March 12, the evacuation area has been enlarged to cover the approximately 70,000 residents within 12.5 miles of Fukushima Daiichi and 6.2 miles of Fukushima Daini.

In addition to supporting the evacuations near Fukushima Daiichi and Daini nuclear power stations, TEPCO is collaborating with the Japanese government to ensure the safety of the all people in the affected region. Iodine tablets, to counteract the effects of radioactivity on the thyroid gland, have been distributed to people at the boundary of the evacuation zone. Sophisticated radiation screening equipment has been mobilized to measure radiation exposure for people close to the evacuation area. The Japanese Nuclear and Industrial Safety Agency said that as many as 160 people may have been exposed to radiation around the Fukushima Daiichi station. TEPCO and the Japanese government will continue to use their full professional and technological resources, as well as those offered by international organizations, to ensure the safety of those displaced by the earthquake and tsunami.

The automatic shutdown of the 11 operating reactors at the Onagawa Nuclear Power Station, Tokai Nuclear Power Station, Fukushima Daiichi and Daini, represents a loss of 3.5% of electric generation capacity for Japan. In addition, several thermal power stations were damaged in the earthquake and are currently under repairs. In order to compensate for this loss of electricity production, TEPCO has instituted rolling blackouts, information about which can be found on the TEPCO website. The Japanese government is also urging all

residents in Japan to minimize their electricity use in order to support the relief and recovery effort in Tohoku.

FEPC, in cooperation with TEPCO and related organizations, will continue to work tirelessly to provide the public with the most accurate and timely information on the situation at the Fukushima Daiichi and Daini nuclear power stations.

Lee, Richard

Subject: Canceled: Fukushima Daiichi coordination meeting
Location: 2C17

Start: Fri 3/18/2011 9:00 AM
End: Fri 3/18/2011 9:30 AM
Show Time As: Free

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Schaperow, Jason
Required Attendees: Uhle, Jennifer; Gibson, Kathy; Santiago, Patricia; Lee, Richard; Tinkler, Charles; Salay, Michael; Wagner, Katie; Chang, Richard
Optional Attendees: Scott, Michael

Importance: High

When: Friday, March 18, 2011 9:00 AM-9:30 AM (GMT-05:00) Eastern Time (US & Canada).
Where: 2C17

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

~~*~*~*~*~*~*~*~*

Request you attend coordination meeting to discuss ongoing DSA efforts on Fukushima Daiichi accident and preparation for Monday's Commission meeting.

Meeting requested by Jason.

4/48

Scott, Michael

From: Scott, Michael
Sent: Friday, March 18, 2011 10:31 AM
To: Zigh, Ghani
Cc: Navarro, Carlos; Dion, Jeanne; Gibson, Kathy; Tinkler, Charles
Subject: RE: Overview of Japanese Event (Meeting Slides)

Ghani:

Thanks. I think we may need something more general. Jeanne will look you up to discuss.

Mike

From: Zigh, Ghani
Sent: Friday, March 18, 2011 8:54 AM
To: Scott, Michael
Cc: Navarro, Carlos; Dion, Jeanne; Santiago, Patricia; Gibson, Kathy; Tinkler, Charles
Subject: RE: Overview of Japanese Event (Meeting Slides)

Mike,
Here is my question (in red) concerning zirc fire for the commissioner's public briefing on Monday regarding the Japanese event and US response.

MELCOR is used to perform Spent Fuel severe accident analysis including the possibility of Zirc fire under a complete loss of water. Is MELCOR validated to perform this kind of scenario?

From: Scott, Michael
Sent: Thursday, March 17, 2011 2:03 PM
To: Navarro, Carlos; Zigh, Ghani; Dion, Jeanne; Santiago, Patricia
Subject: FW: Overview of Japanese Event (Meeting Slides)

From: Thorpe, April
Sent: Thursday, March 17, 2011 2:00 PM
To: Scott, Michael; Bajwa, Chris; Milligan, Patricia
Subject: Overview of Japanese Event (Meeting Slides)

Good Day:

Attached is a completed copy of meeting slides regarding the Japanese Event.

If you should have any questions, please feel free to contact me at your earliest convenience.

Thank you,

April R. Thorpe
Contract Secretary
Region II Plant Licensing Branches
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation
Phone 301-415-2024 Fax 301-415-1222
April.Thorpe@nrc.gov

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From: Cullingford, Michael *MYCR*
To: Leeds, Eric; Boger, Bruce; Grobe, Jack; McGinty, Tim; Regan, Christopher; Hopkins, Jon; Astwood, Heather
Cc: Quinones, Lauren; Brown, Frederick; Glitter, Joseph; Cheok, Michael; Hiland, Patrick; Blount, Tom; Ruland, William; Holian, Brian; Lubinski, John
Subject: FW: Status of Nuclear Power Stations in Japan
Date: Monday, March 14, 2011 7:56:42 AM
Attachments: Summary of the News Releases on the earthquake No22.docx

Latest information received.....mc

From: Hidehiko Yamachika [mailto:yamachika-hidehiko@jnes-usa.org]
Sent: Monday, March 14, 2011 7:32 AM
To: Emche, Danielle; Foggie, Kirk; Cullingford, Michael
Cc: Michael W. Chinworth; aono-kenjiro@jnes-usa.org
Subject: Status of Nuclear Power Stations in Japan

FYI
Latest Press Release of NISA.

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March 14, 2011
Nuclear and Industrial Safety Agency

Seismic Damage Information(the 22th Release)
(As of 07:30 March 14, 2011)

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

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

○Fukushima Dai-ichi Nuclear Power Station, Tokyo Electric Power Co., Inc. (TEPCO)
(Okuma-machi and Futaba-machi, Futaba-gun, Fukushima Prefecture)

(1) The status of operation

Unit 1 (460MWe): automatic shutdown

Unit 2 (784MWe): automatic shutdown

Unit 3 (784MWe): automatic shutdown

Unit 4 (784MWe): in periodic inspection outage

Unit 5 (784MWe): in periodic inspection outage

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

(2) Readings at monitoring posts

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

MP1 (Monitoring at North End of Site Boundary) :

26 microSv/h(18:30 March 13)

→ (Move to MP2)

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

450 microSv/h(20:10 March 13)

→680 microSv/h(3:50 March 14)

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

44.0 microSv/h(19:33 March 13)

→56.4 microSv/h(04:08 March 14)

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

MP6 (Monitoring at the Main Gate)

5.2microSv/h(19:00 March 13)

→66.3 microSv/h(02:50 March 14)

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

Wind direction: North North West

Wind Speed: 0.3 m/s

(4) Report concerning other malfunction

- No fire report notified to NISA
- TEPCO reported to NISA in accordance with Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi, Units 1,2 and 3. (15:42 March 11)
- TEPCO report to NISA the event in accordance with Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ichi, Units 1 and 2.(notified to NISA at 16:36 March 11)
- For Unit 1: Sea water is being injected to the Primary Containment Vessel (PCV) via the Fire Extinguishing System Line (Start up 11:55 March 13)
→Interruption of injection (01:10 March 14)
- For Unit 2: Water Injection Function has been sustained. (14:00 March 13)

- For Unit 3: Fresh water is being injected to the PCV via Fire Extinguishing System Line (FESL) (11:55 March 13)
- For Unit 3: Sea water is being injected to the PCV via FESL(13:12 March 13)
- For Unit 1 and Unit 3: Injection of Sea water injection into PCV is interrupted because of the lack of sea water in pit. (01:10 March 14)
- For Unit 3: Injection of Sea water into PCV is restarted(03:20 March 14)

○ Fukushima Dai-ni Nuclear Power Station (TEPCO)

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

(1) The status of operation

Unit1 (1,100MWe): automatic shutdown

Unit2 (1,100MWe): automatic shutdown

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

Unit4 (1,100MWe): automatic shutdown

(2) Readings at monitoring post etc.

MP1 (Monitoring at the North End of Site Boundary)

0.036 microSv/h(19:00 March 13)

→0.038 microSv/h(05:00 March 14)

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

0.038microSv/h(19:00 March 13)

→0.037 microSv/h(05:00 March 14)

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

0.036microSv/h(19:00 March 13)

→0.038 microSv/h(05:00 March 14)

MP5 (Monitoring at the West End of Site Boundary)

0.04 microSv/h(19:00 March 13)

→0.042 microSv/h(05:00 March 14)

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

Direction: South-southwest

Velocity: 0.9 m /s

(4) Report concerning other malfunction

- None of fire report notified to NISA
- TEPCO reported to NISA in accordance with Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness regarding Fukushima Dai-ni, Units 1. (18:08 March 11)
- As same as above, TEPCO reported to NISA Fukushima Dai-ni Units 2 and 4.(18:33 March 11)
- For Unit 1: Due to Recovery of Residual Heat Removal System(RHR), water in suppression pool is started to cool for cold shut down.(01:24 March 14)

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

(1) The status of operation

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

Unit 2 (825MWe): automatic shutdown

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

(2) Readings of monitoring post

Reading of monitoring post : Changed

MP2 (Monitoring at the North End of Site Boundary)

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

→7,200 nGy/h (07:20 March 14)

(3) Report concerning other malfunction

- Fire Smoke on the first basement of the Turbine Building was confirmed extinguished at 22:55 on March 11th.
- Article 10* of Act on Special Measures Concerning Nuclear Emergency

Preparedness (Unit No. not identified) (13:09 March 13)

2. Action taken by NISA

(March 11)

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

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

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

18:08: Unit 1 of Fukushima Dai-ni notified NISA of the situation of the Article 10 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

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

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

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

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

- Residents living in the area of 3km radius from Unit 1 of the Nuclear Power Station must evacuate.
- Residents living in the area of 10km radius from the Unit 1 must take sheltering.

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

(March12)

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

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

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

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

06:50 According to the article 64, 3 of the Nuclear Regulation Act, government order to control the internal pressure in Fukushima-dai-ichi Units 1 and 2

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

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

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

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

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

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

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

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

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

(March 13)

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

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

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

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

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

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

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

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

(March 14)

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

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

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

<Possible Exposure to Residents>

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

- i) No. of persons to be measured: About 60 persons
- ii) Measured Result: Not yet
- iii) Passage: Exposure could have happened while waiting to be picked up by helicopter at the Futaba high school ground
- iv) Other

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

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

- i) No. of Persons: About 100 persons
- ii) Measured Result: 9 persons out of 100 persons

No. of Counts	No. of Persons
18,000cpm	1
30,000-36000cpm	1
40,000cpm	1
little less than 40,000cpm*	1
very small counts	5

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

- iii) Passage: Under investigation
- iv) Other

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

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

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

(Contact Person)

Mr. Toshihiro Bannai

Director, International Affairs Office,
NISA/METI

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

From: [GovExec.com newsletters](#)
To: [Ruland, William](#)
Subject: GovExec Today: Reorganization begins; Japanese tragedy; and advice from the advisory board
Date: Monday, March 14, 2011 5:01:03 AM



Today

MONDAY, MARCH 14, 2011

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HEADLINES

1. **White House officially begins government reorganization**
2. **Government uses new and old media to get its message out after Japan disaster**
3. **From Nextgov.com: Defense prepares response to massive earthquake in Japan**
4. **Corporate leaders advise government on personnel, contracting issues**
5. **SEC told to reorganize and live within its means**
6. **Is D.C. prepared for a tsunami?**
7. **New continuing resolution shows GOP's strong hand**
8. **Japan earthquake live blog**
9. **Fedblog: Rhetoric of Reorganization**
10. **Today's column: Wired Workplace**
11. **The Earlybird: Today's headlines**
12. **Quote of the Day**

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Cybersecurity Report: Updates on the battle to protect data and systems

Check out Nextgov's cybersecurity blog delivering breaking news and insights on federal cybersecurity efforts. **Don't miss the latest cybersecurity updates – [click here!](#)**

1. **White House officially begins government reorganization**

By Robert Brodsky

Presidential memo directs top aides to look for ways to reduce duplication in trade and export agencies.

Full story: http://www.govexec.com/story_page.cfm?articleid=47317&dcn=e_gvet

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2. **Government uses new and old media to get its message out after Japan disaster**

By Kellie Lunney

Press conferences, Twitter help agencies disseminate information on tsunami effects in the U.S.

4/51

Full story: http://www.govexec.com/story_page.cfm?articleid=47319&dcn=e_gvet

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3. **From Nextgov.com: Defense prepares response to massive earthquake in Japan**

By Bob Brewin

High-capacity undersea cable used by military was severed; impact on operations is unclear.

Full story: http://www.govexec.com/story_page.cfm?articleid=47321&dcn=e_gvet

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4. **Corporate leaders advise government on personnel, contracting issues**

By Robert Brodsky

The new Management Advisory Board is working with the White House on operational management issues.

Full story: http://www.govexec.com/story_page.cfm?articleid=47318&dcn=e_gvet

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5. **SEC told to reorganize and live within its means**

By George A. Warner

House hearing on conflict-of-interest charges involving former general counsel leaves agency battling for public trust and increased funding.

Full story: http://www.govexec.com/story_page.cfm?articleid=47315&dcn=e_gvet

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6. **Is D.C. prepared for a tsunami?**

By Marc Ambinder, National Journal

Complicating a mass evacuation would be various emergency contingency plans put in place by the federal government.

Full story: http://www.govexec.com/story_page.cfm?articleid=47314&dcn=e_gvet

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7. **New continuing resolution shows GOP's strong hand**

By Humberto Sanchez, National Journal

Plan could be considered by the full House as soon as Tuesday.

Full story: http://www.govexec.com/story_page.cfm?articleid=47313&dcn=e_gvet

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8. **Japan earthquake live blog**

National Journal has continuous updates on the earthquake, tsunamis and the federal response.

Full story: http://www.govexec.com/story_page.cfm?articleid=47311&dcn=e_gvet

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Follow us on Twitter:

Get breaking links and more from the best news source for federal government news, from human capital and IT to finance and procurement. Read our tweets at <http://twitter.com/govexec>.

9. **Fedblog: Rhetoric of Reorganization**

By Tom Shoop

Outside the bureaucracy, looking in.

Friday, March 11, 6:16 p.m. ET:

In continued to be intrigued by the talk coming out of the White House on the subject of [reorganizing government](#). On the one hand, the rhetoric is sweeping. "We cannot win the future with a government built for the past," President Obama said in his [memo to agencies](#) on reorganization today. "We live and do business in the information age, but the organization of the federal government has not kept pace. Government agencies have grown without overall strategic planning and duplicative programs have sprung up, making it harder for each to reach its goals."

Read blog: <http://blogs.govexec.com/fedblog/>

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10. **Today's column: Wired Workplace**

Race to Hire

The Veterans Affairs Department has brought on 365 new IT workers so far in its push announced in January.

Full column: <http://www.govexec.com/dailyfed/0311/031411ww.htm>

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11. **The Earlybird: Today's headlines**

Get links to the top news of the day:

<http://www.govexec.com/dailyfed/ebird.htm>

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12. **Quote of the Day**

We use contractors to write contracts for other contractors.

-- Dan Gordon, administrator of the Office of Federal Procurement Policy, on government's overdependence on contractors.

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From: Brown, Frederick | NRR
To: Hiland, Patrick; Ruland, William; McGinty, Tim; Skeen, David; Thomas, Eric; Thorp, John; Glitter, Joseph
Cc: Boger, Bruce
Date: Monday, March 14, 2011 1:10:32 PM
Importance: High

Drafted the message below for Eric to send to all NRR staff. Does this look like a reasonable scope?

As you are all aware from the Agency wide e-mails, the NRC Operations Center is being manned 24 hours a day to support monitoring of the situation in Japan. Many of your NRR colleagues are involved with this effort.

Here in NRR, we can look forward in the coming days and months to many questions about the situation in Japan and the relevance to domestic nuclear facilities. The staff in the Operations Center has already been working on these types of questions and answers. It will be important to maintain effective communication and coordination between the work done in the Office, and the work done in the Operations Center.

In an effort to minimize disruption of Operations Center activities, NRR has designated Eric Thomas (eric.thomas@nrc.gov) in NRR's Operating Experience Branch to be the focused single point of contact for information requests that NRR staff may have for the Reactor Safety and Preventative Measures Teams in the Operations Center.

If you are assigned a task involving event questions and answers, please let Eric know so that he can coordinate with the Operations Center to ensure that we are providing consistent responses. If you are contacted directly by staff in the Operations Center, please respond to the request promptly, and provide an electronic copy of your response to Eric so that he can maintain the response for future use by others.

4/52

From: Ruland, William *WRK*
To: Beall, James
Subject: RE: Excellent NYT graphic
Date: Monday, March 14, 2011 10:06:00 AM

Thanks! I saw this via facebook yesterday.

From: Beall, James *WRK*
Sent: Monday, March 14, 2011 9:24 AM
To: Ruland, William
Subject: Excellent NYT graphic

<http://www.nytimes.com/interactive/2011/03/13/world/asia/satellite-photos-japan-before-and-after-tsunami.html?hp>

Give it a few seconds, but a vertical line will appear in each photo. You can "grab" the line and move it to see Before and after.

From: Leeds, Eric *MLR*
To: Ruland, William
Subject: RE: Excellent NYT graphic
Date: Monday, March 14, 2011 1:19:25 PM

OMG. Unbelievable – thanks for sending!

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

From: Ruland, William
Sent: Monday, March 14, 2011 1:04 PM
To: Leeds, Eric
Subject: FW: Excellent NYT graphic

From: Beall, James *MLR*
Sent: Monday, March 14, 2011 9:24 AM
To: Ruland, William
Subject: Excellent NYT graphic

<http://www.nytimes.com/interactive/2011/03/13/world/asia/satellite-photos-japan-before-and-after-tsunami.html?hp>

Give it a few seconds, but a vertical line will appear in each photo. You can “grab” the line and move it to see Before and after.

4/54

From: [NRR_HIGNFY_Resource](#)
To: [NRR_Distribution](#)
Subject: Special Edition HIGNFY - Response to Recent Events in Japan - Maintain Effective Communication and Coordination
Date: Monday, March 14, 2011 6:01:13 PM

- March 14, 2011 -

*** SPECIAL EDITION *
Have I Got News For You!**

Office of Nuclear Reactor Regulation Mission Statement

NRR supports the NRC mission to protect public health, safety, and the environment by developing and implementing rulemaking, licensing, oversight, and incident response programs for reactors. We conduct these activities in a manner that develops trust and is consistent with the NRC organizational values.

**Response to Recent Events in Japan
Maintain Effective Communication and Coordination**

As you are all aware from the Agency wide e-mails, the NRC Operations Center is being manned 24 hours a day to support monitoring of the situation in Japan. Many of your NRR colleagues are involved with this effort.

Here in NRR, we can look forward in the coming days and months to many questions about the situation in Japan and the relevance to domestic nuclear facilities. The staff in the Operations Center has already been working on these types of questions and answers. It will be important to maintain effective communication and coordination between the work done in the Office, and the work done in the Operations Center.

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Thanks for your cooperation and assistance!

u/s5

Fi

From: [NRC Announcement](#)
To: [NRC Announcement](#)
Subject: Daily: 5 New Items from Monday, March 14, 2011
Date: Monday, March 14, 2011 10:01:35 PM

NRC Daily Announcements



Highlighted Information and Messages



Monday March 14, 2011 -- Headquarters Edition

Employee Resources: Rotational Opportunity - NRO/NPLS, Team Leader for Design Center Support, GG-14/15

General Interest: Call for Veterans' Success Stories

Security/Safety: Japan Earthquake and Tsunami Disaster Fake Web Sites, E-mail Scams, Fake Antivirus and Phishing Attack Warning

Employee Resources: Do You Know Your EAP?

Employee Resources: Rotational Opportunity - RES/SPB, Management Analyst, GG-9/11/12 - Two Positions

Employee Resources: Rotational Opportunity - NRO/NPLS, Team Leader for Design Center Support, GG-14/15

The **Office of New Reactors, Division of New Reactor Licensing, Planning and Scheduling Branch** has a 3- to 4-month rotational opportunity for **GG-14** or **GG-15** employees interested in an assignment as the **Team Leader for Design Center Support**:

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.



(2011-03-14 00:00:00.0)

[View item in a new window](#)

General Interest: Call for Veterans' Success Stories

Attention NRC Military Veterans

Do you have an interesting story to tell about your conversion from military service to civilian service with the NRC? If so, please visit the [Office of Personnel Management Website](#) to learn more about how to submit your story to inspire others to continue or pursue a career in Federal service. Selected stories will be posted on the Website, and could be chosen for an upcoming video focusing on veterans in Federal service.

For assistance or more information, please contact [Len Carsley](#).



(2011-03-14 00:00:00.0)

[View item in a new window](#)

ea 2

W/S26

Security/Safety: Japan Earthquake and Tsunami Disaster Fake Web Sites, E-mail Scams, Fake Antivirus and Phishing Attack Warning

NRC has learned of incorrect information relating to the disaster in Japan being released to the public via Web sites using the NRC logo. Per the March 13th news release, the NRC will **not** provide information on the status of Japan's nuclear power plants. For the latest information on NRC actions see the NRC's [Web site](#) or [blog](#).

Also, US-CERT has warned users of potential email scams, fake antivirus scams, and phishing attacks that use the Japan earthquake and the tsunami disasters to potentially redirect users to malicious sites or otherwise target them. These e-mail scams may contain links or attachments which may direct users to phishing or malware-laden websites. Fake antivirus attacks may come in the form of pop-ups that flash security warnings and ask the user for credit card information. Phishing emails and bogus Websites requesting donations for charitable organizations commonly appear after these types of natural disasters.

The following recommendations are provided to assist users in avoiding these types of malicious attacks:

- Do not follow unsolicited web links or attachments in e-mail messages.
- Review the US-CERT [Recognizing Fake Antivirus](#) document for additional information on recognizing fake antivirus.
- Refer to the US-CERT [Avoiding Social Engineering and Phishing Attacks](#) document for additional information on social engineering attacks.
- Refer to the US-CERT [Recognizing and Avoiding E-mail Scams \(pdf\)](#) document for additional information on avoiding e-mail scams.
- Review the Federal Trade Commission's [Charity Checklist](#).
- Verify the legitimacy of the email by contacting the organization directly through a trusted contact number. Trusted contact information can be found on the Better Business Bureau [National Charity Report Index](#).

If you suspect that a Web site or e-mail is not legitimate or appears to be suspicious in nature, please **do not** open it, reply to it, or click on any links/files found. Instead, forward the information as an attachment to the [Computer Security Incident Response Team](#) for analysis or call 301-415-6666.



(2011-03-14 00:00:00.0)

[View item in a new window](#)

Employee Resources: Do You Know Your EAP?

Do you know your EAP?

Most employees and managers think that NRC's Employee Assistance Program (EAP) only provides counseling for personal problems. It does. However, when you ask these folks if they were aware of other services offered by the EAP such as legal, financial, childcare and eldercare assistance for both employees and their dependants, the majority answer a resounding no. Additionally, beside these highlighted services offered by your EAP, you may be unaware of others such as

management consultation, training, and coaching for employees and work groups.

Promoting Work/Life Balance through Training, Consultation and Coaching

The EAP staff want you to know that the EAP Program is part of NRC's work-life balance strategy to improve organizational effectiveness and to integrate work and personal life. By promoting such balance, the EAP helps make NRC "the best place to work" among all Federal Agencies, and has done so for several years. It does this by offering help in those areas that affect you both on-and-off-the job.

Accessing Services

By now you should have received a mailing of our EAP brochure and wallet card which highlights the many services offered by your EAP program. EAP Consultants, Inc. (EAPC) is NRC EAP contractor. You may also visit [EAPC Website](#). Go to member access and click on EAP Employee Orientation. The NRC passcode is "nuclear". You may call the EAP 24 hours a day, 7 days a week at 1-800-869-0276.

Future Events

Please look for upcoming articles and a listing of our lunch and learn discussion series on various work-life topics.



(2011-03-14 00:00:00.0)

[View item in a new window](#)

Employee Resources: Rotational Opportunity - RES/SPB, Management Analyst, GG-9/11/12 - Two Positions

The **Office of Nuclear Regulatory Research, Division of Systems Analysis, Special Projects Branch**, has two rotational opportunities for a **Management Analyst GG-09/11/12**. The primary SPB project requiring support is the State-of-the-Art Reactor Consequence Analyses conducted with two power plant licensees. Each rotation will last for 4-6 months, beginning in March 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.



(2011-03-14 00:00:00.0)

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Frequently Asked Questions About the NRC Daily Announcements Email

From: Leeds, Eric *in NRR*
To: Steger (Tucci), Christine
Cc: Givvines, Mary; Grobe, Jack; Boger, Bruce; Ruland, William; Brown, Frederick; Schwarz, Sherry; McDermott, Brian; Evans, Michele
Subject: ACTION: Please distribute to all NRR staff in a HIGNFY message.
Date: Monday, March 14, 2011 5:16:38 PM

As you are all aware from the Agency wide e-mails, the NRC Operations Center is being manned 24 hours a day to support monitoring of the situation in Japan. Many of your NRR colleagues are involved with this effort.

Here in NRR, we can look forward in the coming days and months to many questions about the situation in Japan and the relevance to domestic nuclear facilities. The staff in the Operations Center has already been working on these types of questions and answers. It will be important to maintain effective communication and coordination between the work done in the Office, and the work done in the Operations Center.

In an effort to minimize disruption of Operations Center activities, NRR has designated Eric Thomas (eric.thomas@nrc.gov) in NRR's Operating Experience Branch to be the focused single point of contact for information requests that NRR staff may have for the Reactor Safety and Preventative Measures Teams in the Operations Center.

If you are assigned a task involving event questions and answers, please let Eric know so that he can coordinate with the Operations Center to ensure that we are providing consistent responses. If you are contacted directly by staff in the Operations Center, please respond to the request promptly, and provide an electronic copy of your response to Eric so that he can maintain the response for future use by others.

Thanks for your cooperation and assistance!

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

W/S7

From: Hiland, Patrick *INR*
To: Brown, Frederick; Ruland, William; McGinty, Tim; Skeen, David; Thomas, Eric; Thorp, John; Giitter, Joseph
Cc: Boger, Bruce
Subject: RE:
Date: Monday, March 14, 2011 1:17:37 PM

Looks good; be sure to include other offices that are working on this effort (e.g. RES has drafted a section on seismic and continue to brainstorm questions). I'm assuming that Eric will act as filter, as best he can, to avoid duplication.

From: Brown, Frederick *INR*
Sent: Monday, March 14, 2011 1:11 PM
To: Hiland, Patrick; Ruland, William; McGinty, Tim; Skeen, David; Thomas, Eric; Thorp, John; Giitter, Joseph
Cc: Boger, Bruce
Subject:
Importance: High

Drafted the message below for Eric to send to all NRR staff. Does this look like a reasonable scope?

As you are all aware from the Agency wide e-mails, the NRC Operations Center is being manned 24 hours a day to support monitoring of the situation in Japan. Many of your NRR colleagues are involved with this effort.

Here in NRR, we can look forward in the coming days and months to many questions about the situation in Japan and the relevance to domestic nuclear facilities. The staff in the Operations Center has already been working on these types of questions and answers. It will be important to maintain effective communication and coordination between the work done in the Office, and the work done in the Operations Center.

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W/58

From: [Case, Michael](#)
To: [RST01 Hoc](#)
Subject: Fw: Assesment of cooling requirements for Fukushima units 1-3
Date: Tuesday, March 15, 2011 7:37:25 AM

Sent from Blackberry
Michael Case.

From: Gavrilas, Mirela
To: Case, Michael; Gibson, Kathy
Sent: Mon Mar 14 14:36:53 2011
Subject: Fw: Assesment of cooling requirements for Fukushima units 1-3

From: Farmer, Mitchell T. <farmer@anl.gov>
To: Tinkler, Charles; Basu, Sudhamay; Lee, Richard; Gavrilas, Mirela
Sent: Mon Mar 14 14:31:28 2011
Subject: FW: Assesment of cooling requirements for Fukushima units 1-3

FYI.
Mitch

From: Farmer, Mitchell T.
Sent: Monday, March 14, 2011 1:22 PM
To: Grandy, Christopher; Khalil, Hussein S.; Peters, Mark T.; Sattelberger, Alfred P.
Cc: 'corradin@cae.wisc.edu'; Seidensticker, Ralph W.
Subject: Assesment of cooling requirements for Fukushima units 1-3

All,

I did a few back of the envelope calculations to scope out what the cooling requirements will be at Fukushima units 1-3 in the event that they are not able to reestablish power to the site and, thereby, normal cooling functions at these plants.

The limited information I have suggests that they are supplying 30 MT/hour of seawater to unit 1, and so I'll assume that the same is currently going to units 2 and 3. To put this in perspective, that amount of cooling flow can remove 2.8 MW while remaining subcooled at atmospheric conditions, and up to 21.7 MW if this amount of water is completely boiled off. Ideally, you would like to get to subcooled outlet core conditions so you'll stop forming steam and then you can stop the venting that is causing concern right now.

That amount of heat removal needs to be compared to the decay heat levels in these reactors to determine when subcooled conditions can be reached. Unit 1 was 460 Mwe and Units 2- 3 were 784 Mwe per Chris's previous email. Thus, I estimate the thermal power levels of these reactors to be 1200 MWt and 2000 MWt, respectively. After three days (or currently), the power level for a U core would fall to about 0.4 % assuming that the reactors had operated for 200 full-power days before the earthquake (a little higher for the MOX core but I don't have data to assess that). Thus, decay heat in Unit 1 is now about 4.8 MW and for Units 2/3 it's about 8 MWt. Thus, I suspect they're still venting steam at all three units. I then looked at the times when the decay heat will fall below the level at which subcooling can be achieved (ie 2.8 MWt core decay heat level) and for unit 1 that is 6 days total (ie 3 days from now) and for units 2 and 3 it will be about 16 days (ie 13 more days).

u/sy9

This is a worst case scenario that assumes they can't get electricit back to the site and establish normal cooling function; ie they have to rely on sea water injection. Also, I assumed 200 full power days; the power level could be less or a little more if I overestimated/understimated operation times.

As far as coolability of the degraded cores, my opinion is that units 1 and 3 are in coolable configurations; it's been 3 days now and if the configuraiton was not coolable the material most likely would have failed the reactor pressure vessel. I guess the jury is still out on Unit 2; I think the entire core has gone dry at least once. The good news is that the decay heat is way down from what it was a few hours after the accident was initiated.

Mitch

From: [Case, Michael](#)
To: [Karas, Rebecca](#)
Subject: RE: (Action) Tsunami Fact Sheet - NUREG issued in March 2009 Link
Date: Tuesday, March 15, 2011 10:30:00 AM

Thanks. Nobody helps me on the back shift (but then again, there aren't many folks around asking questions)

From: Karas, Rebecca
Sent: Tuesday, March 15, 2011 10:29 AM
To: Case, Michael
Subject: RE: (Action) Tsunami Fact Sheet - NUREG issued in March 2009 Link

We actually have people embedded with the RST now on day and afternoons working on the Q&As and providing more direct access for OPA and the ET. Cliff is covering days, and Annie afternoons (except that Nilesh will cover Thursday days). This has all been coordinated through the ops center scheduler now.

Rebecca Karas, Chief
Geosciences and Geotechnical Engineering Branch 1
Division of Site and Environmental Reviews
Office of New Reactors
U.S. Nuclear Regulatory Commission
Phone: 301-415-7533
Fax: 301-415-5397

From: Case, Michael
Sent: Tuesday, March 15, 2011 10:28 AM
To: Karas, Rebecca
Subject: RE: (Action) Tsunami Fact Sheet - NUREG issued in March 2009 Link

Thanks Becky. I don't know of any more short term requests from the Ops Center, but we'll keep those folks in mind.

From: Karas, Rebecca
Sent: Monday, March 14, 2011 11:23 PM
To: Ross-Lee, MaryJane; Kammerer, Annie; Brown, Frederick; Giitter, Joseph; Howe, Allen; Hiland, Patrick; Skeen, David; Case, Michael; Ruland, William; Dudes, Laura
Cc: McDermott, Brian; Hasselberg, Rick; Chokshi, Nilesh; Munson, Clifford; Seber, Dogan; Li, Yong; Cook, Christopher
Subject: RE: (Action) Tsunami Fact Sheet - NUREG issued in March 2009 Link

Our people are plugged into Annie, so we are communicating, but we have many more resources. Nilesh Chokshi and Cliff Munson are here on day shift, and can provide tsunami and seismic expertise, and access to all of our staff. Our GIS people we are currently staffing the ops center with (Dogan Seber and Yong Li) also have seismology expertise. We have a geologist coming for GIS operation on afternoon shift. Someone also asked today about volcanologists. We have people with some of that experience as well who are normally on day shift. Suggest coordinating directly with Nilesh and Cliff on day shift, and me on evenings for any call-outs or emergent support.

W/60

From: King, Mark
Sent: Monday, March 14, 2011 7:08 AM
To: Thorp, John; Boger, Bruce
Cc: Brown, Frederick; Thomas, Eric
Subject: RE: (Action) Tsunami Fact Sheet - NUREG issued in March 2009 Link

We had a NUREG issued on this subject back in March 2009.

TSUNAMI HAZARD ASSESSMENT AT NUCLEAR POWER PLANT SITES IN THE UNITED STATES OF AMERICA

Click link to view: [\[NUREG/CR-6966\]](#)

<http://pbadupws.nrc.gov/docs/ML0915/ML091590193.pdf>

From: Thorp, John
Sent: Monday, March 14, 2011 6:57 AM
To: Boger, Bruce
Cc: Brown, Frederick; King, Mark; Thomas, Eric
Subject: RE: (Action) Tsunami Fact Sheet

We'll look for it; If we don't find it quickly, we'll start producing one. (Mark King, please start looking)

I take it we would define & describe the tsunami phenomena, then address which nuclear stations in the U.S. are located in areas subject to tsunami waves, and describe what we can regarding the design of plants to withstand tsunami impacts?

Thanks,

John

From: Boger, Bruce
Sent: Monday, March 14, 2011 6:48 AM
To: Thorp, John
Cc: Brown, Frederick
Subject: Tsunami Fact Sheet

I seem to recall that OpE developed a tsunami fact sheet? Should we dust it off?

From: [NRC Announcement](#)
To: [NRC Announcement](#)
Subject: From the Chairman: Events in Japan
Date: Tuesday, March 15, 2011 9:36:44 AM

NRC Daily Announcements



Highlighted Information and Messages



Tuesday March 15, 2011 -- Headquarters Edition

From the Chairman: Events in Japan

From the Chairman: Events in Japan

By now I am sure that most of you are aware of the tragic earthquake and tsunami that struck Japan last week, killing thousands of people, destroying cities and infrastructure, and knocking out large portions of the electricity grid.

I am so proud of our staff and the dedication and tenacity they have shown during the tragic events of the past several days. NRC employees have been willingly working around the clock, and their energy, experience and expertise have been invaluable to our response. Those of you who have not directly been involved in this effort are playing just as valuable a role in making sure that the facilities we license are safe and secure.

The natural disasters in Japan—and the resulting situations at the Fukushima nuclear power plant—are sobering in their size and scope. It's easy to become distracted by the stories and images of devastation and destruction. The best thing we can do in this situation is to make sure we remain mindful of our responsibilities for the safety and security of our existing nuclear plants and materials, and to keep our focus where it must always be—on our mission. I continue to appreciate your dedication to ensure the safety and security of the American people.



(2011-03-15 00:00:00.0)

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4/6/1

From: Theresa Ruland
To: Ruland, William *NR*
Subject: Assessing The Future Of Nuclear Power In The U.S.
Date: Tuesday, March 15, 2011 8:35:15 PM

In Japan, workers are racing to prevent major meltdowns at a nuclear power plant in Fukushima. Many residents near the plant are reportedly fleeing the area. Japan's crisis may affect the renewed push for nuclear energy in the United States and other countries. - More at <http://www.npr.org/2011/03/15/134568574/assessing-the-future-of-nuclear-power-in-the-u-s?ft=1&f=5&sc=17>

Sent from my iPhone

4/62

From: Cullingford, Michael *MMK*
To: [Ruland, William](#); [Lubinski, John](#); [Hiland, Patrick](#); [Cheok, Michael](#); [Holian, Brian](#); [Gitter, Joseph](#); [Brown, Frederick](#)
Cc: [McGinty, Tim](#)
Subject: FW: WNN Weekly 8-14 March 2010
Date: Tuesday, March 15, 2011 8:30:09 AM

fyi

From: World Nuclear News [<mailto:wnn=world-nuclear-news.org@mcsv8.net>] **On Behalf Of** World Nuclear News
Sent: Tuesday, March 15, 2011 8:00 AM
To: Cullingford, Michael
Subject: WNN Weekly 8-14 March 2010

[View WNN Weekly in your browser.](#)



8-14 March 2011

REGULATION & SAFETY:

Dramatic escalation in Japan

15 March 2011

Loud noises were heard at Fukushima Daiichi 2 at 6.10am this morning. A major component beneath the reactor is confirmed to be damaged. Evacuation to 20 kilometres is being completed, while a fire on site was put out. Tepco have said containment shows 'no change'.

Loss of coolant at Fukushima Daiichi 2

14 March 2011

Serious damage to the reactor core of Fukushima Daiichi 2 seems likely after all coolant was lost for a period.

Explosion rocks third Fukushima reactor

14 March 2011

Another hydrogen explosion has rocked the Fukushima Daiichi nuclear power plant, this time at the third reactor unit. Analysis shows the containment structure remains intact.

Cold shutdowns at Fukushima Daini

14 March 2011

Two more reactors at Fukushima Daini have now achieved cold shutdown with full operation of cooling systems. Engineers are working for the same at the last unit.

Rolling blackouts as Japanese efforts continue

14 March 2011

Japanese utilities are introducing rolling blackouts in the face of energy shortages following the natural disasters of the last few days. Meanwhile, the country is relying more than ever on the continued operation of its other nuclear reactors.

Efforts to manage Fukushima Daiichi 3

13 March 2011

Operations to relieve pressure in the containment of Fukushima Daiichi 3 have taken place after the failure of a core coolant system. Seawater is being injected to make certain of core cooling. Malfunctions have hampered efforts but there are strong indications of stability.

4/63

Contamination check on evacuated residents

13 March 2011

Potential contamination of the public is being studied by Japanese authorities as over 170,000 residents are evacuated from within 20 kilometres of Fukushima Daini and Daiichi nuclear power plants. Nine people's results have shown some degree of contamination.

Battle to stabilise earthquake reactors

1 March 2011

Attention remains focused on the Fukushima Daiichi and Daini nuclear power plants as Japan struggles to cope in the aftermath of its worst earthquake in recorded history. A dramatic explosion did not damage containment and sea water injection continues through the night.

Massive earthquake hits Japan

1 March 2011

Nuclear reactors shut down during today's massive earthquake in Japan. Official sources have reported no detected radioactive release but are still monitoring the situation, meanwhile work to establish adequate cooling at Fukushima Daiichi continues.

US nuclear regulator OKs Vermont Yankee extension

1 March 2011

The US Nuclear Regulatory Commission has said that it will renew the operating licence for the Vermont Yankee nuclear power plant for a further 20 years, although the regulator does not have the final say in the plant's future operation.

Two US nuclear projects put back 18 months

8 March 2011

The US Nuclear Regulatory Commission has told Dominion and Luminant that their licence applications to build at North Anna and Comanche Peak will be delayed by some 18 months due after changes in the design of Mitsubishi Heavy Industries' Advanced Pressurized Water Reactor.

WASTE & RECYCLING:

Double attack on US nuclear waste fees

10 March 2011

American utilities and regulators have both filed lawsuits against the Department of Energy for continuing to charge for the halted Yucca Mountain project.

CORPORATE:

Areva, Rolls-Royce team up for UK EPRs

11 March 2011

Areva has signed an industrial cooperation agreement with the UK's Rolls-Royce for the manufacture of components for nuclear energy related projects both in the UK and overseas.

Endesa to access AP1000 technology

9 March 2011

Westinghouse has signed an agreement with Spanish utility Endesa to share information on its AP1000 reactor technology. The move makes Endesa a likely partner for nuclear new build projects in Spain and South America.

Import agreement: Baltic to Lithuania

8 March 2011

A deal has been struck that will see major power exports from the Baltic nuclear power plant to Lithuania. Russian-controlled utilities will transmit 1000 MWe across the border shortly after the start of operation.

EXPLORATION & NUCLEAR FUEL:

China Guangdong makes Kalahari offer

8 March 2011

A deal in the offing could give China Guangdong Nuclear Power Corporation's uranium subsidiary a major stake in the Husab uranium project in Namibia.

INDUSTRY TALK:

Shin Kori 1 enters commercial operation

10 March 2011

Shin Kori unit 1 entered commercial operation on 28 February, according to the Korea Institute of Nuclear Safety (KINS). The indigenously designed OPR-1000 is South Korea's seventh such unit and 21st nuclear power reactor overall.

ESBWR approaches design certification

10 March 2011

The US Nuclear Regulatory Commission has found GE-Hitachi's Economic Simplified Boiling Water Reactor (ESBWR) to be safe and technically acceptable. After five years of consideration the NRC has issued a final safety evaluation report and final design approval for the reactor. Full design certification should follow later this year.

Reactors continue through earthquake

9 March 2011

Nuclear power plants were barely affected by the Sanriku offshore earthquake that rocked Japan at 11.45am this morning. The earthquake measured 7.3 on the Richter scale and originated 160 kilometres offshore some 8 kilometres underground. Nuclear power plants on the Pacific coast that felt the quake include Onagawa, Higashidori and Fukushima Daini and Fukushima Daiichi.

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From: Grobe, Jack INRR
To: Ruland, William
Cc: Leeds, Eric; Boger, Bruce
Subject: Fw: Action Request - Potential Temporary Assignees to OIP
Date: Tuesday, March 15, 2011 12:11:23 PM
Importance: High

Bill could you respond for NRR from the LT
Jack Grobe, Deputy Director, NRR

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

From: Ramsey, Jack TOJP
To: Holahan, Gary; Evans, Michele; Boger, Bruce; Grobe, Jack; Uhle, Jennifer; Dorman, Dan; Moore, Scott
Cc: Johnson, Michael; Rosales-Cooper, Cindy; Wiggins, Jim; Diec, David; Leeds, Eric; Cullingford, Michael; Astwood, Heather; Sheron, Brian; Sangimino, Donna-Marie; Dehn, Jeff; Haney, Catherine; Smith, Shawn; Miller, Charles; Cool, Donald; Tracy, Glenn; Doane, Margaret; Mamish, Nader; Dembek, Stephen; Abrams, Charlotte; Owens, Janice; McDevitt, Joan; Virgilio, Martin; Williams, Shawn; Weber, Michael
Sent: Tue Mar 15 11:25:49 2011
Subject: Action Request - Potential Temporary Assignees to OIP

All,

Activities involving the evolving situation in Japan are having, and are projected to continue to have, a significant impact upon OIP resources. With this, OIP would like to ask if each of the program offices could identify whether they have staff (preferably staff with international experience) that could be detailed to OIP for a period of, at least initially, 3 to 6 months. Any staff considered for possible rotation to OIP should be aware that they could potentially travel to Japan and be exposed to ionizing radiation. Please note that such identified staff may, or may not, actually be needed. Instead, OIP is hoping to have a list of individuals, with program office blessing, that could be utilized (including with very little or no notice).

If possible, feedback by late this week (Friday morning) would be extremely helpful. Within OIP, Joan McDevitt will be the principal point of contact for this.

Thanks in advance to everyone for their understanding during this challenging time.

Jack

4/64

From: Schwarz, Sherry on behalf of Leeds, Eric *NR*
To: Boger, Bruce; Ruland, William; NRR-QWFN-13D20-15p
Subject: Brainstorming Actions Going Forward Based Upon Japan Events

When: Tuesday, March 15, 2011 2:00 PM-2:30 PM (GMT-05:00) Eastern Time (US & Canada).
Where: O13 D20

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

~~*~*~*~*~*~*~*~*

Requested by Eric

W/65

From: Lobel, Richard *NRK*
To: Thomas, Eric
Cc: Ruland, William; Dennig, Robert; Burnell, Scott
Subject: Response to Question 2
Date: Tuesday, March 15, 2011 9:20:36 AM
Attachments: japanese reactor question.docx

Attached is NRR/DSS response to Question 2 in an 8:26 pm e-mail from Holly Harrington to Scott Burnell, et al.

u/lele

Filename: Japanese reactor question

Q: Some in the media and in Hill briefings are suggesting that mark I containment is flawed. What are the concerns about this type of containment? Are the US plants safe?

A. BWR Mark I containments have relatively small volumes in comparison with PWR containments. This makes the BWR Mark I containment relatively more susceptible to containment failure given a core meltdown severe enough to (1) fail the reactor vessel and also (2) severe enough so that the core melt reaches the containment boundary. On the positive side, BWRs have more ways of adding water to the core than PWRs. This includes water injection sources which do not rely on AC electric power.

The NRC considers BWRs with Mark I containment design to be safe.

Helton, Donald

From: Helton, Donald
Sent: Tuesday, March 15, 2011 7:52 AM
To: Helton, Shana
Subject: good morning

Hey,

I glanced at the article you sent...seemed generally accurate...

The best advice I've gotten in the last few days was from George Apostolakis (who is also at the conference), and that was to only pay attention to the official statements being made by the Japanese government...I'm actually mainly just checking the TEPCO and IAEA websites...everything else is speculation based on those releases, usually with it being unclear what the pedigree or bias of the person doing the speculating is.. Having said that, of the pop culture coverage I've seen, MSNBC's seems to be clearly the most centrist...

In any event, I'm off to my conference...I hope your evening went well and morning is going well...

Love you!
Don

4/67

Kuritzky, Alan

From: Marksberry, Don
Sent: Tuesday, March 15, 2011 11:18 AM
To: Marksberry, Don; Stutzke, Martin; Coyne, Kevin; Helton, Donald; Kuritzky, Alan; Demoss, Gary; Beasley, Benjamin
Subject: RE: Jaczko briefing at the White House yesterday pm

Sorry, you have to pay to play

From: Marksberry, Don
Sent: Tuesday, March 15, 2011 11:11 AM
To: Stutzke, Martin; Coyne, Kevin; Helton, Donald; Kuritzky, Alan; Demoss, Gary; Beasley, Benjamin
Subject: Jaczko briefing at the White House yesterday pm

See <http://www.c-spanvideo.org/program/BriefingonNu>

MRC

From: Nguyen, Quynh
To: Leeds, Eric; Boger, Bruce; Grobe, Jack
Cc: Ruland, William; Meighan, Sean
Subject: NEXT STEP? SRM - COMGEA-11-0001 - Utilization of Expert Judgment in Regulatory Decision Making
Date: Tuesday, March 15, 2011 3:33:34 PM
Attachments: SecureZIP Attachments.zip

How should we proceed with this? I know we had guys comment on it...

The staff should provide to the Commission, within 6 months, a plan for the development of guidance that will ensure that the formal utilization of expert judgment is applied consistently in regulatory decision making throughout the Agency. This plan should describe the staff's approach, schedule, and estimated resources. This plan should recognize that the development of the guidance should include the following:

- i. a summary of past and ongoing significant NRC activities that utilized expert judgment to identify the lessons-learned, document the approaches^[1], and identify significant differences among the approaches,
- ii. a survey of recent research to identify promising new approaches (or techniques that can be applied within the broader approach) to expert judgment that may be appropriate for use in nuclear applications,
- iii. an evaluation of recent activities within other agencies that relied on expert judgment to identify the lessons-learned, document the approaches, and identify differences among the approaches and those used in NRC activities,
- iv. options that match the approach with the nature and significance of the issue and the extent to which expert judgment is relied upon in regulatory decision making,
- v. estimates of resources associated with each option for planning purposes,
- vi. guidance that is prescriptive enough to ensure consistent application of expert judgment within the Agency, yet is sufficiently flexible to account for the wide diversity of issues that the Agency faces. The user should be able to tailor the approach to be applicable to the unique issue of concern, and
- vii. guidance must allow flexibility in application and the use of highly stylized approaches by individual researchers, as long as scrutability is maintained.

release

From: RidsNrrOd Resource
Sent: Tuesday, March 15, 2011 3:04 PM
To: Meighan, Sean
Cc: Nguyen, Quynh
Subject: FW: SRM - COMGEA-11-0001 - Utilization of Expert Judgment in Regulatory Decision Making

From: RidsEdoDraftSrmVote Resource
Sent: Tuesday, March 15, 2011 12:52 PM
To: Ash, Darren; Borchartd, Bill; Boyd, Lena; Buckley, Patricia; Clarke, Deanna; Cohen, Miriam;

4/69

EDO_Staff_Assistants; Flory, Shirley; Fry, Jeannie; Garland, Stephanie; Johnson, Michael; Mamish, Nader; Matakas, Gina; Miles, Patricia; Miller, Charles; Owen, Lucy; Riddick, Nicole; RidsAdmMailCenter Resource; RidsCsoMailCenter Resource; RidsFsmeOd Resource; RidsHrMailCenter Resource; RidsNmssOd Resource; RidsNroMailCenter Resource; RidsNrrOd Resource; RidsNsirMailCenter Resource; RidsOeMailCenter Resource; RidsOiMailCenter Resource; RidsOIS Resource; RidsResOd Resource; RidsRgn1MailCenter Resource; RidsRgn2MailCenter Resource; RidsRgn3MailCenter Resource; RidsRgn4MailCenter Resource; RidsSbcrMailCenter Resource; Thomas, Loretta; Virgilio, Martin; Walker, Dwight; Weber, Michael

Subject: FW: SRM - COMGEA-11-0001 - Utilization of Expert Judgment in Regulatory Decision Making

From: Lewis, Antoinette

Sent: Tuesday, March 15, 2011 11:11 AM

To: Vietti-Cook, Annette; Baggett, Steven; Bates, Andrew; Batkin, Joshua; Blake, Kathleen; Bollwerk, Paul; Bozin, Sunny; Bradford, Anna; Brown, Theron; Bubar, Patrice; Bupp, Margaret; Burns, Stephen; Chairman Temp; Clark, Lisa; Coggins, Angela; Cordes, John; Crawford, Carrie; Cutchin, James; Davis, Roger; Fopma, Melody; Franovich, Mike; Gibbs, Catina; Hackett, Edwin; Hart, Ken; Harves, Carolyn; Hawkens, Roy; Hayden, Elizabeth; Henderson, Karen; Herr, Linda; Hipschman, Thomas; Hudson, Sharon; KLS Temp; Kock, Andrea; Lepre, Janet; Loyd, Susan; Mamish, Nader; Marshall, Michael; Mitchell, Reggie; Monninger, John; Moore, Scott; OCA Distribution; OPA Resource; Orders, William; Pace, Patti; Poole, Brooke; Rabideau, Peter; Reddick, Darani; Laufer, Richard; RidsEdoDraftSrmVote Resource; RidsOcaaMailCenter Resource; RidsOcfoMailCenter Resource; RidsOgcMailCenter Resource; RidsOigMailCenter Resource; RidsOipMailCenter Resource; Baval, Rochelle; Rothschild, Trip; Joosten, Sandy; Savoy, Carmel; Sharkey, Jeffrey; Shea, Pamela; Snodderly, Michael; Sosa, Belkys; Speiser, Herald; Svinicki, Kristine; Temp, WCO; Temp, WDM; Thoma, John; Warren, Roberta; Zorn, Jason; Temp, GEA; Apostolakis, George; Tadesse, Rebecca; Butler, Gail; Perry, Jamila; Doane, Margaret; Castleman, Patrick; Montes, David; Dhir, Neha; Adler, James; Jimenez, Patricia; Muessle, Mary; Nieh, Ho; Ostendorff, William; Warnick, Greg; Pearson, Laura; Lui, Christiana

Cc: Wright, Darlene; Lewis, Antoinette

Subject: SRM - COMGEA-11-0001 - Utilization of Expert Judgment in Regulatory Decision Making

(ML110740304)

In an effort to keep the NRC staff informed of Commission decisions in a timely manner, attached for your information are the Staff Requirements Memoranda (SRMs) signed by the Secretary on March 15, 2011. Please make additional distribution to interested staff members in your office.

If you have any questions, please give me a call on 415-1969.

[1] The expert judgment approach refers to the process used to elicit information from experts, analyze this information to develop results, and determine the implications of the results to support regulatory decision making.

