

# Compiled Seismic Questions for response to the March 11, 2011 Japanese Earthquake and Tsunami

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*The keeper of this file is Annie Kammerer. The last update is 3-15-11 at 3pm.*

*The below list of questions and answers has been compiled from multiple sources including, questions forwarded from NRC staff, GI-199 communications plan, Diablo Canyon communications plan, the NEI website, , lists of questions that followed the 2007 earthquake that shut down the Kashiwazaki-Kariwa plant, and others. Currently it is in rough draft shape and should not be distributed beyond those who need it in the short term.*

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## **Natural Hazards and Ground Shaking Design Levels**

### **Did the Japanese underestimate the size of the maximum credible earthquake that could affect the plants?**

**Public response:** The magnitude of the earthquake was somewhat greater than was expected for that part of the subduction zone by seismologists worldwide. However, the Japanese plants were reviewed to similar ground shaking to that observed that was expected to result from a smaller earthquake closer to the sites.

**Additional, technical, non-public information:** None.

### **Can a very large earthquake and tsunami happen here?**

**Public response:** This earthquake was caused by a “subduction zone” event, which is the type of mechanism that produces the largest magnitude earthquakes. A subduction zone is a tectonic plate boundary where one tectonic plate is pushed under another plate. In the continental US, the only subduction zone is the Cascadia subduction zone which lies off the coast of northern California, Oregon and Washington. So, an earthquake and tsunami this large could theoretically happen in that region. The only plant in that area is Columbia, which is far from the coast and the subduction zone. Outside of the Cascadia subduction zone, earthquakes are not expected to exceed a magnitude of approximate 8, which is about 10 times smaller than a magnitude 8.9.

### **Has this changed our perception of Earthquake risk?**

**Public Answer:** This does not change the NRC’s perception of earthquake hazard (i.e. ground shaking) at US plants. As is prudent, the NRC will be looking closely at this incident and the effects on the Japanese nuclear power plant in the future to see if any changes are necessary to NRC regulations. It is too early to tell what the lessons from this earthquake are from an engineering perspective. The NRC will look closely at all aspects of response of the plants to the earthquake to determine if any actions need to be taken in US plants.

**Additional, technical, non-public information.** We expect that there would be lessons learned and we may need to seriously relook at common cause failures, including dam failure and tsunami.

### **What magnitude earthquake are US plants designed to?**

**Public Answer:** Each plant is designed to a ground-shaking level 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 an earthquake and the

distance from the fault plane to the site. A list of plant design ground motions is provided as the first table in the “additional information” section of this document.

**Additional, technical non-public information:** In the past, “deterministic” or “scenario based” analyses were used to determine ground shaking (seismic hazard) levels. Now a probabilistic method is used that accounts for all possible earthquakes coming from all possible sources (including background seismicity) and the likelihood that each particular hypothetical earthquake occurs.

**How many US reactors are located in active earthquake zones (and which reactors)?**

**Public Answer:** Although we often think of the US as having “active” and “non-active” earthquake zones, earthquakes can actually happen almost anywhere. Seismologists typically separate the US into low, moderate, and high seismicity zones. The NRC requires that every plant is designed for site-specific ground motions that are appropriate for their location. In addition, the NRC has specified a minimum ground shaking level to which the plants must be designed.

**Additional, technical non-public information:** No additional.

**How many reactors are along coastal areas that could be affected by a tsunami (and which ones)?**

**Public Answer:** Many plants are located in coastal areas that could theoretically 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. 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.

**Additional, technical non-public information:** None

**If the earthquake in Japan was a larger magnitude than considered by plant design, why can't the same thing happen in the US?**

Public response: ADD. *Discuss in terms of PSHA*

Additional, technical, non-public information: ADD

**What would be the results of a tsunami generated off the coast of a US plant? (Or why are we confident that large tsunamis will not occur relatively close to US shores?)**

Public response: ADD

Additional, technical, non-public information: ADD

**What is the design level flooding for DNCPP and SONGS? Can a tsunami be larger?**

Public response: ADD

Additional, technical, non-public information: ADD

**What would be the results of a tsunami generated off the coast of a US plant? (Or why are we confident that large tsunamis will not occur relatively close to US shores?)**

Public response: ADD

Additional, technical, non-public information: ADD

**Can this happen here i.e. an earthquake that significantly damages a nuclear power plant? Are the Japanese plants similar to U.S. plants?**

**Public Answer:** All U.S. 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.

**Additional technical, non-public information:** Currently operating reactors were designed using a “deterministic” or “maximum credible earthquake” approach. Seismic hazard for the new plants is determined using a probabilistic seismic hazard assessment approach that explicitly addresses uncertainty, as described in Regulatory Guide 1.208. The NRC requires that adequate margin beyond the design basis ground shaking levels is assured. The NRC further enhances seismic safety for beyond-design-basis events through the use of a defense-in-depth approach.

In addition, the NRC periodically reviews the seismic risk at operating reactors when information may have changed. Over the last few years the NRC has undertaken a program called Generic Issue 199, which is focused on assessing hazard for plants in the central and eastern US using the latest techniques and data and determining the possible risk implications of any increase in the anticipated ground shaking levels. This program will help us assure that



the plants are safe under exceptionally rare and extreme ground motions that represent beyond-design-basis events.

**What level of earthquake hazard are the US reactors designed for?**

**Public Answer:** Each reactor is designed for a different ground motion that is determined on a site-specific basis. 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. New reactors are designed using probabilistic techniques that determine the ground motion with a maximum annual likelihood of occurring of  $1 \times 10^{-4}$ .

## Design Against Natural Hazards & Plant Safety in the US

### **Are power plants designed for Tsunami's?**

**Public 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.)

#### **Additional, technical, non-public information:**

Tsunami have been considered in the design of US nuclear plants since the publication of Regulatory Guide 1.59 in 1977, although the approaches that were used for design of the existing plants varied significantly. Nuclear plants are designed to withstand flooding from not only tsunami, but also hurricane and storm surge; therefore there is often significant margin against tsunami flooding. However, it should be noted that Japanese experience has shown that drawdown can be a significant problem. Drawdown was not generally analyzed in the past.

Currently the US NRC has a tsunami research program that is focused on developing modern hazard assessment techniques and additional guidance through cooperation with the National Oceanic and Atmospheric Administration and the United States Geological Survey. This has already lead to several technical reports and an update to NUREG 0-800. The NOAA and USGS contractors are also assisting with NRO reviews of tsunami hazard. A new regulatory guide on tsunami hazard assessment is currently planned in the office of research, although it is not expected to be available in draft form until 2012.

### **What level of Tsunami are we designed for?**

**Public 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.

### **How was the seismic design basis for an existing nuclear power plant established?**

**Public Answer:** 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*. 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>).

**Additional, technical, non-public information:** See discussion at end of GI-199 section for discussion of safety margin and design basis.

### **Is there margin above the design basis?**

**Public Answer:** Yes, there is margin beyond the design basis). In the mid to late 1990s, NRC staff reviewed the plants' assessments of potential consequences of severe earthquakes (earthquakes beyond the safety margin included in each plant's design basis), which licensees performed 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 Central and Eastern United States have considerable safety margins, for withstanding earthquakes, built into the designs.

### **Are US plants safe?**

**Public Answer:** US plants are designed for appropriate earthquake shaking levels and are safe. The NRC periodically reviews earthquake hazard levels and earthquake risk at the plants. Currently the NRC is also conducting a program called Generic Issue 199, which is reviewing the adequacy of earthquake design of US NPPs in the central and eastern North America based on the latest data and analysis techniques.

### **Was the Japanese plant designed for this type of accident? Are US plants?**

**Public Answer:** Plants in both the US and Japan area 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.

### **Why do we have confidence that US nuclear power plants are adequately designed for earthquakes and tsunamis?**

**Public response:** ADD

**Additional, technical, non-public information:** ADD

### **Can this happen here i.e. an earthquake that significantly damages a nuclear power plant? Are the Japanese plants similar to U.S. plants?**

**Public Answer:** All U.S. 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. Nuclear power plants are designed to be safe based on the most severe natural phenomena historically reported for the site and surrounding area. The Japanese facilities are similar in design to several US facilities.

**Additional technical, non-public information:**

Currently operating reactors were designed using a “deterministic” or “maximum credible earthquake” approach. Seismic hazard for the new plants is determined using a probabilistic seismic hazard assessment approach that explicitly addresses uncertainty, as described in Regulatory Guide 1.208. The NRC requires that adequate margin beyond the design basis ground shaking levels is assured. The NRC further enhances seismic safety for beyond-design-basis events through the use of a defense-in-depth approach.

In addition, the NRC periodically reviews the seismic risk at operating reactors when information may have changed. Over the last few years the NRC has undertaken a program called Generic Issue 199, which is focused on assessing hazard for plants in the central and eastern US using the latest techniques and data and is determining the possible risk implications of any increase in the anticipated ground shaking levels. This program will help us assure that the plants are safe under exceptionally rare and extreme ground motions that represent beyond-design-basis events.

The reactor design is a Boiling Water Reactor that is similar to some U.S. designs, including Oyster Creek, Nine Mile Point and Dresden Units 2 and 3.

### **Are US plants susceptible to the same sort of loss of all diesel power?**

Public response: ADD

Additional, technical, non-public information. ADD

### **How does this compare to what happened at Kashiwazaki-Kariwa?**

Public response: ADD

Additional, technical, non-public information. ADD

### **Could an accident like the one at Japan’s Fukushima Daiichi nuclear plant happen in the United States?**

It is difficult to answer this question until we have a better understanding of the precise problems and conditions that faced the operators at Fukushima Daiichi. We do know, however, that Fukushima Daiichi Units 1-3 lost all offsite power and emergency diesel generators. This situation is called “station blackout.” U.S. nuclear power plants are designed to cope with a station blackout event that involves a loss of offsite power and onsite emergency power. The Nuclear Regulatory Commission’s detailed regulations address this scenario. U.S. nuclear plants are required to conduct a “coping” assessment and develop a strategy to demonstrate to the NRC that they could maintain the plant in a safe condition during a station blackout scenario. These assessments, proposed modifications and operating procedures were reviewed and approved by the NRC. Several plants added additional AC power sources to comply with this regulation.

In addition, U.S. nuclear plant designs and operating practices since the terrorist events of September 11, 2001, are designed to mitigate severe accident scenarios such as aircraft impact, which include the complete loss of offsite power and all on-site emergency power sources.

U.S. nuclear plant designs include consideration of seismic events and tsunamis'. It is important not to extrapolate earthquake and tsunami data from one location of the world to another when evaluating these natural hazards. These catastrophic natural events are very region- and location-specific, based on tectonic and geological fault line locations.

**Should U.S. nuclear facilities be required to withstand earthquakes and tsunamis of the kind just experienced in Japan? If not, why not?**

U.S. nuclear reactors are designed to withstand an earthquake equal to the most significant historical event or the maximum projected seismic event and associated tsunami without any breach of safety systems.

The lessons learned from this experience must be reviewed carefully to see whether they apply to U.S. nuclear power plants. It is important not to extrapolate earthquake and tsunami data from one location of the world to another when evaluating these natural hazards, however. These catastrophic natural events are very region- and location-specific, based on tectonic and geological fault line locations.

The U.S. Geological Survey (USGS) conducts continuous research of earthquake history and geology, and publishes updated seismic hazard curves for various regions in the continental US. These curves are updated approximately every six years. NRC identified a generic issue (GI-199) that is currently undergoing an evaluation to assess implications of this new information to nuclear plant sites located in the central and eastern United States. The industry is working with the NRC to develop a methodology for addressing this issue.

**Can you summarize the plant seismic design basis for the US plants? Are there any special issues associated with seismic design?**

**Public response:** Please see the table provided in the "Additional information" section of this document

**Additional, technical, non-public information.** ADD

**How do we know that the equipment in plants is safe in earthquakes?**

**Public response:** All equipment important to safety (required to safely shutdown a nuclear power plant) is qualified to withstand earthquakes in accordance with plants' licensing basis and NRC regulations.

**Additional, technical, non-public information:**

- 10 CFR 50, Appendix A, General Design Criterion 2 and 4, 10 Part 100, and Appendix S.

- Guidance: Regulatory Guides 1.100, IEEE 344 and ASME QME-1

### **How do we know equipment will work if the magnitude is bigger than expected, like in Japan?**

**Public response:** Plant systems are designed to mitigate a design basis earthquake which includes margin above the postulated site specific earthquake.

**Additional, technical, non-public information:** See part 100 Reactor Site Criteria

### **Are US plants susceptible to the same kind of loss of power as happened in Japan?**

**Public response:** Yes in the sense that sites can lose offsite power. Also, hurricane or tornado related high winds may potentially damage the transmission network in the vicinity of a nuclear plant. Flood waters can also 'affect transformers used to power station auxiliary system. These types of weather related events have the potential to degrade the offsite power source to a plant.

The onsite Emergency Diesel Generators need fuel oil stored in tanks that are normally buried underground. These tanks and associated pumps/piping require protection from the elements.

Above ground tanks have tornado/missile protection.

In case both offsite and onsite power supplies fail, NRC has required all licensee to evaluate for a loss of all AC power (station blackout) scenario and implement coping measures to safely shutdown the plant iaw 10 CFR 50.63.

**Additional, technical, non-public information:** Some plants have safeguards equipment below sea level and rely on watertight doors or Bilge pumps to remove water from equipment required to support safe shutdown. Overflowing rivers can result in insurmountable volume of water flooding the vulnerable areas.

### **How do we know that the EDFs in Diablo Canyon and SONGS will not fail to operate like in Japan?**

**Public response:** EDGs are installed in a seismically qualified structure. Even if these EDGs fail, plants can safely shutdown using station blackout power source iaw 10 CFR 50.63.

**Additional, technical, non-public information:** ADD

### **Is all equipment at the plant vulnerable to tsunami?**

**Public response:** Plants are designed iaw GDC 2 to withstand protection against natural phenomena such as tsunami, earthquakes.

**Additional, technical, non-public information:** ADD

**What protection measures do plants have against tsunami?**

Public response: Plants are designed iaw GDC 2 to withstand protection against natural phenomena such as tsunami, earthquakes. What about things like breakwaters?

Additional, technical, non-public information: ADD

**Is there a risk of loss of water during tsunami drawdown? Is it considered in design?**

Public response: ADD

Additional, technical, non-public information: ADD

**Are nuclear buildings built to withstand earthquakes? What about tsunami?**

Public response: ADD

Additional, technical, non-public information: ADD

**Are aftershocks considered in the design of equipment at the plants? Are aftershocks considered in design of the structure?**

Public response: ADD

Additional, technical, non-public information: ADD

**Are there any special issues associated with seismic design at the plants? For example, Diablo Canyon has special requirements. Anyone else?**

Public response: Diablo canyon is licensed with an ESF trip for seismic event due to its susceptibility for earthquakes.

Additional, technical, non-public information: ADD

## About Japanese Hazard, Design and Earthquake Impact?

### Was the damage done to the plants from the Earthquake or the Tsunami?

**Public response:** In the nuclear plants there seems to have been some damage from the shaking, but the tsunami lead to some of the biggest problems in terms of the loss of backup power. This is also true in the general population; the tsunami seems to have lead to most of the deaths.

### What is the design level of the Japanese plants? Was it exceeded?

**Public response:** As a result of a significant change in seismic regulations in 2006, the Japanese regulator initiated a program to reassess seismic hazard and seismic risk for all nuclear plants in Japan. This resulted in new assessments of new ground shaking levels (i.e. seismic hazard) and a review of seismic safety for all Japanese plants. The program is still on-going, but has already resulted in retrofit in some plants. Therefore, it is useful to discuss both the design level and a review level ground motion for the plants, as shown below. Currently we do not have official information. However, it appears that the ground motions (in terms of peak ground acceleration) are similar to the  $S_s$  shaking levels, although the causative earthquakes are different. Thus the design basis was exceeded, but the review level may not have been.

***Table: Original Design Basis Ground Motions ( $S_2$ ) and New Review Level Ground Motions ( $S_s$ ) Used for Review of Japanese Plants***

Plant sites	Contributing earthquakes	New DBGM $S_s$	Original DBGM $S_2$
Onagawa	Soutei Miyagiken-oki (M8.2)	580 gal (0.59g)	375 gal (0.38g)
Fukushima	Earthquake near the site (M7.1)	600 gal (0.62g)	370 gal (0.37g)
Tokai	Earthquakes undefined specifically	600 gal (0.62g)	380 gal (0.39g)
Hamaoka	Assumed Tokai (M8.0), etc.	800 gal (0.82g)	600 gal (0.62g)

### What are the Japanese $S_1$ and $S_s$ ground motions and how are they determined?

**Public response:** Japanese nuclear power plants are designed to withstand specified earthquake ground motions, previously specified as  $S_1$  and  $S_2$ , but now simply  $S_s$ . The design basis earthquake ground motion  $S_1$  was defined as the largest earthquake that can reasonably be expected to occur at the site of a nuclear power plant, based on the known seismicity of the area and local faults that have shown activity during the past 10,000 years. A power reactor could continue to operate safely during an  $S_1$  level earthquake, though in practice they are set to trip at lower levels. The  $S_2$  level ground motion was based on a larger earthquake from faults



that have shown activity during the past 50,000 years and assumed to be closer to the site. The revised seismic regulations in May 2007 replaced  $S_1$  and  $S_2$  with simply  $S_5$ . The  $S_5$  design basis earthquake is based on evaluating potential earthquakes from faults that have shown activity during the past 130,000 years. The ground motion from these potential earthquakes are simulated for each of the sites and used to determine the revised  $S_5$  design basis ground motion level.

**Additional, technical, non-public information.** None

**Did this earthquake affect Kashiwazaki-Kariwa NPP?**

**Public response:** No, this did not affect Kashiwazaki-Kariw NPP. It also did not trip during an earthquake that occurred on the western side subsequent to the 8.9 earthquake. This is very important due to the loss of energy supply from TEPCO's Fukushima NPPs.

**How high were the tsunami at the plants?**

**Public response:** The actual tsunami height at the plants is now know. However, NOAA has information on the recordings at sea for many areas.

**Additional, technical, non-public information:** A preliminary rough estimate of tsunami height at the plant locations was provided to NRC by NOAA shortly after the earthquake. This is shown in the "additional information" section. Most notably, there was a 6 meter wave at Fukushima and the wave at Onogawa may have been between 18 and 23 meters.

**What happened in US Plants during the earthquake?**

**Was there any damage to U.S. reactors from either the earthquake or the resulting tsunami?**

**Public Answer:** No

**Additional, technical non-public information:** Two US plants on the Pacific Ocean (Diablo Canyon and San Onofre) experienced higher than normal sea level due to tsunami. However, the wave heights were consistent with previously predicted levels and this had no negative impact to the plants. In response, Diablo Canyon Units 1 and 2 declared an "unusual event" based on tsunami warning following the Japanese earthquake. They have since exited the "unusual event" declaration, based on a downgrade to a tsunami advisory.

**Have any lessons for US plants been identified?**

**Public Answer:** We need to take a closer look at common cause failures and combined events, such as earthquake and tsunami, and earthquake and dam failure.

**Additional, technical non-public information:** Add

## **Future Actions**

### **What is the NRC doing about the emergencies at the nuclear power plants in Japan?** **Are you sending staff over there?**

**Public Answer:** We are closely following events in Japan, working with other agencies of the federal government, and have been in direct contact with our counterparts in that country. In addition, we are ready to provide assistance if there is a specific request. An NRC staffer is participating in the USAID team headed to Japan.

**Additional technical, non-public information:** We are taking the knowledge that the staff has about the design of the US nuclear plants and we are applying this knowledge to the Japan situation. For example, this includes calculations of severe accident mitigation that have been performed.

NOTE: questions can be pulled from ANS/NEI/the GI-199 comm plan/the DCNPP comm plan

## Reassessment of US Plants and GI-199

### **Is the earthquake safety of US plants periodically reviewed?**

Public response: Yes, during focused design inspections, Under the Generic Issues Program (GI-199) and as part of the Individual Plant Evaluation of External Events program (IPEEE) that was conducted in response to Generic Letter 88-20 Supplement 4.

Additional, technical, non-public information: ADD

### **Does the NRC ever review tsunami risk for existing plants?**

**Public Answer:** The NRC has not reviewed tsunami risk to date, except that there has been review for sites that have applied for a license for a new reactor. This is something that the NRC may consider in the future.

Additional, technical, non-public information: Add

### **Does GI-199 consider tsunami?**

**Public response:** GI-199 does not consider tsunami

**Additional, technical, non-public information:** In the past there has been discussion about a GI program on tsunami, but the NRC's research and guidance was not yet at the point it would be effective. We are just getting to this stage and the topic should be revisited.

### **What is Generic Issue 199 about?**

**Public Answer:** 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 for some nuclear power plants in the Central and Eastern United States is still low, but larger than previous estimates.

**Additional, technical, non-public information:** See additional summary/discussion of GI-199 and terms below.

### **Where can I get current information about Generic Issue 199?**

**Public Answer:** 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 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 provides data and results that are publicly available at <http://earthquake.usgs.gov/hazards/products/conterminous/2008/>.

**Additional, technical, non-public information:** 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.

### **How was the seismic design basis for an existing nuclear power plant established?**

**Public Answer:** 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*. 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>).

**Additional, technical, non-public information:** See discussion at end of GI-199 section for discussion of safety margin and design basis.

### **Is there margin above the design basis?**

**Public Answer:** Yes, there is margin beyond the design basis). In the mid to late 1990s, NRC staff reviewed the plants' assessments of potential consequences of severe earthquakes (earthquakes beyond the safety margin included in each plant's design basis), which licensees performed 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 Central and Eastern United States have considerable safety margins, for withstanding earthquakes, built into the designs.

**Additional, technical, non-public information:** The goal of seismic engineering is to design structures, systems and components that explicitly do not fail at the design level. The application of specific codes, standards, and analysis techniques results in margin beyond the design level. The assessments carried out as part of the IPEEE program demonstrated that margin exists in the operating reactors against seismic demand.

### **Are all U.S. plants being evaluated as a part of Generic Issue 199?**

**Public Answer:** 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.

**Additional, technical, non-public information:** The staff is currently developing specific information needs to be included in a Generic Letter to licensees in the CEUS.