March 15, 2011

MEMORANDUM TO: Commissioner Apostolakis
FROM: Annette Vietti-Cook, Secretary **/RA/**
SUBJECT: COMGEA-11-0001 – UTILIZATION OF EXPERT JUDGMENT IN
REGULATORY DECISION MAKING

This memorandum is to inform you that all Commissioners have concurred in your proposal on utilizing expert judgment in regulatory decision making. The attached SRM provides staff direction on this issue.

This completes action on COMGEA-11-0001.

Attachment:
As stated

cc: Chairman Jaczko
Commissioner Svinicki
Commissioner Magwood
Commissioner Ostendorff
EDO
OGC

ML110740384 public

March 15, 2011

MEMORANDUM TO: R. W. Borchardt
Executive Director for Operations

FROM: Annette L. Vietti-Cook, Secretary **/RA/**

SUBJECT: STAFF REQUIREMENTS – COMGEA-11-0001 – UTILIZATION
OF EXPERT JUDGMENT IN REGULATORY DECISION MAKING

The staff should provide to the Commission, within 6 months, a plan for the development of guidance that will ensure that the formal utilization of expert judgment is applied consistently in regulatory decision making throughout the Agency. This plan should describe the staff's approach, schedule, and estimated resources. This plan should recognize that the development of the guidance should include the following:

- i. a summary of past and ongoing significant NRC activities that utilized expert judgment to identify the lessons-learned, document the approaches¹, and identify significant differences among the approaches,
- ii. a survey of recent research to identify promising new approaches (or techniques that can be applied within the broader approach) to expert judgment that may be appropriate for use in nuclear applications,
- iii. an evaluation of recent activities within other agencies that relied on expert judgment to identify the lessons-learned, document the approaches, and identify differences among the approaches and those used in NRC activities,
- iv. options that match the approach with the nature and significance of the issue and the extent to which expert judgment is relied upon in regulatory decision making,
- v. estimates of resources associated with each option for planning purposes,
- vi. guidance that is prescriptive enough to ensure consistent application of expert judgment within the Agency, yet is sufficiently flexible to account for the wide diversity of issues that the Agency faces. The user should be able to tailor the approach to be applicable to the unique issue of concern, and
- vii. guidance must allow flexibility in application and the use of highly stylized approaches by individual researchers, as long as scrutability is maintained.

(EDO)

(SECY Suspense: 6 months)

¹ The expert judgment approach refers to the process used to elicit information from experts, analyze this information to develop results, and determine the implications of the results to support regulatory decision making.

cc: Chairman Jaczko
Commissioner Svinicki
Commissioner Apostolakis
Commissioner Magwood
Commissioner Ostendorff
OGC
CFO
OCA
OPA
Office Directors, Regions, ACRS, ASLBP (via E-Mail)
PDR

From: [Case, Michael](#)
To: [Csonotos, Aladar](#); [Richards, Stuart](#)
Cc: [Stevens, Gary](#)
Subject: RE: BWR Mark 1 Containment Issue - Torus
Date: Wednesday, March 16, 2011 6:38:00 AM

Yes, that would be nice.

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

From: Csonotos, Aladar
Sent: Tuesday, March 15, 2011 7:46 PM
To: Case, Michael; Richards, Stuart
Cc: Stevens, Gary
Subject: BWR Mark 1 Containment Issue - Torus

Mike,

Just need to inform you about potential issues that are starting to make it in the press on the Mark 1 containment. 1) Mark 1 had design issues back in the 80's that led to lawsuits by licensees and 2) torus corrosion questions regarding reduced stress margins led a contentious debate with ACRS over the Oyster Creek license renewal and others.

Both have tons of publically available reports that may come up while the Japan issues get sorted out especially regarding our 23 Mark 1 BWRs. Gary briefed me about this before the press rediscovered the issues. If you want a brief tomorrow am, just let me know.

AI

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From: Hiland, Patrick
To: Gray, Kathy; Brown, Frederick; Uhle, Jennifer; Skeen, David; Dudes, Laura; Case, Michael; Ruland, William; Holian, Brian
Cc: Evans, Michele; Thorp, John; Thomas, Eric; Collins, Frank; Hasselberg, Rick; Holahan, Gary; OST02 HOC; McGinty, Tim; Lubinski, John
Subject: RE: Staffing the Ops Center 24/7
Date: Wednesday, March 16, 2011 8:51:37 PM

Looks fine to me.

From: Gray, Kathy
Sent: Wednesday, March 16, 2011 4:48 PM
To: Brown, Frederick; Uhle, Jennifer; Skeen, David; Dudes, Laura; Hiland, Patrick; Case, Michael; Ruland, William; Holian, Brian
Cc: Evans, Michele; Thorp, John; Thomas, Eric; Collins, Frank; Hasselberg, Rick; Holahan, Gary; OST02 HOC; McGinty, Tim; Lubinski, John
Subject: RE: Staffing the Ops Center 24/7

RST Directors:

Attached you will find the RST Director schedule for March 19-April 10. If you have any questions or conflicts, please let me know. Thanks!

From: Brown, Frederick
Sent: Tuesday, March 15, 2011 9:28 PM
To: Uhle, Jennifer; Skeen, David; Dudes, Laura; Hiland, Patrick; Monninger, John; Case, Michael; Holahan, Gary; Ruland, William; Giitter, Joseph
Cc: Evans, Michele; Thorp, John; Thomas, Eric; Gray, Kathy; Collins, Frank; Hasselberg, Rick
Subject: Re: Staffing the Ops Center 24/7

I'm going to ask John Thorp to have Kathy Gray coordinate the RST director position for us.

From: OST02 HOC
To: Uhle, Jennifer; Skeen, David; Dudes, Laura; Hiland, Patrick; Monninger, John; Case, Michael; Holahan, Gary; Ruland, William; Brown, Frederick
Cc: Evans, Michele
Sent: Tue Mar 15 18:20:18 2011
Subject: Staffing the Ops Center 24/7

RST Directors:

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

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

We'd like to have a little more consistency in the staffing of most positions. So we'd

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like to staff the RST director in 4 day blocks, three shifts each day, starting March 19.

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

Michele

From: [Case, Michael](#)
To: [Sangimino, Donna-Marie](#)
Subject: RE: NRC travel to Japan
Date: Wednesday, March 16, 2011 2:08:00 PM

Thanks. You're terrific.

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

Mike,

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

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

Donna-Marie Sangimino

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

Donna-Marie.Sangimino@nrc.gov
(+1) 301-251-7673

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From: [Case, Michael](#)
To: [Dion, Jeanne](#)
Subject: RE: Follow-up from 4 pm teleconference on Ops Center Long Term Staffing
Date: Wednesday, March 16, 2011 2:20:00 PM

Severe Accident Management Guidelines (typically some of the PRA folks, reactor systems folks and maybe the human factors folks would have knowledge in that area.

From: Dion, Jeanne
Sent: Wednesday, March 16, 2011 2:19 PM
To: Case, Michael
Subject: RE: Follow-up from 4 pm teleconference on Ops Center Long Term Staffing

Thanks Mike,
In the table, what is SAMG?

Jeanne

From: Case, Michael
Sent: Wednesday, March 16, 2011 2:17 PM
To: Dion, Jeanne
Cc: Sheron, Brian; Uhle, Jennifer
Subject: FW: Follow-up from 4 pm teleconference on Ops Center Long Term Staffing

Hi Jeanne. With respect to the Op Center request, although about a dozen folks volunteered, I did not think any were a particularly good fit for the op center critical skills. Sapna Hurd, Tom Koshy and myself are already participating from DE.

From: Sheron, Brian
Sent: Wednesday, March 16, 2011 7:41 AM
To: Case, Michael; Coe, Doug; Correia, Richard; Gibson, Kathy; Lui, Christiana; Richards, Stuart; Sangimino, Donna-Marie; Scott, Michael; Uhle, Jennifer; Valentin, Andrea
Subject: FW: Follow-up from 4 pm teleconference on Ops Center Long Term Staffing

Here is the list of expertise the Op center is looking for.

From: Evans, Michele
Sent: Tuesday, March 15, 2011 5:53 PM
To: Hackett, Edwin; Brenner, Eliot; Schmidt, Rebecca; Powell, Amy; Droggitis, Spiros; Doane, Margaret; Mamish, Nader; Dyer, Jim; Brown, Milton; Greene, Kathryn; Stewart, Sharon; Howard, Patrick; Miller, Charles; Moore, Scott; Cohen, Miriam; Tracy, Glenn; Haney, Catherine; Dorman, Dan; Johnson, Michael; Holahan, Gary; Leeds, Eric; Boger, Bruce; Grobe, Jack; Zimmerman, Roy; Campbell, Andy; Sheron, Brian; Uhle, Jennifer; Dean, Bill; Lew, David; McCree, Victor; Wert, Leonard; Casto, Chuck; Satorius, Mark; Pederson, Cynthia; Collins, Elmo; Howell, Art; Muessle, Mary; Andersen, James; Akstulewicz, Brenda; Belmore, Nancy; Quesenberry, Jeannette; Kreuter, Jane; Armstrong, Janine; Hudson, Sharon; Ellis, Marv; Hasan, Nasreen; Ronewicz, Lynn; Schumann, Stacy; Daniels, Stanley; Casby, Marcia; Thomas, Loretta; Walker, Dwight; Sprogeris, Patricia; Schwarz, Sherry; Ross, Robin; Cohen, Shari; Riddick, Nicole; Flory, Shirley; Veltri, Debra; Matakas, Gina; ODaniell, Cynthia; Miles, Patricia; Lee, Pamela; Dubose, Sheila; Buckley, Patricia; Tomczak, Tammy; Owen, Lucy; Tannenbaum, Anita; Gusack, Barbara; Harrington, Holly; Ricketts, Paul; Howell, Linda; Higginbotham, Tina; Ross, Brenda; Boyce, Thomas (OIS); Schaeffer, James; Jackson, Donald
Subject: Follow-up from 4 pm teleconference on Ops Center Long Term Staffing

Everyone,

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Please find attached 1) a list of current positions being staffed in the Ops Center and 2) the staff identified as available to support in Japan.

Regarding additional staff available to support in the ops center, the primary needs are for the specialized positions on the PMT and anyone with previous international experience in OIP.

Regarding support in Japan, please provide any updates/changes to the list by COB March 17. The target time frame for sending these staff members is March 27-April 9, so please consider that when considering staff to put on the list.

Thanks for your support.

Michele

From: [Richards, Stuart](#)
To: [Graves, Herman](#)
Cc: [Hogan, Rosemary](#); [Case, Michael](#)
Subject: RE: MANY, MANY THANKS
Date: Monday, March 21, 2011 1:39:01 PM

Herman

Well Done! Thank you for all of the hard work on this.

Stu

From: Graves, Herman
Sent: Monday, March 21, 2011 12:56 PM
To: Hogan, Rosemary; Case, Michael; Richards, Stuart
Subject: FW: MANY, MANY THANKS

FYI. DE staff contributed to today's briefing.

<<Herman>>

<<301.251.7625>>

[mail to: Herman.Graves@nrc.gov](mailto:Herman.Graves@nrc.gov)

From: Khanna, Meena
Sent: Monday, March 21, 2011 12:51 PM
To: Kammerer, Annie; Chokshi, Nilesh; Stutzke, Martin; Farzam, Farhad; Mathew, Roy; Matharu, Gurcharan; Munson, Clifford; Jones, Henry; See, Kenneth; Wescott, Rex; Pelton, David; Terao, David; Cook, Christopher; Graves, Herman; Pires, Jose; Karas, Rebecca
Cc: Wilson, George
Subject: FW: MANY, MANY THANKS

Just wanted to echo what Allen said and share this with you to express our gratitude to all of you for your support of the comm. briefing..thanks again.

From: Howe, Allen
Sent: Monday, March 21, 2011 12:15 PM
To: Boska, John; Gratton, Christopher; Tully, Bridin; Sola, Clara; Miller, Ed; Mahoney, Michael; Andersen, James; Wittick, Susan; Deegan, George; Scott, Michael; Williams, Kevin; Milligan, Patricia; Wilson, George; Bowman, Eric; Thomas, Eric; Collins, Timothy; Harrison, Donnie; Salley, MarkHenry; Kammerer, Annie; Ramsey, Jack; Hall, Randy; Thadani, Mohan; Khanna, Meena; Dion, Jeanne; Shropshire, Alan; Williams, Donna; Bajwa, Chris; VandenBerghe, John; Johnson, Don; Patterson, Malcolm; Kahler, Robert; Anderson, Joseph; Tam, Peter; Pickett, Douglas; Martin, Robert; Sullivan, Randy; Norris, Michael; Kahler, Robert; Ellmers, Glenn
Cc: Brenner, Eliot; Holahan, Gary; Uhle, Jennifer; Piccone, Josephine; Doane, Margaret; Leeds, Eric; Grobe, Jack; Boger, Bruce; Ruland, William; Brown, Frederick; Holian, Brian; Westreich, Barry; Lee, Samson; Cheok, Michael; Harrington, Holly; Uhle, Jennifer; Sheron, Brian; Borchardt, Bill
Subject: MANY, MANY THANKS

Folks – the Commission meeting on the Japan event was an extremely high profile, short turnaround request. You all exemplified the best of what this agency is all about: outstanding cooperation, teamwork, and excellence in this effort. The focus and help was tremendous and many worked long hours including through the weekend to support this accomplishment. My sincere thanks to all of you for your hard work and dedication in

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making this meeting a success.

Thank you -

Allen Howe, Deputy Director
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission

P.S. many folks worked on this – apologies if I missed someone. Please forward to anyone that I may have missed.

From: Gray, Kathy
To: Brown, Frederick; Uhle, Jennifer; Skeen, David; Dudes, Laura; Hiland, Patrick; Case, Michael; Ruland, William; Glitter, Joseph
Cc: Thorp, John; Thomas, Eric; Holahan, Gary
Subject: RST Director Schedule
Date: Wednesday, March 16, 2011 10:30:54 AM
Importance: High

As you know, I've been asked to coordinate the RST Director schedule, starting with mid-shift 3/18 (2300-7:00am). They would like for us to staff in 4-day blocks. Before I prepare the schedule, I'd like to see if anyone would like to volunteer for the mid-shifts. Also, if you have any days/shifts that you absolutely cannot cover, please let me know. A prompt response would be most appreciated.

Thanks!

Kathy A. Gray
Information Management Asst.
Operating Experience Branch, DIRS/NRR
301-415-1166, Rm. O-7F04
Kathy.Gray@nrc.gov

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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 8:12:59 PM

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 as seismic contacts for RST and OPA, they should undertake the following actions:

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- 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 Nilesch when he is on duty in the Ops Center.

From: [Case, Michael](#)
To: [Lorette, Phillip](#)
Subject: FW: Japan Nuclear Emergency
Date: Wednesday, March 16, 2011 7:56:00 AM
Attachments: [Fukushima Event - FPLSummary.ppt](#)
[ANS Japan Backgrounder11.pdf](#)
[America Needs More Nuclear Power The Philly Post.mht](#)

Please print me the first file in color.

From: Aggarwal, Satish
Sent: Tuesday, March 15, 2011 10:26 AM
To: Case, Michael
Cc: Koshy, Thomas
Subject: Japan Nuclear Emergency

FYI

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Attachment Fukushima_Event_-_FPLSummary_1.ppt (1405952 Bytes) cannot be converted to PDF format.

American Nuclear Society Backgrounder: Japanese Earthquake/Tsunami; Problems with Nuclear Reactors

3/12/2011 5:22 PM EST

To begin, a sense of perspective is needed... right now, the Japanese earthquake/tsunami is clearly a catastrophe; the situation at impacted nuclear reactors is, in the words of IAEA, an "Accident with Local Consequences."

The Japanese earthquake and tsunami are natural catastrophes of historic proportions. The death toll is likely to be in the thousands. While the information is still not complete at this time, the tragic loss of life and destruction caused by the earthquake and tsunami will likely dwarf the damage caused by the problems associated with the impacted Japanese nuclear plants.

What happened?

Recognizing that information is still not complete due to the destruction of the communication infrastructure, producing reports that are conflicting, here is our best understanding of the sequence of events at the Fukushima I-1 power station.

- The plant was immediately shut down (scrammed) when the earthquake first hit. The automatic power system worked.
- All external power to the station was lost when the sea water swept away the power lines.
- Diesel generators started to provide backup electrical power to the plant's backup cooling system. The backup worked.
- The diesel generators ceased functioning after approximately one hour due to tsunami induced damage, reportedly to their fuel supply.
- An Isolation condenser was used to remove the decay heat from the shutdown reactor.
- Apparently the plant then experienced a small loss of coolant from the reactor.
- Reactor Core Isolation Cooling (RCIC) pumps, which operate on steam from the reactor, were used to replace reactor core water inventory, however, the battery-supplied control valves lost DC power after the prolonged use.
- DC power from batteries was consumed after approximately 8 hours.
- At that point, the plant experienced a complete blackout (no electric power at all).
- Hours passed as primary water inventory was lost and core degradation occurred (through some combination of zirconium oxidation and clad failure).

- Portable diesel generators were delivered to the plant site.
- AC power was restored allowing for a different backup pumping system to replace inventory in reactor pressure vessel (RPV).
- Pressure in the containment drywell rose as wetwell became hotter.
- The Drywell containment was vented to outside reactor building which surrounds the containment.
- Hydrogen produced from zirconium oxidation was vented from the containment into the reactor building.
- Hydrogen in reactor building exploded causing it to collapse around the containment.
- The containment around the reactor and RPV were reported to be intact.
- The decision was made to inject seawater into the RPV to continue to the cooling process, another backup system that was designed into the plant from inception.
- Radioactivity releases from operator initiated venting appear to be decreasing.

Can it happen here in the US?

- While there are risks associated with operating nuclear plants and other industrial facilities, the chances of an adverse event similar to what happened in Japan occurring in the US is small.
- Since September 11, 2001, additional safeguards and training have been put in place at US nuclear reactors which allow plant operators to cool the reactor core during an extended power outage and/or failure of backup generators – “blackout conditions.”

Is a nuclear reactor "meltdown" a catastrophic event?

- Not necessarily. Nuclear reactors are built with redundant safety systems. Even if the fuel in the reactor melts, the reactor's containment systems are designed to prevent the spread of radioactivity into the environment. Should an event like this occur, containing the radioactive materials could actually be considered a "success" given the scale of this natural disaster that had not been considered in the original design. The nuclear power industry will learn from this event, and redesign our facilities as needed to make them safer in the future.

What is the ANS doing?

ANS has reached out to The Atomic Energy Society of Japan (AESJ) to offer technical assistance.

ANS has established an incident communications response team.

This team has compiling relevant news reports and other publicly available information on the ANS blog, which can be found at ansnuclearcafe.org.

The team is also fielding media inquiries and providing reporters with background information and technical perspective as the events unfold.

Finally, the ANS is collecting information from publicly available sources, our sources in government agencies, and our sources on the ground in Japan, to better understand the extent and impact of the incident.

Attachment America Needs More Nuclear Power The Philly P_1.mht (891814 Bytes) cannot be converted to PDF format.

From: [Dion, Jeanne](#)
To: [Weerakkody, Sunil](#)
Cc: [Uhle, Jennifer](#); [Sheron, Brian](#); [Richards, Stuart](#); [Case, Michael](#); [Hogan, Rosemary](#); [Rini, Brett](#); [Rivera-Lugo, Richard](#); [Armstrong, Kenneth](#); [Kammerer, Annie](#)
Subject: Tsunami documents from RES
Date: Wednesday, March 16, 2011 12:35:49 PM
Attachments: [FW Quick Question regarding any Published RES Documents Related to Tsunamis.msg](#)

Sunil,

Per your request, here are two letter reports regarding tsunamis. If you have additional specific questions please call the Op center and ask to speak with a Reactor Safety team seismologist.

"Evaluation of Tsunami Sources with the Potential to Impact the US Atlantic and Gulf Coasts" ML082960196

"The Current State of Knowledge Regarding Potential Tsunami Sources Affecting U.S. Atlantic and Gulf Coasts." ML082960196

Let me know if I can be of further assistance.

Thanks,

Jeanne Dion
Technical Assistant (Acting)
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
jeanne.dion@nrc.gov
301-251-7482

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Attachment FW Quick Question regarding any Published RES .msg (2560 Bytes) cannot be converted to PDF format.

From: Schwarz, Sherry on behalf of Leeds, Eric
To: NRR Distribution
Subject: Appreciation and Continued Mission Focus
Date: Wednesday, March 16, 2011 5:05:50 PM

NRR

During this period of heightened activity in response to the events in Japan, I want to take the time to let you know how much I value the work that all of you do in NRR. Some of you are providing key support in emergency response, while others are performing the equally vital day-to-day regulatory duties. Throughout these distracting times abroad, it is so important to keep our focus on the safe operation of nuclear power plants here in the United States. Whether you are involved with licensing actions, technical analysis, budget preparations, or administrative functions to help us execute our essential regulatory work, your continued dedication and commitment are vital for us to maintain our mission of protecting the American public's health and safety.

I know that there can be anxiety and stress as events unfold; take time to take good care of yourself. To keep informed, there will be periodic updates from the EDO, and I encourage you to stay abreast of the agency's public announcements and blog at www.nrc.gov. As regulators, we excel at our steadiness in protecting people and the environment. Again, thanks for all you do.

Eric

4/79

From: Leeds, Eric 1 NR
To: Howe, Allen; Ruland, William; Boyer, Bruce; Grobe, Jack
Cc: Brown, Frederick; McGinty, Tim; Glitter, Joseph; Hiland, Patrick
Subject: Brain-storming upcoming Commish meeting
Date: Wednesday, March 16, 2011 1:34:17 PM

Allen/all –

I will undoubtedly need your help in crafting the staff's messages for the upcoming Commission meeting on the Japanese event. If there is a public part of this meeting, and there probably will be, it will be a good opportunity for us to get out the message that we have requirements in place for severe accident management, 50.63 SBO, flooding, 50.54hh(2), Mark I containment improvements, etc. Please brainstorm how we can make that part of our message to the Commission. A lot of what I think we need to do with our licensees, at least in the near term, is to verify what they are already required to do. It might make a good message for the public.

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

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Kuritzky, Alan

From: Kuritzky, Alan
Sent: Wednesday, March 16, 2011 7:09 AM
To: Uhle, Jennifer
Subject: FW: B5b

Jennifer,

I know that the Ops Center is already on top of the B5b work, but if for some reason they don't know the main POC, it is Eric Bowman. Note, all of the licensee and NRC plant-specific lists of potential mitigation strategies included strategies for mitigating release, in addition to preventing core damage.

For what it's worth,
Alan

From: Rosenberg, Stacey
Sent: Tuesday, March 15, 2011 5:23 PM
To: Kuritzky, Alan
Subject: RE: B5b

Hi Alan,

I believe my branch still has purview for that. Eric Bowman is the POC.

Stacey

From: Kuritzky, Alan
Sent: Tuesday, March 15, 2011 8:26 AM
To: Rosenberg, Stacey
Subject: B5b

Hi, Stacey.

Do you know who "owns" the B5b work now? Specifically, do you know who maintains the files that contain all of the individual plant B5b reports and other summary documentation that came out of the NRC's B5b program?

Thanks,
Alan

4/8/11

Marksberry, Don

From: Coyne, Kevin
Sent: Wednesday, March 16, 2011 11:50 AM
To: Ibarra, Jose
Cc: Marksberry, Don; Kuritzky, Alan
Subject: Inputs from PRB/PRAB on IRC

Jose –

Add the following to your list:

Marty Stutzke – PRA, systems

Don Helton (available after March 18) – thermal hydraulics, spent fuel behavior, system modeling, severe accidents

Don Marksberry – IRC coordination

Doug Coe – Available after March 20, system knowledge, PRA

-Kevin

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From: Howe, Allen *1 nkr*
To: Ruland, William; Leeds, Eric; Gitter, Joseph
Subject: FW: **Update 1:15pm March 16** Information on the Japanese Earthquake and Reactors in that Region
Date: Wednesday, March 16, 2011 2:11:50 PM

FYI

From: NEIGA@nei.org [mailto:NEIGA@nei.org]
Sent: Wednesday, March 16, 2011 2:01 PM
To: Howe, Allen
Subject: **Update 1:15pm March 16** Information on the Japanese Earthquake and Reactors in that Region



UPDATE AS OF 1:15 P.M. EDT, WEDNESDAY, MARCH 16:

NEI has posted an updated version of the fact sheet Used Nuclear Fuel Storage at the Fukushima Daiichi Nuclear Power Plant. Also available is a new fact sheet called Industry Taking Action to Ensure Continued Safety at U.S. Nuclear Energy Plants.

As always, please go to <http://resources.nei.org/japan> for the latest updates.

Click [here](#) to unsubscribe



4/83

From: Miranda, Samuel *17/2/11*
To: Mendiola, Anthony; Ruland, William
Cc: Martin, Robert
Subject: Fukushima Daiichi reactor status reports
Date: Wednesday, March 16, 2011 1:16:27 PM

You can obtain the status of the six Fukushima Daiichi reactors, updated several times per day, by going to

<http://www.jaif.or.jp/english/> and clicking on the reactor status link at the top of the list. Prior status reports appear below it on the list.

(Thanks to Bob Martin for this source.)

Samuel Miranda, Sr Reactor Sys Engr

U.S. Nuclear Regulatory Commission

NRR/DSS/SRXB - (301) 415-2303

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From: Ruland, William *NR*
To: Howe, Allen
Subject: Fw: Planning for upcoming, short notice Commission meeting
Date: Wednesday, March 16, 2011 2:40:40 PM
Attachments: Scheduling NoteMar2011 JapaneseEvent agh 3-16-2011.docx

Bill Ruland, from
USNRC Blackberry

From: Correia, Richard *NSIR*
To: Ruland, William; Evans, Michele
Cc: Erlanger, Craig; Westreich, Barry; Layton, Michael; Shropshire, Alan; VandenBerghe, John; Holahan, Patricia
Sent: Wed Mar 16 14:38:00 2011
Subject: Fw: Planning for upcoming, short notice Commission meeting

Bill. The NSIR POCs are:
John Vanden Berghe and Alan Shropshire.
Rich Correia, Director
Division of Security Policy
NSIR

From: Evans, Michele *NSIR*
To: Correia, Richard
Sent: Wed Mar 16 14:05:39 2011
Subject: FW: Planning for upcoming, short notice Commission meeting

Please provide the POC as we discussed. Thanks

From: Ruland, William *NR*
Sent: Wednesday, March 16, 2011 1:19 PM
To: Williams, Donna; Uhle, Jennifer; Sheron, Brian; Moore, Scott; Miller, Charles; Brenner, Eliot; Haney, Catherine; Dorman, Dan; Wiggins, Jim; Evans, Michele; Doane, Margaret; Mamish, Nader
Cc: Johnson, Michael; Holahan, Gary; Leeds, Eric; Grobe, Jack; Howe, Allen
Subject: Planning for upcoming, short notice Commission meeting

Folks,

Attached find a early draft of a scheduling note for a Commission meeting that may be held as early as this coming Monday, March 21st. NRR has been assigned as the lead to pull the meeting together. As you could imagine, this will take some effort. To help with coordination, please provide me a contact so that we can draw on your expertise and help to make this happen. Alan Howe, currently deputy director of DORL, has the lead to pull this together.

I know you have many questions. I'd ask for your patience as we try to get this done. I'll keep you updated through the contact that you provide to us.

Thank you very much.

Bill Ruland

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Draft: 3/16/11

SCHEDULING NOTE

Title: BRIEFING ON JAPANESE EVENT and US RESPONSE (Public?)

Purpose: To provide the Commission a status on the recent event in Japan, and to provide an overview of staff actions to date, early planned actions

Scheduled: **March XX, 2011**
9:00 am

Duration: Approx. 2 hours

Location: Commissioners' Conference Room OWFN

Participants: **Presentation**

NRC Staff Panel **50 mins.***

Bill Borchardt, Executive Director for Operations **15 mins.***
Topic: Overview of Japanese Event and U.S. response

Mike Weber, Deputy Executive Director Materials, Waste, Research, State, Tribal and Compliance Programs **10 mins.***
Topic: Potential consequences; what will be seen in U.S.

Marty Virgilio, Deputy Executive Director for Reactor and Preparedness Programs **10 mins.***
Topic: Situation assessment for U.S. reactors and applicants

Elliot Brenner, OPA **5 mins.***
Topic: Communication Challenges

Eric Leeds, Director, NRR **10 mins.***
Topic: Path forward; Near term and longer term

Commission Q & A **30 mins.**

Discussion – Wrap-up **5 mins.**

Break **10 mins.**

Closed session

Strategy and agenda planning

Documents:

Staff background material due to SECY: March __, 2011.

Slides due to SECY: March __, 2011.

From: [NRC Announcement](#)
To: [NRC Announcement](#)
Subject: General Interest: U.S. House of Representatives Energy and Commerce Committee hearing today, March 16 @ 9:30 AM
Date: Wednesday, March 16, 2011 9:55:29 AM

NRC Daily Announcements



Highlighted Information and Messages



Wednesday March 16, 2011 -- Headquarters Edition

General Interest: U.S. House of Representatives Energy and Commerce Committee hearing today, March 16 @ 9:30 AM

General Interest: U.S. House of Representatives Energy and Commerce Committee hearing today, March 16 @ 9:30 AM

Chairman Jaczko and Energy Secretary Chu will be testifying this morning at a joint hearing of two subcommittees of the House Energy and Commerce Committee, scheduled to begin @ 9:30 a.m. This event can be viewed on C-Span 3, which is channel 39 (NRC Broadband) and is expected to be available on the C-Span website. The hearing was originally scheduled to examine the FY2012 budget, but has been expanded to provide an opportunity for Congress to formally receive a status update on the Japanese nuclear facilities damaged by the earthquake and tsunami. There also will be a Senate Environment and Public Works Committee briefing this afternoon at 3:30 p.m. that is expected to be carried on C-Span.



(2011-03-16 00:00:00.0)

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[Frequently Asked Questions About the NRC Daily Announcements Email](#)

u/86

From: [HRMSBulletin Resource](#)
To: [HRMSBulletin Resource](#)
Cc: [HRMSBulletin Resource](#)
Subject: New Agency Wide TAC Number
Date: Wednesday, March 16, 2011 9:52:58 AM

All Employees,

Due to the most current event in Japan, the Agency has decided to establish a new Agency wide Activity Code. It is: ZG0061 - Japan Earthquake and Tsunami. The PA will be: 111180 – Response Program-Event/Response - Operating RX. Please be reminded that if you charged hours to D92374 in PP6, you will need to submit a corrected time card and use the new TAC number ZG0061 under PA 111180. Also please contact your T & L Coordinator to have that TAC established in your profile.

Thank you for your cooperation.

Time, Labor and Payroll Services

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From: Howe, Allen *MYR*
To: Check, Michael; Holian, Brian; Ruland, William; Wilson, George; Lubinski, John; Thomas, Brian; Quay, Theodore; Nelson, Robert; Gitter, Joseph; Brown, Frederick
Subject: Outline from today's emergency LT attached
Date: Wednesday, March 16, 2011 11:23:21 AM
Attachments: Commission Meeting Outline.pdf

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open & closed

Commission Meeting Outline

NRC Response to Core Damage Accident in Japan

Current Status of Fukushima Daiichi

- Reactors
- Spent Fuel Pools

Consequence Projections

NRC Response Objectives

- Support of US Citizens in Japan
- Support of the Japanese Government
- Advance Our Understanding of Safety and Risk

NRC Response Actions

- In Japan
- At HQ

US Government Response

- NRC Partners and Stakeholders

Challenges to Success in the Response

- Information
- Coordination

Situation Assessment For US Reactors and Applicants (JCO)

- External Events
- Severe Accidents

Path Forward and Priorities

- Near Term Actions
 - In Support of Response
- Longer Term Actions
 - Lessons Learned From this Event
 - Resolution of GSI 19 ⁹

What's not getting done

From: [Case, Michael](#)
To: [Graves, Herman](#); [Hogan, Rosemary](#); [Csonotos, Aladar](#); [Koshy, Thomas](#); [Lin, Bruce](#); [Boyce, Tom \(RES\)](#); [Ali, Syed](#); [Murphy, Andrew](#); [Tregoning, Robert](#); [Gavrilas, Mirela](#); [Sydnor, Russell](#); [Lorette, Phillip](#)
Cc: [Richards, Stuart](#)
Subject: FW: IRC Staffing
Date: Wednesday, March 16, 2011 7:15:00 AM

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

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

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

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

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

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

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

I will forward the list of desired disciplines as soon as I receive them from Michele. Michele said she will be looking for the list of potential IRC replacements by COB tomorrow

W/89

(3/16/11), thus, I will need your candidates by mid-afternoon.

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

Kuritzky, Alan

From: Kuritzky, Alan
Sent: Wednesday, March 16, 2011 1:59 PM
To: Wood, Jeffery
Subject: RE: IRC Staffing

I knew if I ignored your email long enough, you'd come up with the right answer.

From: Wood, Jeffery
Sent: Wednesday, March 16, 2011 12:01 PM
To: Kuritzky, Alan
Subject: RE: IRC Staffing

Don said Kevin is on it, so actually ... No Action Needed!!!

From: Wood, Jeffery
Sent: Wednesday, March 16, 2011 11:41 AM
To: Kuritzky, Alan
Subject: FW: IRC Staffing

I assume this is yours. Sorry, this time action is needed.

From: Ibarra, Jose
Sent: Wednesday, March 16, 2011 11:38 AM
To: Marksberry, Don; Wood, Jeffery
Subject: IRC Staffing

Don and Jeff,
Send me the names of staff that could staff the Incident Response Center. I am compiling the list for DRA.
Kevin wanted the list by 11am. Thanks. Jose

Scott, Michael

From: Scott, Michael
Sent: Wednesday, March 16, 2011 2:19 PM
To: Weerakkody, Sunil
Subject: FW: Calls for answering questions on earthquakes, etc, in support of Japanese event activities

Sunil:

Seems that, per below, I should have forwarded your request to the Opcen. Sorry about that.

Mike

From: Karas, Rebecca
Sent: Wednesday, March 16, 2011 12:05 PM
To: NRO_DSER Distribution
Cc: Chokshi, Nilesh; Kammerer, Annie; Munson, Clifford
Subject: Calls for answering questions on earthquakes, etc, in support of Japanese event activities

All,

Based on what just happened, individuals within NRC appear to be either randomly calling geologists/geophysicists/hydrologists or people they happen to know to answer questions.

For callers who are NRC staff who ask you a question, please direct them to call the Ops Center and ask to be connected to the RST seismologist (Cliff on day shift, Annie on evening shift). That person will coordinate all question responses (if Cliff or Annie call you, provide any support they need to help answer these questions).

For callers who are NOT NRC staff (including people from other agencies), please continue to follow the direction of the EDO here:

THIS IS NOT A DRILL

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

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

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

U.S. nuclear power plants are built to withstand environmental hazards, including earthquakes and tsunamis. Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such

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a natural disaster. The NRC requires that safety significant structures, systems, and components be designed to take in account the most severe natural phenomena historically estimated for the site and surrounding area.

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

Two important reminders:

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

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

Other Sources of Information:

USAID – www.usaid.gov

U.S. Department of State – www.state.gov

FEMA – www.fema.gov

White House – www.whitehouse.gov

Nuclear Energy Institute – www.nei.org

International Atomic Energy Agency – www.iaea.org/press

No response to this message is required.

THIS IS NOT A DRILL

Rebecca Karas, Chief
Geosciences and Geotechnical Engineering Branch 1
Division of Site and Environmental Reviews
Office of New Reactors
U.S. Nuclear Regulatory Commission
Phone: 301-415-7533
Fax: 301-415-5397

Coyne, Kevin

From: Coyne, Kevin
Sent: Wednesday, March 16, 2011 5:26 PM
To: Demoss, Gary
Subject: FW: In case somebody asks

For what it's worth....

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

From: Sancaktar, Selim
Sent: Tuesday, March 15, 2011 10:53 AM
To: Coyne, Kevin
Subject: FW: In case somebody asks

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

From: Sancaktar, Selim
Sent: Tuesday, March 15, 2011 10:19 AM
To: Ferrante, Fernando
Cc: Sancaktar, Selim
Subject: RE: In case somebody asks

Hi Fernando,

I looked at the Monticello model very quickly; I think Fukushima event sequences may be 2-40-13 or 2-40-18 in seismic bin-3 SBO event tree.

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

From: Ferrante, Fernando
Sent: Monday, March 14, 2011 10:13 PM
To: Sancaktar, Selim
Cc: Mitman, Jeffrey
Subject: RE: In case somebody asks

Selim, I am looking at the model and it appears to be either LOOPWR: 40-10/LOOPWR: 40-07/LOOPWR: 40-05 for Fukushima-Daichi Unit 1, is that correct?

From: Sancaktar, Selim
Sent: Monday, March 14, 2011 9:22 AM
To: Coyne, Kevin; Kuritzky, Alan
Cc: Sancaktar, Selim; Demoss, Gary; Ferrante, Fernando; Mitman, Jeffrey
Subject: In case somebody asks

IN SPAR all hazards models, we explicitly model the CDF phase of a seismic event sequence like the one happened to Fukushima 1.

In fact, we have the model for a similar GE 3 domestic plant, Monticello.

Bensi, Michelle

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

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

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

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

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

Annie

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Kuritzky, Alan

From: Coe, Doug
Sent: Wednesday, March 16, 2011 7:36 PM
To: Coyne, Kevin; Salley, MarkHenry; Kuritzky, Alan; Marksberry, Don; Ott, William; Beasley, Benjamin
Cc: Demoss, Gary; Stutzke, Martin; Ibarra, Jose; Hudson, Daniel; Peters, Sean; Xing, Jing; Correia, Richard
Subject: RE: RES support for commission meeting on Monday 3/21.

I expect this will be a public meeting and therefore our key messages must be couched accordingly. RES/DRA will likely get asked to provide bullets on our work on PRA model improvement in general and on GI-199 in particular. The level III work is still formative, and we should be careful not to over-commit it toward seismic or any other particular focus area. We'll see what the scheduling call brings tomorrow.

From: Coyne, Kevin
Sent: Wednesday, March 16, 2011 6:56 PM
To: Salley, MarkHenry; Kuritzky, Alan; Marksberry, Don; Ott, William; Beasley, Benjamin
Cc: Demoss, Gary; Stutzke, Martin; Ibarra, Jose; Hudson, Daniel; Peters, Sean; Xing, Jing; Coe, Doug; Correia, Richard
Subject: FW: RES support for commission meeting on Monday 3/21.

Just wanted to give you a head's up...

Still a bit fuzzy exactly what we need to provide, but we will need to help NRR with this emergent Commission briefing. NRR has the lead, but we need to be ready to lend a hand. More specifics will come after an Office TA scheduling call tomorrow, but you may want to start thinking about these topics:

Bill Borchardt intends to cover:

Advance Our Understanding of Safety and Risk

Marty Virgilio's portion will cover:

- External Events
 - Seismic
 - Flood
 - Tsunamis
- Severe Accidents
 - SBO
 - B.5.b/50.54 (hh)(2)
 - SAMGs
 - Hydrogen control
 - Emergency planning

- Spent Fuel

Bill Borchardt's talk seems more in the DSA area (but might provide an opening for the emerging Level 3 project). Marty Virgilio appears to be touching on topics with some tie to DRA (particularly if NRR wants to address relative risk significance of these events for the US or touch on GI-199). It's a short briefing, so everything would be at a very high level. Obviously, once we have feedback from NRR we'll have a better idea where to head with this...

Kevin

From: Dion, Jeanne

Sent: Wednesday, March 16, 2011 6:43 PM

To: Coe, Doug; Gibson, Kathy; Coyne, Kevin; Case, Michael; Sheron, Brian; Uhle, Jennifer

Cc: Rini, Brett; Armstrong, Kenneth

Subject: RES support for commission meeting on Monday 3/21.

NRR has requested RES to support a commission briefing on Monday 3/21. They are looking for background information, slides, key messages, talking points and possible Q&A- see the attached message. This might be a public meeting- our input will need to be fairly high level. NRR will provide more information after the EDO alignment meeting tomorrow 3/17.

Bill Borchardt's presentation, "Overview of Japanese Event and US response"

- RES to provide slides/information on "Advancing our understanding of safety and risk" (more info to come)

Mike Weber's presentation, "Situation assessment for US reactors and applicants"

- RES to provide slides/information on "Consequence Projections in Japan and what we might expect to see in the US"

Marty Virgilio's presentation, "Situation assessment for US reactors and applicants."

-RES to assist NRR as requested.

I will be in a meeting tomorrow morning (8am to noon)- Kenneth Armstrong will attend the 8:45am meeting.

Thanks,

Jeanne Dion

Technical Assistant (Acting)

U.S. Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

jeanne.dion@nrc.gov

301-251-7482

From: Collins, Elmo *RE*
To: Ruland, William
Subject: RE: A link for information about the Japanese reactors.
Date: Wednesday, March 16, 2011 1:40:53 PM

Thanks Bill
Elmo

From: Ruland, William *WR*
Sent: Wednesday, March 16, 2011 12:21 PM
To: Collins, Elmo; McCree, Victor; Satorius, Mark; Dean, Bill
Subject: A link for information about the Japanese reactors.

<http://www.jaif.or.jp/english/>

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From: Dean, Bill 121
To: Ruland, William
Subject: RE: A link for information about the Japanese reactors.
Date: Wednesday, March 16, 2011 10:43:22 PM

super. thanks

From: Ruland, William
Sent: Wednesday, March 16, 2011 1:21 PM
To: Collins, Elmo; McCree, Victor; Satorius, Mark; Dean, Bill
Subject: A link for information about the Japanese reactors.

<http://www.jaif.or.jp/english/>

4/96

From: Harrington, Holly (OPA)
To: Howe, Allen; Wittick, Susan
Cc: Ruland, William; Leeds, Eric
Subject: RE: Draft Scheduling Note for Japan event 3-16-2011
Date: Wednesday, March 16, 2011 3:25:39 PM

Susan, from OCA, is helping us out in OPA and I've asked her to take this on for us. Susan – pls give him a call ... thank you all

From: Howe, Allen (MRC)
Sent: Wednesday, March 16, 2011 2:10 PM
To: Harrington, Holly
Cc: Ruland, William; Leeds, Eric
Subject: FW: Draft Scheduling Note for Japan event 3-16-2011
Importance: High

Holly – I appreciate the challenges you are facing right now with the blizzard of requests coming to your office. I am coordinating a Commission briefing on the Japan event to be conducted as early as Monday. The draft scheduling note is attached. We are reaching out to impacted offices to prepare for the brief. I have Eliot Brenner as a speaker to discuss communication challenges. What is needed is a POC who can engage in preparations to develop slides and talking points for Eliot. The POC is needed ASAP.

Thanks for your help - Allen

From: Howe, Allen
Sent: Wednesday, March 16, 2011 1:18 PM
To: Merzke, Daniel; Andersen, James
Cc: Leeds, Eric; Ruland, William; Giitter, Joseph; Boger, Bruce; Grobe, Jack; Virgilio, Martin; Weber, Michael; Borchardt, Bill; Brenner, Eliot; Schmidt, Rebecca; Doane, Margaret; Holian, Brian; Brown, Frederick
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Dan/Jim – attached is a rough draft scheduling note for the Commission meeting. Eric Leeds has reviewed it and approved. We are coordinating support for the meeting, which could occur as early as Monday. Please keep me updated on any developments.

Thanks - Allen

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Title: **BRIEFING ON JAPANESE EVENT and US RESPONSE (Public?)**

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Scheduled: **March XX, 2011**
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Duration: Approx. 2 hours

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Participants: **Presentation**

NRC Staff Panel **50 mins.***

Bill Borchardt, Executive Director for Operations **15 mins.***
Topic: Overview of Japanese Event and U.S. response

Mike Weber, Deputy Executive Director Materials, Waste, Research, State, Tribal and Compliance Programs **10 mins.***
Topic: Potential consequences; what will be seen in U.S.

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Discussion – Wrap-up **5 mins.**

Break **10 mins.**

Closed session

Strategy and agenda planning

Documents:

Staff background material due to SECY: March __, 2011.

Slides due to SECY: March __, 2011.

From: Howe, Allen *INRR*
To: Harrington, Holly; Wittick, Susan
Cc: Ruland, William; Leeds, Eric
Subject: RE: Draft Scheduling Note for Japan event 3-16-2011
Date: Wednesday, March 16, 2011 3:47:03 PM

Apologies for the rapidly developing story. Right now the story is that this will be a public meeting. I will also call Susan.

From: Harrington, Holly, *OPA*
Sent: Wednesday, March 16, 2011 3:36 PM
To: Howe, Allen; Wittick, Susan
Cc: Ruland, William; Leeds, Eric
Subject: RE: Draft Scheduling Note for Japan event 3-16-2011

Allen – can we get more information. Eliot seems unaware of this. Is it public/nonpublic?

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Cc: Ruland, William; Leeds, Eric
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4/98

Draft: 3/16/11

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From: Howe, Allen *MAK*
Sent: Wednesday, March 16, 2011 1:18 PM
To: Merzke, Daniel; Andersen, James
Cc: Leeds, Eric; Ruland, William; Gitter, Joseph; Boger, Bruce; Grobe, Jack; Virgilio, Martin; Weber, Michael; Borchardt, Bill; Brenner, Eliot; Schmidt, Rebecca; Doane, Margaret; Holian, Brian; Brown, Frederick
Subject: Draft Scheduling Note for Japan event 3-16-2011

Dan/Jim – attached is a rough draft scheduling note for the Commission meeting. Eric Leeds has reviewed it and approved. We are coordinating support for the meeting, which could occur as early as Monday. Please keep me updated on any developments.

Thanks - Allen

4/99

From: Bahadur, Sher *NR*
To: Ruland, William
Cc: Titus, Brett
Subject: RE: Request for staff that can support OIP Additional Staff requirements outside Ops Center Long Term Staffing
Date: Wednesday, March 16, 2011 2:04:42 PM

Bill –

Several DSS folks are already supporting the agency during the Japanese crisis in several ways. List includes: Ruland, Casto, Ulses, Nakanishi, Collins, and many other staff members. Volunteering additional staff to OIP will seriously challenge the division in meeting its day-to-day obligations I recommend we do not volunteer anyone at this time.

- Sher

SHER BAHADUR; DEPUTY DIRECTOR, NRR/DSS
301-415-3283
sher.bahadur@nrc.gov

From: Ruland, William *NR*
Sent: Wednesday, March 16, 2011 1:46 PM
To: Titus, Brett; Bahadur, Sher
Subject: Re: Request for staff that can support OIP Additional Staff requirements outside Ops Center Long Term Staffing

Let's discuss the list before it is submitted.
Bill Ruland, from
USNRC Blackberry

From: Titus, Brett *NR*
To: Miranda, Samuel; Purciarello, Gerard; Bailey, Stewart; Casto, Greg; Clifford, Paul; Collins, Timothy; Dennig, Robert; Mendiola, Anthony; Ulses, Anthony
Cc: Bahadur, Sher; Ruland, William
Sent: Wed Mar 16 13:43:13 2011
Subject: FW: Request for staff that can support OIP Additional Staff requirements outside Ops Center Long Term Staffing

For your consideration...please see the request below and let me know if there are people on your staff who fit the criteria. Also, please send a negative response if there are none.

Thanks,

Brett Titus
301-415-3075

From: Astwood, Heather *NR*
Sent: Wednesday, March 16, 2011 1:39 PM
To: Azeem, Almas; Cartwright, William; Cusumano, Victor; Fields, Leslie; Heida, Bruce; Meighan, Sean; Nguyen, Quynh; Roquecruz, Carla; Susco, Jeremy; Titus, Brett; Valentine, Nicholee
Cc: Boger, Bruce
Subject: FW: Request for staff that can support OIP Additional Staff requirements outside Ops Center Long Term Staffing

4/100

Importance: High

Dear NRR TAs

Please see the request below. EDO is asking that we support OIP. OIP is asking for names of people who would be interested in helping them with the Japan crisis. They are not sure exactly what the work would entail at this point. It could be doing shifts for OIP in the Ops Center, it could be fielding calls and questions from regulators from other countries or it could be helping with OIP's normal case load.

Eric Leeds would like to support this request. He specifically does not want us to hurt any of NRR's increasing workload but we should help if we can. The time spent assisting OIP could be broken down in a variety of ways. It is unlikely that anyone would be detailed to OIP for a long period of time (i.e. 2 months straight). More likely it would one day a week, or two weeks of one person, then two weeks of a different person. Whatever fits their needs and NRR's need to do our normal case work. The timing is negotiable.

OIP is specifically looking for people who have some international experience. Several members of the international team have already volunteered. Please let me know if there is anyone in your division that would also like to add their names to the list. Note they are asking for the names by COB today. However, I think tomorrow morning would also work.

Heather Astwood

International Team Leader
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
301-415-1075

From: Muessle, Mary *EDO*
Sent: Wednesday, March 16, 2011 9:32 AM
To: Evans, Michele; Hackett, Edwin; Brenner, Eliot; Schmidt, Rebecca; Powell, Amy; Droggitis, Spiros; Doane, Margaret; Mamish, Nader; Dyer, Jim; Brown, Milton; Greene, Kathryn; Stewart, Sharon; Howard, Patrick; Miller, Charles; Moore, Scott; Cohen, Miriam; Tracy, Glenn; Haney, Catherine; Dorman, Dan; Johnson, Michael; Holahan, Gary; Leeds, Eric; Boger, Bruce; Grobe, Jack; Zimmerman, Roy; Campbell, Andy; Sheron, Brian; Uhle, Jennifer; Dean, Bill; Lew, David; McCree, Victor; Wert, Leonard; Casto, Chuck; Satorius, Mark; Pederson, Cynthia; Collins, Elmo; Howell, Art; Andersen, James; Akstulewicz, Brenda; Belmore, Nancy; Quesenberry, Jeannette; Kreuter, Jane; Armstrong, Janine; Hudson, Sharon; Ellis, Marv; Hasan, Nasreen; Ronewicz, Lynn; Schumann, Stacy; Daniels, Stanley; Casby, Marcia; Thomas, Loretta; Walker, Dwight; Sprogeris, Patricia; Schwarz, Sherry; Ross, Robin; Cohen, Shari; Riddick, Nicole; Flory, Shirley; Veltri, Debra; Matakas, Gina; ODaniell, Cynthia; Miles, Patricia; Lee, Pamela; Dubose, Sheila; Buckley, Patricia; Tomczak, Tammy; Owen, Lucy; Tannenbaum, Anita; Gusack, Barbara; Harrington, Holly; Ricketts, Paul; Howell, Linda; Higginbotham, Tina; Ross, Brenda; Boyce, Thomas (OIS); Schaeffer, James; Jackson, Donald
Cc: Williams, Shawn; Andersen, James; Ramsey, Jack
Subject: Additional Staff requirements outside Ops Center Long Term Staffing
Importance: High

OPA and OIP expect large call volumes today and in the next few weeks given expected news from Japan. OIP is looking for names of people who have desk officer or other OIP or international experience to assist them in the event that current staff cannot meet the work demands for call inquiries as well as ongoing international work. Please provide Shawn Williams and I a list of

names that could serve to help OIP in this capacity and their general availability over the next week and month. It is difficult to determine the need level at this time, but as in the Op Center, it is anticipated OIP will have for an additional month. We would like the list of names by COB today.

Thanks

Mary

Mary Muessle
Assistant for Operations - Acting
Office of the Executive Director for Operations
U.S. Nuclear Regulatory Commission
301-415-1703 office
301-415-2700 fax

From: Evans, Michele *INSIR*
Sent: Tuesday, March 15, 2011 5:53 PM

To: Hackett, Edwin; Brenner, Eliot; Schmidt, Rebecca; Powell, Amy; Droggitis, Spiros; Doane, Margaret; Mamish, Nader; Dyer, Jim; Brown, Milton; Greene, Kathryn; Stewart, Sharon; Howard, Patrick; Miller, Charles; Moore, Scott; Cohen, Miriam; Tracy, Glenn; Haney, Catherine; Dorman, Dan; Johnson, Michael; Holahan, Gary; Leeds, Eric; Boger, Bruce; Grobe, Jack; Zimmerman, Roy; Campbell, Andy; Sheron, Brian; Uhle, Jennifer; Dean, Bill; Lew, David; McCree, Victor; Wert, Leonard; Casto, Chuck; Satorius, Mark; Pederson, Cynthia; Collins, Elmo; Howell, Art; Muessle, Mary; Andersen, James; Akstulewicz, Brenda; Belmore, Nancy; Quesenberry, Jeannette; Kreuter, Jane; Armstrong, Janine; Hudson, Sharon; Ellis, Marv; Hasan, Nasreen; Ronewicz, Lynn; Schumann, Stacy; Daniels, Stanley; Casby, Marcia; Thomas, Loretta; Walker, Dwight; Sprogeris, Patricia; Schwarz, Sherry; Ross, Robin; Cohen, Shari; Riddick, Nicole; Flory, Shirley; Veltri, Debra; Matakas, Gina; ODaniell, Cynthia; Miles, Patricia; Lee, Pamela; Dubose, Sheila; Buckley, Patricia; Tomczak, Tammy; Owen, Lucy; Tannenbaum, Anita; Gusack, Barbara; Harrington, Holly; Ricketts, Paul; Howell, Linda; Higginbotham, Tina; Ross, Brenda; Boyce, Thomas (OIS); Schaeffer, James; Jackson, Donald

Subject: Follow-up from 4 pm teleconference on Ops Center Long Term Staffing

Everyone,

Please find attached 1) a list of current positions being staffed in the Ops Center and 2) the staff identified as available to support in Japan.

Regarding additional staff available to support in the ops center, the primary needs are for the specialized positions on the PMT and anyone with previous international experience in OIP.

Regarding support in Japan, please provide any updates/changes to the list by COB March 17. The target time frame for sending these staff members is March 27-April 9, so please consider that when considering staff to put on the list.

Thanks for your support.

Michele

From: Microsoft Exchange
To: "lia11hoc@nrc.gov"
Subject: Undeliverable: Fw: Notification of pumps at Yokota
Date: Wednesday, March 16, 2011 11:40:12 PM
Attachments: Fw Notification of pumps at Yokota.msg

Delivery has failed to these recipients or distribution lists:

HYPERLINK "mailto:lia11hoc@nrc.gov"lia11hoc@nrc.gov'

The recipient's e-mail address was not found in the recipient's e-mail system. Microsoft Exchange will not try to redeliver this message for you. Please check the e-mail address and try resending this message, or provide the following diagnostic text to your system administrator.

Sent by Microsoft Exchange Server 2007

Diagnostic information for administrators:

Generating server: OWMS01.nrc.gov

lia11hoc@nrc.gov

#550 5.1.1 RESOLVER.ADR.RecipNotFound; not found ##

Original message headers:

Received: from HQCLSTR02.nrc.gov ([148.184.44.77]) by OWMS01.nrc.gov ([148.184.100.43]) with mapi; Wed, 16 Mar 2011 23:40:11 -0400

Content-Type: application/ms-tnef; name="winmail.dat"

Content-Transfer-Encoding: binary

From: "Ruland, William" <William.Ruland@nrc.gov>

To: "lia11hoc@nrc.gov" <lia11hoc@nrc.gov>

Date: Wed, 16 Mar 2011 23:40:10 -0400

Subject: Fw: Notification of pumps at Yokota

Thread-Topic: Notification of pumps at Yokota

Thread-Index: AcvkQJqVjqeG9YSCR5WCq+NJV7ADzwAAFDZAAAHaxT0AAytj1Q==

Message-ID: <2B99C8FC0E9CB14D9BAD822B6E7B17E006962AE82E@HQCLSTR02.nrc.gov>

Accept-Language: en-US

Content-Language: en-US

X-MS-Has-Attach:

X-MS-TNEF-Correlator: <2B99C8FC0E9CB14D9BAD822B6E7B17E006962AE82E@HQCLSTR02.nrc.gov>

MIME-Version: 1.0

W/101

From: Howe, Allen *W/R*
To: Ruland, William; Giitter, Joseph
Subject: Scheduling NoteMar2011_JapaneseEvent agh 3-16-2011.docx
Date: Wednesday, March 16, 2011 12:49:45 PM
Attachments: Scheduling NoteMar2011_JapaneseEvent agh 3-16-2011.docx

W/R

SCHEDULING NOTE

Title: **BRIEFING ON JAPANESE EVENT and US RESPONSE (Public?)**

Purpose: To provide the Commission a status on the recent event in Japan, and to provide an overview of staff actions to date, early planned actions

Scheduled: **March XX, 2011
9:00 am**

Duration: Approx. 2 hours

Location: Commissioners' Conference Room OWFN

Participants: **Presentation**

NRC Staff Panel **50 mins.***

Bill Borchardt, Executive Director for Operations **15 mins.***
Topic: Overview of Japanese Event and U.S. response

Mike Weber, Deputy Executive Director Materials, Waste, Research, State, Tribal and Compliance Programs **10 mins.***
Topic: Potential consequences; what will be seen in U.S.

Marty Virgilio, Deputy Executive Director for Reactor and Preparedness Programs **10 mins.***
Topic: Situation assessment for U.S. reactors and applicants

Elliot Brenner, OPA **5 mins.***
Topic: Communication Challenges

Eric Leeds, Director, NRR **10 mins.***
Topic: Path forward; Near term and longer term

Commission Q & A **30 mins.**

Discussion – Wrap-up **5 mins.**

Break **10 mins.**

Closed session

Strategy and agenda planning

Documents:

Staff background material due to SECY: March __, 2011.

Slides due to SECY: March __, 2011.

REFER
NEI

From: NEIGA@nei.org
To: [Ruland, William](#)
Subject: **Update 1:15pm March 16** Information on the Japanese Earthquake and Reactors in that Region
Date: Wednesday, March 16, 2011 2:01:39 PM



UPDATE AS OF 1:15 P.M. EDT, WEDNESDAY, MARCH 16:

NEI has posted an updated version of the fact sheet [Used Nuclear Fuel Storage at the Fukushima Daiichi Nuclear Power Plant](#). Also available is a new fact sheet called [Industry Taking Action to Ensure Continued Safety at U.S. Nuclear Energy Plants](#).

As always, please go to <http://resources.nei.org/japan> for the latest updates.

Click [here](#) to unsubscribe



4/103

From: Dean, Bill *DB*
To: Ruland, William
Subject: RE: A link for information about the Japanese reactors.
Date: Wednesday, March 16, 2011 10:43:22 PM

super. thanks

From: Ruland, William *WR*
Sent: Wednesday, March 16, 2011 1:21 PM
To: Collins, Elmo; McCree, Victor; Satorius, Mark; Dean, Bill
Subject: A link for information about the Japanese reactors.

<http://www.jaif.or.jp/english/>

u/104

From: Collins, Elmo RW
To: Ruland, William
Subject: RE: A link for information about the Japanese reactors.
Date: Wednesday, March 16, 2011 1:40:53 PM

Thanks Bill
Elmo

From: Ruland, William WR
Sent: Wednesday, March 16, 2011 12:21 PM
To: Collins, Elmo; McCree, Victor; Satorius, Mark; Dean, Bill
Subject: A link for information about the Japanese reactors.

<http://www.jaif.or.jp/english/>

4/105

Hogan, Rosemary

From: Case, Michael
Sent: Wednesday, March 16, 2011 2:19 PM
To: Munson, Clifford; Murphy, Andrew; Kammerer, Annie; Hogan, Rosemary; Ake, Jon
Subject: FW: COMMISSION E-READER....WEDNESDAY, MARCH 16, 2011
Attachments: Tab A 03-15-11 Reps. Markey-Capps 11-0118.pdf; Tab B 03-15-11 Rep. Lowey 11-0119.pdf

Here's some test cases to see how well the Q&As hold together!

From: Sheron, Brian
Sent: Wednesday, March 16, 2011 1:13 PM
To: Case, Michael; Coe, Doug; Correia, Richard; Gibson, Kathy; Lui, Christiana; Richards, Stuart; Sangimino, Donna-Marie; Scott, Michael; Uhle, Jennifer; Valentin, Andrea
Subject: FW: COMMISSION E-READER....WEDNESDAY, MARCH 16, 2011

And so it starts.

From: Champ, Billie
Sent: Wednesday, March 16, 2011 12:14 PM
To: Commission E-Reader Distribution; E-Reader Distribution
Subject: COMMISSION E-READER....WEDNESDAY, MARCH 16, 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 16, 2011

INCOMING CORRESPONDENCE

- Tab "A" 03/15/11 -- Letter from Reps. Edward Markey and Lois Capps, requests additional information related to the seismic safety features in nuclear reactors in the U.S.
- Tab "B" 03/15/11 -- Letter from Rep. Nita Lowey, concerns safety factors at Indian Point.

Billie A. C-Lopes

Congress of the United States
Washington, DC 20515

March 15, 2011

The Honorable Greg Jaczko
Chairman
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Dear Chairman Jaczko:

We write to request additional information related to the seismic safety features that are included in nuclear reactors currently in operation in this country. We are concerned that these reactors may not have the features necessary to withstand the sort of catastrophic earthquake and tsunami that has crippled several reactors in Japan, and caused a meltdown and the release of the highly radioactive materials contained within them.

The 9.0 magnitude earthquake caused a number of Japan's nuclear reactors to shut down automatically. However, a combination of tsunami-related damage and the long duration of the external power outages have subsequently led some of these reactors' emergency diesel generators, and thus cooling systems, to fail. To reduce rising pressure inside the Fukushima reactors, radioactive vapor is being vented, but three explosions have occurred as these pressures grew too high.¹ It appears as though meltdowns are proceeding at these reactors. Now life-threatening levels of radiation are being emitted, a 19-mile evacuation and no-fly zone has been established, a fire at a spent fuel pool at one of the units occurred, and 1,350 of the plant's 1,450 workers have been evacuated. Radioactive materials such as cesium and iodine have been detected as much as 100 miles away from these reactors.²

According to analysis prepared by Rep. Markey (see Appendix A, the map appended to this letter), there are eight nuclear reactors located on the seismically active West Coast of the United States, and twenty-seven nuclear reactors located near the New Madrid fault line in the Midwest.³ There are additionally thirty-one nuclear reactors in

¹ http://www.washingtonpost.com/business/economy/nuclear-crisis-deepens-as-third-reactor-loses-cooling-capacity/2011/03/14/ABk6rQV_story.html

² http://www.msnbc.msn.com/id/42066534/ns/world_news-asia-pacific/

³ See <http://pubs.usgs.gov/fs/2009/3071/pdf/FS09-3071.pdf> In 1811-1812, three major earthquakes (magnitude 7 to 7.7 on the commonly used Richter Scale) occurred near the town of New Madrid, MO. In 1886, a large earthquake (Richter Scale magnitude of about 7) occurred near Charleston, S.C. The United States Geological Survey has estimated that the chance of having an earthquake similar to one of the 1811-12 sequence in the next 50 years is about 7 to 10 percent, and the chance of having a magnitude 6 or larger earthquake in 50 years is 25 to 40 percent.

3/15...To EDO to Prepare Response for Chaiman's Signature...Date due Comm:
March 31..Cpy to: RF, OCA to Ack...11-0118...Commission Correspondence
Note: Response requested: ~~Cob~~ Friday, April 8, 2011

the United States that are of the same Mark 1 or Mark 2 design as those currently imperiled in Japan, and twelve of these are located in seismically active zones.

The Nuclear Regulatory Commission (NRC)⁴ indicates that safety-significant structures, systems, and components of nuclear reactors must be designed to take into account:

- “the most severe natural phenomena historically reported for the site and surrounding area. The NRC then adds a margin for error to account for the historical data’s limited accuracy;
- appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena; and
- the importance of the safety functions to be performed.”

According to its website⁵, the San Onofre nuclear power plant, which is located 45 miles from Long Beach, California, is designed to withstand a 7.0 magnitude earthquake. An NRC staff memo⁶ indicates that the Diablo Canyon nuclear power plant, which is located 12 miles from San Luis Obispo, California, is designed to withstand a 7.5 magnitude earthquake. But according to the Southern California Earthquake Center,⁷ there is an 82 percent probability of an earthquake of 7.0 magnitude occurring in the next 30 years, and a 37 percent probability that an earthquake of 7.5 magnitude will occur.

It is not just resilience to the direct effects of an earthquake that raises concerns. While all nuclear power plants are equipped with emergency diesel generators, it is clear from the Japanese catastrophe that these are not themselves infallible, since they all appear to have failed at the Fukushima reactors. These can also fail for other reasons. For example, in 1990,⁸ the Vogtle plant in Georgia experienced a station blackout when a truck knocked over a transmission pole in the switchyard causing a loss of offsite power. The emergency diesel generator started but failed to load. The power plant suffered a complete station blackout, but fortunately power was restored in just over half an hour. NRC regulations only require nuclear power plants to be able to sustain cooling function in a station blackout for 4-8 hours⁹ using back-up battery powered generation capacity.

The vulnerability to the effects of a total station blackout was also noted by the NRC in its 2003 report entitled “Regulatory Effectiveness of the Station Blackout

⁴ <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-seismic-issues.html>

⁵ <http://www.sce.com/PowerandEnvironment/PowerGeneration/SanOnofreNuclearGeneratingStation/publicsafety.htm>

⁶ Research Information Letter 09-001: Preliminary Deterministic Analysis of Seismic Hazard at Diablo Canyon Nuclear Power Plant from Newly Identified “Shoreline Fault”

⁷ <http://www.scec.org/core/public/scecontext.php/3935/13662>

⁸ <http://query.nytimes.com/gst/fullpage.html?res=9C0CEEDF123AF932A35757C0A966958260>

⁹ http://adamswebsearch2.nrc.gov/idmws/DocContent.dll?library=PU_ADAMS^pbntad01&LogonID=ba229e2ba98e61e668d07a5da3c0e726&id=032520158

Rule.”¹⁰ Appendix B of this report (attached to this letter) provides reactor-specific information related to outages experienced, demonstrating that many nuclear reactors in this country have already experienced lengthy power outages. The second column in this table reports the overall risk of core damage frequency as calculated by the plant owners. The third column reports the risk of core damage due to complete station blackout as calculated by the plant owners, which is also expressed as a percentage in column 4. If emergency diesel generators were truly fully reliable, there would be no risk associated with a complete station blackout. Instead, many nuclear reactors are estimated to have a real risk of core damage due to a complete station blackout. The fifth column in this table shows four parameters. The first parameter is the battery coping duration in hours, which can easily be seen to be four hours for most reactors, so some reactors can operate on batteries for eight hours.

Clearly, the risks of core damage to reactors due to a complete power outage are non-trivial and have already been contemplated by the NRC. The 4-8 hour battery generation capacity currently in place at U.S. reactor sites would not have helped mitigate the effects of the Japanese earthquake and subsequent tsunami.

Finally, the spent fuel pools at these nuclear reactors can also fail. If the water that cools these fuel rods drains, the zirconium cladding them can catch fire and lead to another source of melting fuel that can spew high level radioactive materials into the environment. This appears to have already occurred in Japan.

We are concerned that San Onofre, Diablo Canyon, and possibly other nuclear reactors located in seismically active areas are not designed with sufficient levels of resiliency against the sort of earthquakes scientists predict they could experience. We are also interested in more detailed information about just what it means to take the “most severe natural phenomena historically reported for the site and surrounding area” into account when designing the safety related features of nuclear reactors. Consequently, we ask for your prompt response to the following questions and requests for information.

- 1) Please provide the Richter or moment magnitude scale rating for each operating nuclear reactor in the United States. If no such rating information exists, then on what basis can such an assertion be made regarding the design of any single nuclear power plant?
- 2) The San Onofre reactor is reportedly designed to withstand a 7.0 earthquake, and the Diablo Canyon reactor is designed to withstand a 7.5 earthquake. According to the Southern California Earthquake Center,¹¹ there is an 82 percent probability of an earthquake of 7.0 magnitude in the next 30 years, and a 37 percent probability that an earthquake of 7.5 magnitude will occur. Shouldn't these reactors be retrofitted to ensure that they can withstand a stronger earthquake than a 7.5? If not, why not?
- 3) Please provide specific information regarding the differences in safety-significant structures between a nuclear power plant that is located in a seismically active area and one that is not. Please provide, for each operating nuclear reactor in a seismically

¹⁰ See <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1776/sr1776.pdf>

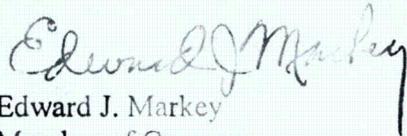
¹¹ <http://www.sceec.org/core/public/seccr01.txt.php/3935/13662>

active area, a full list and description of the safety-significant design features that are included that are not included in similar models that are not located in seismically active areas.

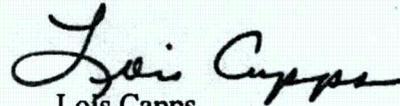
- 4) Please fully describe the emergency back-up power requirements that operating nuclear power plants must possess. How long are emergency diesel generators and back-up battery-powered generators required to be able to operate? If different requirements exist for different locations in the United States or for different types of reactors, please also include this information in your response.
- 5) For each operating nuclear power plant, please indicate a) whether the spent fuel pools are located inside or out of the containment structure, b) whether the emergency diesel generators are connected to the cooling and other equipment associated with the spent fuel pools, c) whether the battery-powered generators are connected to the cooling and other equipment associated with the spent fuel pools.
- 6) Please provide a list of all incidents at operating nuclear reactors since 1990 that have involved a) the loss of off-site power, b) a station blackout, or c) a failure of the battery-powered generators at the reactor. For each such incident, please fully describe the circumstances and duration, and impacts or damages, if any.
- 7) In your opinion, can any of the operating nuclear reactors in the United States withstand an earthquake of the magnitude experienced in Japan?

Please provide your response no later than close of business on Friday April 8, 2011. If you have any questions or concerns, please have your staff contact Dr. Michal Freedhoff of the Natural Resources Committee staff or Dr. Ilya Fischhoff of Rep. Markey's staff at 202-225-2836 or Jonathan Levenshus of Rep. Capps' staff at 202-225-3601.

Sincerely,

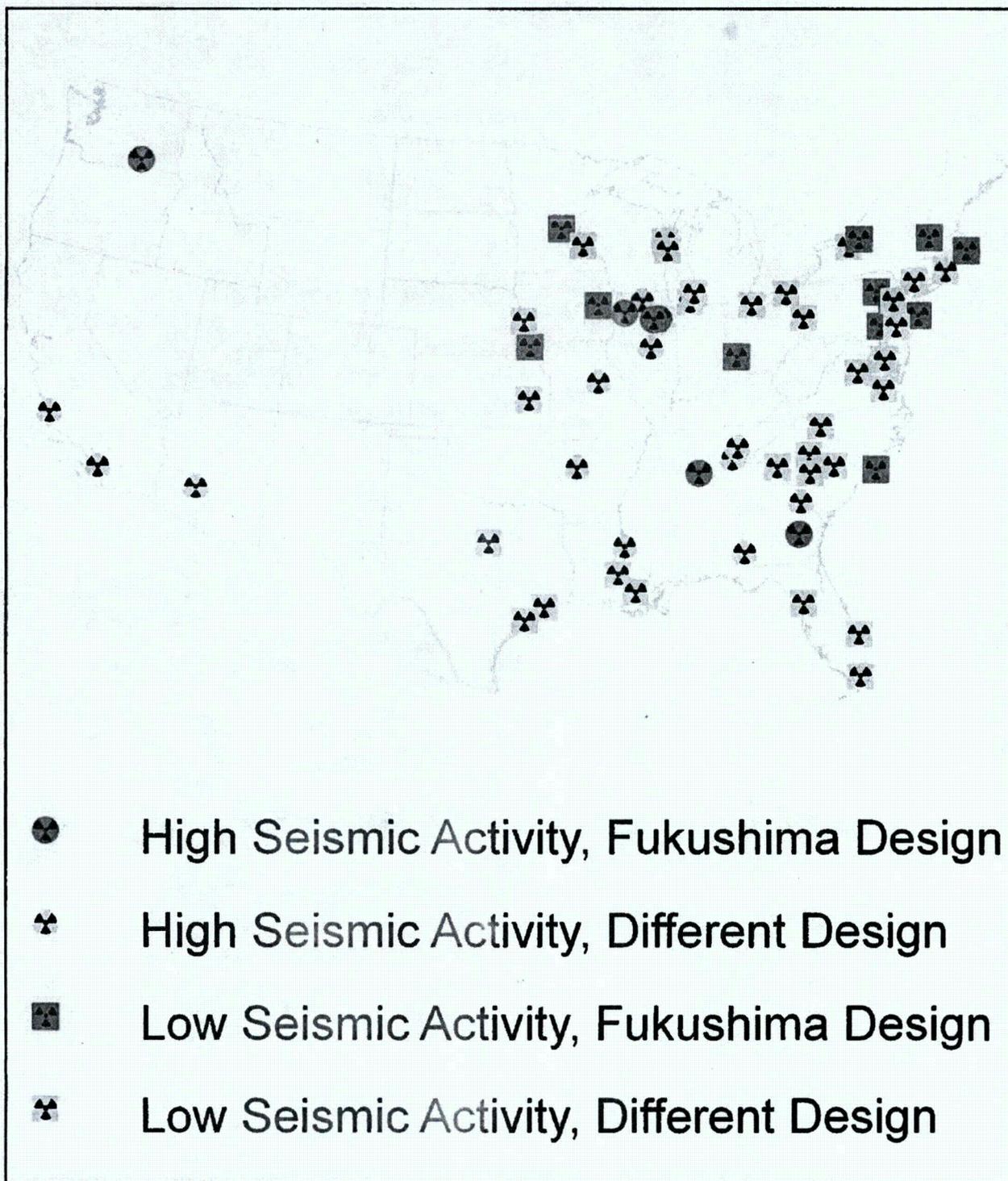


Edward J. Markey
Member of Congress



Lois Capps
Member of Congress

APPENDIX A



APPENDIX B

Plant-Specific Station Blackout Information by Reactor Type and Operating Status

Table B-1 Operating pressurized-water reactors

Plant	Plant CDF	SBO CDF	Percent SBO CDF of Plant CDF	Coping time in hours/EDG reliability/Aac access time in minutes/ extremely severe weather	Modification summary including dc load shed procedural modifications	SBO factors					
						PRA LOOP initiating event frequency	Number of LOOP events at power since commercial operation			LOOP event recovery times ≥ 240 minutes	
							Plant	Weather	Grid	Power	Shutdown
Arkansas Nuclear One Unit 1	4.67E-05	1.58E-05	33.8	4/95/10/1	Added 1 DG and crosstie	3.58E-02	2	1			
Arkansas Nuclear One Unit 2	3.40E-05	1.23E-06	3.6	4/95/10/1	Added crosstie	5.84E-02	1	1			
Beaver Valley Unit 1	2.14E-04	6.51E-05	30.4	4/975/60/1	Added crosstie	6.64E-02	2				
Beaver Valley Unit 2	1.92E-04	4.86E-05	25.3	4/975/60/1	Added crosstie	7.44E-02	1				
Braidwood Units 1&2	2.74E-05	6.20E-06	22.6	4/95/10/1		4.53E-02	2				
Bryon Units 1&2	3.09E-05	4.30E-06	13.9	4/95/10/1		4.43E-02					
Callaway	5.85E-05	1.80E-05	30.8	4/975/-/1		4.60E-02					
Calvert Cliffs Units 1&2	2.40E-04	8.32E-06	3.4	4/975/60/4	Added 1 EDG and one 1 DG	1.36E-01	3				
Catawba Units 1&2	5.80E-05	6.0E-07	10.3	4/95/10/1		2.0E-03	1			330	
Comanche Peak Units 1&2	5.72E-05	1.5E-05	26.2	4/95/-/1							

Plant-Specific Station Blackout Information by Reactor Type and Operating Status

Table B-1 Operating pressurized-water reactors (Cont.)

Plant	Plant CDF	SBO CDF	Percent SBO CDF of Plant CDF	Coping time in hours/EDG reliability/Aac access time in minutes/ extremely severe weather	Modification summary including dc load shed procedural modifications	SBO factors					
						PRA LOOP initiating event frequency	Number of LOOP events at power since commercial operation			LOOP event recovery times ≥ 240 minutes	
							Plant	Weather	Grid	Power	Shutdown
Crystal River Unit 3	1.53E-05	3.28E-06	21.5	4/975/-/4	dc load shed. Added nonclass 1E battery	4.35E-01	3				
Davis-Besse	6.6E-05	3.50E-05	53	4/95/10/2	Added 1 DG	3.50E-02	2	1		1680	
DC Cook Units 1&2	6.2E-05	1.13E-05	18.1	4/975/-/2	dc load shed	4.0E-02	1				
Diablo Canyon Units 1&2	8.8E-05	5.0E-06	5.68	4/95/-/1	Added 1 DG	9.1E-02	1				261 917
Farley Units 1&2	1.3E-04	1.22E-05	9.4	4/95/10/3	Service water to Aac, auto load shedding	4.70E-02	2				
Fort Calhoun	1.36E-05	NA	-	4/95/-/2	DC load shed	2.17E-01	2				
Ginna	8.74E-05	1.0E-06	1.14	4/975/-/1		3.50E-03	4				
Harris	7.0E-05	1.71E-05	24.4	4/95/-/3	Lighting in several areas, ladder to isolation valve						
Indian Point Unit 2	3.13E-05	4.47E-06	14.3	8/95/60/2	Added a DG for gas turbine auxiliaries	6.91E-02	2		3	390	

Plant-Specific Station Blackout Information by Reactor Type and Operating Status

Table B-1 Operating pressurized-water reactors (Cont.)

Plant	Plant CDF	SBO CDF	Percent SBO CDF of Plant CDF	Coping time in hours/EDG reliability/Aac access time in minutes/ extremely severe weather	Modification summary including dc load shed procedural modifications	SBO factors					
						PRA LOOP initiating event frequency	Number of LOOP events at power since commercial operation			LOOP event recovery times ≥ 240 minutes	
							Plant	Weather	Grid	Power	Shutdown
Indian Point Unit 3	4.40E-05	4.80E-06	10.9	8/95/60/2		6.80E-02	1				
Kewaunee	6.6E-05	2.64E-05	40	4/95/60/2	Cross-tie to nonsafety power source	4.4E-02					
McGuire Units 1&2	4.0E-05	9.26E-06	23.3	4/95/10/1		7.0E-02	3				
Millstone Unit 2	3.42E-05	1.0E-10	NMN	8/975/60/5	Upgraded unit 1-2 crosstie	9.10E-02	1	1		330	
Millstone Unit 3	5.61E-05	5.10E-06	6	8/975/60/5	Added DG	1.12E-01					
North Anna Units 1&2	7.16E-05	8.0E-06	11.2	4/95/60/4	Added DG, switchgear, crosstie	1.14E-02					
Oconee Units 1, 2&3	2.3E-05	2.57E-06	11.2	4/975/10/1		9.0E-02	2				
Palisades	5.07E-05	9.10E-06	17.9	4/95/-1	DC load shed, compressed air for ADVs	3.0E-02	3			388	
Palo Verde Units 1, 2&3	9.0E-05	1.91E-05	21.2	4/95/10/2	Added 2 gas turbines	7.83E-02	3			1138	
Point Beach Units 1&2	1.15E-04	1.51E-05	13.1	4/975/60/2	Gas turbine modifications	6.10E-02	4				

Plant-Specific Station Blackout Information by Reactor Type and Operating Status

Table B-1 Operating pressurized-water reactors (Cont.)

Plant	Plant CDF	SBO CDF	Percent SBO CDF of Plant CDF	Coping time in hours/EDG reliability/Aac access time in minutes/ extremely severe weather	Modification summary including dc load shed procedural modifications	SBO factors					
						PRA LOOP initiating event frequency	Number of LOOP events at power since commercial operation			LOOP event recovery times \geq 240 minutes	
							Plant	Weather	Grid	Power	Shutdown
Pacific Island Units 1&2	5.05E-05	3.1E-06	6.14	4/975/10/3	Added 2 EDGs	-	1	2		296 296	
Robinson Unit 2	3.20E-04	2.0E-05	8.13	8/95/60/4	Modified conduit supports in switchgear room	6.1E-02	2			454	
Salem Unit 1	5.20E-05	2.10E-05	40.4	4/975/-/2	EDG compressed air mod	6.0E-02	1				
Salem Unit 2	5.5E-05	1.70E-05	30.9	4/975/-/2	EDG compressed air mod	6.0E-02	2			655	1675
San Onofre Units 2&3	3.0E-05	2.0E-06	6.67	4/95/-/1	DC load shed and crosstie	1.1E-01			2		
St. Lucie Unit 1	2.30E-05	2.65E-06	11.5	4/975/10/5	Added crosstie	1.5E-01	1		3		
St. Lucie Unit 2	2.62E-05	2.64E-06	10.1	4/975/10/5	Added crosstie	1.5E-01					
Seabrook	6.86E-05	1.53E-05	22.3	4/975/-/3	DC load shed	4.93E-02					
Sequoyah Units 1&2	1.70E-04	5.32E-06	3.2	4/975/-/2	DC load shed, added air supply	5.16E-03	2				

Plant-Specific Station Blackout Information by Reactor Type and Operating Status

Table B-1 Operating pressurized-water reactors (Cont.)

Plant	Plant CDF	SBO CDF	Percent SBO CDF of Plant CDF	Coping time in hours/EDG reliability/Access time in minutes/ extremely severe weather	Modification summary including dc load shed procedural modifications	SBO factors					
						PRA LOOP initiating event frequency	Number of LOOP events at power since commercial operation			LOOP event recovery times ≥ 240 minutes	
							Plant	Weather	Grid	Power	Shutdown
Summer	2.0E-04	1.6E-05	24.5	4/95/-13	DC load shed, battery mod	7.3E-02			1		
South Texas Units 1&2	4.3E-05	1.4E-06	34.9	4/975/10/5	Procedural cross-tie						
Surry Units 1&2	1.25E-04	6.3E-06	6.47	4/975/10/4	Added DG	7.6E-02					
Three Mile Island Unit 1	4.49E-04	1.57E-05	3.5	4/975/10/3	Modifications to existing DGs	5.68E-02					
Turkey Point Units 3&4	3.73E-04	4.70E-06	1.2	8/95/10/5	Added 2 EDGs and cross-tie	1.7E-01	4	2	7	7950 7908	335
Vogtle Units 1&2	4.9E-05	4.4E-07	11	4/95/-12	Added 5 circuit breakers and lighting	6.6E-04					
Waterford Unit 3	1.80E-05	6.24E-06	34.7	4/975/-14	DC load shed. Added portable air compressors for EDGs	3.6E-02					
Watts Bar Unit 1	8.0E-05	1.73E-05	21.6	4/975/-7/1		3.64E-02					
Wolf Creek	4.2E-05	1.88E-05	44.8	4/95/-11		5.12E-02					

Plant-Specific Station Blackout Information by Reactor Type and Operating Status

Table B-2 Operating boiling-water reactors

Plant	Plant CDF	SBO CDF	Percent SBO CDF of Plant CDF	Coping time in hours/EDG reliability/Aac access time in minutes/ extremely severe weather	Modification summary including dc load shed procedural modifications	SBO factors					
						PRA LOOP initiating event frequency	Number of LOOP events at power since commercial operation			LOOP event recovery times ≥ 240 minutes	
							Plant	Weather	Grid	Power	Shutdown
Browns Ferry Units 2&3	4.80E-05	1.30E-05	27	4/95/-1	dc load shed	1.12E-01					
Brunswick Units 1&2	2.70E-05	1.80E-05	66.7	4/975/60/5	Modified controls for existing cross-tie	7.40E-02	3				1508 814
Clinton	2.66E-05	9.8E-06	36.8	4/95/10/1	Added gas fans for selected room cooling	8.40E-02					
Cooper	7.97E-05	2.77E-05	34.8	4/95/-2		3.50E-02					
Dresden Units 2&3	1.8E-05	9.30E-07	5.03	4/95/60/2	Added 2 DGs	1.12E-01	3	1		240	
Duane Arnold	7.84E-06	1.90E-06	24.2	4/975/-2	dc load shed, RCIC insulation & main control room lighting	1.17E-01			1		
Fermi	5.70E-06	1.3E-07	NMN	4/95/60/1		1.88E-01					
FitzPatrick	1.92E-06	1.75E-06	NMN	4/95/-1	dc load shed, instrumentation and power supply mods	5.70E-02					
Grand Gulf	1.77E-05	7.46E-06	36.8	4/95/-2	dc load shed	6.80E-02					

Plant-Specific Station Blackout Information by Reactor Type and Operating Status

Table B-2 Operating boiling-water reactors (Cont.)

Plant	Plant CDF	SBO CDF	Percent SBO CDF of Plant CDF	Coping time in hours/EDG reliability/Aac access time in minutes/ extremely severe weather	Modification summary including dc load shed procedural modifications	SBO factors					
						PRA LOOP initiating event frequency	Number of LOOP events at power since commercial operation			LOOP event recovery times \geq 240 minutes	
							Plant	Weather	Grid	Power	Shutdown
Hatch Unit 1	2.33E-05	3.10E-06	14.8	4/95/60/2	Replaced battery chargers	2.20E-02					
Hatch Unit 2	3.30E-05	3.70E-06	13.7	4/95/60/2	Replaced battery chargers	2.20E-02					
Hope Creek	4.93E-05	3.38E-05	73	4/95/-/2	Valve modifications	3.4E-02					
LaSalle Units 1&2	4.74E-05	3.82E-05	80.6	4/975/-/1	dc load shed, New batteries	9.60E-02	1				
Limerick Units 1&2	4.30E-06	1.0E-07	NMN	4/95/60/3	Upgraded cross-ties	5.9E-02					
Monticello	2.60E-05	1.20E-05	46.2	4/95/-/1	dc load shed	7.90E-02					
Nine Mile Point Unit 1	5.50E-06	3.50E-06	NMN	4/975/-/1	dc load shed, added two safety related batteries	5.00E-02	4			595	
Nine Mile Point Unit 2	3.10E-05	5.50E-06	17.7	4/975/-/1	dc load shed	1.20E-01					

Plant-Specific Station Blackout Information by Reactor Type and Operating Status

Table B-2 Operating boiling-water reactors (Cont.)

Plant	Plant CDF	SBO CDF	Percent SBO CDF of Plant CDF	Coping time in hours/EDG reliability/Aac access time in minutes/ extremely severe weather	Modification summary including dc load shed procedural modifications	SBO factors					
						PRA LOOP initiating event frequency	Number of LOOP events at power since commercial operation			LOOP event recovery times \geq 240 minutes	
							Plant	Weather	Grid	Power	Shutdown
Oyster Creek	3.30E-06	2.30E-06	NMN	4/875/00/1	Added cross-tie & reactor pressure indication	3.20E-02	3				240
Peach Bottom Units 2 & 3	1.1E-06	4.51E-07	8.7	8/875/00/3	Cross-tie to hydro unit	5.9E-02					
Perry	1.01E-06	2.20E-06	40.4	4/95/10/1	Replaced selected cables	6.03E-02					
Pilgrim	6.80E-05	1.0E-10	NMN	8/975/10/4	Alarms to line-up Aac	6.17E-01	1	5			1263 534
Quad Cities Units 1&2	1.2E-06	5.72E-07	NMN	4/95/60/1	Added 2 DGs	4.81E-02	2				
River Bend	1.55E-05	1.35E-05	87.5	4/95/-/2	Minor structural mod	3.50E-02	1				
Susquehanna Units 1&2	1.7E-05	4.2E-11	NMN	4/975/-/2	dc load shed	-	1				
Vermont Yankee	4.30E-06	9.17E-07	21.3	8/975/10/4	Modified incoming line and controls	1.0E-01	2			277	
Washington Nuclear Plant Unit 2	1.73E-05	1.07E-05	61.1	4/95/-/1	dc load shed, replaced inverters	2.46E-02					

COMMITTEE ON APPROPRIATIONS

SUBCOMMITTEES:

RANKING MEMBER,
STATE, FOREIGN OPERATIONS, AND
RELATED PROGRAMS

LABOR, HEALTH AND HUMAN SERVICES,
AND EDUCATION

HOMELAND SECURITY



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18th District, New York

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Chairman Gregory B. Jaczko
U.S. Nuclear Regulatory Commission
Mail Stop O-16G4
Washington, DC 20555-0001

March 15, 2011

Dear Chairman Jaczko:

The tragedy in Japan and the threat of meltdowns at the Fukushima Daiichi Nuclear Power Station shine a new light on the need for the heightened evaluation of nuclear power plants within high-population areas. Following the Japan tragedy, it is imperative that the NRC evaluate all possible threats, including terrorism, natural disasters, and the challenges that must be met in developing safety standards and evacuation procedures while determining the re-licensing of the Indian Point Nuclear Facility in Buchanan, New York.

A 2008 study by seismologists at the Columbia University Lamont-Doherty Earth Observatory found that earthquakes in the New York metropolitan area are common and that risks are particularly high due to infrastructure and high population. A 3.9 magnitude earthquake occurred in the Atlantic Ocean approximately 80 miles off Long Island as recently as November 30, 2010. In fact, there have been five earthquakes in the same area in the past two decades, including a 4.7 magnitude earthquake in 1992.

The Ramapo Seismic Zone is a particular threat because the zone passes within two miles of Indian Point. The Ramapo Seismic Zone includes the Dobbs Ferry fault in Westchester, which generated a 4.1 magnitude earthquake in 1985. The Columbia University study suggests that this pattern of subtle but active faults increases the risk to the New York City area and that an earthquake with a magnitude of 7.0 on the Richter scale is within reach. Disturbingly, Energy measures the risk of an earthquake near Indian Point to be between 1.0 and 3.0 on the Richter scale, despite evidence to the contrary.

As our nation stands ready to assist the Japanese to calm this potential nuclear meltdown and disaster, we must not let the same mistakes happen on our shores. The NRC should study Indian Point's risk of and ability to sustain a disaster, including the impact of earthquakes and hurricanes, as well as collateral impacts such as loss of power, inability to cool reactors, and emergency evacuation routes. The NRC should evaluate how a similar incident in the New York metropolitan area could be further complicated due to a dramatically higher population and the effectiveness of proposed evacuation routes. We simply cannot allow those who live in the New York metropolitan area to be susceptible to such risks.

Sincerely,

Nita M. Lowey
Member of Congress

PRINTED ON RECYCLED PAPER

3/15...To EDO to Prepare Response for Chairman's Signature...Date due Comm:
March 30...Cpy to: RF, CCA to Act...11-0119 Commission Correspondence

Schaperow, Jason

From: Schaperow, Jason
Sent: Tuesday, March 22, 2011 9:12 AM
To: Esmaili, Hossein; J. & R. Schaperow; Tinkler, Charles
Subject: RE: Spent fuel pool status

Can we meet later this morning? I think Charlie will be getting in around 10 a.m.

From: Esmaili, Hossein
Sent: Tuesday, March 22, 2011 9:07 AM
To: J. & R. Schaperow; Tinkler, Charles; Schaperow, Jason
Subject: RE: Spent fuel pool status

we were wondering about the source of white smoke from unit 2 last nite. Last we heard, they were pumping about 330 l/min (~86 gpm) into the vessel. They need about 50 gpm to remove decay heat, so the vessel is steaming and presumably discharging into the SP thru the valves. This is the unit that they suspect some torus damage (and I think they are not injecting into the containment). They had already injected into the SFP and the last reading from the pool was 49C. Looking at the pictures, the white smoke seems to be coming from the side of the RB. any thoughts?

From: J. & R. Schaperow [jrcompany@verizon.net]
Sent: Tuesday, March 22, 2011 6:46 AM
To: Tinkler, Charles; Schaperow, Jason; Esmaili, Hossein
Subject: Spent fuel pool status

I did some checking this morning on spent fuel pool status. I found the following:

March 15 - unit 4 - fire, explosion, pool may be boiling
March 16 - unit 4 - smoke rising
March 16 - unit 3 - white smoke
March 21 - unit 2 - white smoke

Also, I checked to see the status of the Bechtel shipment from Australia. I found the following in wiki:

http://en.wikipedia.org/wiki/Fukushima_I_nuclear_accidents

On 22 March, the Australian military flew in Bechtel-owned robotic equipment for remote spraying and viewing of the pool. The Australian reported this would give the first clear view of the pool in the "most dangerous" of the reactor buildings.^[194]

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Esmaili, Hossein

From: Howe, Allen
Sent: Wednesday, March 16, 2011 5:09 PM
To: Dion, Jeanne; Williams, Donna; Bajwa, Chris; Wittick, Susan; Shropshire, Alan; VandenBerghe, John; Deegan, George; Milligan, Patricia
Cc: Meighan, Sean; Hall, Randy; Boska, John
Subject: Assistance with Commission Brief
Attachments: Scheduling NoteMar2011_JapaneseEvent agh 3-16-2011.docx; commission meeting outline 3-16-2011.docx

Importance: High

I am looking for assistance to pull together background information, slides, key messages, talking points and possible Q&A for the Commission briefing on the Japan event. The briefing is likely to happen Monday. Looks like a busy weekend. A rough draft outline is attached with leads for the areas. Please keep in mind that the meeting will be public and the information will be at a fairly high level. If you know of a point of contact that is best suited to address the information, please let me know.

I am working to schedule a meeting tomorrow afternoon @1:30 to flesh this out. I will send out a scheduler with a bridge line.

Thanks - Allen

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SCHEDULING NOTE

Title: BRIEFING ON JAPANESE EVENT and US RESPONSE (Public?)

Purpose: To provide the Commission a status on the recent event in Japan, and to provide an overview of staff actions to date, early planned actions

Scheduled: March XX, 2011
9:00 am

Duration: Approx. 1.5 hours

Location: Commissioners' Conference Room OWFN

Participants: **Presentation**

NRC Staff Panel **50 mins.***

Bill Borchardt, Executive Director for Operations 15 mins.*
Topic: Overview of Japanese Event and U.S. response

Mike Weber, Deputy Executive Director Materials, Waste, Research, State, Tribal and Compliance Programs 10 mins.*
Topic: Potential consequences; what will be seen in U.S.

Marty Virgilio, Deputy Executive Director for Reactor and Preparedness Programs 10 mins.*
Topic: Situation assessment for U.S. reactors and applicants

Elliot Brenner, OPA 5 mins.*
Topic: Communication Challenges

Eric Leeds, Director, NRR 10 mins.*
Topic: Path forward; Near term and longer term

Commission Q & A **30 mins.**

Discussion – Wrap-up **5 mins.**

Documents:

Staff background material due to SECY: March __, 2011.

Slides due to SECY: March __, 2011.

DRAFT Commission Meeting Outline 3/16/2011

NRC Response to Core Damage Accident in Japan

EVENT OVERVIEW AND U.S. RESPONSE – Bill Borchardt

Current Status of Fukushima Daiichi – lead OPS Center

- Reactors
- Spent Fuel Pools

NRC Response Objectives

- Support of US Citizens in Japan - lead OIP
- Support of the Japanese Government - lead OIP
- Advance Our Understanding of Safety and Risk - lead RES

NRC Response Actions – lead OPS Center

- In Japan
- At HQ

US Government Response – lead OCA

- NRC Partners and Stakeholders

POTENTIAL CONSEQUENCES – Mike Weber

Consequence Projections – lead FSME/RES

- In Japan
- In US

COMMUNICATION CHALLENGES – Eliot Brenner – lead OPA

- Information
- Coordination

Situation Assessment For US Reactors and Applicants – Marty Virgilio– lead NRR, W/RES, NMSS support

- External Events
 - Seismic
 - Flood
 - Tsunamis
- Severe Accidents
 - SBO
 - B.5.b/50.54 (hh)(2)

- SAMGs
- Hydrogen control
- Emergency planning
- Spent fuel – NMSS support for dry casks

Path Forward and Priorities – Eric Leeds – lead NRR

- Near Term Actions
 - In Support of Response
 - Near term regulatory actions
 - TI for inspections
 - Generic Communications
 - Licensing actions
- Longer Term Actions
 - Lessons Learned From this Event – process based on past lessons learned e.g. TMI, Chernobyl, Davis-Besse, Japan earthquake at KK
 - Resolution of GSI 199
- Industry actions

Office Points of Contact:

RES – Jeanne Dion 301-251-7482

NRO – Donna Williams x1322

FSME – George Deegan x7834

NMSS – Chris Bajwa 301-492-3333

NRR – Allen Howe

NSIR - John Vanden Berghe and Alan Shropshire

OCA/OPA – Susan Wittick (202-570-0683) 6

From: [Rivera-Lugo, Richard](#)
To: [Flory, Shirley](#)
Cc: [Case, Michael](#); [Csontos, Aladar](#)
Subject: RE: ONE-WEEK LOOK AHEAD QUESTION
Date: Thursday, March 17, 2011 5:21:25 PM

My apologies for that; I was not aware of that time limitation to provide input. I got the information on that meeting this afternoon, as pretty much everyone in DE is responding requests and performing tasks related to the Japan events.

I'll keep it in mind for future requests of this type.

Richie

Richard Rivera-Lugo, EIT, MEM
Technical Assistant (Acting)
U.S. Nuclear Regulatory Commission – HQ
RES/DE
Ph. 301-251-7652
Fax 301-251-7420
Mail M.S. C5C07M
E-mail Richard.Rivera-Lugo@nrc.gov



Please consider the Environment before printing this e-mail.

From: Flory, Shirley
Sent: Thursday, March 17, 2011 5:18 PM
To: Rivera-Lugo, Richard
Cc: Case, Michael; Csontos, Aladar
Subject: RE: ONE-WEEK LOOK AHEAD QUESTION

You are too late. They have already sent out the One-Week Look Aheads. I need to "dump" them no later than Thursday morning or noon at the latest to meet their schedule.

Thanks - Shirley

From: Rivera-Lugo, Richard
Sent: Thursday, March 17, 2011 5:16 PM
To: Flory, Shirley
Cc: Case, Michael; Csontos, Aladar
Subject: RE: ONE-WEEK LOOK AHEAD QUESTION

Shirley,

Here is the One-Week Look Ahead information on the EPRI Information Exchange meeting.

NRC/DE staff and management will be hosting a drop-in with EPRI staff and management

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to discuss a variety topics, e.g. Industry's Materials Degradation Matrix (MDM) and Issue Management Table (IMT), NRC/EPRI Non-Destructive Evaluation projects, NRC/EPRI communications, and existing and potential cooperative research efforts through the NRC/EPRI Memorandum of Understanding.

POC: Aladar Csontos

Thanks,
Richie

Richard Rivera-Lugo, EIT, MEM
Technical Assistant (Acting)
U.S. Nuclear Regulatory Commission – HQ
RES/DE
Ph. 301-251-7652
Fax 301-251-7420
Mail M.S. C5C07M
E-mail Richard.Rivera-Lugo@nrc.gov



Please consider the Environment before printing this e-mail.

From: Case, Michael
Sent: Thursday, March 17, 2011 10:11 AM
To: Rivera-Lugo, Richard
Subject: FW: ONE-WEEK LOOK AHEAD QUESTION
Importance: High

Richie. Could you track this down and reply to Shirley?

From: Flory, Shirley
Sent: Wednesday, March 16, 2011 1:30 PM
To: Case, Michael
Subject: ONE-WEEK LOOK AHEAD QUESTION
Importance: High

Mike:

I see you have a meeting next week (3/22) NRC Research – EPRI Information Exchange. Should you do a One-Week Look Ahead on that?

Thanks - Shirley

From: [Case, Michael](#)
To: [Hiland, Patrick](#); [Coe, Doug](#); [Skeen, David](#)
Cc: [Beasley, Benjamin](#); [Coyne, Kevin](#); [Correia, Richard](#)
Subject: RE: Response requested: Assistance with Commission Brief
Date: Thursday, March 17, 2011 9:06:00 AM
Attachments: [Seismic OAs March 17th 2am update.msg](#)

Seismic folks have been working in the Ops Center to pull together just about every question imaginable on seismic and tsunamis. The 2am version is attached.

From: Hiland, Patrick
Sent: Thursday, March 17, 2011 7:55 AM
To: Coe, Doug; Skeen, David
Cc: Beasley, Benjamin; Coyne, Kevin; Correia, Richard; Case, Michael
Subject: RE: Response requested: Assistance with Commission Brief
Importance: High

Thanks Doug.

David, I believe Mike Case has folks to handle seismic and tsunami. I'm adding him to cc list and perhaps he can take part. As you know our seismic folks focus on structures and SRP vs. detailed seismic- tsunami design. Mike should be able to participate or provide a senior staff person.

From: Coe, Doug
Sent: Wednesday, March 16, 2011 10:47 PM
To: Hiland, Patrick; Skeen, David
Cc: Beasley, Benjamin; Coyne, Kevin; Correia, Richard
Subject: RE: Response requested: Assistance with Commission Brief

Pat/Dave,
I'm out of country and Kevin Coyne is acting Director RES/DRA, and I'll be back late Sunday night and in the office on Monday. Rich Correia is coming over to replace Chris Lui on Mar 28. We can provide you with GI-199 bullets or back you up as needed at the Commission meeting. Please let Kevin and Ben know how you want to present GI-199 and what we can do to support you. One thought is that we may need to indicate a consideration of tsunami for coastal or near-coastal plants in the information we request from licensees although that isn't something we've discussed to-date.
Doug

From: Hiland, Patrick
Sent: Wednesday, March 16, 2011 8:57 PM
To: Skeen, David
Cc: Coe, Doug; Beasley, Benjamin
Subject: FW: Response requested: Assistance with Commission Brief

p.s. I can handle GI-199, but RES (Coe or Beasley) did the heavy lifting.

From: Howe, Allen
Sent: Wednesday, March 16, 2011 4:47 PM
To: Ruland, William; Brown, Frederick; McGinty, Tim; Blount, Tom; Quay, Theodore; Lubinski, John; Thomas, Brian; Nelson, Robert; Giitter, Joseph; Westreich, Barry; Bahadur, Sher; Holian, Brian; Cheok, Michael; Lee, Samson; Wilson, George; Hiland, Patrick; Skeen, David
Cc: Martin, Robert; Meighan, Sean
Subject: Response requested: Assistance with Commission Brief

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Importance: High

LT – I am looking for the right folks to pull together background information, slides, key messages, talking points and possible Q&A for the Commission briefing on the Japan event. The briefing is likely to happen Monday. Looks like a busy weekend. I will attend the ET standup tomorrow to discuss. Please let me know who will support. The areas where NRR has the lead and where specific support is needed are as follows:

Situation Assessment For US Reactors and Applicants – Marty Virgilio– lead NRR, RES support

- External Events
 - Seismic – DE
 - Flood -DE
 - Tsunamis - DE
- Severe Accidents
 - SBO - DE/DRA
 - B.5.b/50.54 (hh)(2) – DRA/DIRS
 - SAMGs - DSS
 - Hydrogen control DSS
 - Emergency planning - NSIR
- Spent fuel – DSS, NMSS support for dry casks

Path Forward and Priorities – Eric Leeds – lead NRR

- Near Term Actions
 - In Support of Response
 - Near term regulatory actions - DPR
 - TI for inspections - DIRS
 - Generic Communications - DPR
 - Licensing actions – DORL
- Longer Term Actions
 - Lessons Learned From this Event – process based on past lessons learned e.g. TMI, Chernobyl, Davis-Besse, Japan earthquake at KK
 - Resolution of GSI 199 - DE
- Industry actions

Thanks - Allen

Attachment Seismic QAs March 17th 2am update.msg (2560 Bytes) cannot be converted to PDF format.

From: [Flory, Shirley](#)
To: [Case, Michael](#); [Kammerer, Annie](#); [Hogan, Rosemary](#)
Subject: TWFN AUDITORIUM
Date: Thursday, March 17, 2011 10:49:39 AM
Importance: High

I just spoke with Rochelle in the SECY's office, trying to confirm when the Commission Meeting re Japan Events is going to be.

Rochelle says it will most likely be on Monday, March 21, but she isn't 100% confirmed YET. She'll let us know when it is 100%.

Thanks - Shirley

u/m

From: [Sheron, Brian](#)
To: [Case, Michael](#); [Richards, Stuart](#); [Kammerer, Annie](#); [Ake, Jon](#); [Murphy, Andrew](#)
Cc: [Weber, Michael](#)
Subject: Seismic
Date: Thursday, March 17, 2011 6:51:47 PM

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

- 2.) Can you please e-mail the latest version of your seismic Q&As to Mike Weber.