**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?**

**Public Answer:** 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 and updated seismic hazard information, 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 program; (2) the probability of exceeding the *safe shutdown earthquake* ground motion may have increased at some sites, but only by a relatively small amount; and (3) 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 (Management Directive 6.4) direct staff to continue their analysis to determine whether any cost-justified plant improvements can be identified to make plants enhance plant safety.

**Additional, technical, non-public information :** 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,  $4 \times 10^{-4}$  (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 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.*

**What do you mean by “increased estimates of seismic hazards” at nuclear power plant sites?**

**Public Answer:** *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).

**Additional, technical, non-public information:** See additional discussion of terms below.

***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**

**Public Answer:** 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).

**Seismic margin** – The difference between a plant's capacity and its seismic design basis (*safe shutdown earthquake, or SSE*).

**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*.



## SONGS specific questions

Note, these were added 3/15 and have not yet been reviewed.

**SONGS received a white finding in 2008 for a bold tissue related to the EDGs that went undetected for 4 years. NRC issued the white as there was risk that the EDGs may both have started under seismic conditions. Aren't all plants susceptible to the unknown? Is there any assurance the emergency cooling systems will function as desired in a Japan-like emergency.**

Public response: ADD

Additional, technical, non-public information. ADD

**Has the earthquake hazard at SONGS been reviewed like DCNPP is doing? Are they planning on doing an update before relicensing?**

PLANT ANSWER-- - Relicensing does not evaluate the potential change to seismic siting of a plant. If there is a seismic design concern, it would be addressed for the plant as it is currently operating.

**Is possible to have a tsunami at songs that is capable of damaging the plant?**

The San Onofre Units 2 and 3 plant grade is elevation +30.0 feet mllw. The controlling tsunami for San Onofre occurring during simultaneous high tide and storm surge produces a maximum runup to elevation +15.6 feet mllw at the Unit 2 and 3 seawall. When storm waves are superimposed, the predicted maximum runup is to elevation +27 mllw. Tsunami protection for the SONGS site is provided by a reinforced concrete seawall constructed to elevation +30.0 mllw. A tsunami greater than this height would be extremely unlikely.

**Does SONGS have an emergency plan for tsunami?**

The SONGS emergency plan does initiate the emergency response organization and results in declaration of emergency conditions via their EALs. The facility would then make protective action recommendations to the Governor, who would then decide on what protective actions would be ordered for the residents around SONGS.

**Has evacuation planning at SONGS considered tsunami?**

These considerations would be contained in the State and local (City, County) emergency plans, which are reviewed by FEMA. FEMA then certifies to the NRC that they have "reasonable assurance" that the off-site facilities can support operation of SONGS in an emergency.

**Is SONGS designed against tsunami and earthquake?**

Yes.

**What is the height of water that SONGS is designed to withstand?**

30 feet.

**What about drawdown and debris?**

Good question...

**Will this be reviewed in light of the Japan quake.**

Probably.

**Could all onsite and offsite power be disrupted from SONGS in the event of a tsunami, and if that happened, could the plant be safely cooled down if power wasn't restored for days after?**

Seismic Category I equipment is equipment that is essential to the safe shutdown and isolation of the reactor or whose failure or damage could result in significant release of radioactive material. All Seismic Category I equipment at SONGS is designed to function following a DBE with ground acceleration of 0.67g.

The operating basis earthquake (1/2 of the DBE) is characterized by maximum ground shaking of 0.33g. Historically, even this level of ground shaking has not been observed at the site. Based on expert analysis, the average recurrence interval for 0.33g ground shaking at the San Onofre site would be in excess of 1000 years and, thus, the probability of occurrence in the 40-year design life of the plant would be less than 1 in 25. The frequency of the DBE would be much more infrequent, and very unlikely to occur during the life of the plant. Even if an earthquake resulted in greater than the DBE movement/acceleration at SONGS, the containment structure would ultimately protect the public from harmful radiation release, in the event significant damage occurred to Seismic category 1 equipment.

**Are there any faults nearby SONGS that could generate a significant tsunami?**

Current expert evaluations estimate a magnitude 7 earthquake about 4 miles from SONGS. This is significantly less than the Japan quake, and SONGS has been designed to withstand this size earthquake without incident. Should discuss the different tectonic nature (not a subduction zone like Japan)?

**What magnitude or shaking level is SONGS designed to withstand? How likely is an earthquake of that magnitude for the SONGS site?**

The design basis earthquake (DBE) is defined as that earthquake producing the maximum vibratory ground motion that the nuclear power generating station is designed to withstand without functional impairment of those features necessary to shut down the reactor, maintain the station in a safe condition, and prevent undue risk to the health and safety of the public. The DBE for SONGS was assessed during the construction permit phase of the project. The DBE is postulated to occur near the site (5 miles), and the ground accelerations are postulated to be quite high (0.67g), when compared to other nuclear plant sites in the U.S (0.25g or less is

typical for plants in the eastern U.S.). Based on the unique seismic characteristics of the SONGS site, the site tends to amplify long-period motions, and to attenuate short-period motions. These site-specific characteristics were accounted for in the SONGS site-specific seismic analyses.

### **Could SONGS withstand an earthquake of the magnitude of the Japanese earthquake?**

We do not have current information on the ground motion at the Japanese reactors. SONGS was designed for approximately a 7.0 magnitude earthquake 4 miles away. The Japanese earthquake was much larger (8.9), but was also almost 9 miles away. The local ground motion at a particular plant is significantly affected by the local soil and bedrock conditions. SONGS was designed (.67g) to withstand approximately 2.5 times the design motion at average US plants (.25g).

### **What about the evacuation routes at SONGS? How do we know they are reasonable?**

EMA reviews off-site evacuation plans formally every 2 years during a biennial emergency preparedness exercise. NRC evaluates on-site evacuation plans during the same exercise. Population studies are formally done every 10 years, and evacuation time estimates are re-evaluated at that time. FEMA reviews these evacuation plans, and will conclude their acceptability through a finding of "reasonable assurance" that the off-site facilities and infrastructure is capable of protecting public health and safety in the event of an emergency at SONGS. The next such exercise is planned for April 12, 2011.

## **Diablo Canyon Specific Questions**

Note, these were added 3/15 and have not yet been reviewed.

### **Now after the Japan tragedy, will the NRC finally hear us (A4NR) and postpone DC license renewal until seismic studies are complete? How can you be sure that what happened there is not going to happen at Diablo with a worse cast quake and tsunami?**

Public response: ADD

Additional, technical, non-public information. ADD

### **The evacuation routes at DCNPP see are not realistic. Highway 101 is small...and can you imagine what it will be like with 40K people on it? Has the evacuation plan been updated w/ all the population growth?**

EMA reviews off-site evacuation plans formally every 2 years during a biennial emergency preparedness exercise. NRC evaluates on-site evacuation plans during the same exercise. Population studies are formally done every 10 years, and evacuation time estimates are re-evaluated at that time. FEMA reviews these evacuation plans, and will conclude their acceptability through a finding of "reasonable assurance" that the off-site facilities and infrastructure is capable of protecting public health and safety in the event of an emergency at DCNPP.

**Why did a Emergency Warning go out for a 'tsunami' that was only 6 ft high? Do these guys really know what they're doing? Would they know it if a big one was really coming? Crying wolf all the time doesn't instill a lot of confidence.**

The 6 foot wave was predicted many hours before and arrived at the time it was predicted. Federal officials to accurately predicted the tsunami arrival time and size; allowing local official to take appropriate measures as they saw necessary to warn and protect the public. It should be understood that even a 6 foot tsunami is very dangerous. Tsunami have far more energy and power than wind-driven waves.

How big did the Japanese think a quake/tsunami could be before 3/11? Why were they so wrong (assuming this quake/tsunami was bigger than what they had designed the plant for)?  
HQ answer

The Japanese were supposed to have one of the best tsunami warning systems around. What went wrong last week (both with the reactors and getting the people out...see #1, evacuation plan above)? HQ answer

## Questions for the Japanese

These need to be gone through and revised for this event

1. What seismic monitoring equipment exists at the plants? Can we get the recordings from the
2. Are there recordings of the tsunami at the plant location?
3. What is the geology and soil profile at the plants?
4. NOAA has a prediction of very large tsunami waves at Onagawa. Are these accurate?

The below is pulled from an KKNPP summary...to be reviewed...

- (1) DESIGN BASES: Exactly what is the design basis ground motion for each of the plants? Did it change through time (i.e. from the first plant to the seventh)? Where was the design basis motion defined, at the top of rock, at the ground surface, at the floor level or somewhere else? Were the site-specific geotechnical properties used in the development of the design basis ground motions for each plant?
- (2) SEISMIC HAZARDS: What assumptions were used in the seismic hazard evaluation to arrive at the design basis ground motions? What faults were considered, what magnitudes and geometries were assumed? What activity rates were assumed for both fault sources and "background" earthquakes?
- (3) OBSERVATIONS-GROUND MOTIONS: What ground motions were recorded and where were they recorded? Specifically, what free-field, in-structure and down-hole recordings were obtained? What are the locations of the instruments that obtained records? Did all the instruments respond as planned, or are there lessons to be learned? Can the digital data be shared with the NRC? Is there any way of evaluating how well the existing analysis methods predicted the observed motions at different points within the plant?
- (4) OBSERVATIONS-DAMAGE: What damage was observed at the plants? How well did equipment such as cranes perform? Were there observations of displacements of equipment from anchorages, were cracks observed in any of the buildings? How well did non-nuclear safety type of buildings and equipment perform? What types of geotechnical phenomena were observed, was there ground deformation/slope failures, lateral spreading or liquefaction near the facility? Did the ABWRs perform better or similar to the older designs?

And another set from the KKNPP earthquake...to be reviewed...

### **Follow-up Questions for Japanese Contacts**

Please provide the following information in the time frame indicated:

#### **Highest Priority Questions** – as soon as possible

- 1) A timeline describing the order of events and the individual plant responses to the earthquake
- 2) Confirmation that all operating and shut down units achieved or maintained safe-shutdown conditions without manual operator intervention or complications. Did all safety-related systems respond to the seismic scram as designed? Please note if there were any unexpected plant responses to the event, including any spurious signals.
- 3) A more detailed description of the impacts of the earthquake on the plant (e.g., what systems were involved, which pipes were damaged, where did the leakage occur (pipe wall, joints, fittings, etc).
- 4) A description of seismic instrumentation at the site and at each of the 7 units, soil/rock shear wave properties through depth, instrument location and mounting condition, all the recorded data on the basis of unified starting time, such that the coherency of motion through the surface or the foundations and at depth can be determined
- 5) Full spectrum seismic design basis for the plant.
- 6) What actually caused the Unit 3B house transformer fire?

#### **Additional Questions** – please provide answers as more information is developed

- 7) Damage to buildings, slope failures, intake structure failure, if any
- 8) Behavior of cranes, cables and conduits
- 9) Failures of any large pumps and valves, pipe mounted control or valve failure
- 10) Instances of any relay or vibration sensitive components malfunctioning
- 11) Nature of damage to service water and fire-suppression piping - their diameter, material they are made of including their elastic properties, design standards used for the piping design, nature of failure (at support, anchor motion, failure of anchors, subsidence differential movement etc)
- 12) Were there any systems that changed state?
- 13) Impact on physical security, and any vulnerabilities identified
- 14) Were there any impacts on the grid because of the event?
- 15) Please describe the switchyard performance?
- 16) What emergency preparedness concerns have been identified as a result of the event?

#### **3B Transformer Specific Questions** – please respond when there is time and other issues have been addressed

- 17) What are the primary and secondary voltages of the transformer?
- 18) What type of transformer - liquid or dry-type (air-cooled)?
- 19) Who was the manufacturer of the transformer?
- 20) What are the physical dimensions of the transformer?
- 21) How are the transformer coils restrained within the cabinet?
- 22) What is the clearance between transformer energized component and cabinet?
- 23) What is the relative displacement for connection between the high voltage leads and the first anchor point (adequate slack?) in the transformer?
- 24) What was the natural frequency of the burned transformer, if known?

- 25) What was the acceleration level (or the response spectrum, if available) at the support location of the burned transformer?
- 26) What seismic requirements exist for the burned transformer? Was the transformer tested or analyzed to a specific acceleration or response spectra, and if so, what are they?
- 27) Are there any of the same type of transformer installed at other locations in the plant?

## Additional Information

Table of Design Basis Ground Motions for US Plants

Design Basis Earthquake Intensity and Magnitude					
Nuclear Plant By State/Location	Maximum Observed Or Inferred Intensity (MMI Scale) <sup>1</sup>	Relative Distance Of Seismic Source <sup>2</sup>	Design SSE Peak Acceleration, <i>g</i> <sub>3</sub>	OBE Peak Acceleration, <i>g</i> <sup>4</sup>	Soil Condition
<b><u>New York</u></b> Fitzpatrick Ginna 1 Indian Point 2, 3 Nine Mile Point 1 Nine Mile Point 2	VI VIII/IX VII IX-X VI	Near >60 miles Near >60 miles Near	0.15 0.2 0.15 0.11 0.15	0.08 0.08 0.1 0.06 0.075	Soil Rock Rock Rock Rock
<b><u>New Jersey</u></b> Salem 1,2	VII-VIII	Near	0.2	0.1	Deep Soil
<b><u>Connecticut</u></b> Millstone 1, 2, 3	VII	Near	0.17	0.07	Rock
<b><u>Vermont</u></b> Vermont Yankee	VI	Near	0.14	0.07	Rock
<b><u>Ohio</u></b> Davis Besse 1 Perry 1	VII VII	Near Near	0.15 0.15	0.08 0.08	Rock Rock
<b><u>Georgia</u></b> Hatch 1, 2 Vogtle 1, 2	VII VII-VIII	Near Near	0.15 0.2	0.08 0.12	Deep Soil Deep Soil
<b><u>Tennessee</u></b> Sequoyah 1, 2 Watts Bar 1	VIII VIII	Near Near	0.18 0.18	0.09 0.09	Rock Rock
<b><u>California</u></b> San Onofre 2, 3 Diablo Canyon 1, 2	IX-X X-XI	Near Near	0.67 0.75	0.34 0.20	Soil Rock
<b><u>Florida</u></b> Crystal River 3 St. Lucie 1, 2 Turkey Point 3, 4	V VI VII	Near Near Near	0.10 0.10 0.15	0.05 0.05 0.05	Rock Soil Rock

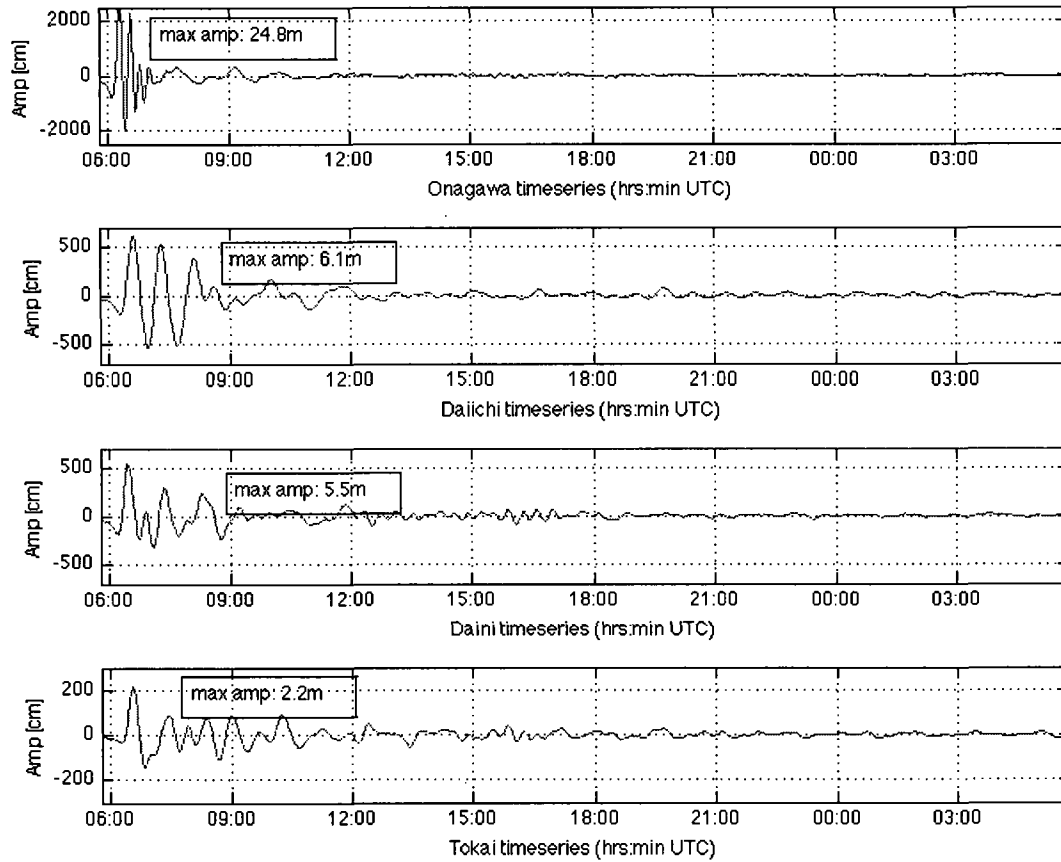
### NOTES:

- 1- MMI=Modified Mercalli Intensity, a measure of observed/reported damage and severity of shaking.
- 2- Relative distance measure used in FSAR to develop SSE acceleration, "Near" indicates distance less than 10 miles.
- 3- SSE=Safe Shutdown Earthquake ground motion, for horizontal acceleration, in units of earth's gravity, *g*.
- 4- OBE=Operating Basis Earthquake ground motion, level of horizontal acceleration, which if exceeded requires plant shutdown.



## Tsunami wave heights from NOAA (preliminary)

### Offshore wave amplitudes, scaled to the coastline



## Design Basis Ground Motions and New Review Level Ground Motions Used for Review of Japanese Plants

Plant sites	Contributing earthquakes	New DBGM Ss *1	DBGM S2
Tomari	Earthquakes undefined specifically	550 Gal	370 Gal
Onagawa	Soutei Miyagiken-oki (M8.2)	580	375
Higashidoori	Earthquakes undefined specifically	450	375
Fukushima	Earthquake near the site (M7.1)	600	370
Tokai	Earthquakes undefined specifically	600	380
Hamaoka	Assumed Tokai (M8.0), etc.	800	600
Shika	Sasanami-oki Fault (M7.6)	600	490
Tsuruga	Urazoko-Uchiikemi Fault (M6.9), etc. →Mera-Kareizaki -Kaburagi(M7.8), Shelf edge+B+Nosaka(M7.7)	800	532
Mihama	C, Fo-A Fault (M6.9)→ Shelf edge+B+Nosaka(M7.7)	750	405
Ohi	C, Fo-A Fault (M6.9)→Fo-A+Fo-B (M7.4)	700	405
Takahama	Fo-A Fault (M6.9) →Fo-A+Fo-B(M7.4)	550	370
Shimane	Shinji Fault (M7.1)	600	456
Ikata	Central Tectonic Structure (M7.6)	570	473

Genkai	Takekoba F. (M6.9) → Enhanced uncertainty consideration	540	370
Sendai	Gotandagawa F.(M6.9), F-A(M6.9)	540	372
Kashiwazaki-Kariwa	F-B Fault (M7.0), Nagaoka-plain-west Fault (M8.1)	2300 (#1 side) 1209 (#5 side)	450
Monju (Proto Type FBR)	Shiraki-Niu F.(M6.9) , C F.(M6.9)→Shelf edge+B+Nosaka(M7.7), Small Damping	760	408
Shimokita Reprocessing F.	Deto-Seiho F.(M6.8), Yokohama F.(M6.8)	450	320

# Status of Review of Japanese NPPs to New Earthquake Levels Based on 2006 Guidance

Utility	Site (Unit)	Type	Apr, 2010	Dec.2010
Hokkaido	Tomari	PWR	△	△
Tohoku	Onagawa (Unit1)	BWR	○	◎
	Higashi-dori	BWR	△	△
Tokyo	Kashiwazaki-Kariwa	BWR	Unit 6,7 ◎	Unit 1,5,6,7 ◎
	Fukushima-No1	BWR	Unit 5 ◎	Unit 3 ◇, 5 ◎
	Fukushima-No2	BWR	Unit 4 ◎	Unit 4,5 ◎
Chubu	Hamaoka	BWR	△	△
Hokuriku	Shika (Unit 2)	BWR	◎	◎
Kansai	Mihama(Unit 1)	PWR	△	◎
	Ohi(Unit 3,4)	PWR	△	◎
	Takahama (Unit 3,4)	PWR	△	◎
Chugoku	Shimane (Unit 1, 2)	BWR	◎	◎
Shikoku	Ikata (Unit 3)	PWR	◎	◎
Kyushu	Genkai (Unit 3 )	PWR	◎	◎
	Sendai (Unit 1)	PWR	◎	◎
Japan Atomic Power	Tokai-Daini	BWR	△	○
	Tsuruga	BWR/PWR	△	△
JAEA	Monju	Proto Type FBR	◎	◎
Japan Nuc. Fuel	Rokkasyo	Reprocessing	○	◎

## Legend Symbol

◎ NSC review finished

# Compiled Seismic Questions for NRC Response to the March 11, 2011 Japanese Earthquake and Tsunami

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**This is current as of 3-16-11 at 3 am.**

***The keeper of this file is Annie Kammerer. Please provide comments, additions and updates to Annie with CC to Clifford Munson and Jon Ake.***

***A SharePoint site has been set up so that anyone can download the latest Q&As. Information will be provided as soon as we have a link to this document on line.***

*We greatly appreciate the assistance of the many people who have contributed. The enclosed list of questions and answers has been compiled from multiple sources including, questions forwarded from NRC staff, GI-199 communications plan, Diablo Canyon communications plan, the NEI website, lists of questions that followed the 2007 earthquake that shut down the Kashiwazaki-Kariwa plant, and others. Please do not distribute beyond the NRC.*

ccc/2

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## Natural Hazards and Ground Shaking Design Levels

### 1) Did the Japanese underestimate the size of the maximum credible earthquake that could affect the plants?

**Public response:** The magnitude of the earthquake was somewhat greater than was expected for that part of the subduction zone by seismologists worldwide. The Japanese plants were recently reviewed to ground shaking similar to that observed. The review level ground motions were expected to result from a smaller earthquake closer to the sites.