Thanks.

u/112

From: [Williams, Shawn](#)
To: [Abu-Eid, Bobby](#); [Astwood, Heather](#); [Brach, Bill](#); [Camper, Larry](#); [Case, Michael](#); [Cook, John](#); [Cool, Donald](#); [Holahan, Vincent](#); [Lewis, Robert](#); [Rini, Brett](#); [Sampson, Michele](#); [Schwartzman, Jennifer](#); [Virgilio, Martin](#); [Weaver, Doug](#); [Williams, Shawn](#)
Subject: Suggest postponing our March 22 meeting on developing a National Stakeholder process for IAEA Safety Standards and issuing a Green Ticket
Date: Thursday, March 17, 2011 2:14:28 PM
Attachments: [Discuss National Stakeholder Input for IAEA Safety Standards.msg](#)
[Draft FRN to Pilot Stakeholder Input to IAEA Safety Standards at a National Level.doc](#)
[RE Addressing IAEA Standards.msg](#)

Bill,

Thanks for sending out the e-mail (3rd attachment) in an effort to prepare for next Tuesday's meeting, March 22, 3-4pm (attached).

All,

Considering you may be busy with the tragic events in Japan, and, as far as I know, you have not had the opportunity to come together and developed a proposal (or counter proposal to the pilot proposal- attached) for NRC's strategy to " *seek comments from national stakeholders and to present a national position on each draft safety standard, which should be based on appropriate consultation at the national level and coordination of the input of national stakeholders,*" I suggest we postpone the meeting on this subject.

I am thinking a better strategy is to assign a Green Ticket to FSME (since they have both WASSC and RASSC) due in 3-4 months to coordinate with the other SSCs to develop an option or options on how the NRC will meet its obligations to this SSC TOR item. I know I may get negative feedback on issuing a formal "Green Ticket," but, from my experience there is a much higher probability we will make progress on this issue if it is a formal action from the EDO's office, rather than an e-mail request.

Let me know if you do have a proposed path forward and are ready for the March 22 meeting. If so, we should keep the meeting as scheduled (of course, it would depend on if Marty is still supporting the HOO).

Comments?

Shawn Williams
Executive Technical Assistant
Office of the Executive Director for Operations
301-415-1009

4/1/13

Attachment Discuss National Stakeholder Input for IAEA Sa.msg (2560 Bytes) cannot be converted to PDF format.

NUCLEAR REGULATORY COMMISSION

Stakeholder Input to IAEA Safety Standards at a National Level

AGENCY: Nuclear Regulatory Commission.

ACTION: Notice to provide an opportunity for the public and other stakeholders to comment on the development of International Atomic Energy Agency Safety Standards (IAEA) during the Member State Review as requested by IAEA, described in the Safety Standards Committees' Terms of Reference, and as practiced by other countries.

SUPPLEMENTAL INFORMATION:

I. Introduction

The International Atomic Energy Agency (IAEA) was set up as the world's "Atoms for Peace" organization in 1957 within the United Nations family. The IAEA works with its Member States and multiple partners worldwide to promote safe, secure and peaceful nuclear technologies. Its key roles contribute to international peace and security, and to the World's Millennium Goals for social, economic and environmental development.

The IAEA statute authorizes the IAEA to establish international safety standards for the protection of health and minimization of danger to life and property; to provide for the application of these standards to its own operations or operations under its control or supervision; and to provide for the application of these standards, at the request of the parties, to operations under

any bilateral or multilateral arrangements, or, at the request of a State, to any of that State's activities in the field of atomic energy.

The IAEA safety standards reflect an international consensus on what constitutes a high level of safety for protecting people and the environment from harmful effects of ionizing radiation. The safety standards establish fundamental safety principles, requirements and measures to control radiation exposure of people and the release of radioactive material to the environment; to restrict the likelihood of events that might lead to a loss of control over a nuclear reactor core, nuclear chain reaction, radioactive source or any other source of radiation; and to mitigate the consequences of such events if they do occur. The standards apply to facilities and activities that give rise to radiation risks, including nuclear installations, the use of radiation and radioactive sources, the transport of radioactive material and the management of radioactive waste. More information on the IAEA Safety Standards can be found at <http://www-ns.iaea.org/standards/default.htm>

Regulating nuclear safety in the United States (U.S.) and in other countries is a national responsibility. The IAEA Safety Standards are not binding on the U.S, and the standards are used in different ways in different countries. The U.S. does not directly adopt IAEA Safety Standards, but can, and has, considered the safety standards as a useful point of reference in the development of proposals under the Administrative Procedure Act for changes to regulations or guidance in the U.S.

The IAEA has stated its commitment to develop, provide and maintain an integrated, comprehensive and consistent set of up-to-date, user-friendly safety standards which, through their use and application in the Member States, will provide for a harmonized and consistent

level of protection for people and the environment, as those standards may be applied world-wide. The IAEA has developed a hierarchy of three levels of IAEA Safety Standards that include the Safety Fundamentals, Safety Requirements and Safety Guides. The Safety Fundamentals document presents the fundamental safety objective and principles of protection and safety and provides the basis for the safety requirements. The Safety Requirements documents establish the requirements that must be met to ensure the protection of people and the environment, both now and in the future. The Safety Guides provide recommendations and guidance on how to comply with the safety requirements.

To assist in the development of the IAEA Safety Standards, the IAEA created four advisory committees to participate in the development, review and revision of standards relating to nuclear safety, radiation safety, waste management safety, and transport safety. The four Safety Standards Committees, which are overseen by the senior-level Commission on Safety Standards (CSS), include:

- NUSSC – Nuclear Safety Standards Committee
- RASSC – Radiation Safety Standards Committee
- WASSC – Radioactive Waste Safety Standards Committee
- TRANSSC – Transport Safety Standards Committee

Each Member State is invited to nominate a senior expert, typically from the regulatory body to represent the Member State on each of the four Safety Standard Committees. Representatives are expected to participate in all committee meetings, contribute actively in the review and development of IAEA Safety Standards and present a national position on draft safety standards, which should be based on consultation as may be appropriate at the national level.

Senior experts from the NRC represent the U.S. on the four Safety Standards Committees and the Commission on Safety Standards. The NRC co-represents the U.S. with the U.S. Department of Transportation (DOT) on the TRANSSEC committee. The NRC coordinates closely with other U.S. Federal Agencies to present a national position on proposed IAEA Safety Standards at meetings of the Safety Standards Committees. Depending upon the subject matter of a particular standard, the lead Federal Agency may be the NRC, or may be another Federal Agency such as the Department of State, Environmental Protection Agency, Department of Energy, Department of Health and Human Services, or the Department of Labor.

Given the very limited role that most IAEA Safety Standards have had in the U.S. national regulatory regime, the NRC has not typically requested national stakeholder review and comment on draft IAEA Safety Standards. There have been instances when NRC has solicited national stakeholder comments on new/revised IAEA Safety Standards, including for example, the solicitation of comments by the NRC and DOT on proposed changes to the IAEA Regulations for the Safe Transport of Radioactive Material (TS-R-1), and an NRC- led multiple agency solicitation of comments on proposed changes to the Basic Safety Standards for Protection Against Ionizing Radiation and for the Safety of Radiation Sources (DS-379). However, the NRC is considering an opportunity for broader engagement for U.S. national stakeholders by piloting an opportunity for the industry and the public to review and comment on draft IAEA Safety Standards posted for official comment by Member States.

II. Further Information

The draft IAEA Safety Standards posted for official comment by Member States are located at <http://www-ns.iaea.org/standards/documents/draft-ms-posted.asp>. The public and industry are encouraged to review the draft IAEA Safety Standards and provide comments, if any, to the NRC to be considered in the final set of U.S. Government (USG) comments.

Comments must be submitted to the NRC using the IAEA Safety Standard comment template form provided on the website above. Comments must be received by the NRC 45 days prior to the IAEA deadline (found on the first page of the draft IAEA Safety Standard) so that they can be reviewed and considered by the NRC and other Federal Agencies before being sent to IAEA prior to the established due date.

Please send any comment forms to IAEASafetyStandardcomments@nrc.gov in email entitled 'DSXXX IAEA Safety standards comments.' (XXX - please enter the number of the Draft Safety Standard you are commenting on).

All comments received will be considered in developing the final set of USG comments. The NRC has the sole discretion, in coordination with other Federal Agencies, on the final set of USG comments. The NRC recognizes that a variety of comments may be provided, and that viewpoints may differ. For resource management, the NRC will not provide specific feedback to those submitting comments as we do for domestic activities under the Administrative Procedure Act (such as for rulemaking). Comments on IAEA Safety Standards from the United States, and other Member States and International Organizations will be considered by the IAEA. The results will be reviewed within the IAEA, including review by the four Safety Standards Committees, and the Commission on Safety Standards, all of which contain U.S. Government representation. Comments submitted by Member States and IAEA's resolution of those comments are generally made available on the IAEA web site: <http://www-ns.iaea.org/committees/comments/> for approximately two months prior to the Safety Standards Committee's meeting to review the Member State comments and approve IAEA's proposed resolution.

Comments on IAEA Safety Standards are not considered as comments on any current or possible future regulation activity, but are useful to assist the international community in developing a logical, scientifically-based set of requirements and guidance. Note that future NRC domestic rulemakings will continue to comply with the Administrative Procedures Act and will follow established rulemaking procedures, including the opportunity for stakeholders, including the industry and public, to comment on proposed NRC rules.

Dated at Rockville, Maryland, this _____ day of _____, 2010.

For the Nuclear Regulatory Commission.

NRC domestic rulemakings will continue to comply with the Administrative Procedures Act and will follow established rulemaking procedures, including the opportunity for stakeholders including the industry and public to comment on proposed NRC rules.

Dated at Rockville, Maryland, this _____ day of _____, 2010.

For the Nuclear Regulatory Commission.

Distribution:

ADAMS Accession No.:

OFFICE	RES	RES	ADM	SUNSI Review	RES	RES
NAME	E. Ziegler	A. Valentin	Tech Edit		M. Case	B. Sheron
DATE	/ /10	/ /10	/ /10	/ /10	/ /10	/ /10
OFFICE	NMSS	FSME	OIP	OGC	DEDR	EDO
NAME	C. Haney	C. Miller	M. Doane	S. Burns	M. Virgilio	R. Borchardt
DATE	/ /10	/ /10	/ /10	/ /10	/ /10	/ /10

OFFICIAL RECORD COPY

Attachment RE Addressing IAEA Standards_1.msg (2560 Bytes) cannot be converted to PDF format.

From: joseph@parktalk.com
To: WHPC@whitehouse.gov; [Case, Michael](#)
Cc: joseph@parktalk.com
Subject: SOLUTION FOR JAPANESE REACTOR
Date: Thursday, March 17, 2011 7:26:39 PM

Quik response

1. Take the most active reactor and drop 2 26' tanks with wheels on of liquid nitrogen. If the exploding wheels do not rupture the tanks then use a strategic charge on the tanks if necessary and immediately cap them with a large chunk of glacial ice. continue as necessary.repeat as necessary.
2. Have water cannons with playpen tanks feed the roof opening and shunt water to cannons with a tandem setup. perhaps siamese with high volume.

Coolant maintenance

I am not familiar with the construction though I deduct that the core floor and especially the pump bases are not hydraulically suspended, This creates the cause of this scenario of fractures/fissures to the mounts possibly extending into the casings. Try the pumps if you can get close enough, if not use robots, Cement that are used underwater could reduce pressure loss. dup them toward any fissure in containment cooling tower.

If I could see diagrams I could have more suggestions.

I designed the system used on #10 BP Solution 25 days before they used it. Don't ignore this one.

joseph

CC Obama and Michael Case of the NRC

4/1/14

From: [Graves, Herman](#)
To: [Tadesse, Rebecca](#)
Cc: [Hogan, Rosemary](#); [Rivera-Lugo, Richard](#); [Csontos, Aladar](#); [Richards, Stuart](#); [Case, Michael](#); [Chokshi, Niles](#); [Dion, Jeanne](#)
Subject: TSUNAMI QUESTION
Date: Thursday, March 17, 2011 4:08:17 PM
Attachments: [TsunamiRequirementsAndMeasures_3.ppt](#)

Ms. Tadesse (Rebecca),

As discussed with you and Al Csontos this afternoon I have attached a set of slides prepared by myself and Niles Chokshi that may answer any questions Commissioner Magwood has on tsunamis. Please note that the slide were prepared in 2005.

The NUREG/CR-6996 is entitled "Tsunami Hazard Assessment at Nuclear Power Plant Sites in the United States of America," published March 2009.

Feel free to contact me if there anymore questions.

~~~~~  
**Herman L. Graves, P. E., F. ACI**  
Sr. Structural Engineer  
USNRC-RES  
Mail Stop : C-5A24M  
Telephone: 301.251.7625  
Fax: 301-251-7425  
email: [Herman.Graves@NRC.GOV](mailto:Herman.Graves@NRC.GOV)

~~~~~  
"The contents of this message are mine personally and do not necessarily reflect any position of NRC"

4/15

Attachment TsunamiRequirementsAndMeasures_3.ppt (742912 Bytes) cannot be converted to PDF format.

From: [Case, Michael](#)
To: [Ruland, William](#)
Subject: FW: Assessment of cooling requirements for Fukushima units 1-3
Date: Thursday, March 17, 2011 9:32:00 AM

FYI

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

From: Gavrilas, Mirela
Sent: Thursday, March 17, 2011 9:24 AM
To: Case, Michael; Gibson, Kathy
Subject: FW: Assessment of cooling requirements for Fukushima units 1-3

fyi

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

From: Michael Corradini [<mailto:corradini@engr.wisc.edu>]
Sent: Thursday, March 17, 2011 9:23 AM
To: Farmer, Mitchell T.
Cc: Tinkler, Charles; Basu, Sudhamay; Lee, Richard; Gavrilas, Mirela
Subject: RE: Assessment of cooling requirements for Fukushima units 1-3

Mitch - I agree with your analysis. I am doing RASCAL calcs about dose effects.

--

Michael Corradini, Chair
Engineering Physics
University of Wisconsin
(608)263-1648 [Fax: 3-7451]
corradini@engr.wisc.edu
<http://www.engr.wisc.edu/ep>

Quoting "Farmer, Mitchell T." <farmer@anl.gov>:

> Hi everyone,

>

> I want to make two final suggestions that I thought of this morning
> and I'm sending it to you in hopes that it can be factored into the
> accident management at the site ASAP. My hand calculations below
> indicated that at the fire pumping rate of 30 T/hour through the
> cores (?) outlet core temp on unit 1 should go subcooled today.
> However, it's going to be another week at least for units 2-3. I've
> also heard about salt crystallization concerns, and that may be
> detrimental to flow passages through the core/core debris. So, if
> they are getting more equipment on site, it would be very beneficial
> to double the pumping capacity for units 2/3 to try to get those
> subcooled ASAP. This would: 1) decrease crystallization rate of salt
> and 2) really reduce source term from the cores. Then, the only
> steaming you should be able to see from the plants would be the
> spent fuel pools which they are attacking now. This would help
> clarify some of the aerial data from units 2-3 if the only steam
> source were the pools.

>

> Second, I don't know if the drywell plugs are still in place, but if
> you flood the drywell to the extent that it fills out the top, then
> some of the water spilling onto the deck would make it into the SFP??

4/1/16

>
> This is my last direct contact, we now have to go through DOE, but I
> want to get info out as fast as possible so that it can help if
> viable.
>
> Praying for the Japanese,
> Mitch
>

> From: Farmer, Mitchell T.
> Sent: Monday, March 14, 2011 1:31 PM
> To: 'Tinkler, Charles'; Basu, Sudhamay; Lee, Richard; Gavrilas, Mirela
> Subject: FW: Assesment of cooling requirements for
> Fukushima units 1-3

>
>
> FYI.
> Mitch

> From: Farmer, Mitchell T.
> Sent: Monday, March 14, 2011 1:22 PM
> To: Grandy, Christopher; Khalil, Hussein S.; Peters, Mark T.;
> Sattelberger, Alfred P.
> Cc: 'corradin@cae.wisc.edu'; Seidensticker, Ralph W.
> Subject: Assesment of cooling requirements for Fukushima units 1-3

>
> All,

>
> I did a few back of the envelope calculations to scope out what the
> cooling requirements will be at Fukushima units 1-3 in the event
> that they are not able to reestablish power to the site and,
> thereby, normal cooling functions at these plants.

>
> The limited information I have suggests that they are supplying 30
> MT/hour of seawater to unit 1, and so I'll assume that the same is
> currently going to units 2 and 3. To put this in perspective, that
> amount of cooling flow can remove 2.8 MW while remaining subcooled
> at atmospheric conditions, and up to 21.7 MW if this amount of water
> is completely boiled off. Ideally, you would like to get to
> subcooled outlet core conditions so you'll stop forming steam and
> then you can stop the venting that is causing concern right now.

>
> That amount of heat removal needs to be compared to the decay heat
> levels in these reactors to determine when subcooled conditions can
> be reached. Unit 1 was 460 Mwe and Units 2- 3 were 784 Mwe per
> Chris's previous email. Thus, I estimate the thermal power levels
> of these reactors to be 1200 MWt and 2000 MWt, respectively. After
> three days (or currently), the power level for a U core would fall
> to about 0.4 % assuming that the reactors had operated for 200
> full-power days before the earthquake (a little higher for the MOX
> core but I don't have data to assess that). Thus, decay heat in
> Unit 1 is now about 4.8 MW and for Units 2/3 it's about 8 MWt. Thus,
> I suspect they're still venting steam at all three units. I then
> looked at the times when the decay heat will fall below the level at
> which subcooling can be achieved (ie 2.8 MWt core decay heat level)
> and for unit 1 that is 6 days total (ie 3 days from now) and for
> units 2 and 3 it will be about 16 days (ie 13 more days).

>
> This is a worst case scenario that assumes they can't get electricit
> back to the site and establish normal cooling function; ie they have
> to rely on sea water injection. Also, I assumed 200 full power

- > days; the power level could be less or a little more if I
- > overestimated/underestimated operation times.
- >
- > As far as coolability of the degraded cores, my opinion is that
- > units 1 and 3 are in coolable configurations; it's been 3 days now
- > and if the configuration was not coolable the material most likely
- > would have failed the reactor pressure vessel. I guess the jury is
- > still out on Unit 2; I think the entire core has gone dry at least
- > once. The good news is that the decay heat is way down from what it
- > was a few hours after the accident was initiated.
- >
- > Mitch
- >
- >

From: Boger, Bruce *NRR*
To: McGinty, Tim; Sloan, Scott
Cc: Ross-Lee, MaryJane; Quay, Theodore; Blount, Tom; Ruland, William; Leeds, Eric
Subject: RE: Incident Response Performance Feedback Regarding Scott Sloan, Federal Liaison
Date: Thursday, March 17, 2011 12:02:53 PM

Scott, I too applaud your efforts. You directly contributed to the agency's top priority by not allowing bureaucratic impediments to stall this important activity. Way to go—and thanks. Bruce

From: McGinty, Tim *NRR*
Sent: Thursday, March 17, 2011 10:46 AM
To: Sloan, Scott
Cc: Ross-Lee, MaryJane; Quay, Theodore; Blount, Tom; Ruland, William; Boger, Bruce; Leeds, Eric
Subject: Incident Response Performance Feedback Regarding Scott Sloan, Federal Liaison

Scott – the purpose of this email is for you to hand to your future supervision regarding your performance in the Operations Center regarding the events in Japan.

As a member of the Liaison Team, in the role of Federal Liaison, your performance has been outstanding. Your initiative, out-of-the-box thinking, can-do attitude, dedication and commitment to safety and security are truly remarkable. I have personal knowledge of your performance in this regard, having served on the same shift with you as the LT Director. Thank You.

This morning, however, it was brought to my attention that your performance last night was especially noteworthy. Bill Ruland informed the entire Executive Team and Leadership Team about your actions yesterday to drive the development of systems to help mitigate the conditions existing in Japan, and to coordinate with other stakeholders for the purposes of positioning the U.S. in a way where we could provide this highly critical technical assistance.

Mr. Ruland conveyed to me that your actions were “heroic”.

Scott – speaking for the NRR ET and LT: Thank You.

Sincerely, Tim McGinty, Director, NRR/DPR

4/1/17

From: Gratton, Christopher *MR*
To: Howe, Allen; Collins, Timothy; Tinkler, Charles; Scott, Michael
Cc: Bahadur, Sher; Boska, John; Ruland, William
Subject: RE: Help with Commission brief
Date: Thursday, March 17, 2011 4:27:35 PM
Attachments: Staff Slides for March 21 Meeting (Japanese Event).pptx

What we are looking for is talking points. High level points to support the slide bullet. If you need a copy of the current version of the slides (they are evolving), let me know. The current version as of 4 pm is attached

CG

From: Howe, Allen *MR*
Sent: Thursday, March 17, 2011 4:23 PM
To: Collins, Timothy; Tinkler, Charles; Scott, Michael
Cc: Bahadur, Sher; Gratton, Christopher; Boska, John; Ruland, William
Subject: RE: Help with Commission brief

Tim – first of all thanks. Can you get with Chris to talk specifics?

Mike/Scott – can you help with the SAMGs? We are on a very tight timeline here, so high level bullets is what is needed and someone to respond to Qs Monday. Note that this meeting will have media coverage.

Thanks - Allen

From: Collins, Timothy
Sent: Thursday, March 17, 2011 4:19 PM
To: Howe, Allen; Ruland, William
Cc: Bahadur, Sher
Subject: RE: Help with Commission brief

I can help with Mark I containments improvements ... we probably need some help from RES (Charlie Tinkler most likely) for SAMGs

From: Howe, Allen
Sent: Thursday, March 17, 2011 4:05 PM
To: Ruland, William; Collins, Timothy
Cc: Bahadur, Sher
Subject: Help with Commission brief
Importance: High

Bill – need someone who can work with Chris Gratton/John Boska on one line talking points for Bill Borchardt. Topic areas are SAMGs and Mark 1 containment improvements.

4/1/18

Thanks - Allen



Briefing on NRC Response to Recent Nuclear Events in Japan

Bill Borchardt
Executive Director for Operations
March 21, 2011

ML110810809 PA

Agenda

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

Event Overview

- **Discuss initiating events**
- **Current status of reactors**
- **Current status of spent fuel pools**
- **Potential Consequences**

Immediate NRC Response

- **Operations Center activation**
- **Dispatched 2 NRC experts to Japan on March 11th and 14th (USAID)**
- **Established support for U.S. Embassy**
- **Opened dialog with Japanese Ministry of Defense**
- **Active outreach to stakeholders**

Continuing NRC Response

- **Keep Operations Center manned 24/7**
- **Support NRC personnel in Japan, rotate as necessary**
- **Evaluate generic communication needs**
- **Provide assistance as requested**

Potential Consequences

- **Release estimates from Japanese event**
- **Plume tracking**
- **Consequences for the U.S.**

Assessment of Domestic Reactor Safety

- **Design basis incorporate natural disasters expected for their locale**
- **All reactors must be able to cope with a loss of all AC power for a designated time period**
- **Plans exist to cope with Beyond-Design-Basis events**

Assessment of Domestic Reactor Safety (Cont.)

- **INPO and industry will respond to assist a licensee**
- **Improvements have been made since initial licensing**
- **{EP Bullet}**
- **U.S. plants continue to be safe**

Planned NRC Activities – Near Term

- **Consider how to evaluate lessons learned**
- **Review panels may be a joint Federal effort**

Planned NRC Activities – Longer Term

- **Lessons learned and recommendations will be developed**
- **Regulatory actions will be considered**

Impact on Current NRC Activities

- **Communication activities have increased**
- **Certain licensing actions will be reviewed**
- **Routine meetings will continue as scheduled**
- **License renewals will continue as scheduled**

From: [NRC Announcement](#)
To: [NRC Announcement](#)
Subject: Employee Resources: When Times Get Tough, Remember Your EAP
Date: Thursday, March 17, 2011 10:12:57 AM

NRC Daily Announcements



Highlighted Information and Messages



Thursday March 17, 2011 -- Headquarters Edition

Employee Resources: When Times Get Tough, Remember Your EAP

Employee Resources: When Times Get Tough, Remember Your EAP

NRC's Employee Assistance Program (EAP) supports employees and family members during these difficult times when NRC is responding to the tragic events in Japan. Free and confidential services are available include counseling, critical incident stress management (CISM), and more. CISM helps individuals and work groups return more readily to full productivity after traumatic events such as the recent catastrophe in Japan.

An EAP consultant is available to you 24/7 at 1-800-869-0276. You may also visit our contractor's [Website](#) to learn more about the services provided by your EAP; go to member access and click on EAP Employee Orientation: Your passcode is "nuclear".



(2011-03-17 00:00:00.0)

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4/11/11

From: CDMC
To: Ruland, William
Subject: Praying for Japanese Disaster-China Nuclear Energy Congress 2011
Date: Thursday, March 17, 2011 6:00:24 AM



Current Status of Fukushima Daiichi NPPs

Unit	Status
1	·Reactor cold shutdown, stable water level, offsite power is available ·No refrigerant is leaked in the reactor contaminant vessel ·Maintain average water temperature at 100 in the pressure restraint
2	·Reactor cold shutdown, stable water level, offsite power is available ·No refrigerant is leaked in the reactor contaminant vessel ·Maintain average water temperature at 100 in the pressure restraint
3	·Reactor cold shutdown, stable water level, offsite power is available ·No refrigerant is leaked in the reactor contaminant vessel ·Maintain average water temperature at 100 in the pressure restraint
4	·Reactor cold shutdown, stable water level, offsite power is available ·No refrigerant is leaked in the reactor contaminant vessel ·Maintain average water temperature at 100 in the pressure restraint

From TEPCO Press Release 13:00 PM Mar. 15

All units at the Fukushima II Daini, Onagawa, and Tokai nuclear power plants are in a safe and stable condition.

Japan's top government spokesperson says the radiation level at the quake-hit nuclear power plant in Fukushima Prefecture, north of Tokyo, rose briefly on Wednesday morning.

The fuel rod exposure at Fukushima Daiichi number 2 reactor is potentially the most serious event so far at the plant.

At this moment, what we can do is just praying for Japanese disaster.

Given the apparent severity of the events at Fukushima, the organizing committee decides to set up some sort of special session(s) at Beijing to help share the initial lessons learned.

Related Speakers:

- LIU Hua, Director, National Nuclear Safety Administration(NNSA)
- Chris Lanzit, Senior Advisor on China, American Society of Mechanical Engineers (ASME)

W/120

- IAEA's speakers are invited by the organizing committee to give our audience a full scene of what happened in FUKUSHIMA.

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?	?	?	?

Agenda at a glance:

	Day one (May 12)	Day two (May 13)
Morning	S1. Outlook of Nuclear Market S2. Reactor Debate	S4. Bottleneck: Safety and Uranium Uranium Mining Companies focus
Afternoon	S3. Dialogue Between Operators Equipment supplies highly suggested	S5. Reviewing Other Asia Nuclear Energy Users

Exhibit at CNEC 2011 and meet with:

- Policy Makers
- China Nuclear Troika
- Domestic EPC Contractor
- Chinese Uranium Traders
- Large equipment providers
- Utilities

If you are interested in sponsorship, exhibit & speaking opportunities, please contact us at c nec@cdmc.org.cn

Please, do not hesitate to contact us with any questions that you may have, and we look forward to welcoming you at the event!

Sincerely,

Michael LIU
 Project Director
 China Nuclear Energy Congress 2011
 T: +8621-6840-7631
 E: michaell@cdmc.org.cn

-->> [Register to attend China Nuclear Energy Congress 2011](#)





From: Schwarz, Sherry on behalf of Borchardt, Bill *in per*
To: Boger, Bruce; Ruland, William; Weber, Michael; Howe, Allen; Virgilio, Martin; Brenner, Eliot; Leeds, Eric; Grobe, Jack; ConferenceRoomO17B4 Resource
Subject: FW: Alignment Meeting for CM - Brief on Japanese Event & U.S. Response (CM date TBD)

When: Thursday, March 17, 2011 10:00 AM-11:00 AM (GMT-05:00) Eastern Time (US & Canada).
Where: O-17B4

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

~~*~*~*~*~*~*~*~*

Gentlemen, If you are not at the Ops Center, Eric would like all of you to attend this meeting with him. Thanks.

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

From: Borchardt, Bill *1900*
Sent: Wednesday, March 16, 2011 3:19 PM
To: Borchardt, Bill; Weber, Michael; Virgilio, Martin; Brenner, Eliot; Leeds, Eric; Grobe, Jack; ConferenceRoomO17B4 Resource
Subject: Alignment Meeting for CM - Brief on Japanese Event & U.S. Response (CM date TBD)
When: Thursday, March 17, 2011 10:00 AM-11:00 AM (GMT-05:00) Eastern Time (US & Canada).
Where: O-17B4

Rct 3/16

4/12/11

From: Nguyen, Quynh *NRC*
To: Leeds, Eric; Grobe, Jack; Boger, Bruce
Cc: Douglas Stone; Sheila Heen; Heather Sulejman; Deeds, Erin; Ruland, William
Subject: COMMAND DECISION: Postpone Difficult Conversations?
Date: Thursday, March 17, 2011 9:01:03 AM
Importance: High

Either way... I'll work with Triad to implement.

Thanks,
Quynh

PS Doug, thanks for the email!

From: Douglas Stone [mailto:stone@diffcon.com]
Sent: Thursday, March 17, 2011 8:41 AM
To: Nguyen, Quynh
Cc: Sheila Heen; Heather Sulejman
Subject: Re: Next Week

Hi Quynh,

As the difficult events in Japan grow worse, and there is the possibility of attendance attrition for our work with you all next week, Sheila and I wanted to put out some possible options. Our goal is to train the full raft of NRC folks as efficiently and economically as possible. All the options below work equally well from our point of view, so the only question is what works best for you all. We would treat any postponements as an "act of God," so no workshops fees to us would be incurred.

- (1) We could keep next week's set up as it is.
- (2) We could postpone Monday's follow up sessions, and still teach the third workshop on Tuesday and Wednesday. We could then merge the follow up for the three groups into two overall sessions (on one day) down the road, at an overall cost savings to you.
- (3) We could postpone both the follow up workshops and the third workshop, and re-schedule for a time when attendance will be stronger and easier for participants.

As I mention, the contract states that canceling or postponing at this late date results in a full fee payment. However, due to the events in Japan, we would waive that provision and charge no fees until the workshops are re-scheduled (which would mean no additional fees for postponement). I should note that we have incurred some out of pocket costs on airline fees, and so we'd investigate changing those tickets (with some possible resulting fees that would need to be passed through to you all).

We are, of course, prepared and eager to come down next week, but we want to do what is best for the NRC in terms of the overall impact of our work with you. So, let us know your thoughts. Please call me when you get this and we can discuss. My number at Triad is (617) 547-1728, ext. 113.

Talk soon,

4/1/22

Doug

Marksberry, Don

From: ANS Broadcasts [broadcasts@ans.org]
Sent: Thursday, March 17, 2011 12:24 AM
To: Marksberry, Don
Subject: Media Outreach Clarification

Dear ANS Member,

We have encouraged you to join us in educating the public and defending the nuclear industry. In doing so, we mentioned specifically contacting the media. **We want to be clear that each individual should work through their employer's media team in this regard.** Most employers have policies regarding media contact that can, in some cases, even extend to family members.

There is no doubt that the events upon us are unique, however we want to be sure that our guidance does not conflict with the needs of our industry and the companies that support us all.

Thank you for your support of the nuclear community.

Sincerely,

Jack Tuohy
Executive Director
American Nuclear Society

4/1/23

Scott, Michael

From: Scott, Michael
Sent: Thursday, March 17, 2011 8:10 AM
To: Dion, Jeanne
Cc: Rini, Brett
Subject: FW: RES support for commission meeting on Monday 3/21.
Attachments: Assistance with Commission Brief

Jeanne – Per below, please include me on all distro for this exercise. I will plan to attend the EDO alignment meeting unless directed otherwise.

Thanks!

Mike

From: Gibson, Kathy
Sent: Wednesday, March 16, 2011 11:36 PM
To: Scott, Michael; Lee, Richard; Santiago, Patricia; Tinkler, Charles; Zigh, Ghani; Navarro, Carlos
Cc: Armstrong, Kenneth
Subject: Fw: RES support for commission meeting on Monday 3/21.

This is a heads up. You will likely be involved in preparing materials for this briefing.

Mike, would you please coordinate this effort and keep me informed? I will be on the night shift Saturday and Sunday night in the Ops Center, so I may or may not be available (i.e. Awake) for the briefing depending on what time the briefing is scheduled.

Thanks, all!

From: Dion, Jeanne
To: Coe, Doug; Gibson, Kathy; Coyne, Kevin; Case, Michael; Sheron, Brian; Uhle, Jennifer
Cc: Rini, Brett; Armstrong, Kenneth
Sent: Wed Mar 16 18:42:32 2011
Subject: RES support for commission meeting on Monday 3/21.

NRR has requested RES to support a commission briefing on Monday 3/21. They are looking for background information, slides, key messages, talking points and possible Q&A- see the attached message. This might be a public meeting- our input will need to be fairly high level. NRR will provide more information after the EDO alignment meeting tomorrow 3/17.

Bill Borchardt's presentation, "Overview of Japanese Event and US response"

- RES to provide slides/information on "Advancing our understanding of safety and risk" (more info to come)

Mike Weber's presentation, "Situation assessment for US reactors and applicants"

- RES to provide slides/information on "Consequence Projections in Japan and what we might expect to see in the US"

Marty Virgilio's presentation, "Situation assessment for US reactors and applicants."

- RES to assist NRR as requested.

I will be in a meeting tomorrow morning (8am to noon)- Kenneth Armstrong will attend the 8:45am meeting.

u/124

Thanks,

Jeanne Dion
Technical Assistant (Acting)
U.S. Nuclear Regulatory Commission
Office of Nuclear Regulatory Research
jeanne.dion@nrc.gov
301-251-7482

Scott, Michael

Subject: INITIAL DISCUSSION ON COMMISSION BRIEF
Location: C3A04

Start: Thu 03/17/2011 10:30 AM
End: Thu 03/17/2011 11:00 AM

Recurrence: (none)

Meeting Status: Meeting organizer

Organizer: Scott, Michael
Required Attendees: Scott, Michael; Santiago, Patricia; Lee, Richard; Tinkler, Charles; Zigh, Ghani; Navarro, Carlos
Optional Attendees: Esmaili, Hossein; Sudhamay Basu

This is per Kathy's note of last night – that we will be developing presentations for Commission brief Monday on Japan and consequences and implications. We will get more direction this afternoon. This first meeting is to discuss in general terms how we will put together the information requested and who else needs to be involved. If you know of someone else who should attend this planning discussion, please invite them.
Thanks

Lee, Richard

Subject: Canceled: Fukushima Daiichi coordination meeting
Location: 2C17

Start: Thu 3/17/2011 3:00 PM
End: Thu 3/17/2011 3:30 PM
Show Time As: Free

Recurrence: Daily
Recurrence Pattern: every day from 3:00 PM to 3:30 PM

Meeting Status: Not yet responded

Organizer: Schaperow, Jason
Required Attendees: Uhle, Jennifer; Gibson, Kathy; Santiago, Patricia; Lee, Richard; Tinkler, Charles; Salay, Michael; Wagner, Katie

Importance: High

When: Occurs every day effective 3/17/2011 until 3/18/2011 from 3:00 PM to 3:30 PM (GMT-05:00) Eastern Time (US & Canada).

Where: 2C17

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

~~*~*~*~*~*~*~*~*

Request you attend coordination meeting to discuss ongoing DSA efforts on Fukushima Daiichi accident and preparation for Monday's Commission meeting.

Meeting requested by Jason.

4/125

From: HPS Headquarters [HPS@BurkInc.com]
Sent: Thursday, March 17, 2011 12:13 PM
To: Marksberry, Don
Subject: Just Announced: HPS Special Session at the June Annual Meeting on the Japanese Nuclear Reactor Situation



Health Physics Society

Specialists in Radiation Safety • Founded 1956 • <http://hps.org>

Just Announced: HPS Special Session at the June Annual Meeting on the Japanese Nuclear Reactor Situation

Attention HPS members! The recent earthquake in Japan, and the subsequent issues with the nuclear reactors at the Fukushima Dai-ichi complex has sparked widespread interest within the HPS, and in the population in general about what happened and what impact it will have on the environment, the population surrounding the reactors, and on nuclear power. The HPS will be holding a Special Session at the Annual Meeting in West Palm Beach this coming June to discuss these issues and more. The details are incomplete at this time, due to the emergent nature of the issues, but keep a close eye on www.hps.org for links to updated information. Also, more information will be published in the May issue of the HPS Newsletter. For information, contact the Task Force Chair, Robin.Hill@pnl.gov or HPSProgram@burkinc.com

4/12/11

4

Huffert, Anthony

From: Huffert, Anthony
Sent: Thursday, March 17, 2011 3:27 PM
To: Lou Brandon
Subject: THuffert PMT support

Hi, Lou -

After our talk earlier today about the proposed PMT schedule, I checked my availability for the next week or so. I'm available nearly all days. I understand that the proposed PMT work schedule is somewhat fluid at this time and that you prefer a senior RASCAL operator team with a junior RASCAL operator for each shift.

As you know, since last Friday I've worked each type of shift (day, evening, night) and I've noticed that a variable shift time does impact my alertness. So for the next week, I'd like to work the same shift time if possible.

Of course, I'd like to work the day shift (who wouldn't?) with a second preference being the evening shift. If only the night shift is available, I'll make that work.

Before I left my shift this morning, I penciled in some shift times for next week, as a straw man. This afternoon, I called the PMT to discuss work schedules for the remainder of this week (including the weekend).

As far as my mgmt is concerned, I'm fairly certain that they will continue to support my work at the Ops Center full time for the foreseeable future. Please know that I enjoy the dose assessment work tremendously and personally feel a strong commitment to serve the agency (and the public) in this capacity.

And thanks again for the help with the RASCAL - each day has brought new challenges and learning opportunities.

Tony

4/1/27

Schaperow, Jason

From: Schaperow, Jason
Sent: Wednesday, March 23, 2011 9:49 AM
To: Chang, Richard
Subject: FW: Requests

From: Tinkler, Charles
Sent: Monday, March 21, 2011 3:17 PM
To: Santiago, Patricia; Chang, Richard; Wagner, Katie
Cc: Schaperow, Jason
Subject: Requests

Right now we have 2 actions we are following up

1. Clarification and assessment of potential radiological release source terms for Fukushima Units 3&4 spent fuel pools, earlier estimates were made based on earlier Peach Bottom analyses and followup is needed to address Fukushima and complete dryout and concrete attack, clarification sought by the PMT
2. We have received additional requests from Naval Reactors. These are being put on hold. Discussed with Brian Sheron

Charles Tinkler
Charles.Tinkler@nrc.gov

4/128

Kuritzky, Alan

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

Pat –

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

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

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

Kevin

From: ANS Broadcasts [broadcasts@ans.org]
Sent: Thursday, March 17, 2011 10:26 PM
To: Marksberry, Don
Subject: Letter to President Obama



AMERICAN NUCLEAR SOCIETY

555 North Kensington Avenue
La Grange Park, Illinois
60526-5592 USA

Tel: 708/ 352-6611
E-Mail: NUCLEUS@ans.org
<http://www.ans.org>
Fax: 708/ 352-0499

March 16, 2011

The Honorable Barack Obama
President of the United States
1600 Pennsylvania Avenue NW
Washington, DC 20500

Dear Mr. President:

On behalf of the more than 11,000 men and women of the American Nuclear Society (ANS), I extend our deepest sympathies to the people of Japan as they begin to recover from a natural disaster of unprecedented proportions. We also salute the heroic efforts of the TEPCO/Fukushima plant operators as they work to facilitate a safe shutdown of the impacted reactors.

ANS has offered technical assistance to the Atomic Energy Society of Japan (AESJ) and is prepared to help the U.S. government in any way possible to provide needed assistance to the Japanese government and people.

We also thank you for your administration's measured political response to the current situation.

Clearly, events at the Fukushima Daiichi reactor site continue to evolve rapidly and our understanding of them has been clouded by conflicting information, and in some cases misleading media reports.

We are urging policymakers in the administration and Congress to withhold judgments on U.S. nuclear policy until the current situation has been resolved and the incident has been fully understood.

We recognize that the events in Japan will trigger a broader public discussion over the benefits and risks of nuclear energy. We welcome that discussion, but only after a complete technical understanding of its causes, progression, and impact has been established and fully evaluated.

Please let me know if I can be of any assistance to you on this or any other matter.

Sincerely,

Joe F. Colvin
President, American Nuclear Society

CC: The Honorable Steven Chu, Secretary of Energy

4/130

From: [HRMSBulletin Resource](#)
To: [HRMSBulletin Resource](#)
Cc: [HRMSBulletin Resource](#)
Subject: Clarification for use of the Tac ZG0061
Date: Thursday, March 17, 2011 9:26:13 AM

Clarification for use of the TAC (ZG0061) that was established for the events in JAPAN

This TAC (ZG0061) was established to track activity related to staff that are supporting the recent events in Japan. Managers that are performing managerial functions relating to the events in Japan should continue to use the TAC (ZM0000). In the situation where a manager is required to perform duties which would be considered different than managerial responsibilities should record their time under the new TAC ZG0061. Support staff that are performing Japan events should use TAC's that relate to their normal responsibilities. In the situation where administrative support staff is required to perform duties that would be considered different than routine administrative support responsibilities should record their time under the new TAC ZG0061.

If you have any additional questions please e-mail Jackie Jones Jackie.Jones@NRC.GOV or Mary Matheson at Mary.Matheson@NRC.GOV.

4/13/11

From: [Ruland, William](#)
To: [Dudes, Laura](#)
Cc: [Sloan, Scott](#); rsi01hoc@nrc.gov
Subject: FW: Link to "Boggs Box" (spray nozzle) sent from Oconee to Japan
Date: Thursday, March 17, 2011 12:07:00 PM

fyi

From: Boger, Bruce *BR*
Sent: Thursday, March 17, 2011 11:51 AM
To: Ruland, William
Subject: FW: Link to "Boggs Box" (spray nozzle) sent from Oconee to Japan

Bill, Here's a video of the nozzle that Oconee is providing to Japan. The RST may be interested, although I don't know how it could be placed into service, given the radiation fields as I understand them. Bruce

From: Meighan, Sean *SM*
Sent: Thursday, March 17, 2011 11:42 AM
To: Boger, Bruce
Subject: Link to "Boggs Box" (spray nozzle) sent from Oconee to Japan

Bruce:

As per your request.

<http://portal.nrc.gov/edo/nrr/dori/japan/Shared%20Documents/Forms/AllItems.aspx>

Very Respectfully
Sean

4/1/32

Hogan, Rosemary

From: Bagchi, Goutam
Sent: Thursday, March 17, 2011 10:53 AM
To: NRO_DSER Distribution
Cc: Kammerer, Annie; Burnell, Scott; Cullingford, Michael; Ali, Syed; Hogan, Rosemary
Subject: Some Seismic Safety Criteria of Japan Nuclear Safety Commission (NSC)
Attachments: JapanNSCSitingRGL-ST-I_0.pdf; JapanNSCSafetyClassRGL-DS-I_01.pdf; JapanNSCseismicDesignRGL-DS-I_02.pdf

This information is for ~~Official Use Only~~

Dear Colleagues,

Those of you that are interested in getting more technical information may want to browse through some of the attached files of regulatory guides (RG) published by the Japan Nuclear Safety Commission (NSC). In this message I am trying to present what I gleaned from the RGs. Please note that the front pages of the RGs may show the original publication dates, such as 1978 etc., inside pages should show the latest revision dates – 2006, 2009 etc.

- **Siting Review Criteria:**
Focuses on proximity to population zone and potential radiation impact, not site suitability from natural hazards (hydrology, meteorology or Seismology stand point)
- **Safety Classification:**
Divided into classes 1, 2 and 3. Required function for Class 3 are) Functions to mitigate reactor pressure increase
2) Functions to suppress reactor power increase
3) Functions to make up reactor coolant
Safety Class 3 design philosophy, "Class 3: Ensure and maintain reliability equivalent to or higher than that of ordinary industrial facilities"
- **Seismic Design:** Safety Class 3 SSCs are designed to static forces with varying numbers of safety factors from 3 to 1.0

Japan's seismic design of structures for resistance ground vibration is very robust -2007 July event at Kashiwazaki shows this. Vibratory ground motion and tsunami from large earthquakes are relatively frequent events in Japan and they occur simultaneously. At this point I am not clear as to the extent to which the older vintage plants considered the combined effects. I do not know what back fits were implemented at the Fukushima like plants when the NSC upgraded its seismic criteria in 2006 (?)

Another factor seems to be qualification of electrical and mechanical equipment in mild and harsh environments, as is required under 10 CFR 50.49. At Fukushima the electrical safety systems (cables?) became wet and did not work even when the diesel generator worked for about an hour.

There are very significant differences in the way reactor oversight is conducted – review of maintenance and in-service inspection of safety related SSCs (10 CFR 50.55a imposes ASME Code criteria to ISI).

Please forgive me, I messed up the formatting in the bulleted portion of the text above. Regards,

*Thank you,
Goutam Bagchi*



NSCRG: L-ST-I.0
Regulatory Guide for Reviewing Nuclear Reactor Site
Evaluation and Application Criteria

Published in May 1964

The Nuclear Safety Commission of Japan

Revision History

Latest Revision on March 27, 1989 by the Nuclear Safety Commission

Disclaimer

This is an unofficial translation of the official Nuclear Safety Commission Regulatory Guide for the benefit of interested readers. For all questions regarding meaning and phrasing, please refer to the official version in Japanese.

Handwritten notes:
JSK
Refer

Revision History

Revised on March 27, 1989, by the Nuclear Safety Commission

Authorized on May 27, 1964, by the then Atomic Energy Commission

In April 1958, the Atomic Energy Commission established the Specialty Subcommittee on Reactor Safety Standards to enact scientific and technical standards for the safety of reactor facilities. On November 2, 1963, the Committee submitted a report regarding the "Regulatory Guide for Nuclear Reactor Siting Evaluation and Application Criteria" as a preliminary stage before establishing the standards for nuclear reactors to be placed on land.

The Atomic Energy Commission studied the report and specified the "Regulatory Guide for Nuclear Reactor Siting Evaluation and Application Criteria". as in the Separate Sheet 1.

The Commission also specified tentative criteria regarding the radiation dosage, etc., as in the Separate Sheet 2, which are required in application of this Guideline.

Guideline for Nuclear Reactor Siting Evaluation

Table of Contents		page
1.	Basic Concept	1
2.	Guideline for Site Review	1
3.	Application	2
	Tentative Judging Criteria	3

A safety review is conducted prior to the establishment of a nuclear reactor to be placed on land.

This Guideline is used in this safety review by the Council on Reactor safety Examination to examine the adequacy of the nuclear reactor siting conditions in relation to rare accident.

1. Basic Concept

1.1 Fundamental Siting Conditions

Regardless of the establishment location, Nuclear reactors are required to be designed, constructed operated and maintained to prevent rare accidents. The following site conditions are, however, required in principle to ensure public safety in case of rare accident:

- (1) There have as yet been no event liable to induce large accident and no such event is expected to occur in the future. There have also been very few events deemed liable to expand disaster;
- (2) In relation to their safety guarding facilities, nuclear reactors shall be located at a sufficient distance from the public; and
- (3) The environment of the nuclear reactor site including its immediate proximity shall be such that appropriate measures for the public can be implemented as required.

1.2 Basic Goal

Based on a policy of ensuring public safety even in case of accident and promoting a sound nuclear development, this Guideline provides the following three basic goals:

- a) Not to cause radiation damage to the neighboring public, even when assuming a serious accident (hereinafter termed "Major Accident")that is deemed to have a possibility of occurrence under the worst scenario from technological point of view, by considering the events in the site vicinity, the characteristics of the nuclear reactor and related safety guarding facilities.
- b) And to prevent significant radiation hazard to the neighboring public when an accident (hereinafter termed "Hypothetical Accident"), which exceeds the Major Accident level and is not expected to occur from technological point of view. is hypothesized, for example, by hypothesizing that some of safety guard facilities which are assumed to be effective in postulating a Major Accident do not function and corresponding release of radioactive materials occurs.
- c) In case of a Hypothetical Accident , effect on the collective dose shall be sufficiently small

2. Guideline for Site Review

When examining the adequacy of the site conditions, it is necessary to ensure that the following three conditions are satisfied at least in order to achieve the previously described basic goals.

2.1 Regarding the area surrounding a nuclear reactor, within "the range in a specified distance" from the nuclear reactor shall be the non-residential area. Here, the range of specified distance means a range of distance where person may be exposed to radiation damage if they remain at the point of that distance under a Major Accident, and "non-residential area" means the area where the public do not reside in principle.

2.2 The region within the range in specified distance from the nuclear reactor and outside the

non-residential area shall be the low population zone. Here, "the range in specified distance" means that wherein the public may be exposed to significant radiation hazard in the case of a Hypothetical Accident unless certain countermeasures are provided. "The low population zone" means the region where appropriate countermeasures can be provided to prevent significant radiation hazard (for instance, a low population density zone).

2.3 The nuclear reactor site shall be separated by specified distance from the dense population zone. Here, the specified distance means the distance where the cumulative value of whole-body dose in case of a hypothetical accident shall be small enough to be deemed acceptable based on the viewpoint of collective dose.

3. Application

This Guideline shall be applied for the siting review of nuclear reactors having 10, 000 KW or larger thermal output. In case of nuclear reactors under 10, 000 KW thermal output, this Guideline shall be used as a reference in their siting review.

Tentative Judging Criteria to apply the Regulatory Guide for Nuclear Reactor Site Evaluation and Application Criteria

The criteria shall be used when the Guideline on the Separate Sheet 1 is applied by the Council on Reactor Safety Examination to review the safety of nuclear reactors to be placed on land.

1. The following dosage values shall be applied as the criteria in judging "the range with the specified distance" in Guideline 2.1.

- For Thyroid (child): 1.5 Sv
- For Whole body: 0.25 Sv

2. The following dosage values shall be considered as the general criteria in judging "the range in specified distance" in Guideline 2.2.

- For Thyroid (adult): 3 Sv
- For Whole body: 0.25 Sv

3. The criteria in judging "to be separated by specified distance" in Guideline 2.3 shall be referred to overseas examples (for instance, for 20,000man-Sv).

Supplement:

- (i) The criteria above are provided from the administrative aspect with comparison and investigation on the currently available information regarding the radiation effect, types and kinds of the diffusion of radioactive materials from nuclear reactors in accidents and overseas examples of these kinds, and shall be reviewed accordingly by promoting research in this field further in Japan and considering international trend as well, since the biological effect of radiation and collective dose remain especially somewhat unclear at this time,
- (ii) The criteria above are provided based on a concept different from that for the emergency measures taken in an actual nuclear reactor accident (for example, dose in relation to food & drink intake limitation and evacuation measures, etc.)
- (iii) The criteria above are used for the safety review prior to nuclear reactor establishment to examine the adequacy of the siting conditions in relation to a rare accident. The criteria for judgment regarding prevention of public radiation damage in the normal reactor operation are provided in the Law for the Regulation of Nuclear Source Materials, Nuclear Fuel Material and Nuclear Reactors (No. 166, in 1957) and the Prime Ministers Ordinance and the Notification of the Science and Technology Agency based on this law.
- (iv) The criteria 1 and 2 above are provided for nuclear reactors which use ordinary uranium fuel. It is necessary to consider different criteria when another criteria for thyroid and whole body are considered important from the damage aspect.



NSCRG: L-DS-I.01
Regulatory Guide for Reviewing Classification of
Importance of Safety Function of Light Water Nuclear
Power Reactor Facilities

Published in August 1990

The Nuclear Safety Commission of Japan

Revision History

Latest Revision on March 9, 2009 by the Nuclear Safety Commission

Disclaimer

This is an unofficial translation of the official Nuclear Safety Commission Regulatory Guide for the benefit of interested readers. For all questions regarding meaning and phrasing, please refer to the official version in Japanese.

Revision History

Revised on March 9th, 2009

Revised on September 19, 2006

Authorized on August 30, 1990

Regulatory Guide for Reviewing Classification of Importance of Safety Function for Light Water Nuclear Power Reactor Facilities

Table of Contents	page
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II. Position and scope of application	1
III. Classification of the importance of safety function	1
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I. Objective	8
II. Position and scope of application	8
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IV. Principles for application of classification	9
V. Design considerations for SSCs with safety functions	11

I. Objective

The objective of this Regulatory Guide is to establish relative importance as to various functions to ensure safety (hereinafter referred to as “safety function”) of light water nuclear power reactor (hereinafter referred to as “LWR”) facilities from the safety standpoint and, thereby, provide basis for imposing suitable requirements on the design of structures, systems and components (hereinafter referred to as “SSCs”) required to perform their safety functions.