**Additional, technical, non-public information:** None.

### 2) Can a very large earthquake and tsunami happen here?

**Public response:** This earthquake was caused by a "subduction zone" event, which is the type of mechanism that produces the largest magnitude earthquakes. A subduction zone is a tectonic plate boundary where one tectonic plate is pushed under another plate. In the continental US, the only subduction zone is the Cascadia subduction zone which lies off the coast of northern California, Oregon and Washington. So, an earthquake and tsunami this large could only happen in that region. The only plant in that area is Columbia, which is far from the coast and the subduction zone. Outside of the Cascadia subduction zone, earthquakes are not expected to exceed a magnitude of approximate 8, which is about 10 times smaller than a magnitude 8.9.

**Additional, technical, non-public information:** Magnitude is on a log scale, so 9 is 10 times bigger than an 8.

### 3) Has this changed our perception of Earthquake risk?

**Public Answer:** This does not change the NRC's perception of earthquake hazard (i.e. ground shaking) at US plants. It is too early to tell what the lessons from this earthquake are from an engineering perspective. The NRC will look closely at all aspects of response of the plants 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.

**Additional, technical, non-public information:** We expect that there would be lessons learned and we may need to seriously relook at common cause failures, including dam failure and tsunami.

### 4) What magnitude earthquake are US plants designed to?

**Public Answer:** Each plant is designed to a ground-shaking level 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 an earthquake and the distance from the fault to the site. 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. Several tables that include plant design ground motions are provided as the first table in the "additional information" section of this document.

**Additional, technical non-public information:** In the past, "deterministic" or "scenario based" analyses were used to determine ground shaking (seismic hazard) levels. Now a probabilistic method is used that accounts for possible earthquakes of various magnitudes that come from potential sources (including background seismicity) and the likelihood that each particular hypothetical earthquake occurs.

**5) How many US reactors are located in active earthquake zones (and which reactors)?**

**Public Answer:** Although we often think of the U.S. as having “active” and “non-active” earthquake zones, earthquakes can actually happen almost anywhere. Seismologists typically separate the U.S. into low, moderate, and high seismicity zones. The NRC requires that every plant be designed for site-specific ground motions that are appropriate for their locations. In addition, the NRC has specified a minimum ground shaking level to which plants must be designed.

Seismic designs at U.S. nuclear power plants are developed in terms of seismic ground motion spectra, which are called the Safe Shutdown Earthquake ground motion response spectra (SSE). Each nuclear power plant is designed to a ground motion level that is appropriate for the geology and tectonics in the region surrounding the plant location. Currently operating nuclear power plants developed their SSEs based on a “deterministic” or “scenario earthquake” that accounts for the largest earthquake expected in the area around the plant.

Generally speaking, seismic activity in the regions surrounding U.S. plants is much lower than that for Japan since most U.S. plants are located in the interior of the stable continental U.S. However, the most widely felt earthquakes within the continental U.S. are the 1811-12 New Madrid sequence and the 1886 Charleston, SC, which were estimated to be between about magnitude 7.0 to 7.75. Nuclear power plants in the U.S. are sited far away from these two earthquake zones as well as other identified potential seismic sources.

On the west coast of the U.S., the two nuclear power plants are designed to specific ground motions from earthquakes of about magnitude 7+ on faults located just offshore of the plants. The earthquakes on these faults are mainly strike-slip (horizontal motion) type earthquakes, not subduction zone earthquakes. Therefore, the likelihood of a tsunami from these faults is remote.

**Additional, technical non-public information:** None.

**6) How many reactors are along coastal areas that could be affected by a tsunami (and which ones)?**

**Public 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.

**Additional, technical non-public information:** A table with information on tsunami design levels is provided in the “Additional Information” section of this document.

**7) If the earthquake in Japan was a larger magnitude than considered by plant design, why can't the same thing happen in the US?**

**Public response:** *Discuss in terms of, IPEEE, Seismic PRA to be provided by Niles*

**Additional, technical, non-public information:** ADD



- 8) If the earthquake in Japan was a larger magnitude than considered by plant design, why can't the same thing happen in the US?

**Public response:** *Discuss in terms of, IPEEE, Seismic PRA to be provided by Niles*

**Additional, technical, non-public information:** ADD

- 9) What if an earthquake like the Sendai earthquake occurred near a US plant?

**Public response:** ADD

**Additional, technical, non-public information:** ADD

- 10) What would be the results of a tsunami generated off the coast of a US plant? (Or why are we confident that large tsunamis will not occur relatively close to US shores?)

**Public response:** *Request for answer by Henry Jones, Goutam Bagchi and/or Richard Raione (once the tsunami fact sheet is done and you have time).*

**Additional, technical, non-public information:** ADD

- 11) Can this happen here i.e. an earthquake that significantly damages a nuclear power plant? Are the Japanese plants similar to U.S. plants?

**Public Answer:** All U.S. 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.

**Additional technical, non-public information:** Currently operating reactors were designed using a "deterministic" or "maximum credible earthquake" approach. Seismic hazard for the new plants is determined using a probabilistic seismic hazard assessment approach that explicitly addresses uncertainty, as described in Regulatory Guide 1.208. The NRC requires that adequate margin beyond the design basis ground shaking levels is assured. The NRC further enhances seismic safety for beyond-design-basis events through the use of a defense-in-depth approach.

In addition, the NRC reviews the seismic risk at operating reactors as needed when information may have changed. Over the last few years the NRC has undertaken a program called Generic Issue 199, which is focused on assessing hazard for plants in the central and eastern US using the latest techniques and data and determining the possible risk implications of any increase in the anticipated ground shaking levels. This program will help us assure that the plants are safe under exceptionally rare and extreme ground motions that represent beyond-design-basis events.

- 12) What level of earthquake hazard are the US reactors designed for?

**Public Answer:** Each reactor is designed for a different ground motion that is determined on a site-specific basis. 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. New reactors are designed using probabilistic techniques that characterize the hazard (i.e. ground shaking levels) and uncertainty at the proposed site. Ground motions from all potential seismic sources in the region are estimated and used to develop an appropriate site specific ground motion, which has a return period of 10,000 years on average over very long time periods.

**Additional technical, non-public information:** None

**13) Does the NRC consider earthquakes of magnitude 8.9?**

**Public Answer:** Earthquakes with very large magnitudes, such as the recent earthquake of the coast of Japan, occur only within subduction zones. Subduction zones are regions where one of the earth's tectonic plates is subducting beneath another. In the continental US, the only subduction zone is the Cascadia subduction zone, which lies off of the coast of northern California, Oregon, and Washington. The only nuclear power plant in that area is Columbia, which is far from the coast and the subduction zone.

Seismic designs at U.S. nuclear power plants are developed in terms of seismic ground motion spectra, which are called the Safe Shutdown Earthquake ground motion response spectra (SSE). Each nuclear power plant is designed to a ground motion level that is appropriate for the geology and tectonics in the region surrounding the plant location. Currently operating nuclear power plants developed their SSEs based on a "deterministic" or "scenario earthquake" basis that account for the largest earthquake expected in the area around the plant. Seismic activity in the regions surrounding U.S. plants is much lower than that for Japan since most U.S. plants are located in the interior of the stable continental U.S. The largest earthquakes within the continental U.S. are the 1811-12 New Madrid sequence and the 1886 Charleston, SC, which were estimated to be between about magnitude 7 to 7.5. Nuclear power plants in the U.S. are sited far away from these two earthquake zones as well as other potential seismic sources. On the west coast of the U.S., the two nuclear power plants are designed to specific ground motions from earthquakes of about magnitude 7 on faults located just offshore of the plants. The earthquakes on these faults are mainly strike-slip (horizontal motion) type earthquakes, not subduction zone earthquakes. Therefore, the likelihood of a tsunami from these faults is very remote.

**Additional technical, non-public information:** None.

**14) What are the definitions of the SSE and OBE?**

**CLEAN UP BELOW information – late question**

From RG1.208 Safe Shutdown Earthquake Ground Motion (SSE). The vibratory ground motion for which certain structures, systems, and components are designed, pursuant to Appendix S to 10 CFR Part 50, to remain functional. The SSE for the site is characterized by both horizontal and vertical free-field ground motion response spectra at the free ground surface

Appendix S to 10 CFR Part 50 (3) has the following information: Required Plant Shutdown. If vibratory ground motion exceeding that of the Operating Basis Earthquake Ground Motion or if significant plant damage occurs, the licensee must shut down the nuclear power plant. If systems, structures, or components necessary for the safe shutdown of the nuclear power plant are not available after the occurrence of the Operating Basis Earthquake Ground Motion, the licensee must consult with the Commission and must propose a plan for the timely, safe shutdown of the nuclear power plant. Prior to resuming operations, the licensee must demonstrate to the Commission that no functional damage has occurred to those features necessary for continued operation without undue risk to the health and safety of the public and the licensing basis is maintained.

The the ratio is provided in guidance as the ratio that the licensees can chose without additional analysis. The OBE mostly used to be half for existing plants, but now it's a 1/3 unless you do analyses to show why it should be 1/2.

<b>Definition of Safe Shutdown</b>	The safe-shutdown earthquake (SSE) for the site is the ground motion response spectra (GMRS), which also satisfies the minimum requirement of paragraph IV(a)(1)(i) of Appendix S,
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<b>Earthquake</b>	"Earthquake Engineering Criteria for Nuclear Power Plants," to Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," of the Code of Federal Regulations (10 CFR Part 50).
<b>Definition of Operating Basis Earthquake:</b>	<p>To satisfy the requirements of paragraph IV(a)(2)(A) of Appendix S to 10 CFR Part 50, the operating-basis earthquake (OBE) ground motion is defined as follows:</p> <ul style="list-style-type: none"> <li>(i) For the certified design portion of the plant, the OBE ground motion is one-third of the CSDRS.</li> <li>(ii) For the safety-related noncertified design portion of the plant, the OBE ground motion is one-third of the design motion response spectra, as stipulated in the design certification conditions specified in design control document (DCD).</li> <li>(iii) The spectrum ordinate criterion to be used in conjunction with Regulatory Guide 1.166, "Pre-Earthquake Planning and Immediate Nuclear Power Plant Operator Post-earthquake Actions," issued March 1997, is the lowest of (i) and (ii).</li> </ul>

**15) What is the likelihood of the ground motions occurring over the life of the plant?**

TO BE CLEANED UP BY MUNSON AND AKE

Assuming independent Poisson behavior, the relationship is---Return Period = Exposure Period/ $\ln(1/P)$ , where P=probability of non-exceedance, and exposure period is 50 years say. IF we plug 10,000 years for the return period we find that the probability of non-exceedance is .995, i.e. the probability of exceedance is 0.5%.

To properly emphasize the conservatism in our current process I suggest we refer to this as: our design ground motions are required to have an annual probability of exceedance of  $1E-4$  or less which alternatively can be viewed as a 0.5% probability of exceedance (or less) in a 50 year period.

Thanks for clarifying. I think in our effort to make this understandable that we sometimes don't consider all of the ramifications. I like using "about 0.5-1.0% probability of exceedance in 50 years" because that provides a straight comparison to the USGS hazard maps

The point you make is quite true and part of my concern. However, keep in mind we interested in the ground motions that are possibly going to happen in the design life of the plant (a few years to a few decades). We want ensure that the design ground motions have a very low probability of being exceeded (i.e.  $1E-4$  AFE is equal to about 0.5-1.0% probability of exceedance in 50 years). Use of the "10,000 year ground motion" invites goofy questions like "how can we guarantee consistency in seismic/tectonic characteristics over 10,000 or 100,000 years?", as well as potential sampling issues, i.e. how do we sample a few years and estimate behavior over 10,000? I think it best to just leave it at  $1E-4$  or 0.5% in 50 years or some way to express it that is consistent with our intended use.

**16) What is magnitude anyway? What is the Richter Scale? What is intensity?**

17)

## Design Against Natural Hazards & Plant Safety in the US

### 18) Are power plants designed for Tsunami's?

**Public 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.)

**Additional, technical, non-public information:** Tsunami are considered in the design of US nuclear plants. Nuclear plants are designed to withstand flooding from not only tsunami, but also hurricane and storm surge; therefore there is often significant margin against tsunami flooding. However, it should be noted that Japanese experience has shown that drawdown can be a significant problem.

Currently the US NRC has a tsunami research program that is focused on developing modern hazard assessment techniques and additional guidance through cooperation with the National Oceanic and Atmospheric Administration and the United States Geological Survey. This has already lead to several technical reports and an update to NUREG 0-800. The NOAA and USGS contractors are also assisting with NRO reviews of tsunami hazard. A new regulatory guide on tsunami hazard assessment is currently planned in the office of research, although it is not expected to be available in draft form until 2012.

### 19) What level of Tsunami are we designed for?

**Public 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.

**Additional, technical, non-public information:** None.

### 20) How was the seismic design basis for an existing nuclear power plant established?

**Public Answer:** 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*. 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>).

**Additional, technical, non-public information:** See discussion at end of GI-199 section for discussion of safety margin and design basis.

### 21) Is there margin above the design basis?

**Public Answer:** Yes, there is margin beyond the design basis). In the mid to late 1990s, NRC staff reviewed the plants' assessments of potential consequences of severe earthquakes (earthquakes beyond the safety margin included in each plant's design basis), which licensees performed 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.

**Additional, technical, non-public information:** None.

**22) Are US plants safe?**

**Public Answer:** US plants are designed for appropriate earthquake shaking levels and are safe. Currently the NRC is also conducting a program called Generic Issue 199, which is reviewing the adequacy of earthquake design of US NPPs in the central and eastern North America based on the latest data and analysis techniques.

**Additional, technical, non-public information:** None.

**23) Was the Japanese plant designed for this type of accident? Are US plants?**

**Public Answer:** Plants in both the US and Japan area 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.

**Additional, technical, non-public information:** None.

**24) Why do we have confidence that US nuclear power plants are adequately designed for earthquakes and tsunamis?**

**Public Answer:** Plants in both the US and Japan area 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.

**Additional, technical, non-public information:** None.

**25) Can this happen here i.e. an earthquake that significantly damages a nuclear power plant? Are the Japanese plants similar to U.S. plants?**

**Public Answer:** All U.S. 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. Nuclear power plants are designed to be safe based on the most severe natural phenomena historically reported for the site and surrounding area. The Japanese facilities are similar in design to several US facilities.

**Additional technical, non-public information:** Currently operating reactors were designed using a "deterministic" or "maximum credible earthquake" approach. Seismic hazard for the new plants is determined using a probabilistic seismic hazard assessment approach that explicitly addresses uncertainty, as described in Regulatory Guide 1.208. The NRC requires that adequate margin beyond the design basis ground shaking levels is assured. The NRC further enhances seismic safety for beyond-design-basis events through the use of a defense-in-depth approach.

In addition, the NRC reviews the seismic risk at operating reactors as needed when information may have changed. Over the last few years the NRC has undertaken a program called Generic Issue 199, which is focused on assessing hazard for plants in the central and eastern US using the latest techniques and data and is determining the possible risk implications of any increase in the anticipated ground shaking levels. This program will help us assure that the plants are safe under exceptionally rare and extreme ground motions that represent beyond-design-basis events.

The reactor design is a Boiling Water Reactor that is similar to some U.S. designs, including Oyster Creek, Nine Mile Point and Dresden Units 2 and 3.

**26) Are US plants susceptible to the same sort of loss of all power?**

**Public response:** *ADD. Can someone discuss how we deal with station blackout? I need help with this one...*

**Additional, technical, non-public information:** ADD

**27) Could an accident like the one at Japan's Fukushima Daiichi nuclear plant happen in the United States?**

**Public response:** It is difficult to answer this question until we have a better understanding of the precise problems and conditions that faced the operators at Fukushima Daiichi. We do know, however, that Fukushima Daiichi Units 1-3 lost all offsite power and emergency diesel generators. This situation is called "station blackout." U.S. nuclear power plants are designed to cope with a station blackout event that involves a loss of offsite power and onsite emergency power. The Nuclear Regulatory Commission's detailed regulations address this scenario. U.S. nuclear plants are required to conduct a "coping" assessment and develop a strategy to demonstrate to the NRC that they could maintain the plant in a safe condition during a station blackout scenario. These assessments, proposed modifications and operating procedures were reviewed and approved by the NRC. Several plants added additional AC power sources to comply with this regulation.

In addition, U.S. nuclear plant designs and operating practices since the terrorist events of September 11, 2001, are designed to mitigate severe accident scenarios such as aircraft impact, which include the complete loss of offsite power and all on-site emergency power sources.

U.S. nuclear plant designs include consideration of seismic events and tsunamis'. It is important not to extrapolate earthquake and tsunami data from one location of the world to another when evaluating these natural hazards. These catastrophic natural events are very region- and location-specific, based on tectonic and geological fault line locations.

**Additional technical, non-public information:** None

**28) Should U.S. nuclear facilities be required to withstand earthquakes and tsunamis of the kind just experienced in Japan? If not, why not?**

**Public response:** U.S. nuclear reactors are designed to withstand an earthquake equal to the most significant historical event or the maximum projected seismic event and associated tsunami without any breach of safety systems.

The lessons learned from this experience must be reviewed carefully to see whether they apply to U.S. nuclear power plants. It is important not to extrapolate earthquake and tsunami data from one location of the world to another when evaluating these natural hazards, however. These catastrophic natural events are very region- and location-specific, based on tectonic and geological fault line locations.

The U.S. Geological Survey (USGS) conducts continuous research of earthquake history and geology, and publishes updated seismic hazard curves for various regions in the continental US. These curves are updated approximately every six years. NRC identified a generic issue (GI-199) that is currently undergoing an evaluation to assess implications of this new information to nuclear plant sites located in the central and eastern United States. The industry is working with the NRC to address this issue.

**Additional technical, non-public information:** None

**29) Can you summarize the plant seismic design basis for the US plants? Are there any special issues associated with seismic design?**

**Public response:** Please see one of the several tables provided in the "Additional information" section of this document

**Additional, technical, non-public information:** None

**30) How do we know that the equipment in plants is safe in earthquakes?**

**Public response:** All equipment important to safety (required to safely shutdown a nuclear power plant) is qualified to withstand earthquakes in accordance with plants' licensing basis and NRC regulations.

**Additional, technical, non-public information:** 10 CFR 50, Appendix A, General Design Criterion 2 and 4, 10 Part 100, and Appendix S. Guidance: Regulatory Guides 1.100, IEEE 344 and ASME QME-1

**31) How do we know equipment will work if the magnitude is bigger than expected, like in Japan?**

**Public response:** Plant systems are designed to mitigate a design basis earthquake which includes margin above the postulated site specific earthquake. (reviewers comment: this needs to be expanded)

**Additional, technical, non-public information:** See part 100 Reactor Site Criteria

**32) Are US plants susceptible to the same kind of loss of power as happened in Japan?**

**Public response:** Yes in the sense that sites can lose offsite power. Also, hurricane or tornado related high winds may potentially damage the transmission network in the vicinity of a nuclear plant. Flood waters can also 'affect transformers used to power station auxiliary system. These types of weather related events have the potential to degrade the offsite power source to a plant.

The onsite Emergency Diesel Generators need fuel oil stored in tanks that are normally buried underground. These tanks and associated pumps/piping require protection from the elements.

Above ground tanks have tornado/missile protection.

In case both offsite and onsite power supplies fail, NRC has required all licensee to evaluate for a loss of all AC power (station blackout) scenario and implement coping measures to safely shutdown the plant law 10 CFR 50.63.

**Additional, technical, non-public information:** Some plants have safeguards equipment below sea level and rely on watertight doors or Bilge pumps to remove water from equipment required to support safe shutdown. Overflowing rivers can result in insurmountable volume of water flooding the vulnerable areas.

**33) How do we know that the EDGs in Diablo Canyon and SONGS will not fail to operate like in Japan?**

**Public response:** EDGs are installed in a seismically qualified structure. Even if these EDGs fail, plants can safely shutdown using station blackout power source law 10 CFR 50.63.

**Additional, technical, non-public information:** None.

**34) Is all equipment at the plant vulnerable to tsunami?**

**Public response:** Plants are designed iaw GDC 2 to withstand protection against natural phenomena such as tsunami, earthquakes. (reviewers comment: this needs to be expanded. I need assistance with this)

**Additional, technical, non-public information:** ADD

**35) What protection measures do plants have against tsunami?**

**Public response:** Plants are designed iaw GDC 2 to withstand protection against natural phenomena such as tsunami, earthquakes. (note from reviewer: add information on breakwater from songs and Diablo example. I need assistance with this)

**Additional, technical, non-public information:** ADD

**36) Is there a risk of loss of water during tsunami drawdown? Is it considered in design?**

**Public response:** *Goutam, Henry and Rich, can you guys answer this?*

**Additional, technical, non-public information:** ADD

**37) Are nuclear buildings built to withstand earthquakes? What about tsunami?**

**Public response:** *There is language elsewhere in this document that answers that...copy here.*

**Additional, technical, non-public information:** ADD

**38) Are aftershocks considered in the design of equipment at the plants? Are aftershocks considered in design of the structure?**

**Public response:** ADD

**Additional, technical, non-public information:** ADD

**39) Are there any special issues associated with seismic design at the plants? For example, Diablo Canyon has special requirements. Are there any others?**

**Public response:** Both SONGS and Diablo canyon are licensed with an automatic trip for seismic events. *(can this be expanded? any others?) Mike Markley, can your group assist with this?*

**Additional, technical, non-public information:** ADD

**40) Is the NRC planning to require seismic isolators for the next generation of nuclear power plants? How does that differ from current requirements and/or precautions at existing U.S. nuclear power plants?**

**Public response:** The NRC would not require isolators for the next generation of plants. However, it is recognized that a properly designed isolation system can be very effective in mitigating the effect of earthquake. Currently the NRC is preparing guidance for plant designers considering the use of seismic isolation devices.

**Additional, technical, non-public information:** A NUREG is in the works in the office of research. It is expected to be available for comment in 2011.



**41) Are there any U.S. nuclear power plants that incorporate seismic isolators? What precautions are taken in earthquake-prone areas?**

**Public response:** No currently constructed nuclear power plants in the US use seismic isolators. However seismic isolation is being considered for a number of reactor designs under development. Currently seismic design of plants is focused on assuring that design of structures, systems, and components are designed and qualified to assure that there is sufficient margin beyond the design basis ground motion.

**Additional, technical, non-public information:** None.

**42) Do you think that the recent Japan disaster will cause any rethinking of the planned seismic isolation guidelines, particularly as it regards earthquakes and secondary effects such as tsunamis?**

**Public response:** Whenever an event like this happens, the NRC thoroughly reviews the experience and tries to identify any lessons learned. The NRC further considers the need to change guidance or regulations. In this case, the event will be studied and any necessary changes will be made to the guidance under development. However, it should be noted that Japan does not have seismically isolated nuclear plants.

**Additional, technical, non-public information:** None.

## About Japanese Hazard, Design and Earthquake Impact

### 43) Was the damage done to the plants from the Earthquake or the Tsunami?

**Public response:** It is hard to tell at this point. In the nuclear plants there seems to have been some damage from the shaking. However, the tsunami lead to some of the biggest problems in terms of the loss of backup power. This is also true in the general population; the tsunami seems to have lead to most of the deaths.

**Additional, technical, non-public information:** None

### 44) What is the design level of the Japanese plants? Was it exceeded?

**Public response:** As a result of a significant change in seismic regulations in 2006, the Japanese regulator initiated a program to reassess seismic hazard and seismic risk for all nuclear plants in Japan. This resulted in new assessments of higher ground shaking levels (i.e. seismic hazard) and a review of seismic safety for all Japanese plants. The program is still on-going, but has already resulted in retrofit in some plants. Therefore, it is useful to discuss both the design level and a review level ground motion for the plants, as shown below.

Currently we do not have official information. However, it appears that the ground motions (in terms of peak ground acceleration) are similar to the  $S_s$  shaking levels, although the causative earthquakes are different. Thus the design basis was exceeded, but the review level may not have been.

**Table: Original Design Basis Ground Motions ( $S_2$ ) and New Review Level Ground Motions ( $S_s$ ) Used for Review of Japanese Plants**

Plant sites	Contributing earthquakes used for determination of hazard	New DBGM $S_s$	Original DBGM $S_1$
Onagawa	Soutei Miyagiken-oki (M8.2)	580 gal (0.59g)	375 gal (0.38g)
Fukushima	Earthquake near the site (M7.1)	600 gal (0.62g)	370 gal (0.37g)
Tokai	Earthquakes specifically undefined	600 gal (0.62g)	380 gal (0.39g)
Hamaoka	Assumed Tokai (M8.0), etc.	800 gal (0.82g)	600 gal (0.62g)

**Additional, technical, non-public information:** None

### 45) What are the Japanese $S_1$ and $S_s$ ground motions and how are they determined?

**Public response:** Japanese nuclear power plants are designed to withstand specified earthquake ground motions, previously specified as  $S_1$  and  $S_2$ , but now simply  $S_s$ . The design basis earthquake ground motion  $S_1$  was defined as the largest earthquake that can reasonably be expected to occur at the site of a nuclear power plant, based on the known seismicity of the area and local faults that have shown activity during the past 10,000 years. A power reactor could continue to operate safely during an  $S_1$  level earthquake, though in practice they are set to trip at lower levels. The  $S_2$  level ground motion was based on a larger earthquake from faults that have shown activity during the past 50,000 years and assumed to be closer to the site. The revised seismic regulations in May 2007 replaced  $S_1$  and  $S_2$  with  $S_s$ .

The S<sub>5</sub> design basis earthquake is based on evaluating potential earthquakes from faults that have shown activity during the past 130,000 years. The ground motion from these potential earthquakes are simulated for each of the sites and used to determine the revised S<sub>5</sub> design basis ground motion level. Along with the change in definition, came a requirement to consider “residual risk”, which is a consideration of the beyond-design-basis event.

**Additional, technical, non-public information:** None

**46) Did this earthquake affect Kashiwazaki-Kariwa NPP?**

**Public response:** No, this earthquake did not affect Kashiwazaki-Kariwa NPP and all reactors remained in their pre-earthquake operating state. It also did not trip during an earthquake of magnitude XX that occurred on the western side subsequent to the 8.9 earthquake. This is very important for the stability of Japan’s energy supply due to the loss of production at TEPCO’s Fukushima NPPs.

**Additional, technical, non-public information:** None

**47) How high were the tsunami at the plants?**

**Public response:** The actual tsunami height at the plants is not currently known. However, NOAA has publically information on the recordings at sea for many areas.

**Additional, technical, non-public information:** A preliminary rough estimate of tsunami height at the plant locations was provided to NRC by NOAA shortly after the earthquake. This was developed using NOAA’s global ocean model and is shown in the “additional information” section. Most notably, there was a 6 meter wave at Fukushima and the wave at Onogawa may have been between 18 and 23 meters.

## What happened in US Plants during the earthquake?

**48) Was there any damage to U.S. reactors from either the earthquake or the resulting tsunami?**

**Public Answer:** No

**Additional, technical non-public information:** Two US plants on the Pacific Ocean (Diablo Canyon and San Onofre) experienced higher than normal sea level due to tsunami. However, the wave heights were consistent with previously predicted levels and this had no negative impact to the plants. In response, Diablo Canyon Units 1 and 2 declared an "unusual event" based on tsunami warning following the Japanese earthquake. They have since exited the "unusual event" declaration, based on a downgrade to a tsunami advisory.

**49) Have any lessons for US plants been identified?**

**Public Answer:** The NRC is in the process of following and reviewing the event in real time. This, inevitably, leads to the indemnification of lessons that warrant further study. However, a complete understanding of lessons learned requires more information than is currently available to NRC staff.

**Additional, technical non-public information:** We need to take a closer look at common cause failures, such as earthquake and tsunami, and earthquake and dam failure.

## Future Actions, Reassessment of US Plants and GI-199

### **50) What is the NRC doing about the emergencies at the nuclear power plants in Japan? Are you sending staff over there?**

**Public Answer:** We are closely following events in Japan, working with other agencies of the federal government, and have been in direct contact with our counterparts in that country. In addition, we are ready to provide assistance if there is a specific request. An NRC staffer is participating in the USAID team headed to Japan.

**Additional technical, non-public information:** We are taking the knowledge that the staff has about the design of the US nuclear plants and we are applying this knowledge to the Japan situation. For example, this includes calculations of severe accident mitigation that have been performed.

### **51) With NRC moving to design certification, at what point is seismic capability tested – during design or modified to be site-specific? If in design, what strength seismic event must these be built to withstand?**

**Public Answer:** During design certification, vendors propose a seismic design in terms of a ground motion spectrum for their nuclear facility. This spectrum is called a standard design response spectrum and is developed so that the proposed nuclear facility can be sited at most locations in the central and eastern United States. The vendors show that this design ground motion is suitable for a variety of different subsurface conditions such as hard rock, deep soil, or shallow soil over rock. Combined License and Early Site Permits applicants are required to develop a site specific ground motion response spectrum that takes into account all of the earthquakes in the region surrounding their site as well as the local site geologic conditions. Applicants estimate the ground motion from these postulated earthquakes to develop seismic hazard curves. These seismic hazard curves are then used to determine a site specific ground motion response spectrum that has a maximum annual likelihood of  $1 \times 10^{-4}$  of being exceeded. This can be thought of as a ground motion with a 10,000 year return period. This site specific ground motion response spectrum is then compared to the standard design response spectrum for the proposed design. If the standard design ground motion spectrum envelopes the site specific ground motion spectrum then the site is considered to be suitable for the proposed design. If the standard design spectrum does not completely envelope the site specific ground motion spectrum, then the COL applicant must do further detailed structural analysis to show that the design capacity is adequate. Margin beyond the standard design and site specific ground motions must also be demonstrated before fuel loading can begin.

**Additional technical, non-public information:** None.

**52) Is the earthquake safety of US plants reviewed once the plants are constructed?**

**Public response:** Yes, earthquake safety is reviewed during focused design inspections, under the Generic Issues Program (GI-199) and as part of the Individual Plant Evaluation of External Events program (IPEEE) that was conducted in response to Generic Letter 88-20 Supplement 4.

**Additional, technical, non-public information:** None.

**53) Does the NRC ever review tsunami risk for existing plants?**

**Public Answer:** The NRC has not conducted a generic issue program on tsunami risk to date. However, some plants have been reviewed as a result of the application for a license for a new reactor. In the ASME/ANS 2009 seismic probabilistic risk assessment standard, all external hazards are included.

**Additional, technical, non-public information:** None.

**54) Does GI-199 consider tsunami?**

**Public response:** GI-199 stems from the increased in perceived seismic hazard focused on understanding the impact of increased ground motion on the risk at a plant. GI-199 does not consider tsunami

**Additional, technical, non-public information:** In the past there has been discussion about a GI program on tsunami, but the NRC's research and guidance was not yet at the point it would be effective. We are just getting to this stage and the topic should be revisited.

**55) What is Generic Issue 199 about?**

**Public Answer:** 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 for some nuclear power plants in the Central and Eastern United States is still low, but larger than previous estimates.

**Additional, technical, non-public information:** See additional summary/discussion of GI-199 and terms below.

**56) Where can I get current information about Generic Issue 199?**

**Public Answer:** 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 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 provides data and results that are publicly available at <http://earthquake.usgs.gov/hazards/products/conterminous/2008/>.

**Additional, technical, non-public information:** 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.

**57) How was the seismic design basis for an existing nuclear power plant established?**

**Public Answer:** 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*. 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>).

**Additional, technical, non-public information:** See discussion at end of GI-199 section for discussion of safety margin and design basis.

**58) Is there margin above the design basis?**

**Public Answer:** Yes, there is margin beyond the design basis. In the mid to late 1990s, NRC staff reviewed the plants' assessments of potential earthquakes beyond the safety margin included in each plant's design basis), which licensees performed 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 Central and Eastern United States have considerable safety margins, for withstanding earthquakes, built into the designs.

**Additional, technical, non-public information:** The goal of seismic engineering is to design structures, systems and components that explicitly do not fail at the design level. The application of specific codes, standards, and analysis techniques results in margin beyond the design level. The assessments carried out as part of the IPEEE program demonstrated that margin exists in the operating reactors against seismic demand.

**59) Are all U.S. plants being evaluated as a part of Generic Issue 199?**

**Public Answer:** 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.

**Additional, technical, non-public information:** The staff is currently developing specific information needs to be included in a Generic Letter to licensees in the CEUS.

**60) 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?**

**Public Answer:** Yes, currently operating nuclear plants in the United States remain safe, with no need for immediate action. This determination is based on NRC staff reviews associated with Early Site Permits and updated seismic hazard information, 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 program; (2) the probability of exceeding the *safe shutdown earthquake* ground motion may have increased at some sites, but only by a relatively small amount; and (3) 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 (Management Directive 6.4) direct staff to continue their analysis to determine whether any cost-justified plant improvements can be identified to make plants enhance plant safety.

**Additional, technical, non-public information :** 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,  $4 \times 10^{-4}$  (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 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.

**61) What do you mean by “increased estimates of seismic hazards” at nuclear power plant sites?**

**Public Answer:** *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).

**Additional, technical, non-public information:** See additional discussion of terms below.

**62) 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



**Public Answer:** 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).

**Seismic margin** – The difference between a plant's capacity and its seismic design basis (*safe shutdown earthquake*, or *SSE*).

**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*.

**63) Let's say there's an estimate expressed as "2.5E-06." (I'm looking at Table D-2 of the safety/risk assessment of August 2010.) I believe that this expression means the same as  $2.5 \times 10^{-6}$ , or 0.0000025, or 2.5 divided by one million. In layman's terms, that means an expectation, on average, of 2.5 events every million years, or once every 400,000 years. Similarly, "2.5E-05" would be 2.5 divided by 100,000, or 2.5 events every 100,000 years, on average, or once every 40,000 years. Is this correct?**

**Public Response:** Yes, at least partly. In the subject documents the frequencies for core damage or ground motion exceedance have been expressed in the form "2.5E-06". As you noted this is equivalent to  $2.5 \times 10^{-6}$ , or 0.000025 per year. If, for example, the core damage frequency was estimated as 2.5E-06, this would be equivalent to an expectation of 2.5 divided by a million per year. It is not really correct to think of these values as "once every 400,000 years," the two numbers are mathematically equivalent but do not convey the same statistical meaning within this context. Rather, you could characterize it as 1 in 400,000 per year of something occurring.

**Additional, technical, non-public information:** None

**64) The GI-199 documents give updated probabilistic seismic hazard estimates for existing nuclear power plants in the Central and Eastern U.S. What document has the latest seismic hazard estimates (probabilistic or not) for existing nuclear power plants in the Western U.S.?**

**Public Response:** At this time the staff has not formally developed updated probabilistic seismic hazard estimates for the existing nuclear power plants in the Western U.S. However, NRC staff during the mid- to late-1990's reviewed the plants' assessments of potential consequences of severe ground motion from earthquakes beyond the plant design basis as part of the Individual Plant Examination of External Events (IPEEE) program. From this review, the NRC staff determined that the seismic designs of operating plants in the U.S. have adequate safety margin. NRC staff has continued to stay abreast of the latest research on seismic hazards in the Western U.S. and interface with colleagues at the U.S. Geological Survey. The focus of Generic Issue 199 has been on the CEUS. However, the Information Notice that summarized the results of the Safety/Risk Assessment was sent to all existing power reactor licensees. The documents that summarize existing hazard estimates are contained in the Final Safety Analysis Reports (FSARS) and in the IPEEE submittals. It must be noted that following 9/11 the IPEEE documents are no longer publicly available.

**Additional, technical, non-public information:** None

**65) The GI-199 documents refer to newer data on the way. Have NRC, USGS et al. released those? I'm referring to this: "New consensus seismic-hazard estimates will become available in late 2010 or early 2011 (these are a product of a joint NRC, U.S. Department of Energy, U.S. Geological Survey (USGS) and Electric Power Research Institute (EPRI) project). These consensus seismic hazard estimates will supersede the existing EPRI, Lawrence Livermore National Laboratory, and USGS hazard estimates used in the GI-199 Safety/Risk Assessment."**

**Public Response:** The new consensus hazard curves are being developed in a cooperative project that has NRC, U.S. Department of Energy, U.S. Geological Survey (USGS) and Electric Power Research Institute (EPRI) participation. The title is: the Central and Eastern U.S. Seismic Source Characterization (CEUS-SSC) project. The project is being conducted following comprehensive standards to ensure quality and regulatory defensibility. It is in its final phase and is expected to be publicly released in the fall of 2011. The project manager is Larry Salamone (Lawrence.salamone@srs.gov, 803-645-9195) and the technical lead on the project is Dr. Kevin Coppersmith (925-974-3335, [kcoppersmith@earthlink.net](mailto:kcoppersmith@earthlink.net)).

Additional information on this project can be found at: <http://mydocs.epri.com/docs/ANT/2008-04.pdf>, and [http://my.epri.com/portal/server.pt?open=512&objID=319&&PageID=218833&mode=2&in\\_hi\\_us\\_erid=2&cached=true](http://my.epri.com/portal/server.pt?open=512&objID=319&&PageID=218833&mode=2&in_hi_us_erid=2&cached=true).

**Additional, technical, non-public information:** None

**66) What is the timetable now for consideration of any regulatory changes from the GI-199 research?**

**Public Response:** The NRC is working on developing a Generic Letter (GL) to request information from affected licensees. The GL will likely be issued in a draft form within the next 2 months to stimulate discussions with industry in a public meeting. After that it has to be approved by the Committee to Review Generic Requirements, presented to the Advisory Committee on Reactor Safeguards and issued as a draft for formal public comments (60 days). After evaluation of the public comments it can then be finalized for issuance. We expect to issue the GL by the end of this calendar year, as the new consensus seismic hazard estimates become available. 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.

**Additional, technical, non-public information:** None

## **Seismic Probabilistic Risk Assessment (SPRA)**

**67) The NRC increasingly uses risk-information in regulatory decisions. Are risk-informed PRAs useful in assessing an event such as this?**

**Public response:** Niles Chokshi to provide Q&As on SPRA

**Additional, technical, non-public information:** None

## Plant-Specific Questions

### SONGS questions

Note, these were added 3/15 and have not yet been reviewed.

**68) SONGS received a white finding in 2008 for 125VDC battery issue related to the EDGs that went undetected for 4 years. NRC issued the white finding as there was increased risk that one EDG may not have started due to a low voltage condition on the battery on one Unit (Unit 2). Aren't all plants susceptible to the unknown? Is there any assurance the emergency cooling systems will function as desired in a Japan-like emergency?**

**Public response:** The low voltage condition was caused by a failure to properly tighten bolts on a electrical breaker that connected the battery to the electrical bus that would be relied on to start the EDG in case of a loss of off-site power. This was corrected immediately on identification and actions taken to prevent its reoccurrence. The 3 other EDGs at SONGS were not affected.

**Additional, technical, non-public information:** None

**69) Has the earthquake hazard at SONGS been reviewed like DCNPP is doing? Are they planning on doing an update before relicensing?**

**Public Answer:** Relicensing does not evaluate the potential change to seismic siting of a plant. If there is a seismic design concern, it would be addressed for the plant as it is currently operating.

The closest active fault is approximately five miles offshore from San Onofre, a system of folds and faults exist called the OZD. The Cristianitos fault is ½ mile southeast, but is an inactive fault. Other faults such as the San Andreas and San Jacinto, which can generate a larger magnitude earthquake, are far enough away that they would produce ground motions less severe than the OZD for San Onofre.

Past history relative to nearby major quakes have been of no consequences to San Onofre. In fact, three major earthquakes from 1992 to 1994 (Big Bear, Landers and Northridge), ranging in distance from 70-90 miles away and registering approximately 6.5 to 7.3 magnitude, did not disrupt power production at San Onofre. The plant is expected to safely shutdown if a major earthquake occurs nearby. Safety related structures, systems and components have been designed and qualified to remain functional and not fail during and after an earthquake.

**Additional, technical, non-public information:** None

**70) Is possible to have a tsunami at songs that is capable of damaging the plant?**

**Public Information:** The San Onofre Units 2 and 3 plant grade is elevation +30.0 feet MLLW. The controlling tsunami for San Onofre occurring during simultaneous high tide and storm surge produces a maximum runup to elevation +15.6 feet MLLW at the Unit 2 and 3 seawall. When storm waves are superimposed, the predicted maximum runup is to elevation +27 MLLW. Tsunami protection for the SONGS site is provided by a reinforced concrete seawall constructed to elevation +30.0 MLLW. A tsunami greater than this height is extremely unlikely.

**Additional, technical, non-public information:** None

**71) Does SONGS have an emergency plan for tsunami?**

**Public Response:** The SONGS emergency plan does initiate the emergency response organization and results in declaration of emergency conditions via their EALs. The facility would then make protective

action recommendations to the Governor, who would then decide on what protective actions would be ordered for the residents around SONGS.

**Additional, technical, non-public information:** None

**72) Has evacuation planning at SONGS considered tsunami?**

**Public Response:** These considerations would be contained in the State and local (City, County) emergency plans, which are reviewed by FEMA. FEMA then certifies to the NRC that they have "reasonable assurance" that the off-site facilities can support operation of SONGS in an emergency.

**Additional, technical, non-public information:** None

**73) Is SONGS designed against tsunami and earthquake?**

**Public Response:** Yes. SONGS is designed against both tsunami and earthquake.

**Additional, technical, non-public information:** None

**74) What is the height of water that SONGS is designed to withstand?**

**Public Response:** 30 feet. Information for all plants can be found in the "Additional Information" section of this document.

**Additional, technical, non-public information:** None

**75) What about drawdown and debris?**

**Public Response:** *Good question...can HQ answer? Goutam, Henry, or Rich...can you help with this one?*

**Additional, technical, non-public information:** None

**76) Will this be reviewed in light of the Japan quake.**

**Public Response:** The NRC will do a thorough assessment of the lessons learned from this event and will review all potential issues at US nuclear plants as a result.

**Additional, technical, non-public information:** None

**77) Could all onsite and offsite power be disrupted from SONGS in the event of a tsunami, and if that happened, could the plant be safely cooled down if power wasn't restored for days after?**

**Public Response:** Seismic Category I equipment is equipment that is essential to the safe shutdown and isolation of the reactor or whose failure or damage could result in significant release of radioactive material. All Seismic Category I equipment at SONGS is designed to function following a DBE with ground acceleration of 0.67g.

The operating basis earthquake (1/2 of the DBE) is characterized by maximum ground shaking of 0.33g. Historically, even this level of ground shaking has not been observed at the site. Based on expert analysis, the average recurrence interval for 0.33g ground shaking at the San Onofre site would be in excess of 1000 years and, thus, the probability of occurrence in the 40-year design life of the plant would be less than 1 in 25. The frequency of the DBE would be much more infrequent, and very unlikely to occur during the life of the plant. Even if an earthquake resulted in greater than the DBE movement/acceleration at SONGS, the containment structure would ultimately protect the public from harmful radiation release, in the event significant damage occurred to Seismic category 1 equipment.

**Additional, technical, non-public information:** None

**78) Are there any faults nearby SONGS that could generate a significant tsunami?**

**Public Response:** Current expert evaluations estimate a magnitude 7 earthquake about 4 miles from SONGS. This is significantly less than the Japan quake, and SONGS has been designed to withstand this size earthquake without incident. Should discuss the different tectonic nature (not a subduction zone like Japan)?

**Additional, technical, non-public information:** None

**79) What magnitude or shaking level is SONGS designed to withstand? How likely is an earthquake of that magnitude for the SONGS site?**

**Public Response:** The design basis earthquake (DBE) is defined as that earthquake producing the maximum vibratory ground motion that the nuclear power generating station is designed to withstand without functional impairment of those features necessary to shut down the reactor, maintain the station in a safe condition, and prevent undue risk to the health and safety of the public. The DBE for SONGS was assessed during the construction permit phase of the project. The DBE is postulated to occur near the site (5 miles), and the ground accelerations are postulated to be quite high (0.67g), when compared to other nuclear plant sites in the U.S (0.25g or less is typical for plants in the eastern U.S.). Based on the unique seismic characteristics of the SONGS site, the site tends to amplify long-period motions, and to attenuate short-period motions. These site-specific characteristics were accounted for in the SONGS site-specific seismic analyses.