II. Position and scope of application

This Regulatory Guide provides fundamental criteria for determining importance of safety functions in applying various requirements set forth in "Regulatory Guide for Reviewing Safety Design of Light Water Nuclear Power Reactor Facilities"(hereinafter referred to as “Safety Design Guide”) in practice in the license review of applications for Establishment Permit (including Modification Permit) of LWRs.

III. Classification of the importance of safety functions

1. Categorization of safety functions

SSCs bearing safety functions are classified into two categories according to the nature of their safety functions as outlined below:

- (1) SSCs whose failure could cause abnormal conditions at nuclear reactor facilities, thereby lead to undue radiation exposure to the public or site personnel: abnormality prevention systems (hereinafter referred to as “PS”).
- (2) SSCs whose function is to prevent, in case of abnormal conditions at nuclear reactor facilities, an escalation of such conditions or put such conditions under control immediately, thereby prevent or mitigate possible undue radiation exposure to the public or site personnel: abnormality mitigation systems (hereinafter referred to as “MS”).

2. Classification of safety importance

SSCs falling into PS and MS categories are further classified into Class 1, Class 2 and Class 3 according to the importance of their safety functions and designated as shown in Table 1. Definitions and safety functions of the SSCs belonging to the respective classes are shown in Table 2.

Table 1 Classification of the importance of safety functions

Categorization by function		SSCs with safety functions		SSCs without safety functions
		PS (with abnormality prevention functions)	MS (with abnormality mitigation functions)	
Safety-related SSCs	Class 1	PS-1	MS-1	-
	Class 2	PS-2	MS-2	
	Class 3	PS-3	MS-3	
Non-safety-related SSCs		-	-	SSCs with non-safety functions alone

Table 2 Definitions and functions for classification of the importance of safety functions (1/3)

Classification		Definition	Function
Class 1	PS-1	SSCs whose damage or failure could cause events leading to: (a) considerable core damage or (b) significant fuel failures.	1) Functions to form reactor coolant pressure boundary
			2) Functions to prevent excessive reactivity insertion
			3) Functions to maintain core geometry
	MS-1	1) SSCs capable of urgently shutting down the reactor, removing residual heat and preventing overpressure within the reactor coolant pressure boundary in the event of abnormal conditions, thereby preventing undue radiological influence on the off-site public.	1) Emergency shutdown of the reactor
			2) Functions to maintain sub-criticality
			3) Functions to prevent overpressure within the reactor coolant pressure boundary
	2) Other SSCs essential to safety	4) Functions to remove residual heat after reactor shutdown	
		5) Functions to cool reactor core	
		6) Functions to confine radioactive materials, shield radiation and reduce radioactive release	
			1) Functions to generate actuation signals for the engineered safety features and reactor shutdown system
			2) Supporting functions especially important to safety

Class 2	PS-2	1) SSCs whose damage or failure could cause events, without considerable core damage or significant fuel failures, leading to excessive release of radioactive materials to the off-site areas.	(1) Functions to contain reactor coolant (Except for: small-diameter pipes excluded from the reactor coolant pressure boundary such as instrumentation pipes; other pipes and equipment which are not directly connected to the boundary.)
			2) Functions to store radioactive materials, without direct connections to the reactor coolant pressure boundary
			3) Functions to handle fuels safely

**Table 2 Definitions and functions for classification of the importance of safety functions
(2/3)**

Classification		Definition	Function
Class 2	PS-2	2) SSCs which are required to function during normal operation and anticipated operational occurrences and whose failure could lead to degraded core cooling.	1) Functions to reseal safety valves and relief valves
	MS-2	1) SSCs capable of sufficiently reducing radiological influence on the off-site public in case of damages or failures of PS-2 SSCs	1) Functions to make up water for fuel storage pool
			2) Functions to prevent radioactive materials release
		2) SSCs especially important to cope with abnormal conditions	1) Functions to monitor plant conditions in case of an accident
			2) Functions to mitigate abnormal conditions
3) Functions to shutdown reactor safely from outside the control room			
Class 3	PS-3	1) SSCs which are not part of PS-1 and PS-2 SSCs and whose failure could become initiating events of abnormal conditions.	1) Functions to retain reactor coolant (other than PS-1 and PS-2)
			2) Functions to circulate reactor coolant
			3) Functions to store radioactive materials
			4) Functions to supply electric power (except for emergency power supply)
			5) Functions for plant instrumentation and control (except for safety protection function)
			6) Auxiliary functions for plant operation
	2) SSCs capable of controlling the concentration of radioactive materials in reactor coolant as low as acceptable for normal operation.	1) Functions to prevent the dispersion of fission products into reactor coolant	
2) Functions to clean up reactor coolant			

**Table 2 Definitions and functions for classification of the importance of safety functions
(3/3)**

Classification		Definition	Function
Class 3	MS-3	1) SSCs capable of mitigating anticipated operational occurrences in conjunction with MS-1 and MS-2.	1) Functions to mitigate reactor pressure increase
			2) Functions to suppress reactor power increase
			3) Functions to make up reactor coolant

		2) SSCs required to cope with abnormal conditions	Functions important to emergency measures and monitoring of abnormal conditions
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IV. Principles for the Application of Classification

To put the classification shown in Table 2 into practice, the following requirements shall be met in principle:

1. Scope and classification of supporting systems

The SSCs designed to directly fulfill the safety functions in Table 2 will be hereinafter referred to as 'competent systems'. The SSCs necessary, directly or indirectly, for a competent system to fulfill its safety functions will be hereinafter referred to as 'supporting systems'.

The scope and classification of supporting systems are specified as follows:

- (1) Supporting systems directly needed for a competent system to fulfill its safety functions are considered to have the importance equivalent to that of competent systems.
- (2) Supporting systems needed for a competent system to maintain or assure its reliability but not directly needed to fulfill its safety functions are considered to have the importance lower than that of competent systems. However, supporting systems for a competent system of class 3 is considered to be class 3.

2. SSCs with two or more safety functions

SSCs with two or more safety functions shall meet every design requirement for the safety functions to be fulfilled.

3. Requirement of separation and isolation

Adequate consideration shall be given to functional isolation and physical separation between two or more SSCs with safety functions as well as between those with and without safety functions so that the expected safety functions of any SSCs of equivalent or higher importance are not impaired by the operation or failure of the others, thereby not threatening the safety of nuclear reactor facilities.

4. Connection between different classes

When SSCs of different classes are connected, design requirements equivalent to those for higher class shall be applied to lower class. Alternatively, adequate functional isolation by means of, for example, isolation devices equivalent to higher class shall be considered so that the safety functions of SSCs of higher class are not impaired by the failure of lower class SSCs.

V. Design considerations for SSCs with safety functions

1. Fundamental objectives

Basic design or design principles for the SSCs in each class shall be such that the following fundamental objectives shall be achieved in the light of ensuring safety functions through established design, construction and testing techniques and operational management.

- (1) Class 1: Ensure and maintain reliability as high as reasonably achievable
- (2) Class 2: Ensure and maintain high reliability.
- (3) Class 3: Ensure and maintain reliability equivalent to or higher than that of ordinary industrial facilities.

2. Application of Classification to Safety Design Guide

SSCs with safety functions shall reflect necessary design considerations to achieve the fundamental objectives described in section 1 above. Hence, the classification in this guide is applied to Safety Design Guide as specified below:

(1) Design considerations for reliability

The systems indicated below are considered to be 'systems with safety functions of especially high importance' that are referred to in item (2) of Guideline 9 of Safety Design Guide.

- (a) Among PS-1 SSCs, the valves that are open during normal operation and closed in case of an accident to perform the function as a part of the reactor coolant pressure boundary.
- (b) MS-1
- (c) Among MS-2 SSCs, the systems that perform the function to monitor plant conditions in case of an accident

(2) Design considerations against natural phenomena

The SSCs indicated below are considered to be 'SSCs with safety functions of especially high importance' that are referred to in item (2) of Guideline 2 of Safety Design Guide.

- (a) Class1
- (b) Among class 2 SSCs, SSCs that are susceptible to natural phenomena in particular and whose functions are difficult to maintain by alternative measures or extremely difficult to restore

(3) Design considerations for electrical systems

'Safety functions of especially high importance' and 'safety functions of high importance', which are referred to in item (1) and item (4) respectively of Guideline 48 of Safety Design Guide, are as indicated below.

(a) Safety functions of especially high importance

- i) PS-1
- ii) MS-1
- iii) Among MS-2 functions,
 - a) Functions to make up water for the fuel storage pool
 - b) Functions to monitor plant conditions in case of an accident
 - c) Functions to check reactor coolant release from relief valves among functions to mitigate abnormal conditions
 - d) Functions for safe reactor shutdown from outside of the control room

(b) Safety functions of high importance

- i) Class 1
- ii) Class 2

Commentary

I. Objective

In license review of the applications for Establishment Permit of LWRs, Safety Design Guide is applied to examine the adequacy of the proposed safety design provisions for the nuclear reactor facilities involved. The requirements specified in Safety Design Guide should be applied properly according to the relative importance of SSCs to safety. It is therefore necessary to properly classify the safety functions to be performed by SSCs according to their importance to safety.

It is the objective of this "Regulatory Guide for Reviewing Classification of Importance of Safety Function for Light Water Nuclear Power Reactor Facilities" (which will be referred to as 'Importance Classification Guide') to provide the fundamental criteria as to the importance of safety functions in applying Safety Design Guide and establish the bases for adequate requirements to be met in the design of SSCs with safety functions.

II. Position and scope of application of this Guide

As mentioned above, this guide should be applied in the license review of the applications for Establishment Permit of LWRs in conjunction with Safety Design Guide. Needless to say, there are various safety requirements to be met in the stages not only for design but also for construction and operation. These requirements must be appropriate and consistent according to the importance of safety functions to be fulfilled by the SSCs involved. This guide, which is primarily applied in the license review for Establishment Permit of LWR as mentioned above, is also considered to serve as a reference when specific safety requirements are set in the detailed design and subsequent stages.

Outlined below are some points that require particular attention when this guide is practically applied:

Firstly, it should be noted that the classification of safety function importance shown in Table 2 of this guide and the examples of SSCs shown in the attached table are based on the concept of LWRs that are considered to be standard in design when this guide was established. Therefore, in order to establish proper classification for nuclear reactor facilities with different designs, correct and thorough understanding of the purport of this guide is indispensable.

Secondly, the classification specified in this guide reflects a comprehensive review of expert judgment as to how individual safety functions play their roles for the overall safety of the nuclear reactor facility. There may appear to be disagreement between the classification in this guide and some other classifications with respect to specific aspects of SSCs. Such examples may be found in the importance classification for seismic design specified in "Regulatory Guide for Reviewing Seismic Design of Nuclear Power Reactor Facilities" (hereinafter referred to as 'Seismic Design Guide') and the classification for structural design of nuclear components specified in Ministry of Economy, Trade and Industry departmental order 62. It is necessary to fully

understand the differences between them in terms of purpose, purport, characteristics focused, etc. Mechanical application or diversion of one to another should be avoided.

III. Classification of safety function importance

This guide covers all the SSCs related to the safety of nuclear reactor facilities in any way. Considering that the requirements for them depend on the nature of functions to be performed, the basis of the classification is focused on the functions necessary to ensure safety (safety functions).

SSCs with safety functions are broadly classified into two categories; prevention systems (PS) with the functions to prevent abnormal conditions from taking place and mitigation systems (MS) with the functions to cope with abnormal conditions upon their occurrence. This classification reflects a consideration that the requirements for the functions of these two categories are not the same. Furthermore, safety importance is classified into three classes for each of the two categories. There are no safety requirements for SSCs which are outside of these categories. Examples of typical SSCs with the functions shown in Table 2 are listed for reference in the attached table.

IV. Principles for application of classification

Although the basic points to be noticed in applying the classification in this guide are as outlined in II above, more detailed principles to be observed in its practical application are summarized below:

1. Scope and classification of supporting systems

In this guide, the SSCs designed to directly fulfill required safety functions are referred to as 'competent systems'. In case of loss of coolant accident (LOCA), for example, the function to inject cooling water and cool the core is performed by the emergency core cooling system (ECCS). Therefore, the ECCS is the competent system with respect to the core cooling function during a LOCA.

However, required safety functions may not always be fulfilled by competent systems alone. For the ECCS to fulfill its safety functions, other provisions are, more or less, necessary such as: the safety protection system for generating actuation signals; electric systems (including emergency on-site power system) for supplying power; auxiliary cooling systems for cooling components; instrumentation for monitoring and assuring the reliability of the systems; testing equipment; foundations and supports for fixing components; building for containing the system and associated ventilation systems. As shown in this example, those SSCs needed, directly or indirectly, for a competent system to fulfill its safety functions are referred to as 'supporting systems' in this guide.

However, it should be noted that even if SSCs are regarded as supporting systems by the above definition, they should be categorized as competent systems provided that they have a wide

range of SSCs relying on their supporting functions. One of the examples is ‘other SSCs essential to safety’ as part of MS-1 in Table 2 of this guide.

All supporting systems other than those mentioned above are divided into two groups: (a) supporting systems which are directly needed by a competent system for fulfilling its safety functions and (b) the others. The importance of the former group shall be considered to be equivalent to that of the competent systems, whereas the importance of the latter group can be considered to be lower. However, among the supporting systems in the latter group, those of which competent systems are class 3 shall be considered as class 3 because they have safety-related functions.

‘Supporting systems directly needed for a competent system to fulfill its safety functions’, as mentioned above, imply indispensable SSCs without which the competent system would not be able to perform or maintain its functions, such as instrumentation for startup and operational control, driving systems, component cooling systems and equipment fuel systems. ‘The importance of the supporting systems directly needed for a competent system to fulfill its safety functions shall be considered to be equivalent to that of the competent systems’, as mentioned above, implies that the competent system together with their supporting systems as a whole shall ensure and maintain the required reliability and that equivalent design considerations shall be given to both the competent system and their supporting systems in order to satisfy, as a whole, the requirements for the competent system.

For instance, provided that a competent system shall be designed not to lose its safety functions with the assumption of a single failure in the system, it is necessary that an assumption of a single failure in the supporting systems directly needed for the competent system to fulfill its safety functions would not lead to a loss of safety functions of the competent system. However, this is not to require an assumption of independent failures in both a competent system and its supporting systems.

2. SSCs with two or more safety functions

Many of SSCs with safety functions may have multiple different safety functions. For instance, take safety valves and relief valves connected to the reactor coolant pressure boundary. They serve as PS as part of the pressure boundary under normal conditions and serve as MS to mitigate overpressure under abnormal conditions. Some system design may also include a pump as part of ECCS as well as part of residual heat removal system. That is to say, SSCs with multiple different safety functions shall meet the respective design requirements imposed on all safety functions that they are expected to fulfill.

3. Requirement of separation and isolation

If it appears that there could be interaction between one of SSCs with safety functions and the others, the influence from any of them shall not impair the safety functions expected for other SSCs of equivalent or higher importance. Hence, it is required that SSCs with safety functions should be designed giving adequate considerations to functional isolation, physical separation or their combination so that their safety functions are not affected by other SSCs of equivalent or

lower importance (including those having no safety functions) .

Examples of aforementioned 'functional isolation' are: systems connected by tie line are isolated from each other by appropriate arrangement of valves; instrumentation systems are divided by insulation amplifier or the like; relays/breakers are used to provide electric isolation between two electric circuits. 'Physical separation' refers to providing an appropriate geometrical layout or physical barriers such as walls and weirs.

The requirements in this section do not necessarily mean that SSCs with safety functions must have independence in the strict sense of the word. The requirements can be considered to be met if it is evident that expected safety functions in design are not impaired by any possible mutual effects.

4. Connection between different classes

Practical methods to be followed for functional isolation in connecting SSCs of different classes are as specified in IV-3 in this guide. The reliability of isolation portions shall be equivalent to that of higher class.

V. Design Considerations for SSCs with safety functions

1. Fundamental objectives

Once safety functions necessary to ensure the safety of nuclear reactor facilities and their relative importance have been determined, various requirements are imposed upon the SSCs that have such safety functions. The ultimate objective of these requirements is to ensure sufficiently high reliability according to the importance of respective safety functions.

This guide, which provides guidance on the practical application of Safety Design Guide pertaining to the importance of safety functions, aims at the" basic design or basic design principles for nuclear reactor facilities. Needless to say, high reliability cannot be achieved only with design considerations but requires consistent efforts through the respective stages of construction and operational management, where such efforts may be mutually complementary. The fundamental objectives specified in this section should be attained not only by design but also by quality assurance activities in the subsequent stages eventually. The basic design or design principles should be such that consideration is given to adequate implementation of necessary activities in the subsequent stages and that the feasibility of achieving the fundamental objectives specified in this guide by these integral efforts can be confirmed.

In general, SSCs, including not only nuclear reactor facilities but also other industrial facilities, are subject to certain codes and standards, which are based on domestic laws and regulations, and/or private and foreign codes and standards considered to be appropriate so that adequate reliability can be ensured. SSCs of class 3 specified in this guide are those for which at least the ordinary industrial level of reliability is considered to be necessary and which thus come under the application of the Building Standards Act, Japanese Industrial Standards, ordinary electric works regulations, etc. As far as nuclear

reactor facilities are concerned, however, it is a general practice to impose reliability requirements higher than the ordinary industrial level on SSCs important to safety in view of the significance of safety. In Seismic Design Guide, for example, it is required that SSCs of classes S and B withstand design seismic forces severer than specified in the Building Standards Act. The Ministry of Economy, Trade and Industry departmental order 62 also imposes severe requirements for mechanical design on components of high importance. This guide, basically similar in concept to those legal requirements, also demands that SSCs of classes 1 and 2 be more reliable than those of ordinary industrial facilities. Specific measures to be taken to ensure the required level of reliability in respective stages of design, construction and operational management depend on the structure, working principles, service conditions, characteristics, etc. of individual SSCs. Therefore, specific measures to meet the individual reliability requirements shall be adequately determined in the light of the fundamental objectives of this guide. For example, when the concrete measures or requirements for maintenance of SSCs are determined for operation management phase, it is adequate to refer to risks such as operational experience and/or PSA results maintaining the safety function specified in this guide. This reflects recent progress in PSA technology as well as the viewpoint of enhancement of scientific rationality, consistency and transparency in nuclear safety and appropriate allocation of limited resources.

2. Application of classification to Safety Design Guide

Adequate design considerations should be given to SSCs with safety functions reflecting their features in order to attain the fundamental objectives specified in V-1 of this guide. Although basic requirements for design considerations are indicated in Safety Design Guide, practical applications are indicated in this guide as referred to in Safety Design Guide.

(1) Design considerations for reliability

Guideline 9 of Safety Design Guide requires in items (2) that the 'systems with safety functions of especially high importance' be designed with redundancy or diversity and with independence, and in item (3) that they be designed to be capable of fulfilling their safety functions even in case of unavailability of off-site power, in addition to an assumption of a single failure of any of the components that comprise the systems. These requirements are in general applied to the systems of MS-1 and part of the systems of PS-1 and MS-2.

Parts of the PS-1 SSCs to which the above requirements are applied are the valves that are normally open and those closed, in case of an accident, thereby forming a part of the reactor coolant pressure boundary. In the systems equipped with such valves, the reactor coolant pressure boundary is defined as the range up to and including the second isolation valves as viewed from the reactor side. This means that redundancy is required for the valves of this kind.

Parts of the MS-2 SSCs to which the above requirements are applied are the systems that have the function of monitoring the plant conditions in case of an accident. They are the systems required for monitoring the condition of the three most important functions for ensuring safety: reactor shutdown, core cooling and radioactivity confinement. With regard to the reliability of

instrumentation and control systems, Safety Design Guide requires that monitoring or estimation of reactor shutdown and core cooling conditions in particular shall be ensured by use of two or more kinds of parameters. This is a requirement for diversity in monitoring the reactor shutdown and core cooling conditions. In addition, "Regulatory Guide for Reviewing Radiation Monitoring in Accidents of Light Water Nuclear Power Reactor Facilities" requires redundancy of the principal radiation monitoring systems which provide the information to confirm the integrity of radioactivity barriers.

(2) Design considerations against natural phenomena

Guideline 2 of Safety Design Guide requires in item (2) the design considerations against postulated natural phenomena other than earthquake and specifies the design consideration for 'SSCs with safety functions of especially high importance'. SSCs of class 1, in general, come under the application of these requirements, so do those of class 2 which are susceptible to natural phenomena as well. Generally speaking, buildings and outdoor structures are considered to be susceptible to natural phenomena. Among class 2 structures and buildings, both the exhaust stack of the auxiliary building of PWR and the exhaust stack of BWR excluding the support function for the exhaust pipe of the standby gas treatment system correspond to above-mentioned SSCs as competent systems. Moreover, buildings belonging to class 2 correspond to this kind of SSCs as supporting systems.

(3) Design considerations for electrical systems

Guideline 48 of Safety Design Guide requires in item (1) that SSCs with 'safety functions of especially high importance' shall be capable of receiving electric power supplies from emergency on-site power systems. The safety functions to which this requirement is applied are in general the functions of class 1 and part of the functions of class 2. The functions of class 2 to which the requirement for emergency on-site power supply is applied are: the function for water makeup for the spent fuel pool and the functions especially important to cope with abnormal conditions. The systems and components with the latter functions are: a part of the instruments for monitoring the plant conditions in case of an accident mentioned in (1) above; a system for shutting down the reactor from outside the control room; PWR pressurizer relief valves (manual operation function) and their block valves.

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (1/14)

Classification	Prevention system						Remarks
	Definition	Function	SSC (PWR)	Significant supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	
PS-1	SSCs whose damage or failure may cause events potentially leading to: (a) considerable core damage or (b) significant fuel failures	1) Functions for reactor coolant pressure boundary	Components and pipelines forming the reactor coolant pressure boundary (except for small-diameter pipes and equipment for instrumentation and control)		Components and pipelines forming the reactor coolant pressure boundary (except for small-diameter pipes and equipment for instrumentation and control)		
		2) Functions to prevent excessive reactivity insertion	Control rod drive mechanism pressure housing		Control rod coupling		
		3) Functions to maintain core geometry	Core support structures (core barrel, upper core support plate, upper core support column, upper core plate, lower core plate, lower core support column, lower core support plate), fuel assembly (except for fuel)		Core support structures (core shroud, shroud support, upper grid plate, core support plate, control rod drive guide tube), fuel assembly (except for fuel)		

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (2/14)

Classification	Mitigation system						
	Definition	Function	SSC (PWR)	Significant supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
MS-1	1) Structures, systems and components capable of urgently shutting down the reactor, removing residual heat and preventing overpressure in the reactor coolant pressure boundary in the event of abnormal conditions, thereby preventing undue radiological influence to the off-site public	1) Functions to shut down the reactor urgently	Reactor shutdown system by control rods (control rod cluster and control rod drive system (scram function))		Reactor shutdown system by control rod (control rod and control rod drive system (scram function))		
		2) Functions to maintain sub-criticality	Reactor shutdown system (control rod system, boron injection function of the chemical and volume control system and the emergency core cooling system)		Reactor shutdown system (control rod system, standby liquid control system)		
		3) Functions to prevent overpressure within the reactor coolant pressure boundary	Pressurizer safety valve (opening function)		Safety relief valve (opening function as safety valve)		

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (3/14)

Classification	Mitigation system						
	Definition	Function	SSC (PWR)	Significant supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
MS-1		4) Functions to remove residual heat after reactor shutdown	Systems for removing residual heat (residual heat removal system, auxiliary feed-water system, main steam system and feed-water system up to the isolation valve in the secondary system of the steam generator, main steam safety valve, main steam relief valve (manual relief function))		Systems for removing residual heat (residual heat removal system (cooling mode at reactor shutdown), reactor core isolation cooling system, high pressure core spray system, safety relief valve (manual relief function), automatic depressurization system (manual relief function))		
		5) Functions to cool reactor core	Emergency core cooling system (low pressure coolant injection system, high pressure coolant injection system, accumulator injection system)		Emergency core cooling system (low pressure core spray system, low pressure coolant injection system, high pressure core spray system, automatic depressurization system)		

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (4/14)

Classification	Mitigation System						
	Definition	Function	SSC (PWR)	Significant supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
MS-1		6) Functions to confine radioactive materials, shield radiation and reduce radioactivity release	Reactor containment, annulus, reactor containment isolation valves, reactor containment spray system, annulus recirculation system, safety-related auxiliary equipment room cleanup system, flammable gas concentration control system	Reactor containment exhaust stack	Reactor containment, reactor containment isolation valves, reactor containment spray cooling system, reactor building, standby gas treatment system, standby recirculation gas treatment system, flammable gas concentration control system	Exhaust stack (support function for the exhaust pipe of the standby gas treatment system)	
	2) Other structures, systems and components essential to safety	1) Functions to generate actuation signals for the engineered safety features and reactor shutdown system	Reactor protection system		Reactor protection system		

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (5/14)

Classification	Mitigation System						
	Definition	Function	SSC (PWR)	Significant, supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
MS-1		2) Supporting functions especially important to safety	Emergency on-site power system, control room and its shielding and ventilating system, component cooling water system, sea water system, direct current power supply system, instrument air system (each related to MS- 1)	Diesel generator fuel transport system, diesel cooling system, water intake system (including outdoor trench)	Emergency on-site power system, control room and its shielding and emergency ventilating system, emergency component cooling water system, direct current power supply system (each related to MS-1)	Diesel generator fuel transport system, diesel cooling system, water intake system (including outdoor trench)	

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (6/14)

Classification	Prevention System						
	Definition	Function	SSC (PWR)	Significant supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
PS -2	1) Structures, systems and components whose damage or failure could cause events leading to excessive release of radioactive materials to off-site areas, but hardly leading to considerable core damage or significant fuel failure.	1) Functions to containment reactor coolant (except for small- diameter pipes that are excluded from the reactor coolant pressure boundary, such as those for instrumentation, and other pipes and equipment not directly connected to the boundary)	Extraction and purification systems of the chemical and volume control System		Main steam system, reactor coolant cleanup system (each outside containment isolation valve only)		

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (7/14)

Classification	Prevention System						
	Definition	Function	SSC (PWR)	Significant supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
PS-2		2) Functions to storage radioactive materials, without direct connection to the reactor coolant pressure boundary	Radioactive waste treatment system (with large radioactivity inventory) ^{*1} , spent fuel pit (including spent fuel rack)	Spent fuel pit cooling System	Radioactive waste treatment system (with large radioactivity inventory) [*] , spent fuel pool (including spent fuel storage rack)	Spent fuel pool cooling system	Radioactive gaseous waste treatment systems come under this category at present.
		3) Functions to handling fuel safely	Fuel handling system		Fuel handling system		
	2) Structures, systems and components whose functioning is required during normal operations and anticipated operational occurrences and whose failure may lead to degraded core cooling.	1) Functions to reseal safety valves and relief valves	Pressurizer safety valve, pressurizer relief valve (each related to reseating function)		Safety relief valve (related with reseating function)		

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (8/14)

Classification	Mitigation System						
	Definition	Function	SSC (PWR)	Significant, supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
MS -2	1) SSCs capable of sufficiently reducing radiological exposure to the off-site public in case of damage or failure of structures, systems and components belonging to PS-2	1) Functions to make up water for the fuel storage pool	Spent fuel pit makeup water system		Emergency makeup water system		*2. PWR containment area monitor and BWR containment atmosphere radioactivity monitor come under this category at present.
		2) Functions to prevent radioactive materials release	Systems for reducing radioactivity release in case of a fuel assembly drop accident, exhaust stack (auxiliary building)		Radioactive gaseous waste treatment system isolation valve, exhaust stack (except for support function for the exhaust pipe of the standby gas treatment system)		
	2) Structures, systems and components especially important to cope with abnormal conditions	1) Functions to monitor plant status in case of an accident	Part of the monitoring instruments for use during accident *2		Part of the monitoring instruments for use during accident *2		

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (9/14)

Classification	Mitigation System						
	Definition	Function	SSC (PWR)	Significant supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
MS-2		3) Functions to shutdown reactor safely from outside the control room	Remote shutdown system (related to safe shutdown function)		Remote shutdown system (related to safe shutdown function)		

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (10/14)

Classification	Prevention System						
	Definition	Function	SSC (PWR)	Significant supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
PS-3	1) Structures, systems and components not belonging to PS-1 and PS-2 whose failure could become initiating events of abnormal conditions	1) Functions to Retain reactor coolant (other than PS-1 and PS -2)	Instrumentation piping, sampling line		Instrumentation piping, sampling line		*3. Radio- active liquid and solid waste treatment systems come under this category at present
		2) Functions to circulate reactor coolant	Primary coolant pump and its supporting systems		Reactor coolant recirculation system		
		3) Functions to store radioactive materials	Radioactive waste treatment system (with small radioactivity inventory) *3		Suppression pool water drain system, condensate water storage tank, radioactive waste treatment system (with small radioactivity inventory) *3		

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (11/14)

Classification	Prevention System						
	Definition	Function	SSC (PWR)	Significant supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
PS-3		4) Functions to supply electric power (except for emergency power supply)	Main steam system (downstream of isolation valve), feed-water system (up to isolation valve), power transmission line, transformer, switch yard		Turbine, power generator and its exciter, condensate system (including condenser), feed-water system, circulating water system, power transmission line, transformer, switch yard		
		5) Functions for plant instrumentation and control (except for safety protection function)	Reactor control system, reactor instrumentation, process instrumentation		Reactor control system (including rod worth minimizer), reactor neutron monitoring system, reactor plant process instrumentation		

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (12/14)

Classification	Prevention System						
	Definition	Function	SSC (PWR)	Significant supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
PS-3		6) Auxiliary functions for plant operation	Auxiliary steam system, instrument air system (other than MS-1)		Station boiler, instrument air system		
	2) Structures, systems and components capable of control the concentration of radioactive materials in reactor coolant as low as acceptable for normal operation	1) Functions to prevent the dispersion of fission products into reactor coolant	Fuel cladding		Fuel cladding		
		2) Functions to clean up reactor coolant	Purification system of the chemical and volume control system (purification function)		Reactor water cleanup system, condensate demineralizer system		

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (13/14)

Classification	Mitigation System						
	Definition	Function	SSC (PWR)	Significant supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
MS-3	1) Structures, systems and components capable of mitigating anticipated operational occurrences in conjunction with MS-1 and MS-2	1) Mitigation of reactor pressure increase	Pressurizer relief valve (automatically operated)		Safety relief valve (relief valve function), turbine bypass valve		
		2) Suppression of reactor power increase	Turbine run-back system, control rod withdrawal inter-locks		Reactor coolant recirculation system (recirculation pump trip function), rod block monitor		
		3) Reactor coolant makeup	Feed system of the chemical and volume control system, primary coolant feed system		Control rod drive hydraulic control system		

Attached Table: Examples of classification of safety function importance in PWRs and BWRs (14/14)

Classification	Mitigation System						
	Definition	Function	SSC (PWR)	Significant supporting system (PWR)	SSC (BWR)	Significant supporting system (BWR)	Remarks
MS-3	2) SSCs necessary for coping with abnormal conditions	1) Functions important to emergency in arrangement and monitoring of abnormal conditions	Nuclear power plant emergency station, sampling system, communication system, radiation monitoring system, part of the monitoring instruments for use during accident, fire extinguishing system, safe escape route, emergency lighting		Nuclear power plant emergency station, sampling system, communication system, radiation monitoring system, part of the monitoring instruments for use during accident, fire extinguishing system, safe escape route, emergency lighting		



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**Regulatory Guide for Reviewing Seismic Design of Nuclear
Power Reactor Facilities**

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Disclaimer

This is an unofficial translation of the official Nuclear Safety Commission Regulatory Guide for the benefit of interested readers. For all questions regarding meaning and phrasing, please refer to the official version in Japanese.

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Regulatory Guide for Reviewing Seismic Design of Nuclear Power Reactor Facilities

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1. Introduction

This Guide provides the basis for judging the adequacy of the seismic design policy of the application for the establishment license (including the application of its alteration) of light water power reactors in the safety review process.

The former version 'Regulatory Guide for Reviewing Seismic Design of Nuclear Power Reactor Facilities (decided by the Nuclear Safety Commission (NSC) on 20 July 1981 and partially revised on 29 March 2001, hereinafter referred to as the "Former Guide")' was effectuated after revision in July 1981, based on the state-of-the-art evaluating methods of static seismic forces etc., of the original version, which had been formulated in September 1978 by the then Atomic Energy Commission (AEC).

This new version comprehensively reflects latest seismological and earthquake engineering knowledge accumulated as well as remarkable improvement and development of seismic design technologies of nuclear power reactor facilities.

The New Guide shall be subject to further revision, as appropriate, reflecting the new knowledge and experiences in accordance with new findings.

2. Scope of Application

This Guide shall be applied to the light water nuclear reactor facilities for power production ("Facilities").

The basic concept of this Guide could be also referred to for nuclear reactor facilities other than light water reactors as well as other nuclear related facilities.

Even if the license application does not fully comply with this guide, it could be acceptable if it ensures equivalent or higher seismic safety than the requirements of this guide by reflecting technological improvements or development.

3. Basic Policy

Those Facilities designated as important from the seismic design standpoints shall be designed to bear the seismic forces exerted from the earthquake ground motion and to maintain their safety functions, which could be postulated appropriately to occur with a very low possibility in the service period of the Facilities from the seismological and earthquake engineering

standpoints, considering such as geological features, geological structures, seismicity, etc. in the vicinity of the proposed site.

Any Facilities shall be designed to bear the design base seismic forces with sufficient margin, which are assumed appropriately for each seismic classification from the standpoint of radiological impacts to the environment due to earthquakes.

Buildings and structures shall be founded on the grounds which have sufficient supporting capacities.

(Commentary)

I. Basic Policy

(1) Formulation of earthquake ground motions for seismic design

The seismic design shall be based on the principle to avoid any risks of serious radiological exposure to the public in the vicinity of the Facilities due to the external disturbance initiated by an earthquake, by appropriately formulating 'the ground motion' for the seismic design, which could be postulated appropriately to occur with a very low probability in the service period of the Facilities and could have serious affects to the Facilities.

This policy is equivalent to the 'basic policy' in the Former Guide which required the seismic design in its provision that 'nuclear power reactor facilities shall maintain sufficient seismic integrities against any postulated seismic forces so that no serious accidents would be induced'.

(2) Existence of "Residual Risks"

From a seismological standpoint, the possibility of stronger earthquake ground motions which may exceed the one formulated as above (1) exists. That is, in formulating the seismic design earthquake ground motions, the "Residual Risks" exist, which may cause serious damages to the Facilities by the ground motion exceeding the formulated design basis ground motions, or massive radioactive release from the Facilities, or cause as a consequence radiological exposure hazards to the public in the vicinity of the Facilities.

Therefore, every effort should be made, at the design of the Facilities (in the basic design stage and subsequent stages), to minimize the "residual risks" to the extent "as low as practically possible" by appropriate attention to the possibility of ground motions exceeding the formulated design basis. .

4. Classification of Importance in Seismic Design

Importance in seismic design of the Facilities shall be classified as in the following, considering the possible impacts of radiation to the environment caused by an earthquake.

(1) Classification of Functions

Class S: The Facilities containing radioactive materials or their relevant Facilities, loss of functions of which might lead to the release of the radioactive materials to the environment; the Facilities necessary to prevent such events; and the Facilities with significant roles to mitigate the consequences of radioactive release in case such accidents occur,

Class B: The Facilities of the same functional categories as above Class S, with lower roles,

Class C: The Facilities other than Class S or B, necessary to ensure equivalent safety as conventional industrial facilities.

(2) Facilities of Classes

Following are the specific Facilities in the above-defined classification of importance in the seismic design,

(a) Class S Facilities:

- i) Equipment/piping systems composing the 'reactor coolant pressure boundaries' (as defined in the Regulatory Guide for Reviewing Safety Design of Light Water Nuclear Power Reactor Facilities),
 - ii) the Facilities to store spent fuels,
 - iii) the Facilities to insert negative reactivity to quickly shut down the reactor and the Facilities to maintain the reactor in the shutdown mode,
 - iv) the Facilities to remove the decay heat from the reactor core after reactor is shut down,
 - v) the Facilities to remove the decay heat from the reactor core after the accident of the loss of reactor coolant pressure boundaries,
 - vi) the Facilities to function as the pressure barrier for preventing the immediate release of radioactive materials when the reactor coolant pressure boundaries are broken, and
 - vii) the Facilities, other than those in the above category vi), to mitigate the radioactive release to the environment at an accident which may cause radioactive release.
- (b) Class B Facilities:
- i) The Facilities directly connected to the reactor coolant pressure boundaries, which contain or may contain radioactive materials therein,
 - ii) The Facilities containing radioactive wastes, but not those facilities which have sufficiently low risks of radiological exposure to the public due to their break as compared with the annual exposure dose limit outside the peripheral observation area, because of their limited inventory of radioactive waste or their storage capabilities,
 - iii) The Facilities relevant to radioactive material other than radioactive waste and their break may cause excessive radiological exposure to the public and the operational personnel,
 - iv) The Facilities to cool the spent fuels, and
 - v) The Facilities other than Class S, to mitigate external release of radioactive materials to the environment at an accident.
- (c) Class C Facilities:
Those Facilities other than Class S or B

5. Formulation of Design Basis Earthquake Ground Motion (DBEGM)

The ground motion to be established as the seismic design basis of the Facilities shall be formulated appropriately as the one, postulating to occur in a very low probability over the service period of the Facilities from the seismological and earthquake engineering point of view on geology, geological structures, seismicity, etc. in the vicinity of the proposed site, and having risks to give serious damages to the Facilities (the "Design Basis Earthquake Ground Motion (DBEGM) Ss").

DBEGM Ss shall be formulated on the following principles.

- (1) DBEGM Ss shall be formulated as the following two types of earthquake ground motions in the horizontal and vertical directions on the free surface of the base stratum at the proposed site: The "Earthquake ground motions ((2) below) with the site specific earthquake source locations"; and the "Earthquake ground motions ((3) below) with no such specific source locations.
- (2) The DBEGM Ss for the earthquake ground motions with the site specific epicenter shall be formulated on the following principles.
 - (a) Earthquakes (more than one) are assumed which may have severe impacts to the proposed site, taking account of the characteristics of active faults, the earthquakes experienced in the past and at present in the vicinity, and classifying these earthquakes by their outbreak modes (hereinafter referred to as "Earthquakes for investigation").

- (b) Following consideration shall be made concerning the ‘characteristics of the active faults around the proposed site’ in (a) above.
- i) The active faults to be considered in the seismic design shall be identified as the one whose activities since the late Pleistocene epoch can not be denied. The faults can be identified depending upon whether or not the displacement and deformation exist by the faults in the stratum or on the geomorphic surface formed during the last interglacial period.
 - ii) The active faults shall be thoroughly investigated by integrating geomorphological, geological and geophysical methods, etc. to make clear their locations, shapes, activity characteristics, etc. as a function of the distance from the proposed site.
- (c) For each “Earthquake for investigation” selected in (a) above, DBEGM Ss shall be formulated by the following two evaluation methodologies, respectively: i) with the response spectra; and ii) by the method with fault models. In evaluating the earthquake ground motions, sufficient consideration shall be made to the various characteristics due to the earthquake breakout modes, seismic wave propagation channels, etc. (including the regional peculiarities).
- i) Evaluation of earthquake ground motions with response spectra
For respective “Earthquakes for investigation,” response spectra shall be evaluated by appropriate methods and the design response spectra shall be defined based on these spectra. Earthquake ground motions shall be evaluated appropriately in considering their characteristics such as duration times, time dependent change of amplitude-enveloping curves suitably.
 - ii) Evaluation of earthquake ground motions by the method with fault models
For respective “Earthquakes for investigation,” earthquake ground motions shall be evaluated by setting the epicenter characteristics parameters with appropriate methods.
- (d) Uncertainties (dispersion) in formulating the DBEGM Ss as elaborated in (c) above shall be considered by appropriate methods.

(3) The DBEGM Ss for the Earthquake ground motions with no specific epicenters shall be formulated by: collecting the observation records near the epicenter which are obtained from the past earthquakes inside the inland earth’s crust, where the correlation of the epicenter and the active faults is difficult to specify; defining the response spectra based on those records by taking into account the ground material characteristics of the proposed site; and with due consideration to the earthquake ground motion characteristics such as the duration time, time dependent change of amplitude-enveloping curves, etc.

(Commentary)

II. Formulation of the DBEGM Ss

(1) Characteristics of the DBEGM Ss.

The Former Guide requested as the design basis earthquake ground motions two categories of Earthquake Ground Motion S1 and S2. The New Guide, however, these two Ground Motions were integrated as the DBEGM Ss, aiming at the enhancement of defining the Earthquakes for Investigation, evaluation of ground motions, etc.

This DBEGM Ss is the premise ground motion for the seismic design to ensure seismic safety of the Facilities. Its formulation requires sufficient checks of its adequacy, with reference to the latest knowledge in specific review cases.

(2) Relevant terminologies in formulating the DBEGM Ss

(a) The ‘Free surface of the base stratum’ for formulating the design basis earthquake ground motion DBEGM Ss is a hypothetically assumed free surface with no surface layers or structures thereon of the base stratum, which is almost flat with no significant unevenness and with a considerable expanse. The ‘Base stratum’ here is defined as a solid foundation, not significantly weathered, the shear wave velocity V_s of which exceeds 700m/s.

- (b) The 'Active faults' are those faults which have moved repeatedly in the recent geological age and may move in the future, too.
- (3) Formulating principles of the DBEGM Ss
- (a) In defining the Earthquakes for Investigation, the characteristics of active faults and the records of past earthquakes in the area concerned should be investigated carefully, and comprehensive reviews shall be made on the existing research results concerning the distribution of middle, small and fine sizes of earthquakes in the vicinity of the proposed site, stress fields, modes of earthquake occurrence (including the plate shapes, movement and mutual interactions), etc .
- (b) The Earthquakes for Investigation shall be selected according to the following classifications considering the modes of earthquakes etc.
- i) Inland Earth's Crust Earthquake
An 'Inland earth's crust earthquake' is an earthquake which occurs in the upper crust earthquake generation layers, including those in the near offshore coasts.
- ii) Inter-plate Earthquake
An 'Inter-plate earthquake' is the one which occurs in the interfacial plane of two plates.
- iii) Oceanic Plate Earthquake
An 'Oceanic plate earthquake' is the one which occurs inside a subducting (or having subducted) oceanic plate, and is classified into the following two types: An 'earthquake in the subducting oceanic plates,' which occurs near the axis of a sea trench or in its near offshore areas; or an 'earthquake in the subducted oceanic plates (in-slab earthquakes),' which occurs in the land side of the axis of a sea trench.
- (c) In evaluating those earthquakes whose epicenter is near the proposed site and its failure process could have large impacts to the evaluation of the ground motions, the utilization of the fault model should be prioritized.
- (d) In considering the 'uncertainties (dispersion) concerned with the formulating process of the DBEGM Ss', the causes of uncertainties (dispersion) and their degrees of possible impacts to the DBEGM Ss shall be duly considered by an appropriate method.
- (e) The 'Earthquake ground motions with no specific epicenters' are introduced as the one which should be considered commonly in all application cases irrespective of the detailed investigation results of around the proposed site. This is because even the detailed investigation with due consideration to the geological conditions of the proposed site area can not fully evaluate in advance all probable inland earth's crust earthquakes which could break out near the proposed site.
The justification of thus specified DBEGM Ss should be checked for each application, referring to the most update information. On that occasion, reference should be made to the probabilistic evaluation as needed regarding the ground motions near the epicenter, which are caused by the source faults with no clear traces on the ground surface..
- (f) The exceedance probabilities of the 'Earthquake ground motions with or without the site specific epicenter' should be referred to in each safety review case, since it is desirable to grasp, to what extent of exceedance probabilities the response spectra of each seismic ground motion formulated corresponds.
- (g) In investigating and evaluating existing materials etc. for the selection of Earthquakes for investigation and formulating the DBEGM Ss, their accuracies should be duly considered and referred to. If the evaluation results are different from the existing ones, their grounds should be accountable.
- (h) Peculiar frequency characteristics of the seismic response should be reflected as needed, if found in the grounds which support the Facilities and/or their structures, to the formulation of the DBEGM Ss.
- (4) Evaluation of the faults assumed as the epicenter

- (a) An in-depth investigation should be made on the active faults, the basis of the evaluation of the faults to be assumed as the epicenter, combining the survey of existing reference materials, tectonic geomorphologic investigation, the earth's surface geological feature investigation, and geophysical investigation, etc. depending on the distance from the proposed site. Especially the area near the proposed site should be investigated precisely and in detail. The extent of the "area near the proposed site" should be defined suitably considering the correlation with the DBEGM Ss formulated as the 'Earthquake ground motions with no specific epicenter'.
- (b) Active folds and active flexures, etc. relevant to seismic movement should also be included in the above-mentioned investigation (a) and should be considered in the evaluation of the faults assumed as the epicenter, depending on their properties.
- (c) The properties of the faults should be evaluated appropriately by grasping the underground structures etc. in respective regions. Special consideration is required if the earthquakes are assumed from the properties of faults in the area where the faults are not distinctly locatable.
- (d) If an empirical formula is used in assuming the magnitude of earthquakes from the fault lengths, etc., the unique features of the empirical formula should be duly considered.
- (e) If the investigation of active faults is not powerful enough to collect sufficient information for setting the epicenter characteristics, including their shape evaluation, uncertainties incurred in setting the epicenter characteristics should be duly considered.

6. Seismic Design Philosophy

(1) Primal Policies

The Facilities shall be designed to fulfill the following primal policies of the seismic design for respective seismic Classes.

- (a) The Facilities in Class S shall maintain their safety functions under the seismic forces caused by the DBEGM Ss. Furthermore, they shall bear the seismic forces caused by the "Elastically Dynamic Design Earthquake Ground Motion Sd (EDEGM Sd)" and the static seismic forces (defined below).
- (b) The Facilities of Class B shall bear the static seismic forces shown below. Furthermore, those Facilities, which may resonate with earthquakes, shall be evaluated for its influence.
- (c) The Facilities of Class C shall bear the static seismic forces shown below.
- (d) The integrity of the Facilities in the upper Class shall not be impaired by the damages of the lower Class Facilities.

(2) Definition of Seismic Forces

Seismic forces for the seismic design of the Facilities shall be defined in the following way.

- (a) Seismic forces caused by the DBEGM Ss

Seismic forces due to the DBEGM Ss shall be defined by appropriately combining the DBEGM Ss in horizontal and vertical directions.
- (b) Seismic forces caused by the EDEGM Sd

The EDEGM Sd shall be established with the engineering judgments based on the DBEGM Ss. And the seismic forces caused by the EDEGM Sd shall be also defined by appropriately combining the horizontal seismic forces with the vertical seismic forces.
- (c) Static seismic forces

Static seismic forces shall be defined as in the following.

 - i) Buildings and structures

Horizontal seismic forces shall be defined by multiplying the seismic story shear coefficient C_i by the following factors corresponding to the importance classification of the facilities, and further multiplying the weight above the story concerned.

Class S

3.0

Class B	1.5
Class C	1.0

Here, the seismic story shear coefficient C_i shall be obtained from the standard shear coefficient C_o as 0.2, taking into account the vibration characteristics of the buildings and structures, geological categories of the ground, etc.

As for the facilities of Class S, horizontal and vertical seismic forces shall be assumed to work simultaneously in the adverse directions. The vertical seismic forces shall be defined by the vertical seismic intensity which is obtained from the reference seismic intensity of 0.3, and by considering the vibration characteristics of the buildings and structures, geological categories of the ground, etc. The vertical seismic intensity is assumed to be constant over the height.

ii) Components and piping system

The seismic forces of respective Classes shall be defined by multiplying the above-mentioned seismic story shear coefficient C_i and the factors corresponding to the importance classification of the Facilities as the horizontal seismic intensity, and by increasing 20% the horizontal seismic intensity concerned and the above-mentioned vertical seismic intensity, respectively.

Horizontal and vertical seismic forces shall be assumed to work simultaneously in the adverse directions. The vertical seismic intensity shall be assumed to be constant, however, over the height.

(Commentary)

III. Design Principles

(1) the necessity of establishing the EDEGM Sd

The Former Guide defined two categories of Earthquake Ground Motions S1 and S2, corresponding to the seismic importance classifications of the buildings, structures, components and piping systems. The New Guide, however, defines only one Design Base Earthquake Ground Motion DBEGM Ss

The basic principle in the seismic design is to ensure maintaining seismic safety functions of the seismically important Facilities under the seismic forces by this DBEGM Ss. The elastically dynamic earthquake ground motion (EDEGM) Sd is additionally defined to ensure, with higher confidence, maintaining seismic safety functions of the Facilities under this DBEGM Ss. The EDEGM Sd is closely related with the DBEGM Ss from the engineering standpoint.

(2) Formulation of the EDEGM Sd

Article 6 of this New Guide requires the Facilities ‘to bear the seismic forces,’ which means that the Facilities are designed in the elastic range as a whole against certain seismic forces. Here, “design in the elastic range” means to limit the stress of individual Facility components below the allowable limits by the stress analysis of the Facilities as an elastic body. The above-mentioned allowable limits do not imply the elastic limits in the strict definition. It is allowable, if the Facilities remain in the elastic range on the whole even though part of the Facilities exceeds the elastic range.

The New Guide requires each Class S Facility ‘to bear the seismic forces’ by the EDEGM Sd, which is established based on the engineering judgment. The “elastic limit condition” is the condition that the impacts of the Earthquake Ground Motions on the Facilities and the subsequent consequences of the Facilities can be evidently evaluated. Maintaining the seismic safety functions of the Facilities can be made more confident under the seismic forces by the DBEGM Ss, by confirming that the Facilities retain the elastic limit condition as a whole under the seismic forces by the EDEGM Sd. In other words, the EDEGM Sd assumes a part of the roles which the Design Earthquake Ground Motion S1 of the Former Guide played in the seismic design.

The EDEGM Sd should be established by multiplying the DBEGM Ss by engineering coefficients defined for individual Facilities and their composing elements in consideration of the ratio of the input seismic loads to the safety functional limits and the elastic limits. In defining the engineering coefficients, reference can be made to the exceedance probability used in the formulation of the DBEGM Ss.

Specific values and their grounds of the EDEGM Sd thus formulated should be made clearly accountable in respective specific application cases.

The ratio of the response spectra of the EDEGM Sd and the DBEGM Ss (Sd/Ss) should be adequately large in considering the characteristics required to EDEGM Sd. Its target value should be not less than 0.5.

The EDEGM Sd may be established for individual components of the Facilities depending on their specific characteristics to be considered in seismic design.

The Clause 6(1)(b) above requests that those Class B Facilities, which may resonate with earthquakes, shall be evaluated for its influence. The earthquake ground motion for this evaluation may be established by multiplying the EDEGM Sd by a factor of 0.5.

(3) Calculation of the seismic forces by the DBEGM Ss and the EDEGM Sd

In calculating the seismic forces due to the DBEGM Ss and the EDEGM Sd by the seismic response analysis, the appropriate analytical methods should be selected in consideration of its applicability and limitations, etc. and adequate investigation should be made to set appropriate conditions for analysis.

When the 'free surface of the base stratum' is significantly deep as compared with the Facilities foundations, the amplification characteristics of the ground motions by the ground above the base stratum should be investigated sufficiently and be reflected to the evaluation of the seismic response as needed.

(4) Static seismic forces

The static seismic forces for the buildings and structures should be calculated as shown (a) and (b) below.

The buildings and structures should be checked so that they reserve the adequate safety margin of retained horizontal strengths against the necessary strengths depending on the importance of the Facilities. The retained horizontal strengths required should be calculated as in (c) below.

(a) Horizontal seismic forces

- i) The datum plane for calculating the horizontal seismic forces should be the ground surface in principle. If it is necessary to consider the characteristics of the building and the structures such as their constitutions or their correlation to the surrounding grounds, an alternative appropriate datum plane should be defined and be reflected to the calculation.
- ii) Horizontal seismic forces on the above-the-datum-plane parts of the Facilities should be obtained as the total seismic forces acting on the part concerned depending on its elevation. The following formula should be used in the calculation.

$$Q_i = n \cdot C_i \cdot W_i$$

where,

Q_i : Horizontal seismic forces acting on the part above the datum plane,

n : Coefficients depending on the importance classifications of the Facilities (3.0 for Class S, 1.5 for Class B and 1.0 for Class C).

C_i : Seismic story shear coefficients, given by

$$C_i = Z \cdot R_t \cdot A_i \cdot C_o,$$

where,

Z : Seismic Zone factor (1.0 regardless of the region),

R_t : Vibration characteristic factors of the buildings, to be obtained pursuant to the appropriate standards and codes safety, where the 'appropriate

standards and codes for safety' corresponds to the Building Standard Law, etc. However, if a different value, representing the vibration characteristics of the buildings and/or the structures, is obtained in consideration of their structural properties, the seismic response characteristics and the ground properties, and if the value is lower than that obtained by the method specified by the Building Standard Law, etc., R_t could be reduced to this value, but not less than 0.7.

A_i : Factors representing the vertical distribution of seismic story shear coefficients, to be calculated, like R_t , by the appropriate standards, codes or the alternative appropriate methods, and

C_o : Standard shear coefficient (0.2),

W_i : Total of dead loads and live loads supported by the part in question.

iii) Horizontal seismic forces on the below-the-datum-plane parts of the Facilities should be evaluated by the following formula.

$$P_k = n \cdot k \cdot W_k,$$

where,

P_k : Horizontal seismic forces acting on the subject part,

n : Coefficients depending on the importance Classifications of the Facilities (3.0 for Class S, 1.5 for Class B and 1.0 for Class C).

k : Horizontal seismic coefficients given by

$$k \geq 0.1 \cdot \left[1 - \frac{H}{40} \right] \cdot Z,$$

where

H : Depth of the subject part below the datum plane (in meters), 20m maximum (20m for all parts deeper than 20 meters), and

Z : Seismic Zone factor (1.0, regardless of the region), and

W_k : Sum of the dead loads and live loads of the subject part concerned.

If the vibration characteristics could be appropriately calculated in consideration of the structural characteristics of the buildings and structures, the seismic response characteristics and the ground properties, the calculated value could be used instead.

(b) Vertical seismic forces

The vertical seismic forces in evaluating the static forces to the Class S Facilities should be obtained by the vertical seismic intensity given by

$$C_v = R_v \cdot 0.3,$$

where

C_v : Vertical seismic intensity, and

R_v : A factor representing the vertical vibration characteristics of the buildings (1.0). However, if a value less than 1.0 is verified based on the special investigation or study, R_v could be reduced to the value (but not less than 0.7).

(c) Retained horizontal strengths required

Retained horizontal strengths required should be defined by the method specified in the 'appropriate standards and codes for safety,' which refers to the Building Standard Law, etc.

In evaluating the retained horizontal strengths required, the seismic importance dependent coefficients to be multiplied by the seismic story shear coefficient should be set as 1.0 in all Earthquake-proof cases, Class S, B and C, and the standard shear force coefficient C_o should be 1.0.

7. Load Combination and Allowable Limits

Following are the basic concepts of combining of loads and allowable limits which shall be considered in assessing the adequacy of seismic safety design policies.

(1) Buildings and Structures

(a) Class S Buildings and Structures

i) Load combination with the DBEGM Ss and allowable limits

Under the combined loads of standing and operating conditions with the seismic forces due to the DBEGM Ss, the buildings and structures concerned shall have sufficient margin of deformation acceptability (deformation at the ultimate strengths) as the total system, and adequate safety margin against the ultimate strengths of the buildings and structures.

ii) Load Combination with the EDEGM Sd and allowable limits

The allowable limits shall be defined by the allowable unit stresses specified in competent standards and codes for safety under the combined loads of the normal and operating conditions with the seismic loads due to the EDEGM Sd or Static seismic forces and their consequent stresses. .

(b) Class B or Class C Buildings and Structures

Same as above (a)-ii) under the combined loads of normal and operating conditions with the Static seismic forces and their consequent stresses.

(2) Components and Piping Systems

(a) Class S Components and Piping Systems

i) Load Combination with the DBEGM Ss and allowable limits

The functions of the Facilities shall not be impaired by the excessive deformations, cracks or failures, even when the most part of structures would reach their yield conditions for plastic deformation under the combined loads of normal operating conditions, anticipated transient conditions or accident conditions with the seismic loads due to the DBEGM Ss, and their consequent stresses. The allowable limits for the active components etc. shall be established by the acceleration limits etc. for retaining of necessary functions, which are verified by the tests etc. under the response acceleration due to the DBEGM Ss.

ii) Load Combination of EDEGM Sd and allowable limits

The allowable limits shall be established by the yield stress or the stress with equivalent safety, under the combined loads at normal operating conditions, anticipated transient conditions or accident conditions, and the seismic loads due to the EDEGM Sd or the Static seismic forces.

(b) Class B or Class C Components and Piping Systems

The allowable limits shall be established by the yield stress or the stress with equivalent safety, under the combined loads in normal operating conditions or anticipated transient conditions, and the seismic loads due to the Static seismic forces.

(Commentary)

IV. Load Combination and Allowable Limits

- (1) In considering the 'respective loads under anticipated transient and accident conditions', the loads by the possible earthquake-originated events and the long-standing loads in the wake of accidents shall be combined with the seismic loads, even if the accidents are not caused directly by the earthquakes .

However, the loads under accident conditions may not be necessary to consider combining with the seismic loads, if the probability of their concurrent loads are extremely low when considering the occurrence probability of this accidental event, its duration time, and the exceedance probability of the earthquake.

- (2) The "competent standards and codes" to specify the allowable unit stress, being referred to in defining the allowable limits for the combined loads of buildings and structures with the EDEGM Sd, etc. (7(1)(a)-ii) above), are specifically the Building Standard Law, etc.

- (3) The "Ultimate strengths' in the clause 7(1)(a)-i) above regarding the combined loads of the buildings and structures with the DBEGM Ss means the bounding maximum bearing loads, under which deformation and strain of the structures would increase dramatically, an ultimate

condition of the structures, when the loads to the structure are added gradually.

- (4) The “yield stress or the stress with equivalent safety” is required concerning the allowable limits of components and piping systems (7(2)(a)-ii) above). Specifically this refers to the ‘Technical Standards on Structures of Nuclear Power Generation Facilities,’ etc., being prescribed in the Electricity Utilities Industry Law.

8. Consideration of the accompanying events of earthquakes

The Facilities shall be designed with sufficient consideration to the accompanying events of earthquakes in the following terms.

- (1) Safety functions of the Facilities shall not be significantly impaired in the seismic events by the possible collapses of the surrounding grounds above the foundations.
- (2) Safety functions of the Facilities shall not be significantly impaired by tsunami which could be reasonably postulated to hit in a very low probability in the service period of the Facilities.

From: Grobe, Jack | *mkr*
To: Sheron, Brian; Uhle, Jennifer; Wiggins, Jim; Evans, Michele; Miller, Charles; Haney, Catherine; Dorman, Dan; Moore, Scott; Johnson, Michael; Holahan, Gary; Leeds, Eric; Boger, Bruce; Brenner, Eliot; Hayden, Elizabeth; Schmidt, Rebecca; Doane, Margaret; Mamish, Nader; Dyer, Jim; Brown, Milton; Hackett, Edwin; Piccone, Josephine; Wilson, George; Harrison, Donnie; Kammerer, Annie; Collins, Timothy; Milligan, Patricia; Salley, MarkHenry; Bowman, Eric
Cc: Borchardt, Bill; Weber, Michael; Virgilio, Martin; Ash, Darren; Burns, Stephen; Vietti-Cook, Annette; Andersen, James; Gitter, Joseph; Howe, Allen; Nelson, Robert; McGinty, Tim; Blount, Tom; Holian, Brian; Gallagher, Johanna; Cheok, Michael; Lee, Samson; Hiland, Patrick; Skeen, David; Ruland, William; Lubinski, John
Subject: Re: Support and Logistics for the Japan Commission Meeting
Date: Friday, March 18, 2011 6:17:31 PM

Oops - I made a mistake. Cathy Haney will be in France so Trish Milligan should also be expected to cover Radiological Consequence Assessment as well as Emergency Preparedness. Thanks.
Jack Grobe, Deputy Director, NRR

From: Grobe, Jack | *mkr*
To: Sheron, Brian; Uhle, Jennifer; Wiggins, Jim; Evans, Michele; Miller, Charles; Haney, Catherine; Dorman, Dan; Moore, Scott; Johnson, Michael; Holahan, Gary; Leeds, Eric; Grobe, Jack; Boger, Bruce; Brenner, Eliot; Hayden, Elizabeth; Schmidt, Rebecca; Doane, Margaret; Mamish, Nader; Dyer, Jim; Brown, Milton; Hackett, Edwin; Piccone, Josephine; Wilson, George; Harrison, Donnie; Kammerer, Annie; Collins, Timothy; Milligan, Patricia; Salley, MarkHenry; Bowman, Eric
Cc: Borchardt, Bill; Weber, Michael; Virgilio, Martin; Ash, Darren; Burns, Stephen; Vietti-Cook, Annette; Andersen, James; Gitter, Joseph; Howe, Allen; Nelson, Robert; McGinty, Tim; Blount, Tom; Holian, Brian; Gallagher, Johanna; Brown, Milton; Cheok, Michael; Lee, Samson; Hiland, Patrick; Skeen, David; Ruland, William; Sheron, Brian; Lubinski, John
Sent: Fri Mar 18 18:06:05 2011
Subject: Support and Logistics for the Japan Commission Meeting

Ladies and Gents,

We want to ask your support for several aspects of the Commission meeting on Monday morning regarding the situation in Japan.

First, the only staff at the Commission table will be Bill Borchardt.

In the well, we anticipate having the two available DEDOs (I understand that Mike Weber will be on shift) and one representative from the front office of each of the following offices (either the office director or deputy)

NRR, NRO, NSIR, RES, NMSS, FSME, OPA, OCA, OIP, CFO, ACRS

Annette Vietti-Cook has indicated that she will reserve the "quadrant" of seats nearest the microphone (on the left side of the room as the Commissioners would see it) for NRC staff. As I understand it, the right side will be for reporters and the central area will be open for general public.

In the area for NRC staff, there will be 39 seats.

From a staff perspective, we would like the highest priority available for the following individuals whom Bill will call upon to answer (on camera) any more detailed questions on the indicated subjects. Bill will have the list and ask for this person to respond to any question where he wants more detailed support. Some of these folks will likely already be in the well. The microphone has been moved to allow television camera access to any

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individual answering questions.

Protection Against Natural Disasters – Gary Holahan
Station Blackout – George Wilson
Severe Accident and Spent Fuel Pool Accident Progression – Jennifer Uhle
Radiological Consequence Analysis – Cathy Haney
Hydrogen Fires and Explosions – MarkHenry Salley
Public Stakeholder Outreach – Eliot Brenner
State Outreach – Josie Piccone
International Interactions – Margie Doane
10CFR50.54(hh)(2)/B.5.b – Eric Bowman
Seismic Issues, Tsunami Issues, GI-199 – Annie Kammerer
Mark I containment issues – Tim Collins
Emergency Preparedness – Trish Milligan
Emergency Operating procedures/SAMGs – Donnie Harrison

We understand that these people are available for the meeting. If not, please coordinate with Allen Howe to provide an equivalently capable individual.

That leaves 26 seats in the staff section for TAs and other Division Directors and above who should attend the meeting.

SECY is arranging for an e-mail to be sent out to the staff to indicate where televisions are available for other interested staff to observe the Commission meeting.

Thanks for your support.

Jack Grobe, Deputy Director
for Engineering and Corporate Support
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission

Scott, Michael

From: Scott, Michael
Sent: Friday, March 18, 2011 8:29 AM
To: Coyne, Kevin; Santiago, Patricia; Dion, Jeanne
Cc: Gibson, Kathy; Armstrong, Kenneth
Subject: RE: Q&A to support OCM Brief on Japan

Kevin:

Do you have /should we have some Qs and As on L-3 for the same meeting? What would those look like?

Mike

From: Coyne, Kevin
Sent: Thursday, March 17, 2011 7:31 PM
To: Santiago, Patricia; Scott, Michael; Dion, Jeanne
Cc: Gibson, Kathy; Armstrong, Kenneth
Subject: RE: Q&A to support OCM Brief on Japan

Pat –

The only comment I have is with the inclusion of the DRA dynamic PRA work, the rest of the write-up is a bit confusing since it refers to "this study". Perhaps changing the title of the last two questions to explicitly refer to SOARCA would reduce this confusion. Also, since I don't have the entire context of the question, I'd leave it to you guys to decide if our dynamic MELCOR-based PRA work fits into this Q&A...

Kevin

From: Santiago, Patricia
Sent: Thursday, March 17, 2011 7:25 PM
To: Scott, Michael; Dion, Jeanne
Cc: Gibson, Kathy; Armstrong, Kenneth; Coyne, Kevin
Subject: Q&A to support OCM Brief on Japan

Attached are a few Qs&As....the first one is a general one on what severe accident research we are doing. I coordinated with Kevin

Other questions are from the SOARCA communication plan and can be removed.

If NRR continues to need support on SAMGs, I will talk to Tina at 9am. The last set of Qs&As from NRR did have a sentence in the document.

Thanks,

Pat

Patricia A. Santiago
Chief, Special Projects Branch
Division of Systems Analysis
Office of Nuclear Regulatory Research
Phone- 301-251-7982
Fax- 301-251-7426
Patricia.Santiago@nrc.gov

Scott, Michael

From: Scott, Michael
Sent: Friday, March 18, 2011 10:54 AM
To: Flory, Shirley; Gibson, Kathy; Dion, Jeanne; Sheron, Brian; Uhle, Jennifer
Subject: RE: COMMISSION MEETING: JAPAN EVENT

Brian:

I have not yet been able to run question 1 by OEDO. Partial answers:

1. I will validate the seating question.
2. I will forward the agenda (scheduling note) to you.
3. Current plan is only the EDO will speak.
4. We RES have a small role in the presentation. We have facilitated developing a slide for consequences, working with the OPCEN, and we are developing Qs and As for various subjects, including zirc fires, SOARCA, seismic, etc.

F/U EDO dry run for slide show is 3:15 today. I will be there.

Since you can't read slide shows well on BB, here are the words for the bullets (last two are what we provided) and the talking points. EDO requested the talking points be brief one-liners.

EVENT OVERVIEW

- Discuss initiating events
- Current status of reactors
- Current status of spent fuel pools
- NRC Incident Response Center evaluating potential dose impacts within 50 miles of site
- Also collaborating with DOE to support evaluation of potential impacts on U.S.

Talking points:

- The Protective Measures Team has been attempting to model potential offsite doses based on fragmented plant status information and recent very limited field measurements.
- One of the tools available to the PMT is the RASCAL code, which assumes modeled characteristics for the facilities and meteorology to predict potential off-site doses out to 50 miles.
- PMT is collaborating with Federal counterparts including DOE's National Atmospheric Release Advisory Center, which can project doses beyond 50 miles.

From: Flory, Shirley
Sent: Friday, March 18, 2011 8:51 AM
To: Scott, Michael; Gibson, Kathy; Dion, Jeanne
Subject: FW: COMMISSION MEETING: JAPAN EVENT
Importance: High

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From: Flory, Shirley
Sent: Thursday, March 17, 2011 5:49 PM
To: Baval, Rochelle
Cc: Sheron, Brian; Uhle, Jennifer
Subject: COMMISSION MEETING: JAPAN EVENT
Importance: High

Rochelle:

I was just speaking with Brian and he asked me to find out what I could about the Commission Meeting re Japan Event. I have it tentatively on our calendar for Monday morning.

His specific questions are:

Will there be reserved seating for Office Directors/Deputies?

Do you have an agenda?

Who will be making the presentations?

Are we (RES) supposed to be preparing any materials?

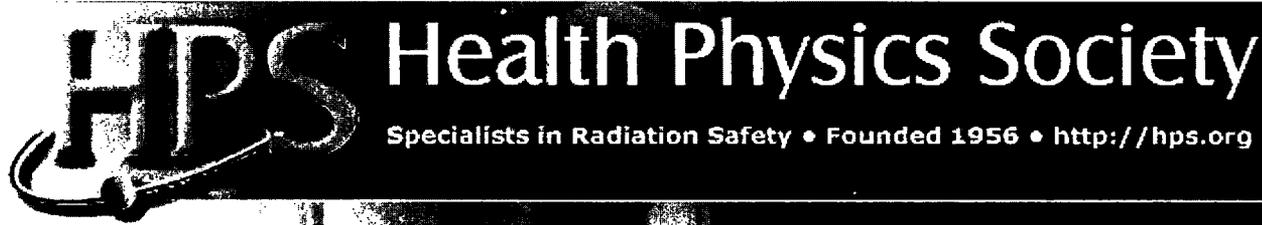
Any info/guidance you can give us would be greatly appreciated.

Thanks much – Shirley Flory 301-251-7400

Marksberry, Don

Marksberry, Don

From: HPS Headquarters [HPS@BurkInc.com]
Sent: Friday, March 18, 2011 11:09 AM
To: Marksberry, Don
Subject: HPS Update on Japan



HPS Update on Japan

HPS Members:

Are you aware of the terrible situation in Japan. The HPS is working on multiple fronts to collect credible information on the nuclear incident, and distribute that information through mainstream and social media outlets and the HPS Web site.

Share your frustration with the misinformation and sensationalism presented by much of the mainstream media. We don't often publicize our efforts, but the HPS maintains an active media liaison and outreach effort all year around; not just during a crisis. Jerry Classic and Howard Dickson are leading this charge. I would like to report to you a sampling of their efforts:

We have communicated with our professional counterparts at the Japan Health Physics Society to offer our assistance and express our support for their courageous efforts.

We have set up a special page on Facebook (<http://www.facebook.com/topic.php?topic=826&post=2780&uid=157387224301493#post2780>) to consolidate media reports and provide additional information, which we believe would be of interest to our audience (uncut and unedited for rapidity of availability).

We are also working to organize television appearances and other media communications for our members to present an alternative perspective on the situation, but with emphasis on radiation safety. We will never be able to respond with the speed of the mainstream media, nor have comparable resources to compete with them, but we will have the information right.

Encourage you to refer the public to our website for the most credible information and links. <http://hps.org/fukushima/>

Most importantly, I encourage you to donate to the Japan relief efforts through the American Red Cross at: http://american.redcross.org/site/PageServer?pagename=ntld_main&s_src=RSG000000000&s_subsrc=RCO_ResponseStateSe

We don't know what other actions our Society should be taking during this nuclear incident.

Now that many of you have also been doing interviews with reporters and we very much appreciate your efforts to get good

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scientific facts in front of the public. Please take the time to tell Kelly (media@hps.org) who you interviewed with and the topic of the interview. We will collect all members efforts for historical purposes.

We all, please keep the people of Japan in your thoughts and prayers.

Respectfully,

Michael Maher

Greenwood, Carol

From: Gibson, Kathy
Sent: Friday, March 18, 2011 12:05 PM
To: Yarsky, Peter
Cc: Elkins, Scott
Subject: Availability to go to Japan

Importance: High

Peter,
We are looking for good engineers with good people skills to go to Japan around the 24th (next Thursday) for about 2 weeks. Are you available and willing? And do you have a passport?

Thanks,
Kathy

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Greenwood, Carol

From: Gibson, Kathy
Sent: Friday, March 18, 2011 12:20 PM
To: Rubin, Stuart
Subject: Availability to go to Japan

Stu,
We are looking for good engineers with good people skills to go to Japan about next Thursday (24th) for about two weeks. Are you available and willing to go? And you have a passport, correct?

I need to give the names to NSIR by 2pm.

Thanks!

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Scott, Michael

From: Scott, Michael
Sent: Friday, March 18, 2011 5:53 PM
To: Howe, Allen; Gratton, Christopher; Leeds, Eric
Cc: Sheron, Brian; Gibson, Kathy; Uhle, Jennifer
Subject: BRIAN SHERON'S COMMENTS ON JAPAN COMM BRIEF PRESENTATION

Brian has been downtown and just now saw the slides. He had a couple of comments.

1. Slide 4 talking points discuss our collaboration with other Federal agencies, but bullets do not refer to those stakeholders in particular. This was similar to a comment made during today's dry run. Please ensure that collaboration and the role of other agencies are highlighted in the presentation.
2. Please consider the following in case the question arises: NRC has issued an IN for reactors regarding the Japan events. Begs the question: What about nonreactor facilities – lessons learned or impacts there?

Thanks

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Scott, Michael

From: Scott, Michael
Sent: Friday, March 18, 2011 10:56 PM
To: Harrison, Donnie
Cc: Santiago, Patricia; Ghosh, Tina
Subject: FW: Help with Commission brief

Donnie:

Please confirm you will be present at the Monday Comm brief on Japan to answer any SAMG questions that might arise. With you there, we will not have any RES staff there to address the same issue.

Thanks

Mike

From: Santiago, Patricia
Sent: Friday, March 18, 2011 7:52 PM
To: Scott, Michael
Subject: FW: Help with Commission brief

Is there still an expectation that Tina needs to attend this or did you confirm that NRR or Ed Fuller, NRO would be the staff support.

If it is Tina I want to confirm that with her.

thanks

From: Ghosh, Tina
Sent: Friday, March 18, 2011 11:07 AM
To: Scott, Michael
Cc: Santiago, Patricia
Subject: RE: Help with Commission brief

Sure, I can be in the audience at the Monday 9am brief.

NRR should own this subject, but their SAMG expert retired in June 2010 (my mentor, and he complained to me many times before he retired that NRC does not regulate SAMGs other than b5b measures), and I have no idea who in NRR now knows what is going on.

From: Scott, Michael
Sent: Friday, March 18, 2011 11:04 AM
To: Ghosh, Tina
Cc: Santiago, Patricia
Subject: RE: Help with Commission brief

Tina:

Can you be in the audience Monday 9 am for the Comm brief in case Brian Sheron gets asked and wants to ask a question of you regarding SAMGs? I don't expect this to come up, but just in case... Hopefully NRR will "own" this subject.

From: Ghosh, Tina
Sent: Friday, March 18, 2011 10:57 AM
To: Boska, John; Harrison, Donnie; Gratton, Christopher; Scott, Michael; Howe, Allen

6/14/11

Cc: Santiago, Patricia; Ruland, William; Tate, Travis
Subject: RE: Help with Commission brief

All US plants have SAMGs.

To my knowledge (and Donnie can correct me if I'm wrong), the development and deployment of SAMGs ended up as an industry voluntary initiative.

We do not regulate SAMGs – i.e., NRC never reviewed final SAMGs, we don't inspect them (though we did a couple of pilot plant reviews), and I'm not sure to what extent/how often licensees train their staff on SAMGs. The notable exception of course is that set of SAMGs that became part of b5b measures that are now regulated.

Best,
Tina

S. Tina Ghosh, Ph.D.
Senior Program Manager
Division of Systems Analysis
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Mail Stop: C-3A07M
Washington, DC 20555
Phone: 301-251-7984

From: Boska, John
Sent: Friday, March 18, 2011 10:52 AM
To: Harrison, Donnie; Gratton, Christopher; Scott, Michael; Howe, Allen
Cc: Ghosh, Tina; Santiago, Patricia; Ruland, William; Tate, Travis
Subject: RE: Help with Commission brief

Donnie, are the SAMGs mandatory, do all plants have them? If so, what NRC directive requires the SAMGs?

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

From: Harrison, Donnie
Sent: Friday, March 18, 2011 10:40 AM
To: Gratton, Christopher; Scott, Michael; Howe, Allen
Cc: Ghosh, Tina; Santiago, Patricia; Ruland, William; Tate, Travis; Boska, John
Subject: RE: Help with Commission brief

See attached a slide that explains SAMGs. Let me know if you need more or less.

From: Gratton, Christopher
Sent: Friday, March 18, 2011 9:50 AM
To: Harrison, Donnie; Scott, Michael; Howe, Allen
Cc: Ghosh, Tina; Santiago, Patricia; Ruland, William; Tate, Travis; Boska, John
Subject: RE: Help with Commission brief

Thanks Donnie, to meet our schedule, we need the info to support the 2 pm EDO brief, so we need it in the next hour to prep the slides.

Cg

From: Harrison, Donnie
Sent: Friday, March 18, 2011 9:47 AM
To: Scott, Michael; Gratton, Christopher; Howe, Allen
Cc: Ghosh, Tina; Santiago, Patricia; Ruland, William; Tate, Travis; Boska, John
Subject: RE: Help with Commission brief

I am looking to put together some high level material today on SAMGs.

Donnie

From: Scott, Michael
Sent: Thursday, March 17, 2011 5:23 PM
To: Gratton, Christopher; Howe, Allen
Cc: Ghosh, Tina; Santiago, Patricia; Ruland, William; Harrison, Donnie; Tate, Travis; Boska, John
Subject: FW: Help with Commission brief

Chris/Allen:

My folks tell me that SAMG, as a licensing activity, is best addressed in NRR. Specifically, that Donnie Harrison or Travis Tate are good sources. If they are unable to provide, Tina Ghosh of the RES staff is knowledgeable and can provide the talking points tomorrow morning. But I would ask that you check with Donnie/Travis first (copied this note).

Mike

From: Gratton, Christopher
Sent: Thursday, March 17, 2011 4:28 PM
To: Howe, Allen; Collins, Timothy; Tinkler, Charles; Scott, Michael
Cc: Bahadur, Sher; Boska, John; Ruland, William
Subject: RE: Help with Commission brief

What we are looking for is talking points. High level points to support the slide bullet. If you need a copy of the current version of the slides (they are evolving), let me know. The current version as of 4 pm is attached

CG

From: Howe, Allen
Sent: Thursday, March 17, 2011 4:23 PM
To: Collins, Timothy; Tinkler, Charles; Scott, Michael
Cc: Bahadur, Sher; Gratton, Christopher; Boska, John; Ruland, William
Subject: RE: Help with Commission brief

Tim – first of all thanks. Can you get with Chris to talk specifics?

Mike/Scott – can you help with the SAMGs? We are on a very tight timeline here, so high level bullets is what is needed and someone to respond to Qs Monday. Note that this meeting will have media coverage.

Thanks - Allen

From: Collins, Timothy
Sent: Thursday, March 17, 2011 4:19 PM
To: Howe, Allen; Ruland, William
Cc: Bahadur, Sher
Subject: RE: Help with Commission brief

I can help with Mark I containments improvements ... we probably need some help from RES (Charlie Tinkler most likely) for SAMGs

From: Howe, Allen
Sent: Thursday, March 17, 2011 4:05 PM
To: Ruland, William; Collins, Timothy
Cc: Bahadur, Sher
Subject: Help with Commission brief
Importance: High

Bill – need someone who can work with Chris Gratton/John Boska on one line talking points for Bill Borchardt. Topic areas are SAMGs and Mark 1 containment improvements.

Thanks - Allen

Lee, Richard

From: Wagner, Katie
Sent: Friday, March 18, 2011 11:23 AM
To: Lee, Richard
Subject: GE doc request

Richard,

I came by and Kathy was in your office with the door closed . . . please let me know if I can help in any way with getting the documents GE requested out.

Thanks,
Katie

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From: [NRC Announcement](#)
To: [NRC Announcement](#)
Subject: Daily: 9 New Items from Friday, March 18, 2011
Date: Friday, March 18, 2011 10:01:02 PM

NRC Daily Announcements



Highlighted Information and Messages



Friday March 18, 2011 -- Headquarters Edition

[Event: RES Seminar: 25th Anniversary of Chernobyl - April 26, 2011](#)

[Event: RES Seminar on Seismic Research Postponed](#)

[General Interest: Latest Edition of FSME Quarterly Newsletter is Now Online](#)

[Event: NRC Viewing of the Commission Meeting on the Japan Event](#)

[General Interest: Security/Safety Reminder - Personal Evacuation Kits](#)

[Employee News: 2011 International Conference for Law Enforcement Agencies at the North Bethesda Marriott](#)

[Staff Changes: Reorganization in the Office of Administration](#)

[Event: Earth Day Celebration, Wednesday, April 20, 2011.](#)

[Employee News: Retirements and Farewells](#)

Event: RES Seminar: 25th Anniversary of Chernobyl - April 26, 2011

A RES Seminar on the 25th Anniversary of Chernobyl will be held in the TWFN auditorium on Tuesday, April 26, 2011, from 9:30 to 11:30 a.m. A summary of the RBMK reactor type, the accident, radiological impacts, and sarcophagus will be given by Brian Sheron, Director of the Office of Nuclear Regulatory Research, and Frank Congel (retired NRC employee), Former Director, Division of Incident Response Operations, NSIR and Former Director, OE.

This agenda gives the order of presentations and speakers:

Introduction – Mike Weber, Deputy Executive Director for Materials, Waste, Research, State, Tribal and Compliance Programs
RBMK Reactor Type – Brian Sheron
Summary of Chernobyl Accident – Brian Sheron
Radiological Impact – Frank Congel
Sarcophagus – Frank Congel

Details about VTCs will be provided when available.



(2011-03-18 00:00:00.0)

[View item in a new window](#)

4/14/3

Event: RES Seminar on Seismic Research Postponed

The upcoming RES Seminar scheduled for March 22, 2011, on Seismic Research at Lawrence Berkley National Laboratory is postponed. Key NRC staff involved with the seminar are currently heavily involved with the activities at the Incident Response Center. The RES intranet page will be updated and an announcement sent when the seminar is re-scheduled.



(2011-03-18 00:00:00.0)

[View item in a new window](#)

General Interest: Latest Edition of FSME Quarterly Newsletter is Now Online

The latest edition of the Office of Federal and State Materials and Environmental Management Programs (FSME) [Quarterly Newsletter](#) is now available. The Newsletter covers a variety of FSME activities and is one of the tools the Office uses to communicate with its stakeholders. For more information, or if you have comments about the content of the Newsletter, please contact Vanessa Cox, 301-415-8342.



(2011-03-18 00:00:00.0)

[View item in a new window](#)

Event: NRC Viewing of the Commission Meeting on the Japan Event

On Monday, March 21, 2011, the NRC will hold a Commission Meeting to address the ongoing nuclear events at the Fukushima Nuclear Reactor site in Japan. The meeting is scheduled to convene at 9 a.m. in the One White Flint North (OWFN) Commission Hearing Room. Interested staff is encouraged to view the proceedings at one of the following locations:

- Two White Flint North (TWFN) auditorium
- TWFN exhibit area
- Cable Channel 46 and 47 throughout the White Flint North Complex
- TWFN Building O-2 B5
- OWFN Building - O-3 B4
- Executive Boulevard Building - 1B15
- Twinbrook Building - 5E01
- Church Street Building - 2C19
- Gateway Building - 04B2
- Region I*
- Region II*
- Region III*
- Region IV*
- Technical Training Center*

*Regional and TTC staff will be notified of the VTC viewing location by their VTC coordinator.

For more information about event viewing locations, contact Jason Wright at 415-

5446 or Christine Kundrat at 415-6130.



(2011-03-18 00:00:00.0)

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General Interest: Security/Safety Reminder - Personal Evacuation Kits

Yellow Announcement No. 035, "Security/Safety Reminder - Personal Evacuation Kits," 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.



(2011-03-18 00:00:00.0)

[View item in a new window](#)

Employee News: 2011 International Conference for Law Enforcement Agencies at the North Bethesda Marriott

The Commission on Accreditation for Law Enforcement Agencies will hold its 2011 International Conference at the North Bethesda Marriott from Tuesday, March 22, 2011, through Saturday, March 26, 2011. More than 1,000 law enforcement officers from around the world are expected to attend. Employees are advised that due to the nature of this conference, the surrounding area will experience a significant increase in law enforcement presence.

Please contact [Gary Simpler](#), Office of Administration, at (301) 415-7402 if you have any questions.



(2011-03-18 00:00:00.0)

[View item in a new window](#)

Staff Changes: Reorganization in the Office of Administration

Yellow Announcement No. 034, "Reorganization in the Office of Administration," 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.



(2011-03-18 00:00:00.0)

[View item in a new window](#)

Event: Earth Day Celebration, Wednesday, April 20, 2011.

The NRC will observe Earth Day on Wednesday, April 20, 2011. The environmental community of individuals, corporations, and governments will join together to mark the 1st Anniversary Earth Day Celebration. Earth Day 2011 will call attention to the progress that has been made as well as the work yet to be completed.

The first Earth Day celebration took place in 1970 as a spectacular grassroots movement of citizen leadership. Earth Day inspires us to save the land we love, to realize that global problems do have local solutions, and to make the preservation of the earth a personal commitment. Come celebrate Earth Day by participating in activities and learning more about the actions we can take to recycle, reduce waste, save energy, and protect our environment.

Earth Day will be held in the Two White Flint North exhibit area from 11:30 a.m. to 1:00 p.m. The planned activities are listed below.

Welcome to the Earth Day Resource Center. View special sculptures by the Georgetown Hill Schoolchildren illustrating how everyday products can be used more than once to reduce waste.

Composting Demonstration. Montgomery County composting experts will be on hand to demonstrate how to setup and compost at home. Learn about this fascinating process that reduces landfill waste while producing soil conditioner that helps plants flourish. The county does not sell compost bins or purchase them for county businesses but will have a few on hand to give away.

Geranium Sale. The Employee Welfare and Recreation Association (EWRA) Website will have plants for sale. You can find more details and [an order form](#) on the [EWRA Home Page](#) .

Flower and Gardening Tips. Representatives from the Maryland Master Gardeners will provide information on flowers and gardening. Get information on soil testing services, learn what plants flourish with minimal watering, and get answers to your personal gardening questions.

Commuting Services. Visit with transportation representatives from NRC and the North Bethesda Transportation Center to better understand commuting options in the local area.

Recycling and Waste Prevention. See NRC's recycling program exhibit and talk to Montgomery County representatives about recycling at home. View samples of the types of batteries that can be recycled at NRC.

Energy Saving. Visit a special display to learn how to save energy. NRC facilities staff and representatives from Montgomery County will provide information on how

you can save energy at work and at home. Also, learn more about how to report energy and water waste at NRC by using the "Fixit" system.



(2011-03-18 00:00:00.0)

[View item in a new window](#)

Employee News: Retirements and Farewells

Headquarters and Regional employees who are leaving the agency:

Retirements:

Brenda Ross, OIS (retiring on March 31, event on March 30)
Michael D. Tschiltz, NMSS (retiring on April 2, event on March 29)
Marie T. Miller, Region I (retiring on April 3, event on March 29)
Ted Quay, NRR (retiring in April, event on March 31)
Rex Wescott, NMSS (retiring on March 31, event on March 24)

For details, access the [Retirements and Farewells Web page](#).



(2011-03-18 00:00:00.0)

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The latest Announcements are always on the [NRC@WORK Home Page](#).

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[Frequently Asked Questions About the NRC Daily Announcements Email](#)

From: Borchardt, Bill *EDD*
To: Weber, Michael; Virgilio, Martin; Brenner, Eliot; Leeds, Eric; Grobe, Jack; ConferenceRoom017B4 Resource; Johnson, Michael; Doane, Margaret; Mamish, Nader; Burns, Stephen; Boger, Bruce; Ruland, William; Howe, Allen
Subject: Alignment Meeting on 3/21 CM re: Japanese Event & U.S. Response

When: Friday, March 18, 2011 3:00 PM-4:00 PM (GMT-05:00) Eastern Time (US & Canada).
Where: O-17B4

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

~~*~*~*~*~*~*~*~*

Rct 3/17

4/1/11

From: Borchardt, Bill | EDO
To: Weber, Michael; Virgilio, Martin; Brenner, Eliot; Leeds, Eric; Grobe, Jack; ConferenceRoom017B4 Resource; Johnson, Michael; Doane, Margaret; Mamish, Nader; Burns, Stephen; Boyer, Bruce; Ruland, William; Howe, Allen
Subject: Alignment Meeting on 3/21 CM re: Japanese Event & U.S. Response

When: Friday, March 18, 2011 3:15 PM-4:15 PM (GMT-05:00) Eastern Time (US & Canada).
Where: O-17B4

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

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Rct 3/17

4/14/11

From: [NRC Announcement](#)
To: [NRC Announcement](#)
Subject: Event: NRC Viewing of the Commission Meeting on the Japan Event
Date: Friday, March 18, 2011 3:49:02 PM

NRC Daily Announcements



Highlighted Information and Messages



Friday March 18, 2011 -- Headquarters Edition

Event: NRC Viewing of the Commission Meeting on the Japan Event

Event: NRC Viewing of the Commission Meeting on the Japan Event

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- TWFN exhibit area
- Cable Channel 46 and 47 throughout the White Flint North Complex
- TWFN Building O-2 B5
- OWFN Building - O-3 B4
- Executive Boulevard Building - 1B15
- Twinbrook Building - 5E01
- Church Street Building - 2C19
- Gateway Building - 04B2
- Region I*
- Region II*
- Region III*
- Region IV*
- Technical Training Center*

*Regional and TTC staff will be notified of the VTC viewing location by their VTC coordinator.

For more information about event viewing locations, contact Jason Wright at 415-5446 or Christine Kundrat at 415-6130.



(2011-03-18 00:00:00.0)

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4/1/46



From: [NRC Announcement](#)
To: [NRC Announcement](#)
Subject: General Interest: Media Interest on Monday's Commission Meeting
Date: Friday, March 18, 2011 5:34:14 PM

NRC Daily Announcements



Highlighted Information and Messages



Friday March 18, 2011 -- Headquarters Edition

General Interest: Media Interest on Monday's Commission Meeting

General Interest: Media Interest on Monday's Commission Meeting

The Office of Public Affairs expects a considerable amount of media attention at the White Flint Complex on Monday morning for the Commission meeting on March 21, 2011. NRC staff are likely to see cameras and reporters positioned outside the building. They are being coordinated by the Office of Public Affairs.

Questions or concerns should be directed to 301-415-8200.



(2011-03-18 00:00:00.0)

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4/147

From: [NRC Announcement](#)
To: [NRC Announcement](#)
Subject: Daily: 9 New Items from Friday, March 18, 2011
Date: Friday, March 18, 2011 10:01:02 PM

NRC Daily Announcements



Highlighted Information and Messages



Friday March 18, 2011 -- Headquarters Edition

[Event: RES Seminar: 25th Anniversary of Chernobyl - April 26, 2011](#)

[Event: RES Seminar on Seismic Research Postponed](#)

[General Interest: Latest Edition of FSME Quarterly Newsletter is Now Online](#)

[Event: NRC Viewing of the Commission Meeting on the Japan Event](#)

[General Interest: Security/Safety Reminder - Personal Evacuation Kits](#)

[Employee News: 2011 International Conference for Law Enforcement Agencies at the North Bethesda Marriott](#)

[Staff Changes: Reorganization in the Office of Administration](#)

[Event: Earth Day Celebration, Wednesday, April 20, 2011.](#)

[Employee News: Retirements and Farewells](#)

Event: RES Seminar: 25th Anniversary of Chernobyl - April 26, 2011

A RES Seminar on the 25th Anniversary of Chernobyl will be held in the TWFN auditorium on Tuesday, April 26, 2011, from 9:30 to 11:30 a.m. A summary of the RBMK reactor type, the accident, radiological impacts, and sarcophagus will be given by Brian Sheron, Director of the Office of Nuclear Regulatory Research, and Frank Congel (retired NRC employee), Former Director, Division of Incident Response Operations, NSIR and Former Director, OE.

This agenda gives the order of presentations and speakers:

Introduction – Mike Weber, Deputy Executive Director for Materials, Waste, Research, State, Tribal and Compliance Programs

RBMK Reactor Type – Brian Sheron

Summary of Chernobyl Accident – Brian Sheron

Radiological Impact – Frank Congel

Sarcophagus – Frank Congel

Details about VTCs will be provided when available.



(2011-03-18 00:00:00.0)

[View item in a new window](#)

4/14/8

Event: RES Seminar on Seismic Research Postponed

The upcoming RES Seminar scheduled for March 22, 2011, on Seismic Research at Lawrence Berkley National Laboratory is postponed. Key NRC staff involved with the seminar are currently heavily involved with the activities at the Incident Response Center. The RES intranet page will be updated and an announcement sent when the seminar is re-scheduled.



(2011-03-18 00:00:00.0)

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General Interest: Latest Edition of FSME Quarterly Newsletter is Now Online

The latest edition of the Office of Federal and State Materials and Environmental Management Programs (FSME) [Quarterly Newsletter](#) is now available. The Newsletter covers a variety of FSME activities and is one of the tools the Office uses to communicate with its stakeholders. For more information, or if you have comments about the content of the Newsletter, please contact Vanessa Cox, 301-415-8342.



(2011-03-18 00:00:00.0)

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Event: NRC Viewing of the Commission Meeting on the Japan Event

On Monday, March 21, 2011, the NRC will hold a Commission Meeting to address the ongoing nuclear events at the Fukushima Nuclear Reactor site in Japan. The meeting is scheduled to convene at 9 a.m. in the One White Flint North (OWFN) Commission Hearing Room. Interested staff is encouraged to view the proceedings at one of the following locations:

- Two White Flint North (TWFN) auditorium
- TWFN exhibit area
- Cable Channel 46 and 47 throughout the White Flint North Complex
- TWFN Building O-2 B5
- OWFN Building - O-3 B4
- Executive Boulevard Building - 1B15
- Twinbrook Building - 5E01
- Church Street Building - 2C19
- Gateway Building - 04B2
- Region I*
- Region II*
- Region III*
- Region IV*
- Technical Training Center*

*Regional and TTC staff will be notified of the VTC viewing location by their VTC coordinator.

For more information about event viewing locations, contact Jason Wright at 415-

5446 or Christine Kundrat at 415-6130.



(2011-03-18 00:00:00.0)

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General Interest: Security/Safety Reminder - Personal Evacuation Kits

Yellow Announcement No. 035, "Security/Safety Reminder - Personal Evacuation Kits," 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.



(2011-03-18 00:00:00.0)

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Employee News: 2011 International Conference for Law Enforcement Agencies at the North Bethesda Marriott

The Commission on Accreditation for Law Enforcement Agencies will hold its 2011 International Conference at the North Bethesda Marriott from Tuesday, March 22, 2011, through Saturday, March 26, 2011. More than 1,000 law enforcement officers from around the world are expected to attend. Employees are advised that due to the nature of this conference, the surrounding area will experience a significant increase in law enforcement presence.

Please contact [Gary Simpler](#), Office of Administration, at (301) 415-7402 if you have any questions.



(2011-03-18 00:00:00.0)

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Staff Changes: Reorganization in the Office of Administration

Yellow Announcement No. 034, "Reorganization in the Office of Administration," 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.



(2011-03-18 00:00:00.0)

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Event: Earth Day Celebration, Wednesday, April 20, 2011.

The NRC will observe Earth Day on Wednesday, April 20, 2011. The environmental community of individuals, corporations, and governments will join together to mark the 1st Anniversary Earth Day Celebration. Earth Day 2011 will call attention to the progress that has been made as well as the work yet to be completed.

The first Earth Day celebration took place in 1970 as a spectacular grassroots movement of citizen leadership. Earth Day inspires us to save the land we love, to realize that global problems do have local solutions, and to make the preservation of the earth a personal commitment. Come celebrate Earth Day by participating in activities and learning more about the actions we can take to recycle, reduce waste, save energy, and protect our environment.

Earth Day will be held in the Two White Flint North exhibit area from 11:30 a.m. to 1:00 p.m. The planned activities are listed below.

Welcome to the Earth Day Resource Center. View special sculptures by the Georgetown Hill Schoolchildren illustrating how everyday products can be used more than once to reduce waste.

Composting Demonstration. Montgomery County composting experts will be on hand to demonstrate how to setup and compost at home. Learn about this fascinating process that reduces landfill waste while producing soil conditioner that helps plants flourish. The county does not sell compost bins or purchase them for county businesses but will have a few on hand to give away.

Geranium Sale. The Employee Welfare and Recreation Association (EWRA) Website will have plants for sale. You can find more details and [an order form](#) on the [EWRA Home Page](#) .

Flower and Gardening Tips. Representatives from the Maryland Master Gardeners will provide information on flowers and gardening. Get information on soil testing services, learn what plants flourish with minimal watering, and get answers to your personal gardening questions.

Commuting Services. Visit with transportation representatives from NRC and the North Bethesda Transportation Center to better understand commuting options in the local area.

Recycling and Waste Prevention. See NRC's recycling program exhibit and talk to Montgomery County representatives about recycling at home. View samples of the types of batteries that can be recycled at NRC.

Energy Saving. Visit a special display to learn how to save energy. NRC facilities staff and representatives from Montgomery County will provide information on how

you can save energy at work and at home. Also, learn more about how to report energy and water waste at NRC by using the "Fixit" system.



(2011-03-18 00:00:00.0)

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Employee News: Retirements and Farewells

Headquarters and Regional employees who are leaving the agency:

Retirements:

Brenda Ross, OIS (retiring on March 31, event on March 30)
Michael D. Tschiltz, NMSS (retiring on April 2, event on March 29)
Marie T. Miller, Region I (retiring on April 3, event on March 29)
Ted Quay, NRR (retiring in April, event on March 31)
Rex Wescott, NMSS (retiring on March 31, event on March 24)

For details, access the [Retirements and Farewells Web page](#).



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Basu, Sudhamay

From: Farmer, Mitchell T. [farmer@anl.gov]
Sent: Friday, March 18, 2011 11:32 AM
To: Tinkler, Charles; Basu, Sudhamay; Lee, Richard; Gavrilas, Mirela
Subject: FW: MIT NSE Nuclear Information Hub (<http://web.mit.edu/nse/>) | Information about the incident at the Fukushima Nuclear Plants in Japan hosted by <http://web.mit.edu/nse/> :: Maintained by the students of the Department of Nuclear Science and Engineering at

I certainly hope your information sources are better than mine, but this gave me modest hope about the pools. I pray that when the power is reconnected that coolant systems for these pools can be restarted. Otherwise it's going to be a long haul.

Mitch

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

From: Wright, Arthur E.

Sent: Friday, March 18, 2011 10:27 AM

To: Yacout, Abdellatif M.; Taiwo, Temitope A.; Grandy, Christopher; Sofu, Tanju; Roglans-Ribas, Jordi; Bauer, Theodore H.; Grimm, Karl N.; Hofman, Gerard L.; Kim, Taek K.; Kim, Yeon Soo; Pointer, William D.; Rest, Jeffrey; Wiencek, Thomas; Yun, Di; Farmer, Mitchell T.

Subject: MIT NSE Nuclear Information Hub (<http://web.mit.edu/nse/>) | Information about the incident at the Fukushima Nuclear Plants in Japan hosted by <http://web.mit.edu/nse/> :: Maintained by the students of the Department of Nuclear Science and Engineering at MIT

<http://mitnse.com/>

This is the best source of information I have found about the Japan nuclear accident situation (much better than the IAEA website).

Mitch... your MCCI work is alluded to, although not by program name.

Art

6/149

Hogan, Rosemary

From: Khanna, Meena
Sent: Friday, March 18, 2011 1:54 PM
To: Mahoney, Michael; Gratton, Christopher; Boska, John
Cc: Wilson, George; Hiland, Patrick; Skeen, David; Chokshi, Nilesh; Howe, Allen; Giitter, Joseph; Case, Michael; Munson, Clifford; Kammerer, Annie; Manoly, Kamal; Thomas, George; Farzam, Farhad; See, Kenneth; Jones, Henry; Wescott, Rex; Raione, Richard; Smith, Brian; Scales, Kerby; Uribe, Juan; Hogan, Rosemary; Karas, Rebecca
Subject: Updated 1-pagers for tsunami, flooding, seismic, and GI-199 issues in support of Monday's Commission Briefing
Attachments: QA and Messages Regarding tsunami.docx; QA and Messages Regarding Flooding final.doc.docx; fact sheet on NRC Seismic Regulations.doc.docx; Highlights of GI-199 and Communications Plan

Pls disregard the 1-pagers that I sent earlier. The attachments to this email includes the latest 1-pagers for GI-199, flooding, tsunami, and seismic, in support of Monday's commission briefing.

I sincerely thank all of those who assisted us in getting these done in such a short turnaround. Pls. let me know if you have any questions and we will bring copies to the 3 pm meeting and address any last minute changes, as necessary.

Pls contact me if you need any further information.

Thanks,

Meena

05/1/11

Tsunami

Review Guidance and Guidelines Related to Tsunami:

1. General Design Criterion 2 (GDC 2), 10CFR50, requires, in part, that structures, systems, and components important to safety be designed to withstand the effects of natural phenomena such as floods, tsunamis, and seiches without loss of capability to perform their safety functions. Design bases for these SSCs are also required to reflect:
2. 10 CFR 100.23, requires, in part, that the size of seismically induced floods and water waves that could affect a site from either locally or distantly generated seismic activity must be determined.
 - a.
3. RG 1.102 – Flood Protection for Nuclear Power Plants, describes types of flood protection acceptable to the NRC staff
 - a. Exterior Barriers (e.g.)
 - i. Levee – embankment to protect land from inundation
 - ii. Seawall or floodwall - a structure separating land and water areas, primarily to prevent erosion and other damages due to wave action
 - iii. Bulkhead – similar to seawall, purpose is to restrain the land area
 - b. Incorporated Barriers
 - i. Protection provided by specially designed walls and penetration closures. Walls are usually reinforced concrete designed to resist static and dynamic forces of a Design Basis Flood Level of a Probable Maximum Flood.
4. RG 1.59 – Design Basis Floods for Nuclear Power Plants
 - a. The most severe seismically induced floods reasonably possible should be considered for each site.
 - b. Tsunami requires consideration of seismic events of the severity of the Safe Shutdown Earthquake occurring at the location that would produce the worst such flood at the nuclear power plant site.
5. US NRC, Standard Review Plan, "Probable Maximum Tsunami Flooding," Section 2.4.6, Rev. 2
 - a. Areas of Review
 - i. Probable maximum tsunami postulated for a site should include wave runup and drawdown
 - ii. Hydrologic characteristics of maximum locally and distantly generated tsunami (e.g., volcanoes, landslides)
 - iii. Geological and seismic characteristics of potential tsunami faults (e.g., magnitude, focal depth, source dimensions, fault orientation, and vertical displacement)

Questions and Answers for Tsunami Issues

1. Why do we have confidence that US nuclear power plants are adequately designed for earthquakes and tsunamis?

Answer: Nuclear plants in both the US and Japan are designed for earthquake shaking. In addition to the design of the plants, significant effort goes into emergency response planning and accident mitigation. This approach is called defense-in-depth.

2. Are nuclear power plants designed for tsunamis?

Answer: Yes. Plants are built to withstand a variety of environmental hazards and those plants that might face a threat from tsunami are required to withstand large waves and the maximum wave height at the intake structure (which varies by plant.)

3. What level of tsunami are we designed for?

Answer: Like seismic hazard, the level of tsunami that each plant is designed for is site-specific and is appropriate for what may occur at each location.

4. Can this happen here (i.e., an earthquake that significantly damages a nuclear power plant)? Are the Japanese plants similar to US plants?

Answer: All US nuclear power plants are built to withstand environmental hazards, including earthquakes and tsunamis. Even those plants that are located within areas with low and moderate 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 even rare and extreme seismic and tsunami events. The Japanese facilities are similar in design to several US facilities

5. How many reactors are along coastal areas that could be affected by a tsunami (and which ones)?

Answer: Many plants are located in coastal areas that could potentially be affected by tsunami.

Two plants, Diablo Canyon and San Onofre, are on the Pacific Coast, which is known to have tsunami hazard. There are also two plants on the Gulf Coast, South Texas and Crystal River. There are many plants on the Atlantic Coast or on rivers that may be affected by a tidal bore resulting from a tsunami. These include St. Lucie, Turkey Point, Brunswick, Oyster Creek, Millstone, Pilgrim, Seabrook, Calvert Cliffs, Salem/Hope Creek, and Surry. Tsunami on the Gulf and Atlantic Coasts occur, but are very rare. Generally the flooding anticipated from hurricane storm surge exceeds the flooding expected from a tsunami for plants on the Atlantic and Gulf Coast.