**Additional, technical, non-public information:** None

**80) Could SONGS withstand an earthquake of the magnitude of the Japanese earthquake?**

**Public Response:** We do not have current information on the ground motion at the Japanese reactors. SONGS was designed for approximately a 7.0 magnitude earthquake 4 miles away. The Japanese earthquake was much larger (8.9), but was also almost 9 miles away. The local ground motion at a particular plant is significantly affected by the local soil and bedrock conditions. SONGS was designed (.67g) to withstand more than 2 times the design motion at average US plants.

**Additional, technical, non-public information:** None

**81) What about the evacuation routes at SONGS? How do we know they are reasonable?**

**Public Response:** FEMA reviews off-site evacuation plans formally every 2 years during a biennial emergency preparedness exercise. NRC evaluates on-site evacuation plans during the same exercise. Population studies are formally done every 10 years, and evacuation time estimates are re-evaluated at that time. FEMA reviews these evacuation plans, and will conclude their acceptability through a finding of "reasonable assurance" that the off-site facilities and infrastructure is capable of protecting public health and safety in the event of an emergency at SONGS. The next such exercise is planned for April 12, 2011.

**Additional, technical, non-public information:** None

**82) Regarding tsunami at Diablo and SONGS, is the tsunami considered separately from flooding in licensing? And from the design perspective, is the flood still the controlling event for those plants rather than the tsunami?**

Public response: See below

**83) What is the design level flooding for DNCPP and SONGS? Can a tsunami be larger?**

**Public response:** Both the Diablo Canyon (main plant) and SONGS are located above the flood level associated with tsunami. However, the intake structures and Auxiliary Sea Water System at Diablo canyon are designed for combination of tsunami-storm wave activity. SONGS has reinforced concrete cantilevered retaining seawall and screen well perimeter wall designed to withstand the design basis earthquake, followed by the maximum predicted tsunami with coincident storm wave action

**Additional, technical, non-public information:** None



## Diablo Canyon Questions

**84) Now after the Japan tragedy, will the NRC finally hear us (A4NR) and postpone DC license renewal until seismic studies are complete? How can you be sure that what happened there is not going to happen at Diablo with a worse cast quake and tsunami?**

**Public response:** ADD

**Additional, technical, non-public information:** ADD

**85) The evacuation routes at DCNPP see are not realistic. Highway 101 is small...and can you imagine what it will be like with 40K people on it? Has the evacuation plan been updated w/ all the population growth?**

**Public Response:** FEMA reviews off-site evacuation plans formally every 2 years during a biennial emergency preparedness exercise. NRC evaluates on-site evacuation plans during the same exercise. Population studies are formally done every 10 years, and evacuation time estimates are re-evaluated at that time. FEMA reviews these evacuation plans, and will conclude their acceptability through a finding of "reasonable assurance" that the off-site facilities and infrastructure is capable of protecting public health and safety in the event of an emergency at DCNPP.

**Additional, technical, non-public information:** None

**86) Are there local offshore fault sources capable of producing a tsunami with very short warning times?**

**Public Response:** ADD- question forwarded to region

**Additional, technical, non-public information:** ADD

**87) Are there other seismically induced failure modes (other than tsunami) that would yield LTSBO? Flooding due to dam failure or widespread liquefaction are examples.**

**Public Response:** ADD question forwarded to region

**Additional, technical, non-public information:** ADD

**88) Ramifications of beyond design basis events (seismic and tsunami) and potential LTSBO on spent fuel storage facilities?**

**Public Response:** ADD question forwarded to region

**Additional, technical, non-public information:** ADD

**89) Why did a Emergency Warning go out for a 'tsunami' that was only 6 ft high? Do these guys really know what they're doing? Would they know it if a big one was really coming? Crying wolf all the time doesn't instill a lot of confidence.**

**Public Response:** The warning system performed well. The 6 foot wave was predicted many hours before and arrived at the time it was predicted. Federal officials to accurately predicted the tsunami arrival time and size; allowing local official to take appropriate measures as they saw necessary to warn and protect the public. It should be understood that even a 6 foot tsunami is very dangerous. Tsunami have far more energy and power than wind-driven waves.

**Additional, technical, non-public information:** ADD

**90) How big did the Japanese think a quake/tsunami could be before 3/11? Why were they so wrong (assuming this quake/tsunami was bigger than what they had designed the plant for)?**

**Public Response:** ADD can HQ answer?

**Additional, technical, non-public information:** ADD

The Japanese were supposed to have one of the best tsunami warning systems around. What went wrong last week (both with the reactors and getting the people out...see #1, evacuation plan above)?

**Public Response:** ADD can HQ answer?

**Additional, technical, non-public information:** ADD

**91) Regarding tsunami at Diablo and SONGS, is the tsunami considered separately from flooding in licensing? And from the design perspective, is the flood still the controlling event for those plants rather than the tsunami?**

**Public Response:** Both the Diablo Canyon (main plant) and SONGS are located above the flood level associated with tsunami. However, the intake structures and Auxiliary Sea Water System at Diablo canyon are designed for combination of tsunami-storm wave activity. SONGS has reinforced concrete cantilevered retaining seawall and screen well perimeter wall designed to withstand the design basis earthquake, followed by the maximum predicted tsunami with coincident storm wave action

**Additional, technical, non-public information:** ADD

## Indian Point Questions

### 92) Why is Indian Point safe if there is a fault line underneath it?

**Public Response:** The Ramapo fault system, which passes through the Indian Point area, is a group of Mesozoic age faults, extending from southeastern New York to northern New Jersey, as well as further southwest. The fault system is composed of a series of southeast-dipping, northeast-striking faults. Various faults of the system contain evidence of repeated slip in various directions since Proterozoic time, including Mesozoic extensional reactivation. However, the USGS staff, who reviewed 31 geologic features in the Appalachian Mountains and Coastal Plain and compiled a National Database on Quaternary Faulting (Crone and Wheeler, 2000), listed the Ramapo fault system as low risk because the fault system lacks evidence for Quaternary slip. They further pointed out that the Ramapo fault system, and 17 other geologic features, "have little or no published geologic evidence of Quaternary tectonic faulting that could indicate the likely occurrence of earthquakes larger than those observed historically" (Wheeler and Crone, 2004). Among these faults, the Ramapo fault system is one of the three that underwent a paleoseismological study. In two trenches excavated across the Ramapo fault, no evidence of Quaternary tectonic faulting was found (Wheeler and Crone, 2000). Because the Ramapo fault system is relatively inactive, because the Indian Point plants are built on solid bedrock, and because the plants are designed to safely shutdown in the event of an earthquake of the highest intensity ever recorded in that area, the NRC has concluded that the risk of significant damage to the reactors due to a probable earthquake in the area is extremely small.

**Additional, technical, non-public information:** None.

## Questions for the Japanese

**NOTE: These were all collected from what we produced after the KKNPP earthquake. These need to be gone through and revised for this event. We should separate into high, medium and low priorities:**

**The below is pulled from an KKNPP summary...to be reviewed...**

What seismic monitoring equipment exists at the plants? Can we get the recordings from the  
Are there recordings of the tsunami at the plant location?  
What is the geology and soil profile at the plants?  
NOAA has a prediction of very large tsunami waves at Onagawa. Are these accurate?

**The below is pulled from an KKNPP summary...to be reviewed...**

DESIGN BASES: Exactly what is the design basis ground motion for each of the plants? Did it change through time (i.e. from the first plant to the seventh)? Where was the design basis motion defined, at the top of rock, at the ground surface, at the floor level or somewhere else? Were the site-specific geotechnical properties used in the development of the design basis ground motions for each plant?

SEISMIC HAZARDS: What assumptions were used in the seismic hazard evaluation to arrive at the design basis ground motions? What faults were considered, what magnitudes and geometries were assumed? What activity rates were assumed for both fault sources and "background" earthquakes?

OBSERVATIONS-GROUND MOTIONS: What ground motions were recorded and where were they recorded? Specifically, what free-field, in-structure and down-hole recordings were obtained? What are the locations of the instruments that obtained records? Did all the instruments respond as planned, or are there lessons to be learned? Can the digital data be shared with the NRC? Is there any way of evaluating how well the existing analysis methods predicted the observed motions at different points within the plant?

OBSERVATIONS-DAMAGE: What damage was observed at the plants? How well did equipment such as cranes perform? Were there observations of displacements of equipment from anchorages, were cracks observed in any of the buildings? How well did non-nuclear safety type of buildings and equipment perform? What types of geotechnical phenomena were observed, was there ground deformation/slope failures, lateral spreading or liquefaction near the facility? Did the ABWRs perform better or similar to the older designs?

**And another set from the KKNPP earthquake...to be reviewed...**

Please provide the following information in the time frame indicated:

Highest Priority Questions – as soon as possible

- A timeline describing the order of events and the individual plant responses to the earthquake
- Confirmation that all operating and shut down units achieved or maintained safe-shutdown conditions without manual operator intervention or complications. Did all safety-related systems respond to the seismic scram as designed? Please note if there were any unexpected plant responses to the event, including any spurious signals.
- A more detailed description of the impacts of the earthquake on the plant (e.g., what systems were involved, which pipes were damaged, where did the leakage occur (pipe wall, joints, fittings,,etc).
- A description of seismic instrumentation at the site and at each of the 7 units, soil/rock shear wave properties through depth, instrument location and mounting condition, all the recorded

data on the basis of unified starting time, such that the coherency of motion through the surface or the foundations and at depth can be determined

- Full spectrum seismic design basis for the plant.
- What actually caused the Unit 3B house transformer fire?

Additional Questions – please provide answers as more information is developed

- Damage to buildings, slope failures, intake structure failure, if any
- Behavior of cranes, cables and conduits
- Failures of any large pumps and valves, pipe mounted control or valve failure
- Instances of any relay or vibration sensitive components malfunctioning
- Nature of damage to service water and fire-suppression piping - their diameter, material they are made of including their elastic properties, design standards used for the piping design, nature of failure (at support, anchor motion, failure of anchors, subsidence differential movement etc)
- Were there any systems that changed state?
- Impact on physical security, and any vulnerabilities identified
- Were there any impacts on the grid because of the event?
- Please describe the switchyard performance?
- What emergency preparedness concerns have been identified as a result of the event?

3B Transformer Specific Questions – please respond when there is time and other issues have been addressed

- What are the primary and secondary voltages of the transformer?
- What type of transformer - liquid or dry-type (air-cooled)?
- Who was the manufacturer of the transformer?
- What are the physical dimensions of the transformer?
- How are the transformer coils restrained within the cabinet?
- What is the clearance between transformer energized component and cabinet?
- What is the relative displacement for connection between the high voltage leads and the first anchor point (adequate slack?) in the transformer?
- What was the natural frequency of the burned transformer, if known?
- What was the acceleration level (or the response spectrum, if available) at the support location of the burned transformer?
- What seismic requirements exist for the burned transformer? Was the transformer tested or analyzed to a specific acceleration or response spectra, and if so, what are they?
- Are there any of the same type of transformer installed at other locations in the plant?

## Additional Information

**Table of Design Basis Ground Motions for US Plants**

<b>Design Basis Earthquake Information</b>					
<b>Nuclear Plant By State/Location</b>	<b>Maximum Observed Or Inferred Intensity (MMI Scale)</b>	<b>Relative Distance Of Seismic Source</b>	<b>Design SSE Peak Acceleration, g</b>	<b>OBE Peak Acceleration, g</b>	<b>Soil Condition</b>
<b>New York</b>					
Fitzpatrick	VI	Near	0.15	0.08	Soil
Ginna 1	VIII/IX	>60 miles	0.2	0.08	Rock
Indian Point 2, 3	VII	Near	0.15	0.1	Rock
Nine Mile Point 1	IX-X	>60 miles	0.11	0.06	Rock
Nine Mile Point 2	VI	Near	0.15	0.075	Rock
<b>New Jersey</b>					
Salem 1,2	VII-VIII	Near	0.2	0.1	Deep Soil
<b>Connecticut</b>					
Millstone 1, 2, 3	VII	Near	0.17	0.07	Rock
<b>Vermont</b>					
Vermont Yankee	VI	Near	0.14	0.07	Rock
<b>Ohio</b>					
Davis Besse 1	VII	Near	0.15	0.08	Rock
Perry 1	VII	Near	0.15	0.08	Rock
<b>Georgia</b>					
Hatch 1, 2	VII	Near	0.15	0.08	Deep Soil
Vogtle 1, 2	VII-VIII	Near	0.2	0.12	Deep Soil
<b>Tennessee</b>					
Sequoyah 1, 2	VIII	Near	0.18	0.09	Rock
Watts Bar 1	VIII	Near	0.18	0.09	Rock
<b>California</b>					
San Onofre 2, 3	IX-X	Near	0.67	0.34	Soil
Diablo Canyon 1, 2	X-XI	Near	0.75	0.20	Rock
<b>Florida</b>					

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Crystal River 3	V	Near	0.10	0.05	Rock
St. Lucie 1, 2	VI	Near	0.10	0.05	Soil
Turkey Point 3, 4	VII	Near	0.15	0.05	Rock

### NOTES:

MMI=Modified Mercalli Intensity, a measure of observed/reported damage and severity of shaking.  
Relative distance measure used in FSAR to develop SSE acceleration, "Near" indicates distance less than 10 miles.

SSE=Safe Shutdown Earthquake ground motion, for horizontal acceleration, in units of earth's gravity, *g*.

OBE=Operating Basis Earthquake ground motion, level of horizontal acceleration, which if exceeded requires plant shutdown.

**Table of SSE, OBE and Tsunami Water Levels**

<b>Nuclear Plant Name By State/ Location</b>	<b>Safe Shutdown Earthquake (SSE) Peak Acceleration (g)</b>	<b>Operating Basis Earthquake (OBE) Peak Acceleration, (g)</b>	<b>Probable Maximum Tsunami OR Maximum Tsunami Water Level</b>
Alabama			
Browns Ferry	0.200	0.100	N/A (Non-Coastal)
Farley	0.100	0.050	N/A (Non-Coastal)
Arkansas			
Arkansas Nuclear	0.200		N/A (Non-Coastal)
Arizona			
Palo Verde	0.200	0.100	N/A (Non-Coastal)
California			
Diablo Canyon	0.400	0.200	The design basis maximum combined wave runup is the greater of that determined for near-shore or distantly-generated tsunamis, and results from near-shore tsunamis. For distantly-generated tsunamis, the combined runup is 30 feet For near-shore tsunamis, the combined wave runup is 34.6 feet, as determined by hydraulic model testing. The safety-related equipment is installed in watertight compartments to protect it from adverse sea wave events to elevation +48 feet above MLLW.
San Onofre	0.670	0.340	The controlling tsunami occurs during simultaneous high tide and storm surge produces a maximum runup to elevation +15.6 feet mean lower low water line (mllw) at the Unit 2 and 3 seawall. When storm waves are superimposed, the predicted maximum runup is to elevation +27 mllw. Tsunami protection for the SONGS site is provided by a reinforced concrete seawall constructed to elevation +30.0 mllw.
Connecticut			
Millstone	0.170	0.090	18 ft SWL
Florida			
Crystal River	0.050	0.025	N/A (Non-Coastal)



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Nuclear Plant Name By State/ Location	Safe Shutdown Earthquake (SSE) Peak Acceleration (g)	Operating Basis Earthquake (OBE) Peak Acceleration, (g)	Probable Maximum Tsunami OR Maximum Tsunami Water Level
St. Lucie	0.100	0.050	No maximum tsunami level, bounded by PMH surge of +18 MLW wave runup, with plant openings at +19.5 MLW
Turkey Point	0.150	0.050	No maximum tsunami level, bounded by PMH surge of +18.3 MLW water level, site protected to +20 MLW with vital equipment protected to +22 MLW
Georgia			
Hatch	0.150	0.080	N/A (Non-Coastal)
Vogtle	0.200	0.120	N/A (Non-Coastal)
Illinois			
Braidwood	0.200	0.090	N/A (Non-Coastal)
Byron	0.200	0.090	N/A (Non-Coastal)
Clinton	0.250	0.100	N/A (Non-Coastal)
Dresden	0.200	0.100	N/A (Non-Coastal)
LaSalle	0.200	0.100	N/A (Non-Coastal)
Quad Cities	0.240	0.120	N/A (Non-Coastal)
Iowa			
Duane Arnold	0.120	0.060	N/A (Non-Coastal)
Kansas			
Wolf Creek	0.120	0.060	N/A (Non-Coastal)
Louisiana			
River Bend	0.100	0.050	
Waterford	0.100		Floods – 30 feet MSL
Maryland			
Calvert Cliffs	0.150	0.080	14 ft design wave
Massachusetts			
Pilgrim	0.150	0.080	*Storm flooding design basis - 18.3ft
Michigan			
D.C. Cook	0.200	0.100	N/A
Fermi	0.150	0.080	N/A
Palisades	0.200	0.100	N/A

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Nuclear Plant Name By State/ Location	Safe Shutdown Earthquake (SSE) Peak Acceleration (g)	Operating Basis Earthquake (OBE) Peak Acceleration, (g)	Probable Maximum Tsunami OR Maximum Tsunami Water Level
Missouri			
Callaway	0.200		N/A (Non-Coastal)
Mississippi			
Grand Gulf	0.150	0.075	N/A
Minnesota			
Monticello	0.120	0.060	N/A (Non-Coastal)
Prarie Island	0.120	0.060	N/A (Non-Coastal)
Nebraska			
Cooper	0.200	0.100	N/A (Non-Coastal)
Fort Calhoun	0.170	0.080	N/A (Non-Coastal)
New York			
Fitzpatrick	0.150	0.080	N/A (Non-Coastal)
Ginna	0.200	0.080	N/A
Indian Point	0.150	0.100	15 ft msl
Nine Mile Point, Unit 1	0.110	0.060	N/A
Nine Mile Point, Unit 2	0.150	0.075	N/A
New Hampshire			
Seabrook	0.250	0.125	(+) 15.6' MSL Still Water Level (Tsunami Flooding -Such activity is extremely rare on the U.S. Atlantic coast and would result in only minor wave action inside the harbor.)
New Jersey			
Hope Creek	0.200	0.100	35.4 MSL The maximum probable tsunami produces relatively minor water level changes at the site. The maximum runup height reaches an elevation of 18.1 feet MSL with coincident 10 percent exceedance high tide)
Oyster Creek	0.184	0.092	(+) 23.5' MSL Still Water Level (Probable Maximum Tsunami - Tsunami events are not typical of the eastern coast of the United States and have not, therefore, been addressed.)

<b>Nuclear Plant Name By State/ Location</b>	<b>Safe Shutdown Earthquake (SSE) Peak Acceleration (g)</b>	<b>Operating Basis Earthquake (OBE) Peak Acceleration, (g)</b>	<b>Probable Maximum Tsunami OR Maximum Tsunami Water Level</b>
Salem	0.200	0.100	21.9 MSL (There is no evidence of surface rupture in East Coast earthquakes and no history of significant tsunami activity in the region)
North Carolina			
Brunswick	0.160	0.030	N/A
McGuire	0.150	0.080	N/A (Non-Coastal)
Shearon Harris	0.150		N/A (Non-Coastal)
Ohio			
Davis-Besse	0.150	0.080	N/A
Perry	0.150	0.080	N/A
Pennsylvania			
Beaver Valley	0.130	0.060	N/A (Non-Coastal)
Limerick	0.150	0.075	N/A (Non-Coastal)
Peach Bottom	0.120	0.050	N/A (Non-Coastal)
Three Mile Island	0.120	0.060	N/A (Non-Coastal)
Susquehanna	0.150	0.080	N/A (Non-Coastal)
South Carolina			
Catawba	0.150	0.080	N/A (Non-Coastal)
Oconee	0.150	0.050	N/A (Non-Coastal)
Robinson	0.200	0.100	N/A (Non-Coastal)
V.C. Summer	0.250	0.150	N/A (Non-Coastal)
Tennessee			
Sequoyah	0.180	0.090	N/A (Non-Coastal)
Watts Bar, Unit 1	0.180	0.090	N/A (Non-Coastal)
Texas			
Comanche Peak	0.120	0.060	N/A
South Texas Project	0.100	0.050	N/A
Vermont			

Nuclear Plant Name By State/ Location	Safe Shutdown Earthquake (SSE) Peak Acceleration (g)	Operating Basis Earthquake (OBE) Peak Acceleration, (g)	Probable Maximum Tsunami OR Maximum Tsunami Water Level
Vermont Yankee	0.140	0.070	N/A
Virginia			
North Anna	0.180		N/A
Surry	0.150	0.080	N/A
Washington			
Columbia	0.250		N/A (Non-Coastal)
Wisconsin			
Kewaunee	0.120	0.060	N/A
Point Beach	0.120		N/A
<b>Definition of Safe Shutdown Earthquake</b>	The safe-shutdown earthquake (SSE) for the site is the ground motion response spectra (GMRS), which also satisfies the minimum requirement of paragraph IV(a)(1)(i) of Appendix S, "Earthquake Engineering Criteria for Nuclear Power Plants," to Title 10, Part 50, "Domestic Licensing of Production and Utilization Facilities," of the Code of Federal Regulations (10 CFR Part 50).		
<b>Definition of Operating Basis Earthquake:</b>	<p>To satisfy the requirements of paragraph IV(a)(2)(A) of Appendix S to 10 CFR Part 50, the operating-basis earthquake (OBE) ground motion is defined as follows:</p> <ul style="list-style-type: none"> <li>(iv) For the certified design portion of the plant, the OBE ground motion is one-third of the CSDRS.</li> <li>(v) For the safety-related noncertified design portion of the plant, the OBE ground motion is one-third of the design motion response spectra, as stipulated in the design certification conditions specified in design control document (DCD).</li> <li>(vi) The spectrum ordinate criterion to be used in conjunction with Regulatory Guide 1.166, "Pre-Earthquake Planning and Immediate Nuclear Power Plant Operator Post-earthquake Actions," issued March 1997, is the lowest of (i) and (ii).</li> </ul>		

**Table From GI-199 Program Containing SSE, SSE Exceedance Frequencies, Review Level Earthquakes, and Seismic Core Damage Frequencies**

Plant	Docket	SSE (g's)	Frequency of Exceeding the SSE (per year)	RLE (HCLPF) (g's)	Seismic Core Damage Frequency (per year)	IPEEE Method	Source
Arkansas 1	05000313	0.2	2.8E-04	0.3	4.1E-06	0.3g full-scope EPRI SMA	GI-199
Arkansas 2	05000368	0.2	9.7E-05	0.3	4.1E-06	0.3g focused-scope EPRI SMA	GI-199
Beaver Valley 1	05000334	0.12	3.3E-04	n/a	4.8E-05	seismic PRA	GI-199
Beaver Valley 2	05000412	0.12	2.7E-04	n/a	2.2E-05	seismic PRA	GI-199
Braidwood 1	05000456	0.2	6.7E-05	0.3	7.3E-06	0.3g focused-scope EPRI SMA	GI-199
Braidwood 2	05000457	0.2	6.7E-05	0.3	7.3E-06	0.3g focused-scope EPRI SMA	GI-199
Browns Ferry 1	05000259	0.2	2.5E-04	0.3	3.7E-06	0.3g focused-scope EPRI SMA	GI-199
Browns Ferry 2	05000260	0.2	2.5E-04	0.26	5.4E-06	0.3g focused-scope EPRI SMA	GI-199
Browns Ferry 3	05000296	0.2	2.5E-04	0.26	5.4E-06	0.3g focused-scope EPRI SMA	GI-199
Brunswick 1	05000325	0.16	7.3E-04	0.3	1.5E-05	0.3g focused-scope EPRI SMA	GI-199
Brunswick 2	05000324	0.16	7.3E-04	0.3	1.5E-05	0.3g focused-scope EPRI SMA	GI-199
Byron 1	05000454	0.2	5.2E-05	0.3	5.8E-06	0.3g focused-scope EPRI SMA	GI-199
Byron 2	05000455	0.2	5.2E-05	0.3	5.8E-06	0.3g focused-scope EPRI SMA	GI-199
Callaway	05000483	0.2	3.8E-05	0.3	2.0E-06	0.3g focused-scope EPRI SMA	GI-199
Calvert Cliffs 1	05000317	0.15	1.9E-04	n/a	1.0E-05	seismic PRA	GI-199
Calvert Cliffs 2	05000318	0.15	1.9E-04	n/a	1.2E-05	seismic PRA	GI-199
Catawba 1	05000413	0.15	1.4E-04	n/a	3.7E-05	seismic PRA	GI-199
Catawba 2	05000414	0.15	1.4E-04	n/a	3.7E-05	seismic PRA	GI-199
Clinton	05000461	0.25	5.8E-05	0.3	2.5E-06	0.3g focused-scope EPRI SMA	GI-199
Columbia	05000397	0.25	1.7E-04	n/a	2.1E-05	seismic PRA	IPEEE
Comanche Peak 1	05000445	0.12	1.6E-05	0.12	4.0E-06	reduced-scope EPRI SMA; SSE = 0.12g	GI-199
Comanche	05000446	0.12	1.6E-05	0.12	4.0E-06	reduced-scope EPRI SMA; SSE =	GI-199

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Plant	Docket	SSE (g's)	Frequency of Exceeding the SSE (per year)	RLE (HCLPF) (g's)	Seismic Core Damage Frequency (per year)	IPEEE Method	Source
Peak 2						0.12g	
Cooper	05000298	0.2	1.5E-04	0.3	7.0E-06	0.3g focused-scope EPRI SMA	GI-199
Crystal River 3	05000302	0.1	8.9E-05	0.1	2.2E-05	reduced-scope EPRI SMA; SSE = 0.1g	GI-199
D.C. Cook 1	05000315	0.2	2.1E-04	n/a	2.2E-05	seismic PRA	GI-199
D.C. Cook 2	05000316	0.2	2.1E-04	n/a	2.2E-05	seismic PRA	GI-199
Davis Besse	05000346	0.15	6.3E-05	0.26	6.7E-06	reduced-scope EPRI SMA	GI-199
Diablo Canyon 1	05000275	0.75	3.9E-03	n/a	4.2E-05	seismic PRA	IPEEE
Diablo Canyon 2	05000323	0.75	3.9E-03	n/a	4.2E-05	seismic PRA	IPEEE
Dresden 2	05000237	0.2	9.7E-05	0.26	1.9E-05	0.3g focused-scope EPRI SMA	GI-199
Dresden 3	05000249	0.2	9.7E-05	0.26	1.9E-05	0.3g focused-scope EPRI SMA	GI-199
Duane Arnold	05000331	0.12	2.3E-04	0.12	3.2E-05	reduced-scope EPRI SMA; SSE = 0.12g	GI-199
Farley 1	05000348	0.1	1.0E-04	0.1	2.8E-05	reduced-scope EPRI SMA; SSE = 0.1g	GI-199
Farley 2	05000364	0.1	1.0E-04	0.1	2.8E-05	reduced-scope EPRI SMA; SSE = 0.1g	GI-199
Fermi 2	05000341	0.15	1.0E-04	0.3	4.2E-06	0.3g focused-scope EPRI SMA	GI-199
Fitzpatrick	05000333	0.15	3.2E-04	0.22	6.1E-06	0.3g focused-scope NRC SMA	GI-199
Fort Calhoun 1	05000285	0.17	3.7E-04	0.25	5.4E-06	0.3g focused-scope NRC SMA	GI-199
Ginna	05000244	0.2	1.0E-04	0.2	1.3E-05	0.3g focused-scope EPRI SMA	GI-199
Grand Gulf	05000416	0.15	1.0E-04	0.15	1.2E-05	reduced-scope EPRI SMA; SSE = 0.15g	GI-199
Hatch 1	05000400	0.148	3.9E-04	0.29	2.3E-06	0.3g focused-scope EPRI SMA	GI-199
Hatch 2	05000321	0.15	2.7E-04	0.3	2.5E-06	0.3g focused-scope EPRI SMA	GI-199

Plant	Docket	SSE (g's)	Frequency of Exceeding the SSE (per year)	RLE (HCLPF) (g's)	Seismic Core Damage Frequency (per year)	IPEEE Method	Source
Hope Creek	05000366	0.2	9.7E-05	0.3	2.5E-06	0.3g focused-scope EPRI SMA	GI-199
Indian Point 2	05000354	0.15	4.9E-04	n/a	2.8E-06	seismic PRA	GI-199
Indian Point 3	05000247	0.15	4.9E-04	n/a	3.3E-05	seismic PRA	GI-199
Kewaunee	05000286	0.12	2.8E-04	n/a	1.0E-04	seismic PRA	GI-199
LaSalle 1	05000305	0.2	1.7E-04	n/a	5.1E-06	seismic PRA	GI-199
LaSalle 2	05000373	0.2	1.7E-04	n/a	2.8E-06	seismic PRA	GI-199
Limerick 1	05000374	0.15	1.8E-04	n/a	2.8E-06	seismic PRA	GI-199
Limerick 2	05000352	0.15	1.8E-04	0.15	5.3E-05	reduced-scope EPRI SMA	GI-199
McGuire 1	05000353	0.15	9.5E-05	0.15	5.3E-05	reduced-scope EPRI SMA	GI-199
McGuire 2	05000369	0.15	9.5E-05	n/a	3.1E-05	seismic PRA	GI-199
Millstone 1	05000370	0.254	9.3E-05	n/a	3.1E-05	seismic PRA	GI-199
Millstone 2	05000336	0.17	8.3E-05	0.25	1.1E-05	0.3g focused-scope EPRI SMA	GI-199
Millstone 3	05000423	0.17	8.3E-05	n/a	1.5E-05	seismic PRA	GI-199
Monticello	05000263	0.12	9.3E-05	0.12	1.9E-05	modified focused/expended reduced-scope EPRI SMA	GI-199
Nine Mile Point 1	05000220	0.11	1.5E-04	0.27	4.2E-06	0.3g focused-scope EPRI SMA	GI-199
Nine Mile Point 2	05000410	0.15	4.8E-05	0.23	5.6E-06	SPRA and focused-scope EPRI SMA	GI-199
North Anna 1	05000338	0.12	2.1E-04	0.16	4.4E-05	0.3g focused-scope EPRI SMA	GI-199
North Anna 2	05000339	0.12	2.1E-04	0.16	4.4E-05	0.3g focused-scope EPRI SMA	GI-199
Oconee 1	05000269	0.1	9.7E-04	n/a	4.3E-05	seismic PRA	GI-199
Oconee 2	05000270	0.1	9.7E-04	n/a	4.3E-05	seismic PRA	GI-199
Oconee 3	05000287	0.1	9.7E-04	n/a	4.3E-05	seismic PRA	GI-199
Oyster Creek	05000219	0.17	1.5E-04	n/a	1.4E-05	seismic PRA	GI-199
Palisades	05000255	0.2	1.4E-04	n/a	6.4E-06	seismic PRA	GI-199
Palo Verde 1	05000528	0.258	3.5E-05	0.3	3.8E-05	0.3g full-scope EPRI SMA	IPEEE
Palo Verde 2	05000529	0.258	3.5E-05	0.3	3.8E-05	0.3g full-scope EPRI SMA	IPEEE

Plant	Docket	SSE (g's)	Frequency of Exceeding the SSE (per year)	RLE (HCLPF) (g's)	Seismic Core Damage Frequency (per year)	IPEEE Method	Source
Palo Verde 3	05000530	0.258	3.5E-05	0.3	3.8E-05	0.3g full-scope EPRI SMA	IPEEE
Peach Bottom 2	05000277	0.12	2.0E-04	0.2	2.4E-05	modified focused-scope EPRI SMA	GI-199
Peach Bottom 3	05000278	0.12	2.0E-04	0.2	2.4E-05	modified focused-scope EPRI SMA	GI-199
Perry	05000440	0.15	2.2E-04	0.3	2.1E-05	0.3g focused-scope EPRI SMA	GI-199
Pilgrim 1	05000293	0.15	8.1E-04	n/a	6.9E-05	seismic PRA	GI-199
Point Beach 1	05000266	0.12	2.0E-04	n/a	1.1E-05	seismic PRA	GI-199
Point Beach 2	05000301	0.12	2.0E-04	n/a	1.1E-05	seismic PRA	GI-199
Prairie Island 1	05000282	0.12	2.0E-04	0.28	3.0E-06	0.3g focused-scope EPRI SMA	GI-199
Prairie Island 2	05000306	0.12	2.0E-04	0.28	3.0E-06	0.3g focused-scope EPRI SMA	GI-199
Quad Cities 1	05000254	0.24	8.2E-04	0.09	2.7E-05	0.3g focused-scope EPRI SMA	GI-199
Quad Cities 2	05000265	0.24	8.2E-04	0.09	2.7E-05	0.3g focused-scope EPRI SMA	GI-199
River Bend	05000458	0.1	2.4E-04	0.1	2.5E-05	reduced-scope EPRI SMA; SSE = 0.1g	GI-199
Robinson (HR)	05000261	0.2	1.1E-03	0.28	1.5E-05	0.3g full-scope EPRI SMA	GI-199
Saint Lucie	05000335	0.1	1.4E-04	0.1	4.6E-05	reduced-scope EPRI SMA; SSE = 0.1g	GI-199
Salem 1	05000389	0.2	2.6E-04	0.1	4.6E-05	reduced-scope EPRI SMA; SSE = 0.1g	GI-199
Salem 2	05000272	0.2	2.6E-04	n/a	9.3E-06	seismic PRA	GI-199
San Onofre 2	05000361	0.67	1.2E-04	n/a	1.7E-05	seismic PRA	IPEEE
San Onofre 3	05000362	0.67	1.2E-04	n/a	1.7E-05	seismic PRA	IPEEE
Seabrook	05000311	0.25	1.3E-04	n/a	9.3E-06	seismic PRA	GI-199
Sequoyah 1	05000443	0.18	7.1E-04	n/a	2.2E-05	seismic PRA	GI-199
Sequoyah 2	05000327	0.18	7.1E-04	0.27	5.1E-05	0.3g full-scope EPRI SMA	GI-199
Shearon Harris 1	05000328	0.15	4.6E-05	0.27	5.1E-05	0.3g full-scope EPRI SMA	GI-199
South Texas 1	05000498	0.1	3.0E-05	n/a	6.2E-06	seismic PRA	GI-199



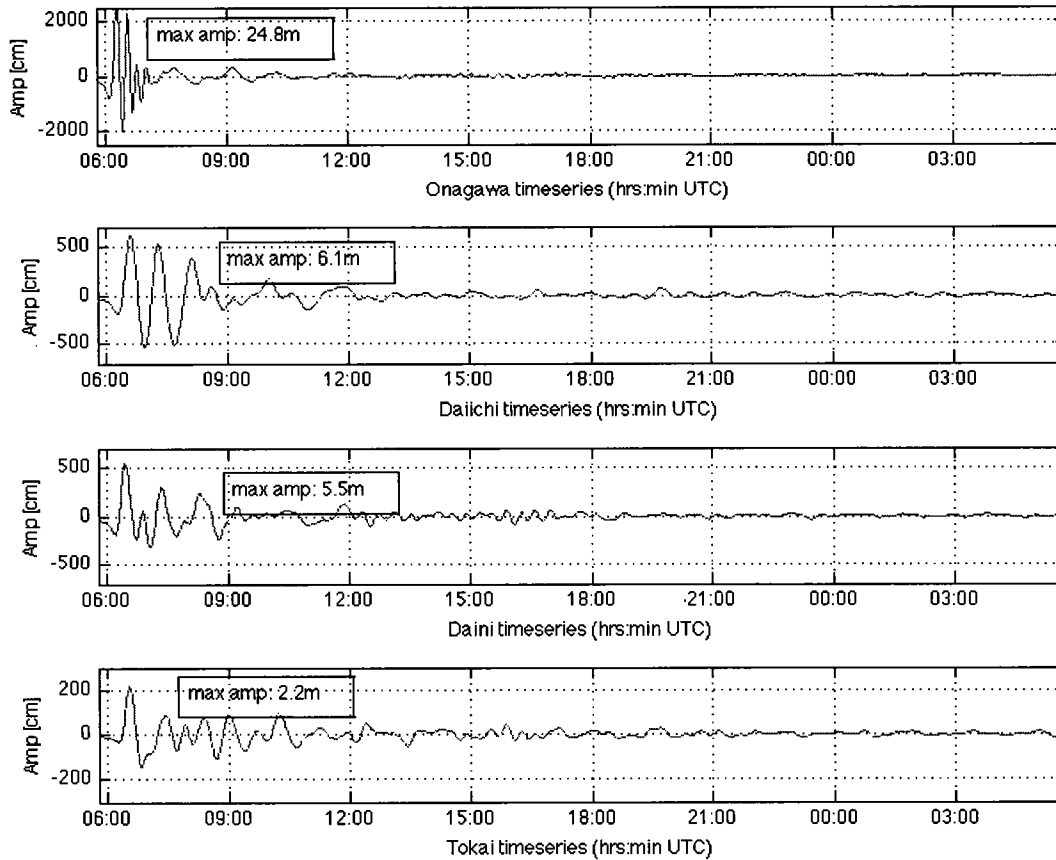
Plant	Docket	SSE (g's)	Frequency of Exceeding the SSE (per year)	RLE (HCLPF) (g's)	Seismic Core Damage Frequency (per year)	IPEEE Method	Source
South Texas 2	05000499	0.1	3.0E-05	n/a	6.2E-06	seismic PRA	GI-199
Summer	05000395	0.15	3.9E-04	0.22	3.8E-05	0.3g focused-scope EPRI SMA	GI-199
Surry 1	05000280	0.15	2.2E-04	n/a	5.7E-06	seismic PRA	GI-199
Surry 2	05000281	0.15	2.2E-04	n/a	5.7E-06	seismic PRA	GI-199
Susquehanna 1	05000387	0.1	1.9E-04	0.21	1.3E-05	0.3g focused-scope EPRI SMA	GI-199
Susquehanna 2	05000388	0.1	1.9E-04	0.21	1.3E-05	0.3g focused-scope EPRI SMA	GI-199
Three Mile Island 1	05000289	0.12	1.0E-04	n/a	4.0E-05	seismic PRA	GI-199
Turkey Point 3	05000250	0.15	3.8E-05	0.15	1.0E-05	site-specific approach; SSE=0.15g	GI-199
Turkey Point 4	05000251	0.15	3.8E-05	0.15	1.0E-05	site-specific approach; SSE=0.15g	GI-199
Vermont Yankee	05000271	0.14	1.2E-04	0.25	8.1E-06	0.3g focused-scope EPRI SMA	GI-199
Vogtle 1	05000424	0.2	1.5E-04	0.3	1.8E-05	0.3g focused-scope EPRI SMA	GI-199
Vogtle 2	05000425	0.2	1.5E-04	0.3	1.8E-05	0.3g focused-scope EPRI SMA	GI-199
Waterford 3	05000382	0.1	1.1E-04	0.1	2.0E-05	reduced-scope EPRI SMA; SSE = 0.1g	GI-199
Watts Bar	05000390	0.18	2.9E-04	0.3	3.6E-05	0.3g focused-scope EPRI SMA	GI-199
Wolf Creek	05000482	0.12	3.7E-05	0.2	1.8E-05	reduced-scope EPRI SMA	GI-199
25th percentile			9.6E-05		6.0E-06		
min			1.6E-05		2.0E-06		
median			1.7E-04		1.5E-05		
mean			3.1E-04		2.1E-05		
max			3.9E-03		1.0E-04		
75th percentile			2.6E-04		3.2E-05		

**Summary of seismological information from regional instrumentation**

Placeholder: Jon Ake is developing.

**Tsunami wave heights from NOAA (very preliminary. For basic situational awareness only)**

**Offshore wave amplitudes, scaled to the coastline**



## **Tsunami Fact Sheet**

Placeholder: Goutam Bagchi, Henry Jones and Rich Raone are developing.

**Seismicity of the Central and Eastern US Fact Sheet**

Placeholder: Jon Ake is developing.

## Design Basis Ground Motions and New Review Level Ground Motions Used for Review of Japanese Plants

Plant sites	Contributing earthquakes	New DBGM $S_s$	Original DBGM $S_2$
Tomari	Earthquakes undefined specifically	550 Gal	370 Gal
Onagawa	Soutei Miyagiken-oki (M8.2)	580	375
Higashidoori	Earthquakes undefined specifically	450	375
Fukushima	Earthquake near the site (M7.1)	600	370
Tokai	Earthquakes undefined specifically	600	380
Hamaoka	Assumed Tokai (M8.0), etc.	800	600
Shika	Sasanami-oki Fault (M7.6)	600	490
Tsuruga	Urazoko-Uchiikemi Fault (M6.9), etc. → Mera-Kareizaki - Kaburagi(M7.8), Shelf edge+B+Nosaka (M7.7)	800	532
Mihama	C, Fo-A Fault (M6.9)→ Shelf edge+B+Nosaka(M7.7)	750	405
Ohi	C, Fo-A Fault (M6.9)→Fo-A+Fo-B (M7.4)	700	405
Takahama	Fo-A Fault (M6.9) →Fo-A+Fo-B(M7.4)	550	370
Shimane	Shinji Fault (M7.1)	600	456
Ikata	Central Tectonic Structure (M7.6)	570	473
Genkai	Takekoba F. (M6.9) → Enhanced uncertainty consideration	540	370
Sendai	Gotandagawa F.(M6.9), F-A(M6.9)	540	372
Kashiwazaki-Kariwa	F-B Fault (M7.0), Nagaoka-plain-west Fault (M8.1)	2300 (R1 side) 1209 (R5 side)	450
Monjyu (Proto Type FBR)	Shiraki-Niu F.(M6.9) , C F.(M6.9)→Shelf edge+B+Nosaka(M7.7), Small Damping	760	408
Shimokita Reprocessing F.	Deto-Seiho F.(M6.8), Yokohama F.(M6.8)	450	320

**Status of Review of Japanese NPPs to New Earthquake Levels Based on 2006 Guidance**

Utility	Site (Unit)	Type	Dec.2010
Hokkaido	Tomari	PWR	△
Tohoku	Onagawa (Unit1)	BWR	◎
	Higashi-dori	BWR	△
Tokyo	Kashiwazaki-Kariwa	BWR	Unit 1,5,6,7 ◎
	Fukushima-No1	BWR	Unit 3 ◇, 5 ◎
	Fukushima-No2	BWR	Unit 4,5 ◎
Chubu	Hamaoka	BWR	△
Hokuriku	Shika (Unit 2)	BWR	◎
Kansai	Mihama(Unit 1)	PWR	◎
	Ohi(Unit 3,4)	PWR	◎
	Takahama (Unit 3,4)	PWR	◎
Chugoku	Shimane (Unit 1, 2)	BWR	◎
Shikoku	Ikata (Unit 3)	PWR	◎
Kyushu	Genkai (Unit 3 )	PWR	◎
	Sendai (Unit 1)	PWR	◎
Japan Atomic Power	Tokai-Daini	BWR	○
	Tsuruga	BWR/PWR	△
JAEA	Monjyu	Proto Type FBR	◎
Japan Nuc. Fuel	Rokkasyo	Reprocessing	◎
◎: NSC review finished, ○: NISA review finished and in NSC review, △: Under review by NISA			

## US Portable Array briefing sheet for brief congressional staffers

NOTE: This is provided because IRIS participants let us know that here was a discussion about the NRC's involvement in this program. We have been involved in this for the last couple years.



The Incorporated Research Institutions for Seismology is the Consortium of United States Universities with Major Research Programs in Seismology and Related Fields.

### The Transportable Array: A Science Investment that Can Be Leveraged

IRIS is installing the Transportable Array – a set of 400 broadband seismic instruments – in each of more than 1600 sites across the contiguous United States. The instruments operate at each site for two years and then are removed and redeployed further east. Roughly 1100 stations have been installed since 2003, and instruments have been removed from more than 600 of those sites in the western United States.