NRC's Regulatory Framework for Seismic Safety

NRC Regulations and Guidelines for Seismic Safety:

- The seismic regulatory basis for licensing of the currently operating nuclear power reactors is contained in the following regulations:
 - 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," including the "General Design Criteria for Nuclear Power Plants," and
 - 10 CFR Part 100 ("Seismic and Geologic Siting Criteria For Nuclear Power Plants") and Appendix A to that Part, which describes the general criteria that guide the evaluation of the suitability of proposed sites for nuclear power plants.
- In addition, General Design Criterion (GDC) 2, "Design Bases for Protection Against Natural Phenomena," in Appendix A requires that:
 - The structures and components in nuclear power plants be designed to withstand the effects of natural phenomena, including earthquakes and tsunamis, without loss of capability to perform their intended safety functions.
 - GDC 2 also requires that the design bases include sufficient margin to account for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.
 - The earthquake which could cause the maximum vibratory ground motion at the site is designated as the **Safe Shutdown Earthquake (SSE)**. Under SSE ground motions, nuclear power plant structures and components must remain functional and within applicable stress, strain, and deformation limits.
 - Each plant must also have seismic instrumentation to determine if the **Operating Basis Earthquake (OBE)**, typically one-half or one-third the level of the SSE, has been exceeded. If the OBE is exceeded or significant plant damage has occurred, then the nuclear power plant must be shutdown.

Plant Design /Design Basis (Seismic):

- Each plant is designed to a ground-shaking level (the SSE) that is appropriate for its location, given the possible earthquake sources that may affect the site and its tectonic environment. Ground shaking is a function of both the magnitude of the earthquake, the distance of the earthquake to the site, and the local geology. The magnitude alone cannot be used to predict ground motions. The existing plants were designed on a "deterministic" or "scenario earthquake" basis that accounted for the largest earthquake expected in the area around the plant. This required an assessment of earthquakes that had occurred in the region around each plant site.
- Design basis loads for nuclear power plant structures include combined loads for seismic, wind, tornado, normal operating conditions (pressure and thermal), and accident conditions. Codes and standards, such as the American Society of Mechanical Engineers, the American Concrete Institute, and the American Institute of Steel Construction, are used in the design of nuclear power plant structures to ensure a conservative, safe design under design basis loads.

NRC Current Reviews/Initiatives:

- In the mid to late 1990s, NRC staff reviewed the potential consequences of severe earthquakes (earthquakes beyond the safety margin included in each plant's design basis), as part of the Individual Plant Examination of External Events (or IPEEE) program. From this review, the staff determined that seismic designs of operating plants in the United States have adequate safety margins, for withstanding earthquakes, built into the designs. Currently, the NRC staff is reassessing the seismic designs of operating plants through our Generic Issues program. The initial results of this assessment found that: 1) seismic hazard estimates have increased at some operating plants in the central and eastern US; 2) there is no immediate safety concern, plants have significant safety margin and overall seismic risk estimates remain small; and 3) assessment of updated seismic hazards and plant performance should continue.

Flooding Issues:

1. General Design Criterion 2 (GDC 2), 10CFR50, requires, in part, that structures, systems, and components important to safety be designed to withstand the effects of natural phenomena such as floods, tsunamis, and seiches without loss of capability to perform their safety functions. Design bases for these SSCs are also required to reflect:
 - a. Appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding region, with sufficient margin for the limited accuracy and quantity of the historical data and the period of time in which the data have been accumulated.
 - b. Appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena.
 - c. The importance of the safety functions to be performed.
2. Design basis floods for the present fleet of operating reactors were calculated using deterministic methods to determine the maximum credible flood levels at the site. These deterministic methods include the site specific calculation of parameters such as the probable maximum precipitation, which is defined as the theoretically greatest depth of precipitation for a given duration that is physically possible over a particular drainage basin. Other potential flooding hazards such as flooding due to storm surge, river flooding, coastal flooding including tsunamis, are evaluated at each site using maximum credible levels from each hazard. Over the life of the operating reactor, if new information becomes available that could affect the design basis, licensees are required to evaluate the new information. Based on this review, if needed, licensees are required to take appropriate mitigation measures, update their final safety analysis report and submit it to the NRC for review and approval.
3. In order to impose new requirements on existing plants, the NRC must be able to justify the new requirements in accordance with the "Backfit Rule" (10 CFR 50.109).

Questions and Answers for Flooding Issues

Does the NRC consider severe floods in the design of nuclear power plants?

Yes. NRC regulations require that nuclear power plants are, at all times, capable of safely shutting down and maintaining a safe shutdown condition under severe flooding situations. Safety-related Structures, Systems and Components (SSCs) of Nuclear reactors in the U.S. are required to withstand the design basis flood (DBF). The design basis flood may be caused by the following natural Phenomena:

- 1) Intense rainfall occurring at the site (known as local intense precipitation).
- 2) Intense rainfall (known as the Probable Maximum Precipitation) occurring on other areas of the watershed leading to riverine or coastal flooding (known as Probable Maximum Flood" or "PMF").

- 3) Floods from upstream dam failure or a combination of upstream dam failures.
- 4) Failure of On-site Water Control or Storage Structures (i.e. tanks).
- 5) Storm Surge, Seiche and Tsunami including wave effects. (See Tsunami Q&A Sheet)
- 6) Flooding caused by ice effects (i.e. ice dams both upstream and downstream).
- 7) Floods caused by diversions of stream channels toward the site.
- 8) Other site specific cause(s) identified by the applicant and/or the NRC.

What about droughts and conditions which lead to low water? Are these considered?

Yes. Impacts to the plant from low water conditions brought about by ice effects, downstream dam breach, tsunamis, hurricanes and channel diversions away from the site are reviewed as well to ensure the plant remains safe under these scenerios.

Periods of long rainfall can cause the groundwater elevation to rise which can cause structures such as deeply embedded tanks to fail due to buoyancy. Are nuclear power plants designed to withstand this effect?

Yes. Worst-case groundwater levels are estimated for each site and the impacts of these levels are considered in the design of the plant to ensure the plant remains safe under these conditions. During the safety review, impacts due to groundwater levels and other hydrodynamic effects on the design bases of plant foundations and other safety-related structures systems and components (SSCs) are evaluated. Impacts to a safety-related structure such as a deeply embedded tank or a structure containing a deeply embedded tank are considered in the safety review.

Some of the Reports from the National Weather Service used to estimate the design precipitation are 30-40 years old. Are these estimates still valid?

The NRC has funded research by the U.S. Bureau of Reclamation to review the information and methods developed by the National Weather Service and the U.S. Army Corps of Engineers (HMR 51), focusing on South and North Carolina. To date, reviews of precipitation records from extreme storm events (e.g., tropical storms, hurricanes) since the publication of HMR 51 does not indicate any exceedance or potential for exceedance of those precipitation (PMP) estimates in this region. We have not seen any information or data that would indicate that HMR precipitation (PMP) estimates for the U.S. have been exceeded. As expected, individual point rainfall gauges have recorded rainfall amounts that have exceeded these areal estimates.

Hogan, Rosemary

From: Khanna, Meena
Sent: Thursday, March 17, 2011 3:25 PM
To: Leeds, Eric
Cc: Manoly, Kamal; Wilson, George; Chokshi, Nilesh; Hiland, Patrick; Skeen, David; Giitter, Joseph; Meighan, Sean; Nguyen, Quynh
Subject: Highlights of GI-199 and Communications Plan
Attachments: GI 199 Comm Plan.word.doc.docx

Eric,

As requested, here are some highlights regarding GI-199, which includes the timeline for the issuance of the generic letter. Also attached to the email is the GI-199 Communication Plan. Pls. contact either George or myself if you need any further information. Thanks.

GENERIC ISSUE 199, "IMPLICATIONS OF UPDATED PROBABILISTIC SEISMIC HAZARD ESTIMATES IN CENTRAL AND EASTERN UNITED STATES ON EXISTING PLANTS"

Objective of GI-199

The objective of the GI-199 Safety/Risk Assessment was to perform a conservative, screening-level assessment to evaluate if further investigations of seismic safety for operating reactors in the central and eastern U.S. (CEUS) are warranted consistent with NRC directives.

- The results of the GI-199 safety risk assessment should not be interpreted as definitive estimates of plant-specific seismic risk.
- The nature of the information used (both seismic hazard data and plant-level fragility information) make these estimates useful only as a screening tool. The NRC does not rank plants by seismic risk.

Key Messages from the GI-199 Communications Plan (slightly revised) are:

- (1) In August 2010, the Safety/Risk Assessment for GI-199 was completed. That assessment found that operating nuclear power plants are safe: Plants have adequate safety margin for seismic issues. The NRC's Safety/Risk Assessment confirmed that overall seismic risk estimates remain small and that adequate protection is maintained.
- (2) Though still small, some seismic hazard estimates have increased: Updates to seismic data and models indicate increased seismic hazard estimates for some operating nuclear power plant sites in the Central and Eastern United States.
- (3) Assessment of GI-199 will continue: Plants are safe (see key message 1), but the NRC has separate criteria for evaluating whether plant improvements may be imposed. The NRC's Safety/Risk Assessment used readily available information and found that for about one-quarter of the currently operating plants, the estimated core damage frequency change is large enough to warrant further attention. Action may include obtaining additional, updated information and developing methods to determine if plant improvements to reduce seismic risk are warranted.

Note: GI-199 Communication Plan is available in ADAMs: ML081850477.

Status of Operating Plants and Need of Additional Actions due to Japanese Event:

- Currently operating nuclear plants in the United States remain safe, with no need for immediate action.
- This determination is based on NRC staff reviews of updated seismic hazard information and the conclusions of the Generic Issue 199 Screening Panel.

- Existing plants were designed with considerable margin to be able to withstand the ground motions from the “deterministic” or “scenario earthquake” that accounted for the largest earthquake expected in the area around the plant.
- During the mid-to late-1990s, the NRC staff reassessed the margin beyond the design basis as part of the Individual Plant Examination of External Events (IPEEE) program.
- The results of the GI-199 assessment demonstrate that the probability of exceeding the design basis ground motion may have increased at some sites, but only by a relatively small amount. In addition, the Safety/Risk Assessment stage results indicate that the probabilities of seismic core damage are lower than the guidelines for taking immediate action.
- In summary, US plants are designed for appropriate earthquake levels and are safe. As addressed above, the NRC is conducting a program called Generic Issue 199, which is reviewing the adequacy of the earthquake design of US NPPs in central and eastern North America based on the latest data and analysis techniques. The NRC will look closely at all aspects of the response of the plants in Japan to the earthquake and tsunami to determine if any actions need to be taken in US plants and if any changes are necessary to NRC regulations.

Timeline for Preparation and Issuance of GI-199 Generic Letter:

- The NRC is working on developing a Generic Letter (GL) to request information of all affected plants (96 plants that are east of the Rockies).
- The GL is planned to be issued in draft form within the next 2 months to stimulate discussions with industry in a public meeting.
- Process will be followed, i.e., Committee to Review Generic Requirements, Advisory Committee on Reactor Safeguards Meeting and then GL will be issued as a draft for formal public comments (60 days), followed by a second meeting with ACRS.
- We expect to issue the GL by the end of this calendar year, as the new consensus seismic hazard estimates become available. (This effort is being coordinated with US NRC, DOE, EPRI, and USGS).
- The information from licensees will likely require 3 to 6 months to complete. Staff’s review will commence after receiving licensees’ responses. Based on staff’s review, a determination can be made regarding cost beneficial backfits where it can be justified.

COMMUNICATION PLAN FOR GENERIC ISSUE 199

March 17, 2011
(ML081850477)

Goal

This plan will guide staff communications and activities with internal and external stakeholders of the United States Nuclear Regulatory Commission (NRC) as they relate to Generic Issue 199 (GI-199), "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on Existing Plants."

Key Message Following March 11, 2011, Japanese Earthquake

US plants are designed for appropriate earthquake shaking levels and are safe. Currently the NRC is conducting a program called Generic Issue 199, which is reviewing the adequacy of the earthquake design of US NPPs in central and eastern North America based on the latest data and analysis techniques. The NRC will look closely at all aspects of the response of the plants in Japan to the earthquake and tsunami to determine if any actions need to be taken in US plants and if any changes are necessary to NRC regulations.

Key Messages

The key messages to be communicated to stakeholders based on the GI-199 Safety Risk/Assessment (completed in August 2010) are as follows:

- (1) **Operating nuclear power plants are safe:** Plants have adequate safety margin for seismic issues. The NRC's Safety/Risk Assessment confirms that overall *seismic risk* estimates remain small and that adequate protection is maintained.
- (2) **Though still small, some seismic hazard estimates have increased:** Updates to seismic data and models indicate increased *seismic hazard* estimates for some operating nuclear power plant sites in the Central and Eastern United States.
- (3) **Assessment of GI-199 will continue:** Plants are safe (see key message 1), but the NRC has separate criteria for evaluating whether plant improvements may be imposed. The NRC's Safety/Risk Assessment used readily available information and found that for about one-quarter of the currently operating plants, the estimated *core damage frequency* change is large enough to warrant further attention. Action may include obtaining additional, updated information and developing methods to determine if plant improvements to reduce seismic risk are warranted.

Background

This issue was proposed as a Generic Issue in May 2005 after NRC staff's review of updates to the seismic source and ground motion models provided by applicants in support of early site permits for new reactors. The updated seismic information included new Electric Power Research Institute (EPRI) models to estimate earthquake ground motion and updated models

for earthquake sources in seismic regions such as eastern Tennessee, and around both Charleston, South Carolina and New Madrid, Missouri. The new data and models resulted in increased estimates of the seismic hazards for some plants in the Central and Eastern United States (CEUS). The staff evaluated this new information along with preliminary results from a 2004 U.S. Geological Survey (USGS) letter report regarding seismic hazard estimates. From this review the staff concluded that the likelihood of exceeding the seismic hazard values, used in plant design and in previous evaluations (such as the Individual Plant Examination of External Events (IPEEE) Program), may be higher than previously understood for some currently operating CEUS sites.

The staff compared the new seismic hazard data with the earlier evaluations conducted as a part of the IPEEE Program. From this comparison, the staff determined that the seismic designs of operating plants in the CEUS still provide adequate safety margins. At the same time, the staff also recognized that the new seismic data and models could reduce available safety margins due to increased estimates of the probability associated with seismic hazards at some of the currently operating sites in the CEUS.

The licensing basis for currently operating plants is based on deterministic analysis of design basis loads from the maximum earthquake level determined from historical data. The licensing basis does not include a probabilistic assessment of seismic hazards or probabilistic assessment of their potential impact on plant structures, systems, and components.

To maintain consistency with the performance-based approach for assessing seismic hazards for new reactors, the staff determined that the screening analysis should consider seismic hazard data and models besides those available from the USGS. This determination was based on the staff's ongoing interactions with stakeholders to develop a new performance-based approach for assessing seismic hazards for new reactors, as described in a memorandum to the Commission, "A Performance-Based Approach to Define the Safe Shutdown Earthquake Ground Motion," dated July 26, 2006 (ADAMS Accession No. ML052360044). The NRC staff held a public meeting, in February 2008, to engage external stakeholders. During the meeting, the representative from the Nuclear Energy Institute (NEI) expressed their willingness to support a collaborative approach to GI-199. This led to a Seismic Risk Memorandum of Understanding Addendum between EPRI and NRC.

The staff collected and analyzed seismic hazard information from the USGS and from other sources, and seismic risk information from IPEEE analyses. EPRI reported that they calculated mean seismic hazard results for all nuclear power plant sites in the CEUS and used these results to perform an independent evaluation of the implications of changes in seismic hazard estimates. The staff completed the review and analysis of seismic data in support of the Safety/Risk Assessment in June 2009.

Audience and Stakeholders

Internal

Internal stakeholders include the Commission, Office of the Executive Director for Operations (OEDO), Office of Nuclear Regulatory Research (RES), Office of Nuclear Reactor Regulation (NRR), Office of New Reactors (NRO), Office of Nuclear Material Safety and Safeguards (NMSS), Office of Federal and State Materials and Environmental Management Programs (FSME), Region I, Region II, Region III, Region IV, Office of Public Affairs (OPA), Advisory Committee on Reactor Safeguards (ACRS), Office of International Programs (OIP), Office of Congressional Affairs (OCA). (See the “Communications Team” section for a list of specific Communication Team members.)

External

External stakeholders include licensees, EPRI, Nuclear Energy Institute, Congressional members, public interest groups, media, and the public.

Communication Timeline

Detailed Activities to Support Release of the GI-199 Safety/Risk Assessment Report				
Stakeholder Group	Specific Audience	Tool	Lead	Date
Internal	Regional Offices	Brief	RES-Kauffman	May 12, 2010 (c)
	NRR Office Director	Brief	RES-Kauffman	May 12, 2010 (c)
	NRO Office Director	Brief	RES-Beasley	May 19, 2010 (c)
	Region I Management	Brief	RES-Kauffman	June 3, 2010 (c)
	EDO, Deputy EDOs	Brief	RES-Kauffman	June 22, 2010 (c)
	Commission offices	Technical Assistants Brief	RES-Kauffman	July 8, 2010 (c)
	NRC Chairman	Brief	RES-Kauffman	August 23, 2010
	Commission offices	EDO Daily Note (with link to documents)	RES-Killian	T* (September 1, 2010)
	EDO	Issue Safety/Risk Assessment Report (goes public after 5 working days)	RES-Sheron	T
External	General Public	Safety/Risk Assessment Report made public in ADAMS		T + 6 days (September 7, 2010)
	General Public	Press Release	OPA-Burnell	T + 6 days (September 7, 2010)
	Public and Licensees	Information Notice	NRR-Manoly	T + 6 days (September 7, 2010)
	Congressional Members/staff (as appropriate)	Phone Calls	OCA-Riley	T + 6 days (September 7, 2010)
	International contacts (as appropriate)	Phone Calls	OIP	T + 6 days (September 7, 2010)
	State/local governments (as appropriate)	Phone Calls	Regional State Liaison Officers Region I- McNamara/Tiftt Region II – Trojanowski Region III – Barker Region IV - Maier	T + 6 days (September 7, 2010)

	USGS	Phone Call	OCA-Riley	T + 6 days (September 7, 2010)
	General Public	Public Meeting	RES-Beasley	T + [1 month]
	General Public	Seismic Fact Sheet Update	RES-Killian OPA-Burnell	August 26, 2010

* "T" refers to the time that the Director, RES endorses the Safety/Risk Assessment panel recommendation.

Communication Team

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Additional Communication Tools

The NRC has an internal Generic Issues Program (GIP) website (<http://www.internal.nrc.gov/RES/GIP/index.html>) and a public GIP website (<http://www.nrc.gov/about-nrc/regulatory/gen-issues.html>). These websites include program information and documents, background and historical information, generic issue status information, and links to related programs.

The staff created a Seismic Issue Fact Sheet (<http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-seismic-issues.html>).

Questions and Answers

Background

Q1. What is the NRC Generic Issues Program?

A1. The Nuclear Regulatory Commission (NRC) Generic Issues Program (GIP) evaluates technical issues that apply to two or more facilities and that may not be covered by existing regulatory processes or criteria. Issues are evaluated for their effect on safety, security, and/or the environment. The GIP is a program by which these issues can be formally assessed to see if they can be dispositioned by existing regulatory processes or if not, to determine their safety and/or risk significance and how best to treat them. Information on the program is available on the public NRC GIP website (<http://www.nrc.gov/about-nrc/regulatory/gen-issues.html>); information is also available to NRC staff on the NRC internal GIP website (<http://www.internal.nrc.gov/RES/projects/GIP/>). Management Directive (MD) 6.4, "Generic Issues Program," contains GIP guidance (available at <http://www.nrc.gov/about-nrc/regulatory/gen-issues/policy-procedures.html>). MD 6.4 was updated in November 2009 to incorporate program changes described in SECY-07-0022 (available at <http://www.nrc.gov/reading-rm/doc-collections/commission/secys/2007/>).

Q2. What is Generic Issue 199 about?

A2. Generic Issue 199 investigates the safety and risk implications of updated earthquake-related data and models. These data and models suggest that the probability for earthquake ground shaking above the seismic design basis (see answers A8, A9, and A10) for some nuclear power plants in the Central and Eastern United States is still low, but larger than previous estimates (see answer A12).

Q3. Where can I get current information about Generic Issue 199?

A3. The public NRC Generic Issues Program (GIP) website (<http://www.nrc.gov/about-nrc/regulatory/gen-issues.html>) contains program information and documents, background and historical information, generic issue status information, and links to related programs. The GI-199 section of the NRC internal GIP website (<http://www.internal.nrc.gov/RES/projects/GIP/Individual%20GIs/GI-0199.html>) contains additional information about Generic Issue 199 (GI-199) and is available to NRC staff. The latest Generic Issue Management Control System quarterly report, which has regularly updated GI-199 information, is publicly available at <http://www.nrc.gov/reading-rm/doc-collections/generic-issues/quarterly/index.html>. Additionally, the U.S. Geological Survey data is publicly available at <http://earthquake.usgs.gov/hazards/products/conterminous/2008/>.

Q4. Are all U.S. plants being evaluated as a part of Generic Issue 199?

A4. The scope of the Generic Issue 199 (GI-199) Safety/Risk Assessment is limited to all plants in the Central and Eastern United States. Although plants at the Columbia, Diablo Canyon, Palo Verde, and San Onofre sites are not included in the GI-199 Safety/Risk Assessment, the Information Notice on GI-199 is addressed to all operating power plants in the U.S. (as well as all independent spent fuel storage installation licensees). The staff will also consider inclusion

of operating reactors in the Western U.S. in its future generic communication information requests.

Q5. Does GI-199 affect license renewal?

A5. No. The NRC's regulations for license renewal (10 CFR Part 54) require licensees to manage age-related degradation to ensure that systems, structures, and components (SSCs) will fulfill their safety-related functions, as specified in the current licensing basis, for the period of extended operation. The aging management review conducted by license renewal applicants specifically addresses the impact of age-related degradation on SSC seismic capacity. It should be noted that a plant's licensing basis, including its seismic design basis, is established outside of the license renewal process during initial plant licensing and subsequent license amendments. In addition, the NRC has processes to evaluate the adequacy of plant licensing bases (e.g., the Generic Issues Program) based on new information or operating experience and, if necessary, improve safety (e.g., require plant improvements through the backfit process).

Note: Related to license renewal, the County Executive of Westchester County (New York) and groups from New Jersey submitted a petition for rulemaking on license renewal, including a seismic-related aspect. NRC denied this petition. The petitioners then filed suit in the U.S. Court of Appeals Second Circuit and the court upheld the NRC's position. Details are available on the internal webpage of the Office of General Counsel (under Law Library, Summary of AEC-NRC Litigation, "Spano v. NRC" (2d Cir. 2009): http://www.internal.nrc.gov/ogc/internal/AEC-NRC_Cases.pdf.)

Q6. Are the implications of new seismic hazard estimates being considered for the storage of spent fuel?

A6. Yes, while the GI-199 Safety/Risk Assessment focused solely on operating power reactors in the Central and Eastern U.S., spent fuel storage has been considered by NRC.

The NRC Office of Nuclear Materials Safety and Safeguards (NMSS) was informed of GI-199 and a preliminary screening review was performed in November, 2008 by the NMSS Division of Spent Fuel Storage and Transportation. There is a total of 40 operating independent spent fuel storage installations (ISFSIs) in the Central and Eastern U.S. (CEUS). Except for a wet storage facility at G. E. Morris located in Illinois, the ISFSIs are co-located at the operating and permanently shutdown reactor sites. A review of design earthquakes (DE) used at the existing ISFSI locations in CEUS indicated that the safety margin (defined for ISFSIs as the ratio of DE/SSE, where SSE is the *safe shutdown earthquake* discussed in answer A8) for the cask designs were in the range of 1.20 ~ 3.90. Therefore, NMSS considers that there is significant margin built into the existing designs and has confidence that the ISFSIs can continue to operate safely while the licensees' investigate this issue using their site specific information. Even so, holders of operating license for ISFSIs are included among addressees in the Information Notice on GI-199.

Spent fuel pools (SFPs) were not specifically evaluated as part of GI-199. However, based on their design attributes (as follows), SFPs remain safe. SFPs are constructed of reinforced concrete, several feet thick, with a stainless steel liner to prevent leakage and maintain water quality. Due to their configuration, SFPs are inherently structurally-rugged and are designed to the same seismic requirements as the nuclear plant.

Note: Typically, SFPs are about 40 feet deep and vary in width and length. The fuel is stored in stainless steel racks and submerged with approximately 23 feet of water above the top of the stored fuel. Each plant has a preferred SFP make-up water source (the refueling water storage tank for pressurized water reactors and the condensate storage tank for boiling water reactors). SFPs have alternate means of make-up such as service water systems and the fire water system. SFPs are also typically designed (e.g. with anti-siphon check valves) and instrumented such that leakage is minimized and promptly detected.

Q7. Are the implications of new seismic hazard estimates being considered for fuel cycle facilities?

A7. Yes, while the GI-199 Safety/Risk Assessment focused solely on operating power reactors in the Central and Eastern U.S., fuel cycle facilities have been considered by NRC. Based on preliminary reviews of the updated seismic hazard estimates, NRC staff in the Office of Nuclear Material Safety and Safeguards concluded that, for the fuel cycle facilities within the CEUS, there is no immediate safety concern.

Existing facilities (uranium enrichment, fuel fabrication [high and low enriched]) were mostly built to local building codes. These facilities demonstrate compliance with the performance requirements in 10 CFR 70.61 through their Integrated Safety Analyses (ISAs). 10 CFR Part 70 licensees are required to perform an ISA in which seismic events are addressed (through a combination of design and preventive/mitigative actions). To demonstrate compliance with Part 70, licensees must limit the risk of high and intermediate consequence events, by limiting the likelihood or consequence. It is expected that, in view of this new data, existing facilities will consider the updated information as it relates to the performance requirements and see if additional safety controls are necessary.

In addition to the ISA requirements, new facilities have to meet the even higher baseline design criteria (BDC), which requires the design to provide adequate protection against natural phenomena with consideration of the most severe documented historical events for the site. Three new facilities (LES, USEC ACP, and MOX) are undergoing construction. Conservatism was built into the design of these facilities (i.e., design code factors of safety, elasticity in the structures, and conservatism in the design evaluation) resulting in additional safety margin. All new facilities and new processes at existing facilities are required to meet 10 CFR 70.64(a)(2), which requires adequate protection against natural phenomena.

Note: Regarding some particular facilities, the Paducah Gaseous Diffusion Plant (a 10 CFR Part 76 facility) was designed to meet local building codes at the time of its construction in the early 1950s. Later in the late 1990s, as part of the Certification process, the Paducah plant was evaluated and reinforced to meet a 250 year return earthquake. Honeywell's construction was also consistent with the local building codes when it was built 50 years ago. Later during the 1990s, structural modifications were performed at Honeywell to upgrade the plant so it could withstand a 475-yr recurrence site-specific earthquake.

Q8. How can I learn more about earthquakes?

A8. A fact sheet on seismic issues for existing nuclear power plants is available on the NRC public website at <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-seismic-issues.html>. Background information on earthquakes can also be obtained at the U.S. Geological Survey website at <http://earthquake.usgs.gov/>.

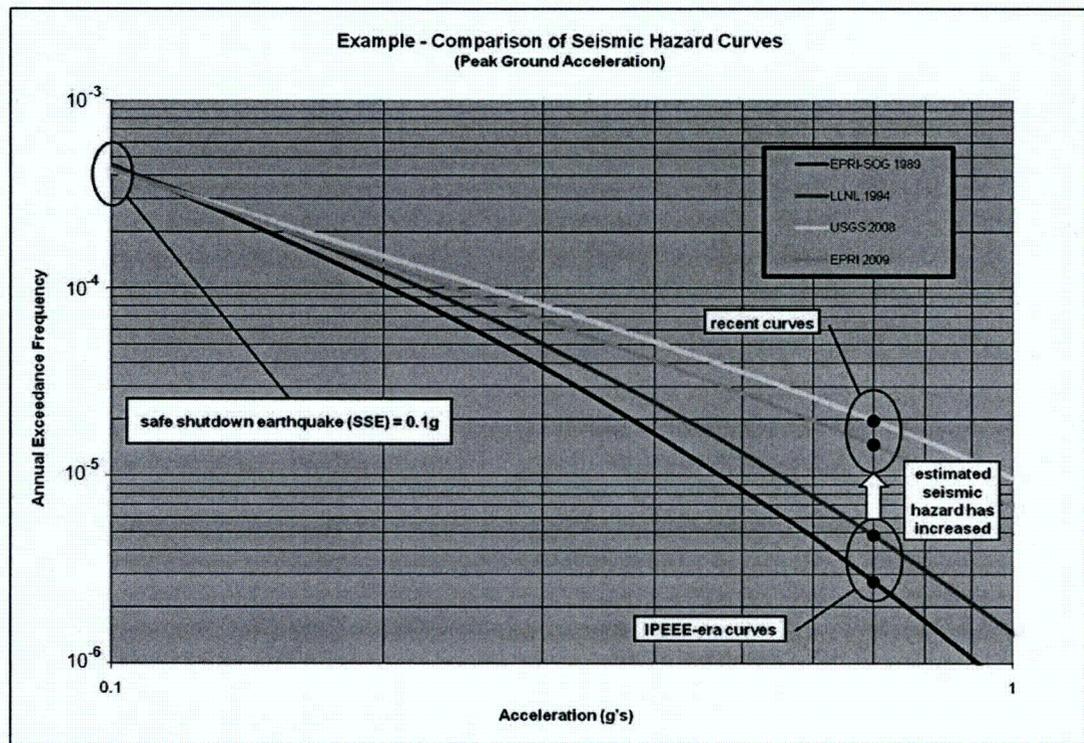
Q9. What do the following terms mean?

- **Annual exceedance frequency**
- **Core damage frequency**
- **Design basis earthquake or safe shutdown earthquake**
- **Ground acceleration**
- **High confidence of low probability of failure capacity**
- **Large early release frequency**
- **Seismic hazard**
- **Seismic margin**
- **Seismic risk**

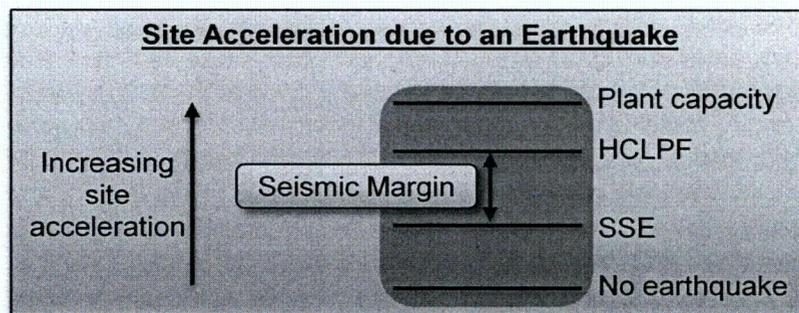
A9. The terms are defined as follows:

- **Annual exceedance frequency (AEF)** – Number of times per year that a site's ground motion is expected to exceed a specified acceleration.
- **Core damage frequency (CDF)** – Expected number of core damage events per unit of time. *Core damage* refers to the uncovering and heat-up of the reactor core, to the point that prolonged oxidation and severe fuel damage are not only anticipated but also involve enough of the core to result in off-site public health effects if released. *Seismic core damage frequency* refers to the component of total CDF that is due to seismic events.
- **Design basis earthquake or safe shutdown earthquake (SSE)** – A *design basis earthquake* is a commonly employed term for the *safe shutdown earthquake (SSE)*; the SSE is the earthquake ground shaking for which certain structures, systems, and components are designed to remain functional. In the past, the SSE has been commonly characterized by a standardized spectral shape associated with a peak *ground acceleration* value.
- **Ground acceleration** – Acceleration produced at the ground surface by seismic waves, typically expressed in units of *g*, the acceleration of gravity at the earth's surface.
- **High confidence of low probability of failure (HCLPF) capacity** – A measure of *seismic margin*. In *seismic risk* assessment, *HCLPF capacity* is defined as the earthquake motion level, at which there is high confidence (95%) of a low probability (at most 5%) of failure of a structure, system, or component.
- **Large early release frequency (LERF)** – The expected number of large early releases per unit of time. A *large early release* is the rapid, unmitigated release of airborne fission products from the containment building to the environment, occurring before the effective implementation of off-site emergency response and protective actions, such that there is a potential for early health effects. *Seismic large early release frequency* refers to the component of total LERF that is due to seismic events.
- **Seismic hazard** – Any physical phenomenon, such as ground motion or ground failure, that is associated with an earthquake and may produce adverse effects on human activities (such as posing a risk to a nuclear facility).

For the representative plant in the chart below, the *annual exceedance frequency* for a 0.7g acceleration (e.g., for a large, but highly improbable earthquake) has increased from approximately one in 250,000 years (for IPEEE-era curves) to approximately one in 60,000 years (for recent *seismic hazard* curves). (In other words, the annual exceedance frequency for a 0.7g acceleration has increased from about 4×10^{-6} (0.000004) per year for IPEEE-era curves to about 1.8×10^{-5} (0.000018) per year for recent seismic hazard curves.) Note that the curves in this example are virtually indistinguishable at the SSE (design basis) level, but this is not always the case. Ultimately, GI-199 is about understanding the impact of these seismic hazard changes on reactor risk.



- **Seismic margin** – The difference between a plant’s *HCLPF* capacity and its seismic design basis (*safe shutdown earthquake, SSE*), as shown in the figure below. (Note that the “plant capacity” label in this figure is the acceleration expected to result in core damage half of the time.) (Also see answer A11.)



- **Seismic risk** – The risk (frequency of occurrence multiplied by its consequence) of severe earthquake-initiated accidents at a nuclear power plant. A severe accident is an accident that causes core damage, and, possibly, a subsequent release of radioactive materials into the environment. Several risk metrics may be used to express *seismic risk*, such as *seismic core damage frequency* and *seismic large early release frequency*.

Safety

Q10. How was the seismic design basis for an existing nuclear power plant established?

A10. The seismic ground motion used for the design basis was determined from the evaluation of the maximum historic earthquake within 200 miles of the site, without explicitly considering the time spans between such earthquakes; safety margin was then added beyond this maximum historic earthquake to form a hypothetical *design basis earthquake* (see answer A9). The relevant regulation for currently operating plants is 10 CFR Part 100, Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants" (<http://www.nrc.gov/reading-rm/doc-collections/cfr/part100/part100-appa.html>).

Q11. Is there margin above the design basis?

A11. Yes, there is margin beyond the design basis (see answer A9). In the mid to late 1990s, NRC staff reviewed the plants' assessments of potential consequences of severe earthquakes (earthquakes well beyond the safety margin included in each plant's design basis), which licensees performed as part of the Individual Plant Examination of External Events program. From this review, the staff determined that seismic designs of operating plants in the Central and Eastern United States have considerable safety margins, for withstanding earthquakes, built into the designs.

Q12. What do you mean by "increased estimates of seismic hazards" at nuclear power plant sites?

A12. *Seismic hazard* (earthquake hazard) represents the chance (or probability) that a specific level of ground shaking could be observed or exceeded at a given location. Our estimates of seismic hazard at some Central and Eastern United States locations have changed based on results from recent research, indicating that earthquakes occurred more often in some locations than previously estimated. Our estimates of seismic hazard have also changed because the models used to predict the level of ground shaking, as caused by a specific magnitude earthquake at a certain distance from a site, changed. The increased estimates of seismic hazard at some locations in the Central and Eastern United States were discussed in a memorandum to the Commission, dated July 26, 2006. (The memorandum is available in the NRC Agencywide Documents Access and Management System [ADAMS] under Accession No. ML052360044).

Q13. What has the Safety/Risk Assessment found and what does it mean for Generic Issue 199?

A13. Results of the Safety/Risk Assessment confirm that currently operating plants have adequate protection against *seismic hazards* (see Safety/Risk Assessment report transmittal

memorandum). However, based on a separate criterion in the Generic Issues Program, the estimated *core damage frequency* change is still large enough to warrant further attention regarding the possible imposition of plant improvements. Action could include obtaining information and developing methods to complete plant-specific value-impact analyses.

RES staff developed a methodology and implemented it to assess the risk associated with this issue. Overall *seismic risk* estimates remain small in an absolute sense. All operating plants in the Central and Eastern United States have seismic core damage frequency (SCDF) less than or equal to 10^{-4} (0.0001) per year, which is considered safe (see answer to A15). The SCDF changes (the difference in SCDFs calculated using the old and new seismic hazard information) for a number of plants lie in the range of 10^{-4} to 10^{-5} (0.0001 to 0.00001) per year, which meets the NRC Generic Issues Program numerical risk threshold for an issue to continue to be evaluated for possible regulatory action.

Q14. Are the plants safe? If you are not sure they are safe, why are they not being shut down? If you are sure they are safe, why are you continuing evaluations related to this generic issue?

A14. Yes, currently operating nuclear plants in the Central and Eastern United States remain safe, with no need for immediate action. This determination is based on NRC staff reviews associated with Early Site Permits, the conclusions of the Generic Issue 199 Screening Panel (comprised of technical experts), and the conclusions of the Safety/Risk Assessment Panel (also comprised of technical experts).

No immediate action is needed because: (1) existing plants were designed to withstand anticipated earthquakes with substantial design margins, as confirmed by the results of the Individual Plant Examination of External Events; (2) the probability of exceeding the *safe shutdown earthquake* ground motion (see answer A9) may have increased at some sites, but only by a relatively small amount; (3) the increased probability is primarily in the high structural response frequencies, so buildings and equipment should not be affected (seismic amplitudes at lower frequencies are the primary contributors to building and equipment damage); and (4) the Safety/Risk Assessment Stage results indicate that the probabilities of seismic core damage are lower than the guidelines for taking immediate action.

Even though the staff has determined that existing plants remain safe, the Generic Issues Program criteria direct staff to continue their analysis to determine whether any cost-justified plant improvements can be identified to make plants even safer.

Q15. How do you know the plants are safe?

A15. The Safety/Risk Assessment results confirm that plants are safe. The relevant risk criterion for GI-199 is total *core damage frequency* (CDF). The threshold for taking immediate regulatory action (found in NRR Office Instruction LIC-504, see below) is a total CDF greater than or on the order of 10^{-3} (0.001) per year. For GI-199, the staff calculated seismic CDFs of 10^{-4} (0.0001) per year and below for nuclear power plants operating in the Central and Eastern U.S. (CEUS) (based on the new U.S. Geological Survey seismic hazard curves). The CDF from internal events (estimated using the staff-developed Standardized Plant Analysis of Risk models) and fires (as reported by licensees during the IPEEE process and documented in NUREG-1742), when added to the seismic CDF estimates results in the total risk for each plant to be, at most, 4×10^{-4} (0.0004) per year or below. This is well below the threshold (a CDF of

10⁻³ [0.001] per year) for taking immediate action. Based on the determination that there is no need for immediate action, and that this issue has not changed the licensing basis for any operating plant, the CEUS operating nuclear power plants are considered safe. In addition, as detailed in the GI-199 Safety/Risk Assessment and answers A13 and A14 above, there are additional, qualitative considerations that provide further support to the conclusion that plants are safe.

Note: The NRC has an integrated, risk-informed decision-making process for emergent reactor issues (NRR Office Instruction LIC-504, ADAMS Accession No. ML100541776 [not publically available]). In addition to deterministic criteria, LIC-504 contains risk criteria for determining when an emergent issue requires regulatory action to place or maintain a plant in a safe condition.

Despite NRC's determination that plants are safe to operate, MD 6.4, "Generic Issues Program," contains quantitative risk guidelines that place GI-199 into the category of continued evaluation to determine if cost-beneficial backfits can be justified at any plants.

Note: Also, New U.S. Geological Survey seismic hazard information provides ground acceleration likelihoods at each power plant site for both design basis and beyond design basis earthquakes. This seismic hazard information was combined with an estimate of each plant's resistance to earthquakes (seismic fragility) to produce an estimate of the frequency of damage to the reactor core due to earthquakes. This seismic core damage frequency (SCDF) was combined with estimates of the core-damage frequency (CDF) for internal events and fires, and the total CDF was then compared to risk thresholds used by the NRC to assess and assure that nuclear power plants are operated safely. The frequency calculated for all operating nuclear power plants in the CEUS is in the range considered safe.

Q16. Why are new nuclear plants being built to different seismic design requirements than existing nearby plants? Why are the currently operating plants not required to meet the new standards?

A16. Currently operating plants have been determined to adequately protect the public; new plants are designed to different requirements in order to meet the Nuclear Regulatory Commission's expectation that the new plants will provide enhanced margins of safety (see "Regulation of Advanced Nuclear Power Plants; Statement of Policy" 59 FR 35461 at <http://www.nrc.gov/reading-rm/doc-collections/commission/policy/#power>). There are two primary ways of determining safety: deterministic assessments (based on past events and engineering judgment) and probabilistic assessments. New plants employ probabilistic methods. Existing plants were built to older standards, based on deterministic assessments. Those standards have been monitored, and were found to be sufficient and appropriate. In order to impose new requirements on existing plants, the NRC must be able to justify the new requirements in accordance with the "Backfit Rule" (10 CFR 50.109, available at <http://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0109.html>). The NRC needs additional information to justify any new requirements, and the Safety/Risk Assessment Panel recommended taking action to acquire the information.

Q17. How does the occurrence of a new earthquake in the Central or Eastern United States affect Generic Issue 199?

A17. The effect of a single earthquake is small on the estimated *seismic hazard* (defined in answer A9) and hence on Generic Issue 199, unless it occurs in an area not previously recognized as being capable of producing earthquakes, or is larger than previously believed possible in a region. In a seismic hazard study, the seismic source zones are specifically delineated to include a sufficient number of earthquakes to provide a stable estimate of the seismicity rate and are thus relatively insensitive to the addition of a single earthquake. If an earthquake does occur in an area not previously recognized as being capable of producing earthquakes or if an earthquake occurs that is larger than previously believed possible in a region, changes to the seismic hazard model used to develop seismic hazard estimates would be required.

Note: The magnitude 5.2 earthquake that occurred on April 18, 2008 in southeastern Illinois provides a good example of the potential impact of a single earthquake. This earthquake occurred in an area recognized as being capable of producing significant earthquakes (the Wabash Valley seismic source zone) and was smaller than the maximum magnitude event defined for the zone based on geologic investigations (maximum magnitude of 7-7.5). The addition of a single event of this magnitude to the earthquake database for this area would likely change the activity rate by less than a few percent and thus have a very small impact on the estimated seismic hazard at any of the nuclear facilities in the area.

Schedule

Q18. What has been done about this issue since it was identified as a generic issue in the Generic Issues Program?

A18. The following summarizes what has been done on Generic Issue 199 (GI-199):

Prioritization and Screening

- *June 2005:* The issue was logged into the Generic Issues Program (GIP) and, based on the NRC determination that the seismic design of plants in the Central and Eastern United States still provided an adequate level of protection, the Agency decided that this issue was a relatively low priority.
- *November 2005 – February 2007:* The Agency awarded a contract to screen this issue and determine whether it should continue to be evaluated under the GIP. In 2006, the contractor notified RES of problems obtaining information that the contractor wanted to perform its task.
- *April 2007:* The NRC decided to use Agency staff to complete the screening analysis using guidance provided in Management Directive (MD) 6.4 and SECY-07-0022, "Status Report on Proposed Improvements to the Generic Issues Program," dated January 30, 2007. MD 6.4 outlines the seven GIP criteria for use in determining whether proposed generic issues should be designated generic issues (the screening process) and proceed to the Safety/Risk Assessment Stage of the GIP.
- *September 2007:* An initial screening analysis was completed.
- *October 2007:* For consistency with the performance-based approach for assessing *seismic hazards* for new reactors, the staff determined that the screening analysis should consider seismic hazard data and models besides those available from the U.S.

Geological Survey.

- *February 2008:* The NRC completed the GIP screening with the GI-199 Screening Panel concluding that the issue should proceed to the Safety/Risk Assessment Stage under the GIP. The NRC staff held a public meeting to engage external stakeholders. During the meeting, the representative from NEI expressed their willingness to support a collaborative approach to GI-199. (This led to a Seismic Risk Memorandum of Understanding Addendum between the Electric Power Research Institute and the NRC Office of Nuclear Regulatory Research (RES).)

Safety/Risk Assessment Stage

- GI-199 then entered the Safety/Risk Assessment Stage of the GIP. RES staff collected and analyzed seismic hazard information from the U.S. Geological Survey and other sources, and *seismic risk* information from Individual Plant Examination of External Events analyses.
- *November 2008:* The NRC Office of Nuclear Material Safety and Safeguards (NMSS) performed a preliminary review related to independent spent fuel storage installations (ISFSIs). A review of design earthquakes (DE) used at the existing ISFSI locations in Central and Eastern U.S., indicated that there is significant margin built into the existing designs and NMSS determined that they have confidence that the ISFSIs can continue to operate safely while GI-199 is processed.
- *June 2009:* In support of the Safety/Risk Assessment, the staff completed the review and detailed analysis of seismic data for 96 plants.
- *July 2009 – March 2010:* Several Safety/Risk Assessment Panel meetings were held to determine recommendations in light of stakeholder input that was received.
- *April 2010 – August 2010:* The Safety/Risk Assessment report is finalized. Internal briefings and communications are carried out (to build NRC consensus and to prepare for the release of the Safety/Risk Assessment report and associated public meeting).
- During the process of resolving GI-199, staff responded to Freedom of Information Act requests and held numerous meetings with internal and external stakeholders.

Q19. Why is it taking the NRC so long to process Generic Issue 199?

A19. This is a complicated issue involving the intersection of the probabilistic risk analysis and seismic disciplines. Obtaining data, developing methods, and performing analyses are all required to address the issue. Analyzing a few representative plants for this issue (as is normally done in the Generic Issues Program) is inappropriate because the *seismic hazard* and associated impact to the power plant are very site-specific; so analysis for 96 separate plants is required. (Refer to A14 for a summary of what has been done on GI-199 since it was first identified.) GI-199 has also been a communication-intensive generic issue because it affects many parts of the NRC and industry, and because it is important to NRC and all stakeholders that the Safety/Risk Assessment results are properly conveyed.

Q20. What will happen next regarding Generic Issue 199?

A20. The next step is for the staff to complete the Safety/Risk Assessment Stage of the Generic Issues Program (GIP). The Safety/Risk Assessment report will soon be published, followed by an information notice being sent to all licensees of nuclear power reactors and independent spent fuel storage installations. A public meeting will be held to discuss the results of the Safety/Risk Assessment and the next steps for GI-199. After the Safety/Risk Assessment

Stage, further action regarding GI-199 will be pursued (such as obtaining more detailed, plant-specific information and performing analysis to determine whether plant-specific improvements are warranted). NRC staff will also make presentations to the Advisory Committee on Reactor Safeguards.

Q21. Aside from evaluations for GI-199, what is the NRC's expectation regarding the use of updated probabilistic seismic hazard information in regulatory applications?

A21. It is expected that all NRC licensees that are required to analyze risks and hazards impacting their operations will use the most current seismic hazard information.

Regarding currently operating nuclear power plants, there is no requirement that the plants re-evaluate their seismic design basis (10 CFR 100, Appendix A, "Seismic and Geologic Siting Criteria for Nuclear Power Plants"), but plants do need to use the most updated information available in the case of risk-informed licensing amendments.

Note: The NRC guidance for using probabilistic risk assessment (PRA) in risk-informed decisions on plant-specific changes to the licensing basis is provided in RG 1.174. The scope, level of detail, and technical acceptability of the PRA are to be commensurate with the application for which it is intended and the role that the PRA results play in the integrated decision process. One over-riding requirement is that the PRA should realistically reflect the actual design, construction, operational practices, and operational experience of the plant and its owner. RG 1.200 provides further guidance concerning the technical adequacy of PRAs and states that seismic hazard analysis should include current information. Consistent with this guidance, the staff expects that licensees will use the most recent seismic hazard information available for risk-informed regulatory applications.

Regarding seismic requirements for dry cask storage systems and independent spent fuel storage installations (ISFSIs), the staff also expects that licensees will use the most recent seismic hazard information available for risk-informed regulatory applications.

Note: NRC regulations (in 10 CFR Part 72) require licensees to perform written evaluations to establish that, for their site-specific conditions, the conditions set forth in the Certificate of Compliance (CoC) have been met. They must also perform evaluations showing that cask storage pads and areas have been designed to adequately support the static and dynamic loads of the stored casks, considering potential amplification of earthquakes through soil-structure interaction as well as soil liquefaction potential or other soil instability due to vibratory ground motion.

Stakeholder Interest

Q22. Has the NRC received any requests from government officials regarding seismic issues?

A22. Yes. On November 15, 2007, the NRC received a letter (available in the NRC Agencywide Documents Access and Management System, ADAMS, under Accession No. ML0732500954) from the Attorneys General of six states (Connecticut, Delaware, Illinois, Kentucky, New York, and Vermont). The letter encouraged the NRC to consider siting and safety requirements, including geographic and seismic issues, in the regulatory process for license renewal. The NRC reviewed this letter and responded that the items of concern are

addressed in “ongoing regulation [that]... occurs throughout the life of the license... [and that] expand[ing] the scope of license renewal to cover...[the] issues raised in [the] letter...[would be] duplicating the Commission’s responsibilities...” (ADAMS Accession No. ML073400603). Additionally, several Freedom of Information Act requests were received, and NRC staff responded to the requests; the U.S. Geological Survey data related to these requests is publicly available under ADAMS Accession No. ML072880133.

Also, the County Executive of Westchester County (New York) and groups from New Jersey submitted a petition for rulemaking on license renewal, including a seismic-related aspect. The NRC denied this petition. The petitioners then filed suit in the U.S. Court of Appeals Second Circuit and the court upheld the NRC position. Details are available on the internal webpage of the NRC Office of General Counsel (under Law Library, Summary of AEC-NRC Litigation, “Spano v. NRC” (2d Cir. 2009): http://www.internal.nrc.gov/ogc/internal/AEC-NRC_Cases.pdf.)

Q23. Will the NRC release the results of the Safety/Risk Assessment? If so, will plant-specific results be included?

A23. The Safety/Risk Assessment report will be made available on the public NRC Generic Issues Program (GIP) website (<http://www.nrc.gov/about-nrc/regulatory/gen-issues.html>), on the internal NRC GIP website (<http://www.internal.nrc.gov/RES/projects/GIP/>), and in the NRC Agencywide Document Access and Management System (ADAMS) under Accession No. ML100270582.

Regarding the plant-specific results, they are included in the Safety/Risk Assessment report (in appendix D), and have been used in the aggregate for the determination that further, plant-specific information and analysis is needed to investigate possible plant-specific improvements. (See the last section, “Safety/Risk Assessment Results - Plants in the GIP “Continue Region,” of this Communication Plan.)

Note: Results of the Safety/Risk Assessment confirm that currently operating plants have adequate protection against seismic hazards; however, the results also indicated that GI-199 meets the NRC Generic Issues Program numerical risk threshold for an issue to continue to be evaluated for possible regulatory action (see answer A13). The Safety/Risk Assessment utilized simplifying methods and assumptions to produce plant-specific results to determine trends, not to finalize which plants will or will not be further analyzed.

Safety/Risk Assessment Results - Plants in the GIP “Continue Region”

Plant-specific results are included in the Safety/Risk Assessment report (in appendix D) and have been used in the aggregate to determine that further, plant-specific information and analysis is needed to investigate possible plant-specific improvements. Listed below are plants that are currently above the Generic Issues Program (GIP) numerical risk threshold for an issue to continue to be evaluated for possible regulatory action (see answers A13 and A23). (Note that the plants are listed in alphabetical order by NRC region.) During the analysis, this group of plants was referred to as the “plants in the *continue region*.”

As more information becomes available and more detailed analysis is performed, this group of plants *will* change. As discussed in answer A4, generic communications on this issue will be addressed to all operating power plants in the United States. More detailed, plant-specific analysis of all plants will allow NRC staff to prioritize plants that may be considered for regulatory action. The need to continue evaluating GI-199 is based on the collective results, not the results for any particular plant.

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

Q24. There was a recent Part 21 (60-Day Interim Report) Notification concerning seismic input for control rods that might lead to a failure to scram at Boiling Water Reactors (BWRs). Was this information included in the GI-199 Safety/ Risk Assessment (S/RA)? Could this information change the results of the S/RA?

A24. On September 3, 2010, General Electric Hitachi (GEH) Nuclear Energy submitted a 10CFR50 Part 21 Notification regarding a failure to include seismic input in reactor control blade customer guidance for BWRs. BWRs remain safe because (1) control rods are expected to fully or partially insert even with channel-control rod interference, (2) operators will still have the ability to manually scram partially inserted rods, and (3) the limited time spent at conditions where the failure to scram could occur (low reactor pressure). NRR has been following this Part 21 issue and has determined that the GEH has provided effective interim guidance to the affected licensees that experience channel-control rod interference, and that additional guidance detailed in the Part 21 notice, provides licensees with conservative strategies to assist in the insertion of control rods under low reactor pressure conditions.