The National Science Foundation is funding the full cost to “roll” the Transportable Array across the US, more than \$90,000,000 over ten years. Comparatively small incremental investments could add significant data that are relevant to the safety of nuclear power plants. These efforts would be uniquely cost effective, since NSF is already funding installation, and they would feed data into an existing, standardized and widely used data management system that already incorporates the vast majority of seismic data from US networks. But these opportunities are time constrained: the array will be fully installed in the contiguous 48 states by late 2013.

### More Value from Longer Term Regional Observations

A dense, uniform seismic network is necessary for long-term, broad-area seismic monitoring of the central and eastern United States due to low event recurrence rates and the risk of significant earthquakes ( $M > 5$ ) anywhere in the region. Monitoring seismicity in the central and eastern US can be improved by turning selected sites into permanent seismic stations. A total of more than 35 Transportable Array stations have already been “adopted” by several organizations, creating a permanent legacy, but only in the western United States.

A strategic “1-in-4” plan would involve “adoption” of systematically selected stations in the central and eastern United States – every other station in both the east-west and north-south directions, creating a uniform grid of some 250 stations. Long-term regional operation could be combined with two optional enhancements to create a unique observatory for the study of seismicity, source characteristics, attenuation, and local ground acceleration.

#### Enhancement 1: Acquire Higher Frequency Data

Crustal rigidity in the central and eastern US makes it desirable to record high frequency characteristics of local and regional earthquakes. The existing instruments could be reconfigured to record high frequencies but doing so would nearly triple the data flow, necessitating improvements to the communications infrastructure.

#### Enhancement 2: Add Strong Motion Sensors

Acquiring strong motion sensors and reconfiguring field computers that record and telemeter the data would help to measure unique effects of severe shaking. The design anticipated this augmentation, and several stations in California and Washington were operated that way. Upgrade would be more efficient at sites that have not yet been installed.

*Estimate of annual acquisition and O&M costs for the 1-in-4, 250-station network in central and eastern US.*

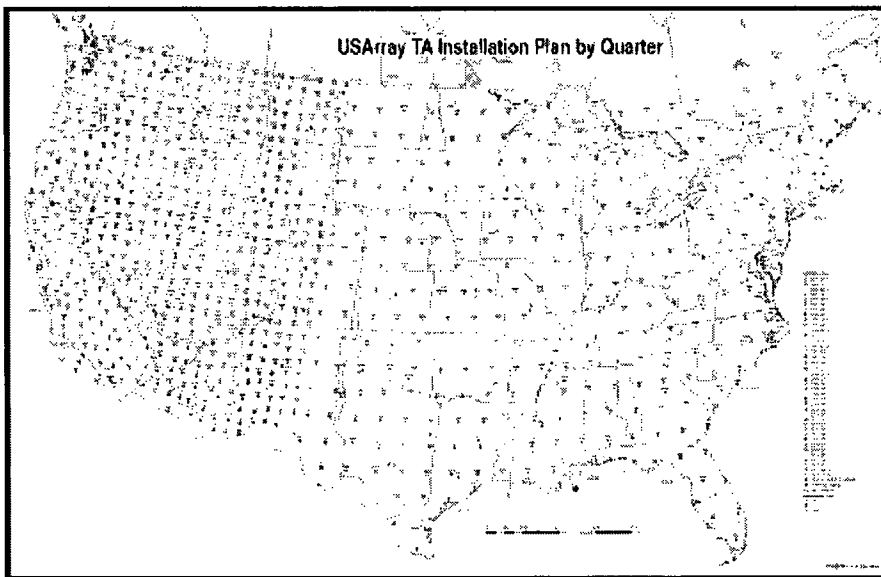
Year	Stations	Acquisition <sup>1</sup>	O&M <sup>2</sup>	Total
2011	50	\$1,800,000	\$ 400,000	\$2,200,000
2012	50	\$1,800,000	\$ 800,000	\$2,600,000
2013	50	\$1,800,000	\$1,200,000	\$3,000,000
2014	50	\$1,800,000	\$1,600,000	\$3,400,000
2015	50	\$1,800,000	\$2,000,000	\$3,800,000
2016	–	–	\$2,000,000	\$2,000,000

<sup>1</sup> Assumes upgrades to six channel data loggers with strong motion sensors.

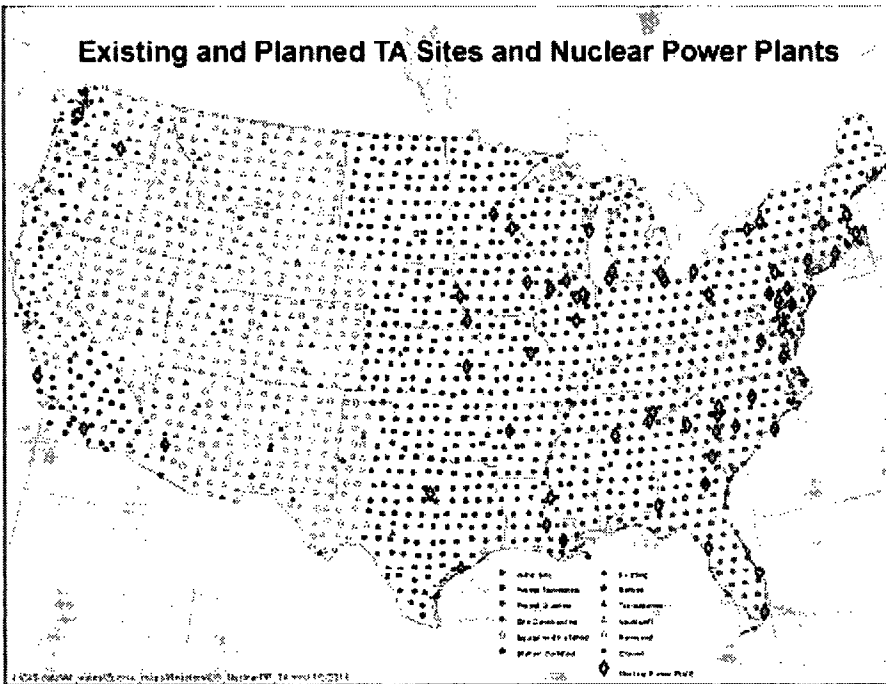
<sup>2</sup> Assumes a conservative estimate of \$8,000/station/year.



*The 1-in-4, 250-station network that could be created in the central and eastern US by "leaving behind" one out of every four Transportable Array stations during the years 2011 through 2015.*



*A large majority of nuclear power plants are located in the central and eastern parts of the US, where it is still possible to "leave behind" 1-in-4 Transportable Array stations for long-term regional observations.*



## List of Questions

<b>Natural Hazards and Ground Shaking Design Levels .....</b>	<b>1</b>
1) Did the Japanese underestimate the size of the maximum credible earthquake that could affect the plants? .....	1
2) Can a very large earthquake and tsunami happen here? .....	1
3) Has this changed our perception of Earthquake risk? .....	1
4) What magnitude earthquake are US plants designed to? .....	1
5) How many US reactors are located in active earthquake zones (and which reactors)? .....	2
6) How many reactors are along coastal areas that could be affected by a tsunami (and which ones)? .....	2
7) If the earthquake in Japan was a larger magnitude than considered by plant design, why can't the same thing happen in the US? .....	2
8) If the earthquake in Japan was a larger magnitude than considered by plant design, why can't the same thing happen in the US? .....	3
9) What if an earthquake like the Sendai earthquake occurred near a US plant? .....	3
10) What would be the results of a tsunami generated off the coast of a US plant? (Or why are we confident that large tsunamis will not occur relatively close to US shores?) .....	3
11) Can this happen here i.e. an earthquake that significantly damages a nuclear power plant? Are the Japanese plants similar to U.S. plants? .....	3
12) What level of earthquake hazard are the US reactors designed for? .....	3
13) Does the NRC consider earthquakes of magnitude 8.9? .....	4
14) What are the definitions of the SSE and OBE? .....	4
15) What is the likelihood of the ground motions occurring over the life of the plant? .....	5
16) What is magnitude anyway? What is the Richter Scale? What is intensity? .....	5
17) .....	6
<b>Design Against Natural Hazards &amp; Plant Safety in the US.....</b>	<b>6</b>
18) Are power plants designed for Tsunami's? .....	6
19) What level of Tsunami are we designed for? .....	6
20) How was the seismic design basis for an existing nuclear power plant established? .....	6
21) Is there margin above the design basis? .....	6
22) Are US plants safe? .....	7
23) Was the Japanese plant designed for this type of accident? Are US plants? .....	7

- 24) Why do we have confidence that US nuclear power plants are adequately designed for earthquakes and tsunamis?..... 7
- 25) Can this happen here i.e. an earthquake that significantly damages a nuclear power plant? Are the Japanese plants similar to U.S. plants? ..... 7
- 26) Are US plants susceptible to the same sort of loss of all power? ..... 8
- 27) Could an accident like the one at Japan's Fukushima Daiichi nuclear plant happen in the United States? ..... 8
- 28) Should U.S. nuclear facilities be required to withstand earthquakes and tsunamis of the kind just experienced in Japan? If not, why not? ..... 8
- 29) Can you summarize the plant seismic design basis for the US plants? Are there any special issues associated with seismic design? ..... 9
- 30) How do we know that the equipment in plants is safe in earthquakes? ..... 9
- 31) How do we know equipment will work if the magnitude is bigger than expected, like in Japan? 9
- 32) Are US plants susceptible to the same kind of loss of power as happened in Japan? ..... 9
- 33) How do we know that the EDGs in Diablo Canyon and SONGS will not fail to operate like in Japan? 9
- 34) Is all equipment at the plant vulnerable to tsunami?..... 10
- 35) What protection measures do plants have against tsunami? ..... 10
- 36) Is there a risk of loss of water during tsunami drawdown? Is it considered in design? ..... 10
- 37) Are nuclear buildings built to withstand earthquakes? What about tsunami?..... 10
- 38) Are aftershocks considered in the design of equipment at the plants? Are aftershocks considered in design of the structure? ..... 10
- 39) Are there any special issues associated with seismic design at the plants? For example, Diablo Canyon has special requirements. Are there any others?..... 10
- 40) Is the NRC planning to require seismic isolators for the next generation of nuclear power plants? How does that differ from current requirements and/or precautions at existing U.S. nuclear power plants? ..... 10
- 41) Are there any U.S. nuclear power plants that incorporate seismic isolators? What precautions are taken in earthquake-prone areas? ..... 11
- 42) Do you think that the recent Japan disaster will cause any rethinking of the planned seismic isolation guidelines, particularly as it regards earthquakes and secondary effects such as tsunamis?

11

**About Japanese Hazard, Design and Earthquake Impact..... 12**

- 43) Was the damage done to the plants from the Earthquake or the Tsunami? ..... 12

44)	What is the design level of the Japanese plants? Was it exceeded? .....	12
45)	What are the Japanese $S_1$ and $S_2$ ground motions and how are they determined? .....	12
46)	Did this earthquake affect Kashiwazaki-Kariwa NPP? .....	13
47)	How high were the tsunami at the plants? .....	13
<b>What happened in US Plants during the earthquake? .....</b>		<b>14</b>
48)	Was there any damage to U.S. reactors from either the earthquake or the resulting tsunami? .....	14
49)	Have any lessons for US plants been identified? .....	14
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50)	What is the NRC doing about the emergencies at the nuclear power plants in Japan? Are you sending staff over there? .....	15
51)	With NRC moving to design certification, at what point is seismic capability tested – during design or modified to be site-specific? If in design, what strength seismic event must these be built to withstand? .....	15
52)	Is the earthquake safety of US plants reviewed once the plants are constructed? .....	16
53)	Does the NRC ever review tsunami risk for existing plants? .....	16
54)	Does GI-199 consider tsunami? .....	16
55)	What is Generic Issue 199 about? .....	16
56)	Where can I get current information about Generic Issue 199? .....	16
57)	How was the seismic design basis for an existing nuclear power plant established? .....	16
58)	Is there margin above the design basis? .....	17
59)	Are all U.S. plants being evaluated as a part of Generic Issue 199? .....	17
60)	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? .....	17
61)	What do you mean by “increased estimates of seismic hazards” at nuclear power plant sites? .....	18
62)	What do the following terms mean? .....	18
63)	Let's say there's an estimate expressed as "2.5E-06." (I'm looking at Table D-2 of the safety/risk assessment of August 2010.) I believe that this expression means the same as $2.5 \times 10^{-06}$ , or 0.0000025, or 2.5 divided by one million. In layman's terms, that means an expectation, on average, of 2.5 events every million years, or once every 400,000 years. Similarly, "2.5E-05" would be 2.5 divided by 100,000, or 2.5 events every 100,000 years, on average, or once every 40,000 years. Is this correct? .....	20

64) The GI-199 documents give updated probabilistic seismic hazard estimates for existing nuclear power plants in the Central and Eastern U.S. What document has the latest seismic hazard estimates (probabilistic or not) for existing nuclear power plants in the Western U.S.?	20
65) The GI-199 documents refer to newer data on the way. Have NRC, USGS et al. released those? I'm referring to this: "New consensus seismic-hazard estimates will become available in late 2010 or early 2011 (these are a product of a joint NRC, U.S. Department of Energy, U.S. Geological Survey (USGS) and Electric Power Research Institute (EPRI) project). These consensus seismic hazard estimates will supersede the existing EPRI, Lawrence Livermore National Laboratory, and USGS hazard estimates used in the GI-199 Safety/Risk Assessment."	20
66) What is the timetable now for consideration of any regulatory changes from the GI-199 research?	21
<b>Seismic Probabilistic Risk Assessment (SPRA)</b>	<b>22</b>
67) The NRC increasingly uses risk-information in regulatory decisions. Are risk-informed PRAs useful in assessing an event such as this?	22
<b>Plant-Specific Questions</b>	<b>23</b>
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68) SONGS received a white finding in 2008 for 125VDC battery issue related to the EDGs that went undetected for 4 years. NRC issued the white finding as there was increased risk that one EDG may not have started due to a low voltage condition on the battery on one Unit (Unit 2). Aren't all plants susceptible to the unknown? Is there any assurance the emergency cooling systems will function as desired in a Japan-like emergency?	23
69) Has the earthquake hazard at SONGS been reviewed like DCNPP is doing? Are they planning on doing an update before relicensing?	23
70) Is possible to have a tsunami at songs that is capable of damaging the plant?	23
71) Does SONGS have an emergency plan for tsunami?	23
72) Has evacuation planning at SONGS considered tsunami?	24
73) Is SONGS designed against tsunami and earthquake?	24
74) What is the height of water that SONGS is designed to withstand?	24
75) What about drawdown and debris?	24
76) Will this be reviewed in light of the Japan quake.	24
77) Could all onsite and offsite power be disrupted from SONGS in the event of a tsunami, and if that happened, could the plant be safely cooled down if power wasn't restored for days after?	24
78) Are there any faults nearby SONGS that could generate a significant tsunami?	25
79) What magnitude or shaking level is SONGS designed to withstand? How likely is an earthquake of that magnitude for the SONGS site?	25
80) Could SONGS withstand an earthquake of the magnitude of the Japanese earthquake?	25

81) What about the evacuation routes at SONGS? How do we know they are reasonable?.....	25
82) Regarding tsunami at Diablo and SONGS, is the tsunami considered separately from flooding in licensing? And from the design perspective, is the flood still the controlling event for those plants rather than the tsunami? .....	25
83) What is the design level flooding for DNCPP and SONGS? Can a tsunami be larger? .....	26
Diablo Canyon Questions.....	27
84) Now after the Japan tragedy, will the NRC finally hear us (A4NR) and postpone DC license renewal until seismic studies are complete? How can you be sure that what happened there is not going to happen at Diablo with a worse cast quake and tsunami? .....	27
85) The evacuation routes at DCNPP see are not realistic. Highway 101 is small...and can you imagine what it will be like with 40K people on it? Has the evacuation plan been updated w/ all the population growth? .....	27
86) Are there local offshore fault sources capable of producing a tsunami with very short warning times?.....	27
87) Are there other seismically induced failure modes (other than tsunami) that would yield LTSBO? Flooding due to dam failure or widespread liquefaction are examples. ....	27
88) Ramifications of beyond design basis events (seismic and tsunami) and potential LTSBO on spent fuel storage facilities? .....	27
89) Why did a Emergency Warning go out for a 'tsunami' that was only 6 ft high? Do these guys really know what they're doing? Would they know it if a big one was really coming? Crying wolf all the time doesn't instill a lot of confidence. ....	27
90) How big did the Japanese think a quake/tsunami could be before 3/11? Why were they so wrong (assuming this quake/tsunami was bigger than what they had designed the plant for)? .....	28
The Japanese were supposed to have one of the best tsunami warning systems around. What went wrong last week (both with the reactors and getting the people out...see #1, evacuation plan above)?.....	28
91) Regarding tsunami at Diablo and SONGS, is the tsunami considered separately from flooding in licensing? And from the design perspective, is the flood still the controlling event for those plants rather than the tsunami? .....	28
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92) Why is Indian Point safe if there is a fault line underneath it?.....	29
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**Cartwright, William**

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**From:** Kobetz, Timothy  
**Sent:** Friday, March 11, 2011 11:23 AM  
**To:** West, Steven; Reynolds, Steven; Croteau, Rick; Munday, Joel; Clifford, James; Roberts, Darrell; Vogel, Anton; Pruett, Troy; Wilson, Peter  
**Cc:** Brown, Frederick; Thorp, John; Thomas, Eric  
**Subject:** Japan Earthquake Info  
**Attachments:** Válasz: Earhquake position; Re:Earhquake position; OECD/NEA - WGPC Secretariat - FW: Japan Situation update (Friday 11 March 11:45 UTC - 19:45 Japan time); RE: OECD/NEA - Japan Friday 11 March 13:45 UTC - Evacuation order to residents

Gentlefolk,

Per our discussion at today's DD call attached is information I have received from my international counterparts. I'll let IOEB know that you would be interested in receiving anything they send out.

Tim

ccc/3



## Hogan, Rosemary

---

**From:** Richards, Stuart  
**Sent:** Friday, March 11, 2011 3:05 PM  
**To:** Boyce, Tom (RES); Csontos, Aladar; Gavrilas, Mirela; Hogan, Rosemary; Koshy, Thomas; Sydnor, Russell; Ali, Syed; Birla, Sushil; Murphy, Andrew; Santos, Daniel; Tregoning, Robert  
**Cc:** Case, Michael  
**Subject:** FW: USNRC Earthquake/Tsunami Status Update  
**Attachments:** Earthquake-TsunamiUpdate.031111.1330EST.docx  
  
**Importance:** High

See attached on the latest (noon EST) info on the Japanese Earthquake.

Thanks  
Stu

---

**From:** Mroz (Sahm), Sara  
**Sent:** Friday, March 11, 2011 2:58 PM  
**To:**  
**Subject:** USNRC Earthquake/Tsunami Status Update  
**Importance:** High

Attached, please find a status update from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami on March 11, 2011.  
Please call the Headquarters Operations Officer at 301-816-5100 with questions.  
-Sara

Sara K. Mroz  
Communications and Outreach  
Office of Nuclear Security and Incident Response  
US Nuclear Regulatory Commission  
[sara.mroz@nrc.gov](mailto:sara.mroz@nrc.gov)

ccc/4

## Hogan, Rosemary

---

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

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

For example:

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

Mike will likely get additional guidance on Monday morning.

Thanks  
Stu

**From:** Bowman, Gregory  
**To:** Coe, Doug; Coyne, Kevin; Demoss, Gary; Hunter, Christopher; Croteau, Rick; Laur, Steven; Rogers, Walt; Bush-Goddard, Stephanie; Burnell, Scott; Scott, Michael  
**Subject:** Chairman Briefing on Robinson ASP Results  
**Date:** Friday, March 11, 2011 10:14:54 AM  
**Importance:** High

---

FYI – I just learned that the Chairman will likely be involved in a briefing on the earthquake and tsunami at 11:00. The Chairman's administrative staff are working on figuring out when we can reschedule. They're hoping for later today, maybe at 11:30, but I don't know for sure yet. I'll let everyone know as soon as I do. Sorry for the late notice.

ccc/5

**From:** Virgilio, Martin  
**To:** Cianci, Sandra  
**Subject:** Re: May trip  
**Date:** Friday, March 11, 2011 8:49:25 AM

---

Thanks

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**From:** Cianci, Sandra  
**To:** Virgilio, Martin  
**Sent:** Fri Mar 11 08:04:53 2011  
**Subject:** RE: May trip

Scheduled for 1pm on Monday.