The GI-199 S/RA was completed in August, prior to the Part 21 notice. Considering the above, information from the new Part 21 notice would not be expected to change the conclusions of the GI-199 S/RA. Information from this Part 21 Notification will be considered in future efforts to address GI-199.

From: [Case, Michael](#)
To: [Williams, Shawn](#)
Cc: [Boyce, Tom \(RES\)](#); [Rini, Brett](#)
Subject: RE: Suggest postponing our March 22 meeting on developing a National Stakeholder process for IAEA Safety Standards and issuing a Green Ticket
Date: Friday, March 18, 2011 7:29:00 AM

Sounds good to me Shawn. We'd be willing to support FSME in their efforts.

From: Williams, Shawn
Sent: Thursday, March 17, 2011 2:14 PM
To: Abu-Eid, Bobby; Astwood, Heather; Brach, Bill; Camper, Larry; Case, Michael; Cook, John; Cool, Donald; Holahan, Vincent; Lewis, Robert; Rini, Brett; Sampson, Michele; Schwartzman, Jennifer; Virgilio, Martin; Weaver, Doug; Williams, Shawn
Subject: Suggest postponing our March 22 meeting on developing a National Stakeholder process for IAEA Safety Standards and issuing a Green Ticket

Bill,

Thanks for sending out the e-mail (3rd attachment) in an effort to prepare for next Tuesday's meeting, March 22, 3-4pm (attached).

All,

Considering you may be busy with the tragic events in Japan, and, as far as I know, you have not had the opportunity to come together and developed a proposal (or counter proposal to the pilot proposal- attached) for NRC's strategy to " *seek comments from national stakeholders and to present a national position on each draft safety standard, which should be based on appropriate consultation at the national level and coordination of the input of national stakeholders,*" I suggest we postpone the meeting on this subject.

I am thinking a better strategy is to assign a Green Ticket to FSME (since they have both WASSC and RASSC) due in 3-4 months to coordinate with the other SSCs to develop an option or options on how the NRC will meet its obligations to this SSC TOR item. I know I may get negative feedback on issuing a formal "Green Ticket," but, from my experience there is a much higher probability we will make progress on this issue if it is a formal action from the EDO's office, rather than an e-mail request.

Let me know if you do have a proposed path forward and are ready for the March 22 meeting. If so, we should keep the meeting as scheduled (of course, it would depend on if Marty is still supporting the HOO).

Comments?

Shawn Williams
Executive Technical Assistant
Office of the Executive Director for Operations
301-415-1009

W/157

From: OST01 HOC
To: Abrams, Charlotte; Adams, John; Afshar-Tous, Mugeh; Alemu, Bezakulu; Alter, Peter; Anderson, James; Ashkeboussi, Nima; Baker, Stephen; Bergman, Thomas; Berry, Rollie; Bloom, Steven; Blount, Tom; Boger, Bruce; Bower, Anthony; Brandon, Lou; Brandt, Phillip; Brock, Kathryn; Brown, Cris; Brown, David; Brown, Eva; Brown, Frederick; Bukharin, Oleg; Camper, Larry; Carpenter, Cynthia; Case, Michael; Casto, Greg; Cervera, Margaret; Chazell, Russell; Chen, Yen-Ju; Chokshi, Nitesh; Chowdhury, Prosanta; Circle, Jeff; Clement, Richard; Clinton, Rebecca; Collins, Frank; Cool, Donald; Costa, Arlon; Crutchley, Mary Glenn; Cruz, Zahira; Dacus, Eugene; DeCicco, Joseph; Decker, David; Dembek, Stephen; Devlin, Stephanie; Doane, Margaret; Dorman, Dan; Dozier, Jerry; Droqgitis, Spiros; Dudek, Michael; Dudes, Laura; Emche, Danielle; English, Lance; Erlanger, Craig; Esmaili, Hossein; Figueroa, Roberto; Fiske, Jonathan; Franovich, Rani; Fuller, Edward; Galletta, Thomas; Gambone, Kimberly; Glitter, Joseph; Gordon, Dennis; Gott, William; Grant, Jeffery; Grobe, Jack; Hale, Jerry; Hardesty, Duane; Hart, Ken; Hart, Michelle; Hasselberg, Rick; Henderson, Karen; Hiland, Patrick; Holahan, Patricia; Holahan, Vincent; Holian, Brian; Huyck, Doug; Howard, Tabitha; Huffert, Anthony; Hurd, Sapna; Isom, James; Jackson, Karen; Jessie, Janelle; Johnson, Michael; Jolicoeur, John; Jones, Andrea; Jones, Cynthia; Kahler, Carolyn; Kammerer, Annie; Karas, Rebecca; Khan, Omar; Kowalczyk, Jeffrey; Kozal, Jason; Kratchman, Jessica; Kugler, Andrew; Lamb, Christopher; Larson, Emily; LaVie, Steve; Lewis, Robert; Li, Yong; Lombard, Mark; Lubinski, John; Lynch, Jeffery; Mamish, Nader; Manahan, Michelle; Marksberry, Don; Marshall, Jane; Mavros, Lauren; Mazaika, Michael; McConnell, Keith; McCoppin, Michael; McDermott, Brian; McGinty, Tim; McMurtray, Anthony; Merritt, Christina; Meyer, Karen; Miller, Charles; Miller, Chris; Milligan, Patricia; Mohseni, Aby; Moore, Scott; Morlang, Gary; Morris, Scott; Mroz (Sahm), Sara; Munson, Clifford; Murray, Charles; Nerret, Amanda; Norris, Michael; Norton, Charles; Ordaz, Vonna; Padovan, Mark; Patel, Jay; Parillo, John; Pope, Tia; Purdy, Gary; Quinlan, Kevin; Ragland, Robert; Ralph, Melissa; Reed, Elizabeth; Reed, Wendy; Reis, Terrence; Riley (OCA), Timothy; Rini, Brett; Rodriguez-Luccioni, Hector; Rosenberg, Stacey; Ross-Lee, MaryJane; Roundtree, Amy; Ruland, William; Salav, Michael; Salus, Amy; Sanfilippo, Nathan; Scarbrough, Thomas; Schaperow, Jason; Schmidt, Duane; Schoenebeck, Greg; Schrader, Eric; Schwartzman, Jennifer; Seber, Dogan; Shane, Raeann; Shea, James; Shepherd, Jill; Sheron, Brian; Skeen, David; Sloan, Scott; Smiroldo, Elizabeth; Smith, Theodore; Stahl, Eric; Stang, Annette; Steger (Tucci), Christine; Stieve, Alice; Stone, Rebecca; Stransky, Robert; Sturz, Fritz; Sullivan, Randy; Sun, Casper; Tappert, John; Temple, Jeffrey; Thaggard, Mark; Thomas, Eric; Thorp, John; Tobin, Jennifer; Trefethen, Jean; Tschiltz, Michael; Turtill, Richard; Uhle, Jennifer; Valencia, Sandra; Vaughn, James; Vick, Lawrence; Wastler, Sandra; Watson, Bruce; Weber, Michael; Webber, Robert; 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, Roy
Cc: OST02 HOC; OST01 HOC
Subject: Work Schedule and Pay Guidance for Reponders to Japan Events
Date: Friday, March 18, 2011 5:07:06 AM
Attachments: Work Schedule and Premium Pay Guidance for Japan Response 3.docx

From: Davidson, Lawrence
Sent: Thursday, March 17, 2011 5:14 PM
To: OST02 HOC; McMurtray, Anthony
Cc: Evans, Michele; Johns, Nancy; Scott, Tracy; Tallarico, Alison
Subject: FW:

Please distribute to everyone who serves in and supports the Ops Center in response to the events in Japan...

From: Davidson, Lawrence
Sent: Thursday, March 17, 2011 2:06 PM
To: Abraham, Susan; Abrams, Charlotte; Ader, Charles; Akstulewicz, Frank; Albert, Ronald; Allwein, Russell; Alston, Timothy; Andersen, James; Anderson, Joseph; Armentrout, Deborah; Ash, Darren; Ash, Melissa; Astwood, Heather; Auluck, Rajender; Austin, Joseph; Ayres, David; Bahadur, Sher; Bailey, Marissa; Bailey, Stewart; Baker, Pamela; Banas, Paul; Barss, Dan; Bartlett, Bruce; Bartley, Jonathan; Bartley, Malion; Batkin, Joshua; Baum, Robin; Bayliff, Shirley; Beardsley, James; Beasley, Benjamin; Bell, Hubert; Bell, Marvin; Bellamy, Ronald; Bellinger, Alesha; Benjamin, Jamie; Benner, Eric; Benney, Brian; Bergman, Thomas; Biggins, James; Bladey, Cindy; Blamey, Alan; Bloom, Steven; Bloomer, Tamara; Blount, Tom; Boger, Bruce; Boland, Anne; Bolduc, Angela; Bonser, Brian; Borchardt, Bill; Borden, William; Bouling, Ramona; Bower, Fred; Bower, Phyllis; Boyce, Tom (RES); Boyce, Thomas (OIS); Brady, Joseph; Brenner, Eliot; Brezovec, Michael; Broaddus, Doug; Brooks, Kenneth; Brown, Frederick; Brown, Tony; Brown, Milton; Brown, Rohn; Bubar, Patrice; Buchholz, Jeri; Buckley, Michael; Bumpass, Sheila; Burns, Stephen; Burritt, Arthur; Burton, Stephen; Burton, William; Bush-Goddard, Stephanie; Cain, Chuck; Caldwell, Robert; Calle, Joselito; Cameron, Jamnes; Campbell, Andy; Campbell,

4/15/11

Larry; Campbell, Stephen; Campbell, Vivian; Camper, Larry; Caniano, Roy; Cardenas, Daniel; Carlson, Robert; Carpenter, Cynthia; Case, Michael; Casto, Chuck; Casto, Greg; Cataldo, Paul; Catts, Michelle; Champion, Bryan; Chang, Helen; Chang, Lydia; Cheok, Michael; Chernoff, Harold; Chernoff, Margaret; Chokshi, Nilesh; Christensen, Harold; Clark, Jeff; Clay, Earnestine; Clayton, Brent; Clifford, James; Cobey, Eugene; Cochrum, Steven; Coe, Doug; Cohen, Miriam; Cohen, Ronald; Cohen, Stephen; Colaccino, Joseph; Coleman, Judy; Collins, Daniel; Collins, Elmo; Conte, Richard; Cook, Christopher; Corbett, James; Cordes, John; Correia, Richard; Costello, Ralph; Coyne, Kevin; Croteau, Rick; Crowe, Eddy; Cruz, Jeffrey; Csontos, Aladar; Cabbage, Amy; Cubellis, Louis; Cullison, David; Curtis, David; Daley, Robert; Daly, Jill; Dambly, Jan; Daniel, Susan; Danna, James; Dapas, Marc; Davis, Henry; Davis, Jack; Davis, Marlone; Dean, Michael; Dean, Bill; Dehn, Janine; Delligatti, Mark; Dembek, Stephen; Demoss, Gary; Dennig, Robert; Dentel, Glenn; Desai, Binoy; Dias, Antonio; Diaz-Toro, Diana; Dickson, Billy; Dingbaum, Stephen; DiPaolo, Eugene; Dixon, John; Dixon-Herrity, Jennifer; Doane, Margaret; Dodmead, James; Doerflein, Lawrence; Donaldson, Leslie; Donnell, Tremaine; Donoghue, Joseph; Doornbos, Roger; Dorman, Dan; Dorsey, Jeryll; Dosch, William; Dreisbach, Jason; Droggitis, Spiros; Dudes, Laura; Dumbacher, David; Duncan, Eric; Dwyer, James; Dyer, Jim; Eads, Johnny; Easson, Pamela; Egan, Dennis; Egli, Richard; Einberg, Christian; Elkins, Scott; Ellegood, John; Elliott, Robert; Ellsbury, Richard; Erlanger, Craig; Ernstes, Michael; Brown, Cris; Evans, Carolyn; 'Michele.ca@nrc.gov'; Farnholtz, Thomas; Felts, Russell; Fenton, Darlene; Ferdas, Marc; Ferrell, Kimberly; Ficks, Ben; Fields, Leslie; Finney, Patrick; Fitch, Karen; Flanders, Scott; Flynn, Sean; Foster, Jack; Franke, Mark; Franovich, Rani; Fredericks, Carl; Freeman, Scott; Fretz, Robert; Frumkin, Daniel; Frye, Timothy; Fuller, Michael; Gaddy, Vincent; Gallo, Jenny; Galloway, Melanie; Gartman, Michael; Gavrilas, Mirela; Giantelli, Adelaide; Gibson, Kathy; Giessner, John; Giitter, Joseph; Givvines, Mary; Gody, Tony; Golder, Jennifer; Golshan, KG; Gorham, Tajuan; Gott, William; Graham, Thorne; Grancorvitz, Teresa; Grant, Jeffery; Graser, Dan; Gray, Mel; Greene, Kathryn; Grice, Thomas; Griffin, Steven; Grobe, Jack; Hawkins, Kimberly; Gusack, Barbara; Guthrie, Eugene; Guttmann, Jack; Haag, Robert; Habighorst, Peter; Hackett, Edwin; Haeg, Lucas; Haire, Mark; Hall, Donald; Hall, Patricia; Hamzehee, Hossein; Haney, Catherine; Hansell, Samuel; Harris, Tim; Harrison, Donnie; Hatchett, Gregory; Hawkens, Roy; Hay, Michael; Hayden, Elizabeth; Hays, Myra; Heck, James; Heck, Jared; Helton, Shana; Henderson, Pamela; Hickey, James; Hiland, Patrick; Hills, David; Hilton, Nick; Hiltz, Thomas; Hirsch, Patricia; Hoeg, Tim; Hogan, Rosemary; Holahan, Gary; Holahan, Patricia; Holian, Brian; Holland, Crystal; Holody, Daniel; Holonich, Joseph; Holt, BJ; Hopper, George; Howard, Patrick; Howe, Allen; Howell, Art; Howell, Linda; Hoxie, Chris; Hsia, Anthony; Hsu, Caroline; Hsueh, Kevin; Huber, Deborah; Hudson, Jody; Humerick, David; Hunegs, Gordon; Hunter, James; Huth, Virginia; Hutto, Andy; Huyck, Doug; Imboden, Andy; Itzkowitz, Marvin; Jackson, Deborah; Jackson, Donald; Jackson, Terry; James, Lois; Jankovich, John; Janney, Margie; Jarvis, Rodney; Jenkins, Ronaldo; Jernell, Eleni; Johns, Nancy; Johnson, Michael; Johnson, Clay; Johnson, Robert; Jolicoeur, John; Jones, Bradley; Jones, Evan; Jones, William; Josey, Jeffrey; Joustra, Judith; Julian, Emile; Jung, Ian; Junge, Michael; Kahler, Robert; Kaplan, Michele; Karas, Rebecca; Kellar, Ray; Kelley, Corentis; Kemerer, Myron; Kemker, Brian; Kennedy, Kriss; Kennedy, Silas; Kerben, Valerie; Kern, David; Khanna, Meena; Kim, Yong; Kimble, Daniel; King, Donald; King, Michael; Kinneman, John; Kirkland, John; Kirkwood, Sara; Klein, Alex; Knutson, Ed; Kobetz, Timothy; Kokajko, Lawrence; Kolaczyk, Kenneth; Konzman, Carl; Koshy, Thomas; Kowal, Mark; Kramer, John; Krohn, Paul; Krsek, Robert; Krupnick, David; Kulesa, Gloria; Kulp, Jeffrey; Kunowski, Michael; Lam, Donna; Lambert, Kenneth; Landau, Mindy; Langan, Scott; Lankford, Jeffrey; Lantz, Ryan; Lara, Julio; Larkin, Grant; Laura, Richard; Layton, Michael; Le, Hong; Lee, Bert; Lee, David; Lee, Richard; Lee, Samson; Lee, Samuel; Leeds, Eric; Lennartz, Jay; Lesser, Mark; Lew, David; Lewis, Robert; Lipa, Christine; Lombard, Mark; Long, Chris; Lopez, Joseph; Lorson, Raymond; Louden, Patrick; Lubinski, John; Luehman, James; Lui, Christiana; Lukes, Robert; Lund, Louise; Lupold, Timothy; Lyons-Burke, Kathy; Ma, May; Madden, Patrick; Madison, Wil; Magruder, Stewart; Mamish, Nader; Markley, Michael; Marshall, Jane; Marshfield, Mark; Martin, Gillian; Masnik, Michael; Masse, Todd; Matheson, Mary; Mathew, Roy; Matthews, David; Mattingley, Joel; Maxin, Mark; Mayfield, Michael; McCann, Carrie; McConnell, Keith; McCoppin, Michael; McCoy, Gerald; McCrary, Cheryl; McCree, Victor; McDermott, Brian; McGhee, James; McGill, Clinton; McGinty, Tim; McGowan, Anna; McHale, John; McKelvey, Harold; McKenna, Eileen; McKenney, Christopher; McKirgan, John; McMillan, Joseph; McMurtray, Anthony; Mendiola, Anthony; Meyer, David; Michalak, Paul; Miller, Charles; Miller, Chris; Miller, Geoffrey; Miller, Marie; Miller, Mark; Miller, Michael; Miotla, Sherri; Mitchell, Matthew; Mitchell, Reggie; Mohseni, Aby; Monk, Robert; Monninger, John; Montgomery, Jack; Moore, Scott; Moore, Thomas; Moorman, James; Morris, Eddie; Morris, James; Morris, R. Michael; Morris, Scott; Morrissey, Thomas; Moulding, Patrick; Moy, Romena; Mrowca, Lynn; Muessle, Mary; Munday, Joel; Murphy, Jerome; Murphy, Martin; Musser, Randy; Narick, Marianne; Nazario, Tomy; Nease, Rebecca; Neff, Deborah; Nelson, Robert; Nichols, Russell; Nieh, Ho; Norato, Michael; Norris, Michael; Nute-Blackshear, Lora; OBrien, Kenneth; OBryan, Phil; O'Donohue, Kathleen;

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

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

Subject:

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

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

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

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

Larry Davidson
Office of Human Resources
Nuclear Regulatory Commission
301-492-2286; lawrence.davidson@nrc.gov

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

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

Work Schedules

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

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

Possible work schedules include:

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

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

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

Premium Pay

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

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

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

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

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

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

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

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

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

Miscellaneous

Employee Assistance Program (EAP)

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

Travel

If you travel to/from Japan:

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

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

From: [Murphy, Andrew](#)
To: [Kammerer, Annie](#); [Ake, Jon](#)
Cc: [Case, Michael](#)
Subject: Slides for Talking Points
Date: Friday, March 18, 2011 1:39:08 PM
Attachments: [GI-199 vav Japanese Events rev 0.pptx](#)

Jon & Annie,

Mike asked me to prepare several slides as the basis for some talking points for Brian and Jennifer for the middle of next week. They cover the Sendai Earthquake, GI-199, and now regulatory context. Please comment on them when you have a moment.

Andy

4/15/11

Attachment GI-199 vav Japanese Events rev 0.pptx (337368 Bytes) cannot be converted to PDF format.

From: Raione, Richard
To: Hiland, Patrick; Wilson, George; Howe, Allen
Cc: Skeen, David; Case, Michael; Giitter, Joseph; Chokshi, Nilesh; Munson, Clifford; Kammerer, Annie; See, Kenneth; Cook, Christopher; Flanders, Scott; Jones, Henry
Subject: RE: Points of Contact - Tsunami
Date: Friday, March 18, 2011 10:29:11 AM

The NRO expert on tsunamis and storm surge is Dr. Henry Jones of my staff. Please include Dr. Jones on any emails dealing with tsunami and flooding also .

Richard Raione, PG, CPG, CGWP
Branch Chief - Hydrologic Engineering Branch
NRO / DSER / RHEB
301-415-7190

From: Hiland, Patrick
Sent: Thursday, March 17, 2011 11:33 AM
To: Wilson, George; Howe, Allen
Cc: Skeen, David; Case, Michael; Giitter, Joseph; Chokshi, Nilesh; Munson, Clifford; Kammerer, Annie; Raione, Richard; See, Kenneth; Cook, Christopher; Flanders, Scott
Subject: RE: Points of Contact

Add Annie Kammerer to POC for Tsunami

From: Wilson, George
Sent: Thursday, March 17, 2011 11:17 AM
To: Howe, Allen
Cc: Hiland, Patrick; Skeen, David; Case, Michael; Giitter, Joseph; Chokshi, Nilesh; Munson, Clifford; Kammerer, Annie; Raione, Richard; See, Kenneth; Cook, Christopher; Flanders, Scott
Subject: Points of Contact

External Events

Seismic – DE Point of Contact Meena Khanna – {We will need support from Res (Jon Ake, Marty Stutzke, and Anne Kammerer) and NRO (Cliff Munson, Nilesh Chokshi)}

Flood – DE Point of contact – George Wilson - {We will need support from NMSS (Rex Wescot) and NRO (Richard Raione, Ken See and Chris Cook)}

Tsunamis – DE Point of Contact – Meena Khanna - {We will need support form NRO (Cliff Munson, Nilesh Chokshi, and Richard Raione)}

Severe Accidents

SBO – DE point of contact – George Wilson

Long Term Actions

Resolution of GSI 199 - DE Point of Contact – Meena Khanna {We will need support from Res (Jon Ake and Marty Stutzke)}

George Wilson
USNRC
EICB Branch Chief, Division of Engineering

6/1/11

Mail Stop O12H2
301-415-1711

From: [Case, Michael](#)
To: [West, Stephanie](#)
Subject: FW: TSUNAMI QUESTION
Date: Friday, March 18, 2011 7:14:00 AM
Attachments: [TsunamiRequirementsAndMeasures_3.ppt](#)

Please print including email

From: Graves, Herman
Sent: Thursday, March 17, 2011 4:08 PM
To: Tadesse, Rebecca
Cc: Hogan, Rosemary; Rivera-Lugo, Richard; Csonotos, Aladar; Richards, Stuart; Case, Michael; Chokshi, Nilesh; Dion, Jeanne
Subject: TSUNAMI QUESTION

Ms. Tadesse (Rebecca),

As discussed with you and Al Csonotos this afternoon I have attached a set of slides prepared by myself and Nilesh Chokshi that may answer any questions Commissioner Magwood has on tsunamis. Please note that the slide were prepared in 2005.

The NUREG/CR-6996 is entitled "Tsunami Hazard Assessment at Nuclear Power Plant Sites in the United States of America," published March 2009.

Feel free to contact me if there anymore questions.

~~~~~  
**Herman L. Graves, P. E., F. ACI**  
Sr. Structural Engineer  
USNRC-RES  
Mail Stop : C-5A24M  
Telephone: 301.251.7625  
Fax: 301-251-7425  
email: [Herman.Graves@NRC.GOV](mailto:Herman.Graves@NRC.GOV)

~~~~~  
"The contents of this message are mine personally and do not necessarily reflect any position of NRC"

4/15/11

Attachment TsunamiRequirementsAndMeasures_3_1.ppt (742912 Bytes) cannot be converted to PDF format.

From: [Case, Michael](#)
To: peter.lyons@nuclear.energy.gov
Cc: [Sheron, Brian](#); [Uhle, Jennifer](#); [Munson, Clifford](#); [Kammerer, Annie](#); [Khanna, Meena](#); [Chokshi, Niles](#); [Wilson, George](#)
Subject: Fact Sheet on NRC Seismic Regulation
Date: Friday, March 18, 2011 1:30:00 PM
Attachments: [Draft Fact Sheet on NRC Seismic Regulations JPA BT GB MK CM.docx](#)
[Draft Fact Sheet on NRC Seismic Regulations JPA BT GB MK CM bullets.docx](#)

Dr. Lyons:

Per your discussions with Brian, please find attached a one-page fact sheet on the NRC's Seismic Regulations (same information, one narrative, one bulletized).

W/156

Fact Sheet: Summarization of the NRC's Regulatory Framework for Seismic Safety

The seismic regulatory basis for licensing of the currently operating nuclear power reactors is contained in the following regulations: 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," including the "General Design Criteria for Nuclear Power Plants," and 10 CFR Part 100 ("Seismic and Geologic Siting Criteria For Nuclear Power Plants") and Appendix A to that Part, which describes the general criteria that guide the evaluation of the suitability of proposed sites for nuclear power plants.

General Design Criterion (GDC) 2, "Design Bases for Protection Against Natural Phenomena," in Appendix A requires that the structures and components in nuclear power plants be designed to withstand the effects of natural phenomena, including earthquakes and tsunamis, without loss of capability to perform their intended safety functions. GDC 2 also requires that the design bases include sufficient margin to account for the limited accuracy, quantity, and period of time in which the historical data have been accumulated. The earthquake which could cause the maximum vibratory ground motion at the site is designated as the **Safe Shutdown Earthquake (SSE)**. Under SSE ground motions, nuclear power plant structures and components must remain functional and within applicable stress, strain, and deformation limits. Each plant must also have seismic instrumentation to determine if the **Operating Basis Earthquake (OBE)**, typically one-half or one-third the level of the SSE, has been exceeded. If the OBE is exceeded or significant plant damage has occurred, then the nuclear power plant must be shutdown.

Each plant is designed to a ground-shaking level (the SSE) that is appropriate for its location, given the possible earthquake sources that may affect the site and its tectonic environment. Ground shaking is a function of both the magnitude of the earthquake, the distance of the earthquake to the site, and the local geology. The magnitude alone cannot be used to predict ground motions. The existing plants were designed on a "deterministic" or "scenario earthquake" basis that accounted for the largest earthquake expected in the area around the plant. This required an assessment of earthquakes that had occurred in the region around each plant site.

Design basis loads for nuclear power plant structures include combined loads for seismic, wind, tornado, normal operating conditions (pressure and thermal), and accident conditions. Codes and standards, such as the American Society of Mechanical Engineers, the American Concrete Institute, and the American Institute of Steel Construction, are used in the design of nuclear power plant structures to ensure a conservative, safe design under design basis loads.

In the mid to late 1990s, NRC staff reviewed the potential consequences of severe earthquakes (earthquakes beyond the safety margin included in each plant's design basis), as part of the Individual Plant Examination of External Events (or IPEEE) program. From this review, the staff determined that seismic designs of operating plants in the United States have adequate safety margins, for withstanding earthquakes, built into the designs. Currently, the NRC staff is reassessing the seismic designs of operating plants through our Generic Issues program. The initial results of this assessment found that: 1) seismic hazard estimates have increased at some operating plants in the central and eastern US; 2) there is no immediate safety concern, plants have significant safety margin and overall seismic risk estimates remain small; and 3) assessment of updated seismic hazards and plant performance should continue.

NRC's Regulatory Framework for Seismic Safety

NRC Regulations and Guidelines for Seismic Safety:

- The seismic regulatory basis for licensing of the currently operating nuclear power reactors is contained in the following regulations:
 - 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," including the "General Design Criteria for Nuclear Power Plants," and
 - 10 CFR Part 100 ("Seismic and Geologic Siting Criteria For Nuclear Power Plants") and Appendix A to that Part, which describes the general criteria that guide the evaluation of the suitability of proposed sites for nuclear power plants.
- In addition, General Design Criterion (GDC) 2, "Design Bases for Protection Against Natural Phenomena," in Appendix A requires that:
 - The structures and components in nuclear power plants be designed to withstand the effects of natural phenomena, including earthquakes and tsunamis, without loss of capability to perform their intended safety functions.
 - GDC 2 also requires that the design bases include sufficient margin to account for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.
 - The earthquake which could cause the maximum vibratory ground motion at the site is designated as the **Safe Shutdown Earthquake (SSE)**. Under SSE ground motions, nuclear power plant structures and components must remain functional and within applicable stress, strain, and deformation limits.
 - Each plant must also have seismic instrumentation to determine if the **Operating Basis Earthquake (OBE)**, typically one-half or one-third the level of the SSE, has been exceeded. If the OBE is exceeded or significant plant damage has occurred, then the nuclear power plant must be shutdown.

Plant Design /Design Basis (Seismic):

- Each plant is designed to a ground-shaking level (the SSE) that is appropriate for its location, given the possible earthquake sources that may affect the site and its tectonic environment. Ground shaking is a function of both the magnitude of the earthquake, the distance of the earthquake to the site, and the local geology. The magnitude alone cannot be used to predict ground motions. The existing plants were designed on a "deterministic" or "scenario earthquake" basis that accounted for the largest earthquake expected in the area around the plant. This required an assessment of earthquakes that had occurred in the region around each plant site.
- Design basis loads for nuclear power plant structures include combined loads for seismic, wind, tornado, normal operating conditions (pressure and thermal), and accident conditions. Codes and standards, such as the American Society of Mechanical Engineers, the American Concrete Institute, and the American Institute of Steel Construction, are used in the design of nuclear power plant structures to ensure a conservative, safe design under design basis loads.

NRC Current Reviews/Initiatives:

- In the mid to late 1990s, NRC staff reviewed the potential consequences of severe earthquakes (earthquakes beyond the safety margin included in each plant's design basis), as part of the Individual Plant Examination of External Events (or IPEEE) program. From this review, the staff determined that seismic designs of operating plants in the United States have adequate safety margins, for withstanding earthquakes, built into the designs. Currently, the NRC staff is reassessing the seismic designs of operating plants through our Generic Issues program. The initial results of this assessment found that: 1) seismic hazard estimates have increased at some operating plants in the central and eastern US; 2) there is no immediate safety concern, plants have significant safety margin and overall seismic risk estimates remain small; and 3) assessment of updated seismic hazards and plant performance should continue.

From: [Case, Michael](#)
To: [Ali, Syed](#)
Cc: [West, Stephanie](#)
Subject: Go to Japan? (Need answer by 2:00
Date: Friday, March 18, 2011 10:45:00 AM

Hi Syed. I think they are trying to put together a list of folks that could go to Japan probably on or about March 24th to relieve the first set of experts that are over there. I guess they were looking for structural experts.

Can we put your name on the list?

W/S/M

From: [Evans, Michele](#)
To: [Gibson, Kathy](#)
Cc: [Case, Michael](#)
Subject: RE: Staff for Potential Support in Japan
Date: Friday, March 18, 2011 2:07:15 PM

Got it

From: Gibson, Kathy
Sent: Friday, March 18, 2011 2:06 PM
To: Evans, Michele
Cc: Case, Michael
Subject: Re: Staff for Potential Support in Japan

No he is not, Mike Case is considering alternatives.

From: Evans, Michele
To: Gibson, Kathy
Sent: Fri Mar 18 14:04:02 2011
Subject: RE: Staff for Potential Support in Japan

A question came up from Wiggins whether Syed Ali was available for structural since he was so involved in the post 911 work

From: Gibson, Kathy
Sent: Friday, March 18, 2011 1:39 PM
To: Evans, Michele
Cc: Uhle, Jennifer; Coyne, Kevin; Huffert, Anthony; Rubin, Stuart; Yarsky, Peter; Salley, MarkHenry; Elkins, Scott; Case, Michael; Bush-Goddard, Stephanie; Scott, Michael
Subject: Staff for Potential Support in Japan
Importance: High

Michele,
I am following up on your request to Jennifer for staff to potentially go to Japan beginning around March 24 for about 2 weeks.

I don't have a name for structural as yet, but will provide it when DE gets back to me.

For the other areas of expertise:

Protective Measures – Tony Huffert
Engineers with good people skills – Stu Rubin, Peter Yarsky
Infrared Imaging – Mark Salley

Please let me know if you need anything else.

Kathy

4/1/11

From: [Evans, Michele](#)
To: [Gibson, Kathy](#)
Cc: [Case, Michael](#)
Subject: RE: Staff for Potential Support in Japan
Date: Friday, March 18, 2011 3:34:00 PM

Mike,

Any structural names???

From: Gibson, Kathy
Sent: Friday, March 18, 2011 2:06 PM
To: Evans, Michele
Cc: Case, Michael
Subject: Re: Staff for Potential Support in Japan

No he is not, Mike Case is considering alternatives.

From: Evans, Michele
To: Gibson, Kathy
Sent: Fri Mar 18 14:04:02 2011
Subject: RE: Staff for Potential Support in Japan

A question came up from Wiggins whether Syed Ali was available for structural since he was so involved in the post 911 work

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Sent: Friday, March 18, 2011 1:39 PM
To: Evans, Michele
Cc: Uhle, Jennifer; Coyne, Kevin; Huffert, Anthony; Rubin, Stuart; Yarsky, Peter; Salley, MarkHenry; Elkins, Scott; Case, Michael; Bush-Goddard, Stephanie; Scott, Michael
Subject: Staff for Potential Support in Japan
Importance: High

Michele,

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I don't have a name for structural as yet, but will provide it when DE gets back to me.

For the other areas of expertise:

Protective Measures – Tony Huffert
Engineers with good people skills – Stu Rubin, Peter Yarsky
Infrared Imaging – Mark Salley

Please let me know if you need anything else.

Kathy

4/15/11

From: [Hurd, Sapna](#)
To: [Valentin, Andrea](#)
Cc: [Case, Michael](#)
Subject: RE: WAIVER OF WORK SCHEDULE AND PAY CAP RULES FOR WORK IN RESPONSE TO THE EVENTS IN JAPAN
Date: Friday, March 18, 2011 8:39:09 AM

I worked March 11, 12, 13, 15, and 17.

I plan to work as of now: March 18, 19,20,21, 22, 24

Please let me know if you need anything else!!!

Sapna Hurd
Management Analyst
Division of Engineering
Office of Nuclear Regulatory Research
U.S. NRC
Ph: 301-251-7687
5C04

From: Valentin, Andrea
Sent: Friday, March 18, 2011 7:56 AM
To: Case, Michael
Cc: Hurd, Sapna; Kammerer, Annie; Rini, Brett
Subject: RE: WAIVER OF WORK SCHEDULE AND PAY CAP RULES FOR WORK IN RESPONSE TO THE EVENTS IN JAPAN

CFO needs the dates that they worked as well (so they can make any needed changes to get them paid). Brett already sent me his so I need your dates, Sapna and Annie's (I have cc'ed them).

Thanks

From: Case, Michael
Sent: Friday, March 18, 2011 7:53 AM
To: Valentin, Andrea
Subject: RE: WAIVER OF WORK SCHEDULE AND PAY CAP RULES FOR WORK IN RESPONSE TO THE EVENTS IN JAPAN

Hi Andrea. I think the names of the DE folks working in a "response mode" would be Sapna, Annie Kammerer, myself, Brett (not really us).

From: Valentin, Andrea
Sent: Thursday, March 17, 2011 10:00 AM
To: Sheron, Brian; Coyne, Kevin; Bonaccorso, Amy; Calvo, Antony; Case, Michael; Coe, Doug; Correia, Richard; Dion, Jeanne; Gibson, Kathy; Lui, Christiana; Richards, Stuart; Rini, Brett; Sangimino, Donna-Marie; Uhle, Jennifer
Subject: RE: WAIVER OF WORK SCHEDULE AND PAY CAP RULES FOR WORK IN RESPONSE TO THE EVENTS IN JAPAN

Yes, we will collect the data.

4/160

From: Sheron, Brian
Sent: Thursday, March 17, 2011 9:55 AM
To: Coyne, Kevin; Bonaccorso, Amy; Calvo, Antony; Case, Michael; Coe, Doug; Correia, Richard; Dion, Jeanne; Gibson, Kathy; Lui, Christiana; Richards, Stuart; Rini, Brett; Sangimino, Donna-Marie; Uhle, Jennifer; Valentin, Andrea
Subject: FW: WAIVER OF WORK SCHEDULE AND PAY CAP RULES FOR WORK IN RESPONSE TO THE EVENTS IN JAPAN

Andrea, can PMDA take the lead to collect the list of names of staff that are performing emergency-related premium work and the dates that the people worked. Divisions should supply this information to Andrea. Thanks.

From: Flory, Shirley **On Behalf Of** RidsResOd Resource
Sent: Thursday, March 17, 2011 9:18 AM
To: Rini, Brett; Armstrong, Kenneth; Ibarra, Jose; Rivera-Lugo, Richard; Case, Michael; Coe, Doug; Coyne, Kevin; Gibson, Kathy; Richards, Stuart; Sangimino, Donna-Marie; Scott, Michael; Sheron, Brian; Uhle, Jennifer; Valentin, Andrea
Subject: FW: WAIVER OF WORK SCHEDULE AND PAY CAP RULES FOR WORK IN RESPONSE TO THE EVENTS IN JAPAN

From: RidsResPmdaMail Resource
Sent: Thursday, March 17, 2011 8:50 AM
To: Valentin, Andrea; RidsResOd Resource
Cc: Donaldson, Leslie; Chan, Deborah; Isakovic, Nadja
Subject: FW: WAIVER OF WORK SCHEDULE AND PAY CAP RULES FOR WORK IN RESPONSE TO THE EVENTS IN JAPAN

Please read the following memo in response to work schedules and pay cap for Japan response.

Thanks,
Heather

From: Khan, Charline
Sent: Thursday, March 17, 2011 7:29 AM
To: RidsAcrsAcnw_MailCTR Resource; RidsAslbpManagement Resource; RidsOgcMailCenter Resource; RidsOcaaMailCenter Resource; RidsOcfoMailCenter Resource; RidsOigMailCenter Resource; RidsOipMailCenter Resource; RidsOcaMailCenter Resource; RidsOpaMail Resource; RidsSecyMailCenter Resource; RidsSecyCorrespondenceMCTR Resource; RidsEdoMailCenter Resource; RidsAdmMailCenter Resource; RidsCsoMailCenter Resource; RidsOeMailCenter Resource; RidsFsmeOd Resource; RidsOiMailCenter Resource; RidsOIS Resource; RidsHrMailCenter Resource; RidsNroOd Resource; RidsNroMailCenter Resource; RidsNmssOd Resource; RidsNrrOd Resource; RidsNrrMailCenter Resource; RidsResOd Resource; RidsResPmdaMail Resource; RidsSbcrMailCenter Resource; RidsNsirOd Resource; RidsNsirMailCenter Resource; RidsRgn1MailCenter Resource; RidsRgn2MailCenter Resource; RidsRgn3MailCenter Resource; RidsRgn4MailCenter Resource
Cc: Davidson, Lawrence; Buchholz, Jeri; Johns, Nancy
Subject: WAIVER OF WORK SCHEDULE AND PAY CAP RULES FOR WORK IN RESPONSE TO THE EVENTS IN JAPAN

MEMORANDUM TO: Those on the Attached List

FROM: Miriam L. Cohen, Director/RA by J. Buchholz for/

Office of Human Resources

DATED: March 16, 2011

**SUBJECT: WAIVER OF WORK SCHEDULE AND PAY CAP RULES FOR WORK IN
RESPONSE TO THE EVENTS IN JAPAN**

ADAMS Accession No. ML11075A003 refers

NOTE: Electronic distribution only

Charline Khan

Administrative Assistant (Rotation)

U.S. NUCLEAR REGULATORY COMMISSION

Office of Human Resources

P:301-492-2318

Charline.Khan@nrc.gov

Marksberry, Don

From: Joe Colvin [president@ans.org]
Sent: Thursday, March 24, 2011 1:52 AM
To: Marksberry, Don
Subject: ANS Japan Relief Fund

Dear ANS Member,

In response to your feedback, ANS has established the Japan Relief Fund to help our friends, colleagues, and their families in Japan who have been affected by the earthquake and tsunami. The beneficiaries of this fund will be determined by the ANS and sister organizations in Japan. We'll work to be sure the fund benefits the nuclear power plant employees and their families.

Please visit the ANS Japan Relief Fund page today at <http://www.new.ans.org/about/japanrelief/>.

ANS has also made Japan Relief Fund icons available for download at the link above. I urge you to include these icons on your websites (with any necessary authorizations, of course) and link to the Japan Relief Fund page.

Respectfully,

Joe Colvin
ANS President

4/16/11

From: [Case, Michael](#)
To: [West, Stephanie](#)
Subject: FW: SLIDES: Materials for March 24th Commission Briefing on 50.46a ECCS Rule
Date: Friday, March 18, 2011 8:35:00 AM
Attachments: [110324 50.46\(a\) Scheduling Note.docx](#)
[Slides NRC Staff.pptx](#)
[Seating External Panel.docx](#)
[Seating NRC Staff.docx](#)
[Slides Bowman STP.pptx](#)
[Slides Czufin BWROG .ppt](#)
[Slides Jones PWROG.ppt](#)

Please print.

From: Dudley, Richard
Sent: Friday, March 18, 2011 8:09 AM
To: Ader, Charles; Case, Michael; Cheok, Michael; Collins, Timothy; Dinsmore, Stephen; Dixon-Herrity, Jennifer; Downey, Steven; Dube, Donald; Evans, Michele; Hardies, Robert; Harrison, Donnie; Helton, Shana; Hiland, Patrick; Huyck, Doug; Jervey, Richard; Khanna, Meena; Landry, Ralph; Li, Yueh-Li; McGinty, Tim; Mizuno, Geary; Quay, Theodore; Ruland, William; Terao, David; Tregoning, Robert; Tsirigotis, Alexander; Wen, Peter; Wilson, Jerry
Cc: Wittick, Brian
Subject: SLIDES: FW: Materials for March 24th Commission Briefing on 50.46a ECCS Rule

FYI - Here are some of the external panel slides for the 50.46a Commission meeting.
S. Dinsmore/R. Tregoning – Pls note that Bowman (STP) provides the curve STP is using to say that our TBS is in the E10-7 to E10-8 range. We should try to figure out where it came from.

Dick Dudley
415-1116

From: Baval, Rochelle
Sent: Thursday, March 17, 2011 7:01 PM
To: Svinicki, Kristine; Montes, David; Adler, James; Bates, Andrew; Batkin, Joshua; Bubar, Patrice; Bupp, Margaret; Chairman Temp; Clark, Lisa; Coggins, Angela; Davis, Roger; Dhir, Neha; Hart, Ken; Laufer, Richard; Loyd, Susan; Monninger, John; Nieh, Ho; Pearson, Laura; Reddick, Darani; Baval, Rochelle; Rothschild, Trip; Joosten, Sandy; Sharkey, Jeffrey; Shea, Pamela; Sosa, Belkys; Burns, Stephen; Vietti-Cook, Annette; Warren, Roberta; Zorn, Jason; Baggett, Steven; Baval, Rochelle; Bradford, Anna; Castleman, Patrick; Kock, Andrea; Tadesse, Rebecca; Thoma, John; Franovich, Mike; Hipschman, Thomas; Batkin, Joshua; Marshall, Michael; Orders, William; Snodderly, Michael; Warnick, Greg
Cc: Dudley, Richard; Ruland, William; Tregoning, Robert; Wittick, Brian; Andersen, James; Blake, Kathleen; Bozin, Sunny; Cianci, Sandra; Crawford, Carrie; Gibbs, Catina; Harves, Carolyn; Hasan, Nasreen; Jimenez, Patricia; KLS Temp; Landau, Mindy; Lepre, Janet; Lewis, Antoinette; Herr, Linda; Muesle, Mary; Pace, Patti; Pulley, Deborah; Savoy, Carmel; Speiser, Herald; Taylor, Renee; Temp, GEA; Temp, WCO; Temp, WDM; Wright, Darlene
Subject: Materials for March 24th Commission Briefing on 50.46a ECCS Rule

Attached are final scheduling note and seating charts for the March 24th Commission briefing on the 50.46a ECCS Rule. Also attached are slides from the staff, PWROG, BWROG, and STP. Hard copies will be distributed in the morning. I still expect slides from NEI and UCS, and we'll forward those when we receive them.

Tim Powell, STP, will not be able to participate in the briefing due to the events in Japan, so Tim Bowman will be representing STP.

4/16/2

Note that Commissioner Magwood goes first with questions.

Rochelle

Final: 3/17/11

SCHEDULING NOTE

Title: **BRIEFING ON THE § 50.46a RISK-INFORMED EMERGENCY CORE COOLING SYSTEM (ECCS) RULE (Public)**

Purpose: To provide the Commission a discussion and facilitate voting on the draft final § 50.46a risk-informed ECCS rule which would establish an alternative set of risk-informed ECCS requirements that licensees may choose to comply in lieu of meeting the current emergency core cooling system requirements in § 50.46. Using these alternative ECCS requirements would provide some licensees with opportunities to change various aspects of facility design and operation.

Scheduled: **March 24, 2011**
9:00 am

Duration: Approx. 3.5 hours

Location: Commissioners' Conference Room, 1st floor OWFN

Participants:	Presentation
<u>NRC Staff Panel</u>	50 mins.*
Bill Borchardt , Executive Director for Operations Eric Leeds , Director, NRR	
William Ruland , Director, Division of Safety Systems, NRR <u>Topic:</u> General overview of § 50.46a rule	10 mins*
Richard Dudley , Division of Policy and Rulemaking, NRR <u>Topic:</u> History of rulemaking and overview of rule requirements	20 mins*
Robert Tregoning , Division of Engineering, RES <u>Topic:</u> Generic studies performed to support determining the transition break size	20 mins*
Commission Q & A	50 mins.
Break	5 mins.

<u>External Panel</u>	50 mins*
John Butler , Senior Director, Engineering and Operations Support, Nuclear Energy Institute <u>Topic:</u> Broader perspectives on risk-informed regulation in general and applicability of § 50.46a to both BWRs and PWRs.	10 mins*
Ron Jones , Member, PWROG Executive Committee, and Senior Vice President, Nuclear Development, Duke Energy <u>Topic:</u> Industry views on usefulness of and likelihood of adopting draft final § 50.46a rule.	10 mins*
David Czufin , Member, BWROG Executive Oversight Committee and Vice President, Engineering, Exelon Corporation <u>Topic:</u> BWROG perspective on why they are not interested in the alternative process and what they would do differently.	10 mins*
Tim Bowman , General Manager, Nuclear Safety Assurance, South Texas Project Nuclear Operating Company <u>Topic:</u> Issues considered by individual licensees when deciding whether to adopt the alternative rule.	10 mins*
Edwin Lyman , Senior Scientist, Union of Concerned Scientists <u>Topic:</u> Public stakeholder perspectives on draft final § 50.46a rule.	10 mins*
Commission Q & A	50 mins.
Discussion – Wrap-up	5 mins.

*For presentation only and does not include time for Commission Q & As

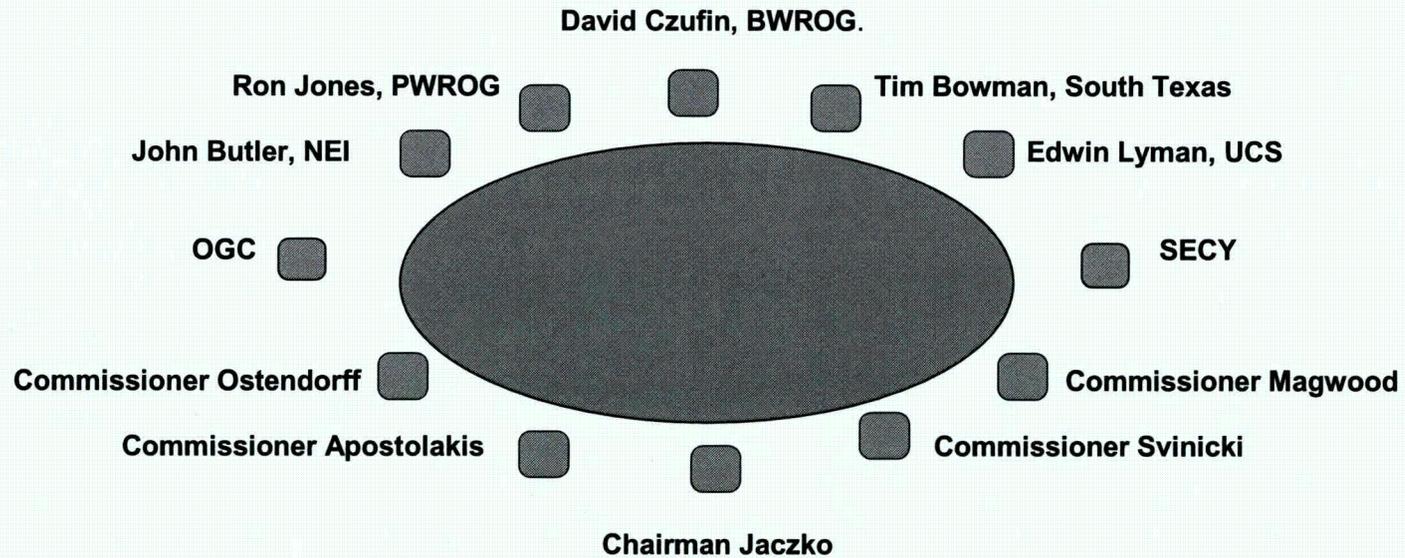
Documents:

- SECY-10-0161, 12/13/10 - Final Rule: Risk-Informed Changes to Loss-of-Coolant Accident Technical Requirements (10 CFR 50.46a) (RIN 3150-AH29)
Background material distributed: March 10, 2011.
Slides distributed: March 17, 2011.

Attachment Slides NRC Staff_1.pptx (186984 Bytes) cannot be converted to PDF format.

BRIEFING ON § 50.46a RISK-INFORMED ECCS RULE (Public)
Thursday, March 24, 2011, 9:00 a.m.

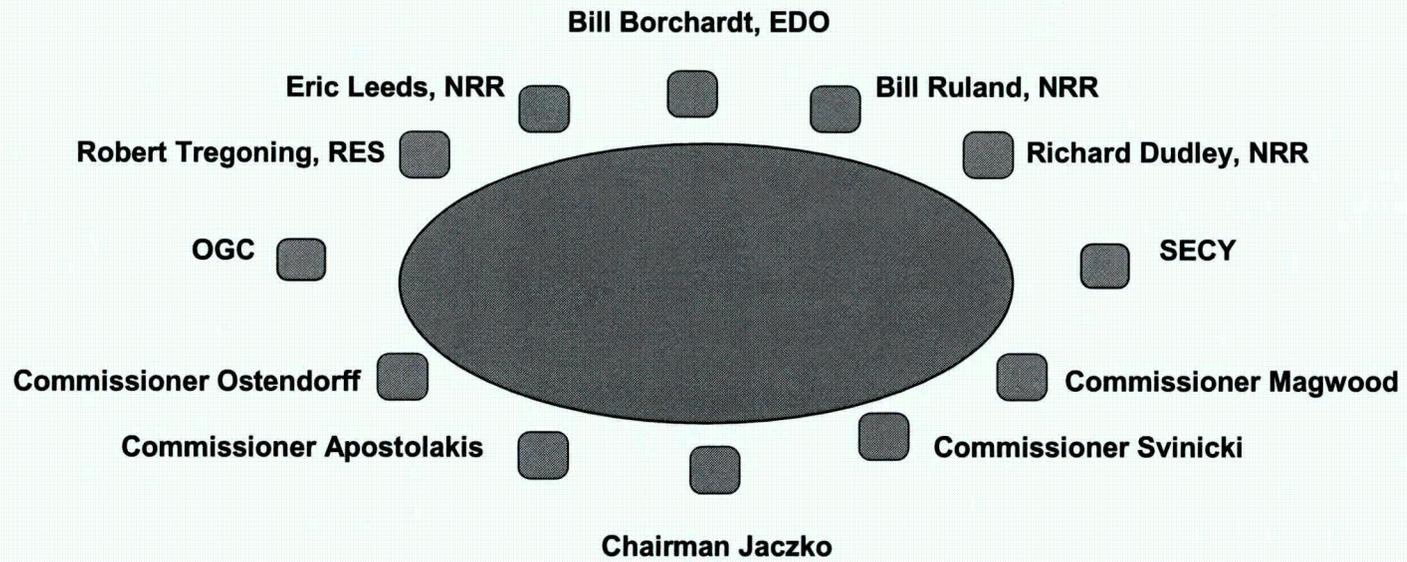
External Panel



COMMISSIONERS

**BRIEFING ON § 50.46a RISK-INFORMED ECCS RULE (Public)
Thursday, March 24, 2011, 9:00 a.m.**

Internal Panel



COMMISSIONERS

Attachment Slides Bowman STP_1.pptx (97412 Bytes) cannot be converted to PDF format.

Attachment Slides Czufin BWROG _1.ppt (292352 Bytes) cannot be converted to PDF format.