*Sandy Cianci*

*Administrative Assistant to Marty Virgilio, DEDR  
Office of the Executive Director for Operations  
O-17 H13  
301-415-1714  
sandra.cianci@nrc.gov*

---

**From:** Virgilio, Martin  
**Sent:** Thursday, March 10, 2011 5:25 PM  
**To:** Cianci, Sandra  
**Subject:** May trip

Sandy

Please see if you can set up a short meeting for me with Mary Carter Monday or Tuesday of next week

Marty

ccc/b

**From:** Sheron, Brian  
**To:** 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: USNRC Earthquake/Tsunami Status Update  
**Date:** Friday, March 11, 2011 3:00:24 PM  
**Attachments:** Earthquake-TsunamiUpdate.031111.1330EST.docx  
**Importance:** High

---

**From:** Mroz (Sahm), Sara  
**Sent:** Friday, March 11, 2011 2:58 PM  
**To:** Batkin, Joshua; Pace, Patti; Bubar, Patrice; Sosa, Belkys; Nieh, Ho; Sharkey, Jeffry; Thomas.Hipsch@nrc.gov; Marshall, Michael; Batkin, Joshua; Castleman, Patrick; Snodderly, Michael; Orders, William; Bubar, Patrice; Franovich, Mike; Wittick, Brian; Andersen, James; Trapp, James; Leeds, Eric; Brenner, Eliot; Miller, Charles; James.Wiggins@nrc.gov; Johnson, Michael; Sheron, Brian; Schmidt, Rebecca; Catherine.Hainey@nrc.gov  
**Cc:** LIA12 Hoc; LIA01 Hoc; HOO Hoc  
**Subject:** USNRC Earthquake/Tsunami Status Update  
**Importance:** High

Attached, please find a status update from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami on March 11, 2011. Please call the Headquarters Operations Officer at 301-816-5100 with questions.  
-Sara

Sara K. Mroz  
Communications and Outreach  
Office of Nuclear Security and Incident Response  
US Nuclear Regulatory Commission  
[sara.mroz@nrc.gov](mailto:sara.mroz@nrc.gov)

cccl 7

**From:** Mamish, Nader  
**To:** Johns, Nancy; Ash, Darren; Borchardt, Bill; Boyce, Thomas (OIS); Buchholz, Jeri; Burns, Stephen; Carpenter, Cynthia; Casto, Chuck; Cohen, Miriam; Collins, Elmo; Dapas, Marc; Dean, Bill; Doane, Margaret; Dorman, Dan; Dyer, Jim; Gallagher, Johanna; Greene, Kathryn; Haney, Catherine; Holahan, Gary; Howell, Art; Johnson, Michael; Kelley, Corenthis; Leeds, Eric; Lew, David; McCree, Victor; Miller, Charles; Moore, Scott; Muesse, Mary; Pederson, Cynthia; Satorius, Mark; Schaeffer, James; Sheron, Brian; Tallarico, Alison; Tracy, Glenn; Uhle, Jennifer; Virgilio, Martin; Weber, Michael; Wert, Leonard; Wiggins, Jim  
**Subject:** RE: ERB Item for Review  
**Date:** Friday, March 11, 2011 9:02:31 AM

---

OIP concurs w/the approach.

---

**From:** Johns, Nancy  
**Sent:** Thursday, March 10, 2011 2:25 PM  
**To:** Ash, Darren; Borchardt, Bill; Boyce, Thomas (OIS); Buchholz, Jeri; Burns, Stephen; Carpenter, Cynthia; Casto, Chuck; Cohen, Miriam; Collins, Elmo; Dapas, Marc; Dean, Bill; Doane, Margaret; Dorman, Dan; Dyer, Jim; Gallagher, Johanna; Greene, Kathryn; Haney, Catherine; Holahan, Gary; Howell, Art; Johns, Nancy; Johnson, Michael; Kelley, Corenthis; Leeds, Eric; Lew, David; Mamish, Nader; McCree, Victor; Miller, Charles; Moore, Scott; Muesse, Mary; Pederson, Cynthia; Satorius, Mark; Schaeffer, James; Sheron, Brian; Tallarico, Alison; Tracy, Glenn; Uhle, Jennifer; Virgilio, Martin; Weber, Michael; Wert, Leonard; Wiggins, Jim  
**Subject:** ERB Item for Review  
**Importance:** High

ERB Members,

Mike Tschilz, currently the Deputy Division Director in the Division of Fuel Cycle Safety and Safeguards (FCSS), has informed NMSS management of his intent to retire at the beginning of April. Eventually, NMSS proposes to reassign one Deputy Director in the Division of High Level Waste Repository Safety (HLWRS) to FCSS and eliminate one Deputy Director position in HLWRS rather than eliminate a Deputy Director position in FCSS. NMSS considers it important to retain both deputies in FCSS because of the scope of the work and current activities/challenges in FCSS. However, as you are aware, by October 1, pending any change in direction, the Agency will have transitioned the Yucca Mountain Program to closure. After October 1, HLWRS' areas of focus will be extended storage and transportation/waste confidence, reprocessing, and alternative geological disposal. It would not be advisable to make any changes in HLWRS until the YM Program has been brought to closure.

In the interim, NMSS proposes initially to assign a current Branch Chief to act as Deputy Division Director, FCSS, for up to 3 months. This will allow time for NMSS to consider soliciting interest for CDP graduates and/or current SES to act as Deputy Division Director, FCSS, until October; provide rotational opportunities for additional Branch Chiefs; or weigh other options based on the results of succession planning and ERB feedback.

Please reply with any comments or concerns.

ccc/8

**From:** Burns, Stephen  
**To:** Johns, Nancy; Ash, Darren; Borchardt, Bill; Boyce, Thomas (OIS); Buchholz, Jeri; Carpenter, Cynthia; Casto, Chuck; Cohen, Miriam; Collins, Elmo; Dapas, Marc; Dean, Bill; Doane, Margaret; Dorman, Dan; Dyer, Jim; Gallagher, Johanna; Greene, Kathryn; Haney, Catherine; Holahan, Gary; Howell, Art; Johnson, Michael; Kelley, Corenthis; Leeds, Eric; Lew, David; Mamish, Nader; McCree, Victor; Miller, Charles; Moore, Scott; Muessle, Mary; Pederson, Cynthia; Satorius, Mark; Schaeffer, James; Sheron, Brian; Tallarico, Alison; Tracy, Glenn; Uhle, Jennifer; Virgilio, Martin; Weber, Michael; Wert, Leonard; Wiggins, Jim  
**Subject:** RE: ERB Item for Review  
**Date:** Friday, March 11, 2011 11:10:04 AM

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Fine with me

---

**From:** Johns, Nancy  
**Sent:** Thursday, March 10, 2011 2:25 PM  
**To:** Ash, Darren; Borchardt, Bill; Boyce, Thomas (OIS); Buchholz, Jeri; Burns, Stephen; Carpenter, Cynthia; Casto, Chuck; Cohen, Miriam; Collins, Elmo; Dapas, Marc; Dean, Bill; Doane, Margaret; Dorman, Dan; Dyer, Jim; Gallagher, Johanna; Greene, Kathryn; Haney, Catherine; Holahan, Gary; Howell, Art; Johns, Nancy; Johnson, Michael; Kelley, Corenthis; Leeds, Eric; Lew, David; Mamish, Nader; McCree, Victor; Miller, Charles; Moore, Scott; Muessle, Mary; Pederson, Cynthia; Satorius, Mark; Schaeffer, James; Sheron, Brian; Tallarico, Alison; Tracy, Glenn; Uhle, Jennifer; Virgilio, Martin; Weber, Michael; Wert, Leonard; Wiggins, Jim  
**Subject:** ERB Item for Review  
**Importance:** High

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Please reply with any comments or concerns.

cccl9

**From:** [HOO Hoc](#)  
**To:** [HOO Hoc](#)  
**Subject:** EDO BRIEFING PACKAGE FOR 3-11-11  
**Date:** Friday, March 11, 2011 5:54:46 AM  
**Attachments:** [Non OVO EDO Brief.pdf](#)  
[OVO EDO Brief.pdf](#)

---

See attached.

Joe O'Hara  
Headquarters Operations Officer  
U.S. Nuclear Regulatory Commission  
Phone: 301-816-5100  
Fax: 301-816-5151  
email: [hoo.hoc@nrc.gov](mailto:hoo.hoc@nrc.gov)  
secure e-mail: [hoo1@nrc.sgov.gov](mailto:hoo1@nrc.sgov.gov)



cccl 1.8



March 11, 2011

Nuclear and Industrial Safety Agency

Seismic Damage Information (the 2nd Release)  
(As of 16:15 March 11, 2011)

Nuclear and Industrial Safety Agency (NISA) confirmed the current conditions of Tomari Power Station, Hokkaido Electric Power Co., Inc.

Higashidori Nuclear Power Station and Onagawa Nuclear Power Station, Tohoku Electric Power Co., Inc

Higashidori Nuclear Power Station,, Fukushima Dai-ichi Nuclear Power Station and Fukushima Dai-ni Nuclear Power Station, Tokyo Electric Power Co., Inc. and works at the Japan Nuclear Fuel are as follows:

Walkdowns are continuing at these power stations.

1. Summary of Damage

1. Summary of Damage

(1) Time of Occurrence: 14:46 (UTC 5:46) March 11, 2011, Friday

(2) Epicenter: Off-Coast of Sanriku (North Latitude: 38; East Longitude: 142.9)

10km deep, M7.9

(3) Seismic Intensity in Japanese Scale

<Area of Seismic Intensity Larger Than and Including 4>

7: Northern Miyagi Prefecture

6+: Northern and southern Ibaraki Prefecture

5+: Sanpachi-Kamikita Aomori Prefecture

5: Chuetsu, Niigata Prefecture

<Municipality of Seismic Intensity Larger than and Including 4>

6+: Naraha Machi, Tomioka Machi, Ookuma-machi, and Futaba-machi, Fukushima Prefecture

6: Ishinomaki-city and, Onagawa town (by Seismograph of NPP)of ,

Miyagi Prefecture and Tokaimura, Ibaraki Pref.

5: Kariwa-village, Niigata Prefecture

4: Rokkasho-village, Higashidori-village, Aomori Prefecture,  
Kashiwazaki-city, Niigata Prefecture and Yokosuka-city, Kanagawa  
Prefecture

1: Tomari-mura, Hokkaido

1. The status of operation at Power Stations

a. Tomari Power Station: Hokkaido Electric Power Co., Inc. (Tomari-mura,  
Fururu-gun, Hokkaido)

(1) The status of operation

Unit 1 (579MWe): In continued operation

Unit 2 (579MWe): In continued operation

Unit 3 (912MWe): In continued operation

(2) Readings at monitoring post etc.

Variation in the monitoring post readings: Yes/No

Variation in the main stack monitor readings: Yes/No

(3) Report concerning other malfunction

b. Higashidori Nuclear Power Station, Tohoku Electric Power Co., Inc.  
(Higashidori-mura, Shimokita-gun, Aomori Prefecture)

(1) The status of operation

Unit 1 (1,100MWe) (outage for periodic inspection)

(2) Readings at monitoring post etc.

Variation in the monitoring post readings: No

Variation in the main stack monitoring readings: No

(3) Report concerning other malfunction

Report of fire: No

c. Onagawa Nuclear Power Station (Onagawa-machi and Ishinomaki-shi,  
Miyagi Prefecture)

(1) The status of operation

Unit 1 (524MWe) (Automatic shutdown)

Unit 2 (825MWe) (Automatic shutdown)

Unit 3 (825MWe) (Automatic shutdown)

(567 Gal was observed on the foundation slab. )

(2) Readings of monitoring post etc.

Variation in the monitoring post readings: No

Variation in the main stack monitor readings: No

(3) Report concerning other malfunction

Report of fire: No -Confinement function was confirmed.

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

Unit4(784MW): in periodic inspection outage

Unit5(784MW): in periodic inspection outage

Unit6(1,100MW): in periodic inspection outage

(2) Readings at monitoring post etc.

Variation in the monitoring post readings: No

Variation in the main stack monitoring readings: No

(3) Report concerning other malfunction

Article 10\* of Act on Special Measures Concerning Nuclear Emergency

Preparedness (Fukushima Dai-ichi(Units 1,2 and 3)

(\* In a heightened alert conditioning)

e. Fukushima-Daini Nuclear Power

Station(TEPCO)(Naraha-cho/Tomioka-cho, Futaba-gun, Fukushima pref.)

(1) The status of operation

Unit1(1,100MW): (Automatic shutdown)

Unit2(1,100MW): (Automatic shutdown)

Unit3(1,100MW): (Automatic shutdown)

Unit4(1,100MW): (Automatic shutdown)

(2) Readings at monitoring post etc.

Variation in the monitoring post readings: No

Variation in the main stack monitoring readings: No

(3) Report concerning other malfunction

Report of fire: No-Confinement function was confirmed.

f. Tokai Dai-ni Nuclear Power Stationj(JAPC)

(1) The status of operation

Unit1(1,100MW): Automatically shut down

(2) Readings at monitoring post etc.

Variation in the monitoring post readings: No

Variation in the main stack monitoring readings: No

(3) Report concerning other malfunction

Report of fire: No- Confinement function was confirmed.

2. JNFL(Rokkasyo-mura, Kamikita-gun, Aomori Pref)

(1) The status of operation

-Reprocessing facility: Originally outage

(2) Report concerning other malfunction

Report of fire: No - Confinement function was confirmed.

3. Action taken by NISA

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 Act on  
Special Measures Concerning Nuclear Emergency Preparedness (Fukushima  
Dai-ichi(Units 1,2 and 3)

All facilities which will be confirmed safely will be eliminated from next  
press release

(Contact Person)

Mr. Masaomi Koyama

Deputy Director, International Affairs

---

Office, NISA/METI

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

**From:** Trapp, James  
**To:** Andersen, James  
**Subject:** FW: Addl info: HOO HIGHLIGHT - DIABLO CANYON UNUSUAL EVENT  
**Date:** Friday, March 11, 2011 7:25:00 AM

---

FYI

---

**From:** Kennedy, Kriss  
**Sent:** Friday, March 11, 2011 6:04 AM  
**To:** Pruett, Troy; Miller, Geoffrey; Lantz, Ryan; Trapp, James; Markley, Michael  
**Subject:** Fw: Addl info: HOO HIGHLIGHT - DIABLO CANYON UNUSUAL EVENT

This email is being sent from an NRC Blackberry device.

---

**From:** Collins, Elmo  
**To:** Virgilio, Martin  
**Cc:** Howell, Art; Weber, Michael; Borchardt, Bill; Leeds, Eric; Boger, Bruce; Dricks, Victor; Uselding, Lara; Doane, Margaret; Wiggins, Jim; Evans, Michele; Weil, Jenny; Powell, Amy; Kennedy, Kriss; Maier, Bill; Miller, Charles; Dean, Bill; McCree, Victor; Satorius, Mark; Howell, Linda  
**Sent:** Fri Mar 11 05:45:38 2011  
**Subject:** Addl info: HOO HIGHLIGHT - DIABLO CANYON UNUSUAL EVENT

Marty

We do plan an update phone call at 8 am EST on a HOO bridge to review collected information about progress across Pacific. Region IV plans to lead the brief regarding potential impact on RIV licensees.

For material licensees, we have a couple of portable gage licensees in Guam and American Samoa. A number of licensees in Hawaii.

News reports show earthquake/tsunami impacts in Japan including a nuclear power plant.

Diablo has design features for a tsunami wave. We'll discuss site design features and licensee actions on the call.

Elmo

---

**From:** HOO Hoc  
**To:** HOO Hoc  
**Sent:** Fri Mar 11 05:09:33 2011  
**Subject:** HOO HIGHLIGHT - DIABLO CANYON UNUSUAL EVENT

Diablo Canyon declared a Notice of Unusual Event at 0123 PST due to a Tsunami Warning for the coastal areas of California as a result of a 8.9 magnitude earthquake off the coast of Japan. The Agency remains in the NORMAL response mode as of 0452 EST.

Joe O'Hara  
Headquarters Operations Officer  
U.S. Nuclear Regulatory Commission

ccc/11

Phone: 301-816-5100

Fax: 301-816-5151

email: [hoo.hoc@nrc.gov](mailto:hoo.hoc@nrc.gov)

secure e-mail: [hoo1@nrc.sgov.gov](mailto:hoo1@nrc.sgov.gov)



**From:** Miller, Geoffrey  
**To:** Trapp, James  
**Subject:** Re: Addl info: HOO HIGHLIGHT - DIABLO CANYON UNUSUAL EVENT  
**Date:** Friday, March 11, 2011 8:02:22 AM

---

SONGS is on a bluff right on the beach. It's closer to the water than Diablo, but I think it's higher up.

Sent from NRC Blackberry

---

**From:** Trapp, James  
**To:** Miller, Geoffrey  
**Sent:** Fri Mar 11 07:28:06 2011  
**Subject:** FW: Addl info: HOO HIGHLIGHT - DIABLO CANYON UNUSUAL EVENT

Likely a stupid question, but being an east coast kind of guy – is San Onofre away from the coast line enough? Always looked from pictures that DC sits up on a hill. Thanks

---

**From:** Kennedy, Kriss  
**Sent:** Friday, March 11, 2011 6:04 AM  
**To:** Pruet, Troy; Miller, Geoffrey; Lantz, Ryan; Trapp, James; Markley, Michael  
**Subject:** Fw: Addl info: HOO HIGHLIGHT - DIABLO CANYON UNUSUAL EVENT

This email is being sent from an NRC Blackberry device.

---

**From:** Collins, Elmo  
**To:** Virgilio, Martin  
**Cc:** Howell, Art; Weber, Michael; Borchardt, Bill; Leeds, Eric; Boger, Bruce; Dricks, Victor; Uselding, Lara; Doane, Margaret; Wiggins, Jim; Evans, Michele; Weil, Jenny; Powell, Amy; Kennedy, Kriss; Maier, Bill; Miller, Charles; Dean, Bill; McCree, Victor; Satorius, Mark; Howell, Linda  
**Sent:** Fri Mar 11 05:45:38 2011  
**Subject:** Addl info: HOO HIGHLIGHT - DIABLO CANYON UNUSUAL EVENT

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For material licensees, we have a couple of portable gage licensees in Guam and American Samoa. A number of licensees in Hawaii.

News reports show earthquake/tsunami impacts in Japan including a nuclear power plant.

Diablo has design features for a tsunami wave. We'll discuss site design features and licensee actions on the call.

Elmo

ccc/12

---

**From:** HOO Hoc



**To:** HOO Hoc  
**Sent:** Fri Mar 11 05:09:33 2011  
**Subject:** HOO HIGHLIGHT - DIABLO CANYON UNUSUAL EVENT

Diablo Canyon declared a Notice of Unusual Event at 0123 PST due to a Tsunami Warning for the coastal areas of California as a result of a 8.9 magnitude earthquake off the coast of Japan. The Agency remains in the NORMAL response mode as of 0452 EST.

Joe O'Hara  
Headquarters Operations Officer  
U.S. Nuclear Regulatory Commission  
Phone: 301-816-5100  
Fax: 301-816-5151  
email: [hoo.hoc@nrc.gov](mailto:hoo.hoc@nrc.gov)  
secure e-mail: [hoo1@nrc.sgov.gov](mailto:hoo1@nrc.sgov.gov)



**From:** HOO Hoc  
**To:** HOO Hoc  
**Subject:** HOO HIGHLIGHT - NRC IN MONITORING MODE AT 0946  
**Date:** Friday, March 11, 2011 10:08:42 AM

---

The NRC is in the Monitoring Response Mode as of 0946 on 3/11/11. Region IV will take the lead for U.S. sites and HQ for international sites to provide assistance in response to the earthquake in Japan and any adverse affects from a tsunami. This response mode change is NOT associated with event number 46668.

Joe O'Hara  
Headquarters Operations Officer  
U.S. Nuclear Regulatory Commission  
Phone: 301-816-5100  
Fax: 301-816-5151  
email: [hoo.hoc@nrc.gov](mailto:hoo.hoc@nrc.gov)  
secure e-mail: [hoo1@nrc.sgov.gov](mailto:hoo1@nrc.sgov.gov)



cccf/13

**From:** Williams, Shawn  
**To:** Trapp, James  
**Subject:** FW: Japan Update: Water levels at Fukushima; Onagawa fire extinguished  
**Date:** Friday, March 11, 2011 1:52:23 PM

---

**From:** Breskovic, Clarence  
**Sent:** Friday, March 11, 2011 12:26 PM  
**To:** Breskovic, Clarence  
**Subject:** Japan Update: Water levels at Fukushima; Onagawa fire extinguished

### **Update9: 3,000 Ordered To Evacuate Near Quake-hit Fukushima Nuclear Plant**

Tokyo, March 12 Kyodo -- (EDS: ADDING FIRE EXTINGUISHED AT ONAGAWA PLANT) Japan declared a state of atomic power emergency Friday after the country, which has about 50 nuclear power reactors, was hit by a magnitude 8.8 earthquake, instructing around 3,000 residents near the Fukushima No. 1 plant to evacuate.

Top government spokesman Yukio Edano told an evening press conference, "We have a situation where one of the reactors (of the plant) cannot be cooled down." But the chief Cabinet secretary said the evacuation instruction was only precautionary.

Edano said, "No radiation has leaked outside the reactor. The incident poses no danger to the environment at the moment." He also said early Saturday in Tokyo the incident was under control.

The post-quake situation prompted the Vienna-based International Atomic Energy Agency to scramble for details from contacts in Japan's industry ministry, while saying in a statement that at least four nuclear power plants "closest to the quake have been safely shut down" after the 2:46 p.m. quake.

Tokyo Electric Power Co., the operator of the Fukushima plant, reported that the water level around fuel rods was falling in the reactor. Radioactive materials could be emitted if part of a fuel rod is exposed to the air.

But officials of the prefectural government dismissed the view that the plant is in a critical situation, saying the top of the water is 3.4 meters above the fuel rods at the troubled No. 2 reactor.

The evacuation advisory was issued for people living within a 3-kilometer radius of the plant, while those living within a 10-kilometer radius were asked to stay home, Edano said.

Prime Minister Naoto Kan declared the emergency, the first in the quake-prone country, so that authorities can easily implement emergency relief measures, Edano said. Defense Minister Toshimi Kitazawa ordered the Self-Defense Forces to act in response to the declaration.

The Defense Ministry dispatched a chemical corps of the Ground Self-Defense Force to the plant and Motohisa Ikeda, senior vice industry minister, also left for Fukushima by an SDF helicopter.

According to the industry ministry, a total of 11 nuclear reactors automatically shut down at the Onagawa plant, the Fukushima No. 1 and No. 2 plants and the Tokai No. 2 plant after the strongest recorded earthquake in the country's history.

A fire started at a building housing the turbine of the Onagawa plant in Miyagi at 3:30 p.m. but was put out before 11 p.m., the operator, Tohoku Electric Power Co., said, denying it had detected any signs of radiation leaks.

Water spilled from pools containing fuel rods at the Kashiwazaki-Kariwa plant on the Sea of Japan coast

ccc/14

in Niigata Prefecture and the Onagawa plant, the operators said, saying they saw no signs suggesting radiation leaks.

**From:** Williams, Shawn  
**To:** Trapp, James  
**Subject:** FW: Japan: Radioactive Steam Could Be Released From Troubled Plant  
**Date:** Friday, March 11, 2011 1:57:17 PM

---

**From:** Breskovic, Clarence  
**Sent:** Friday, March 11, 2011 1:57 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.

ccc/15

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**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](http://www.nrc.gov). Information is also available on the NRC External Blog at: <http://public-blog.nrc-gateway.gov>. Employees contacted by the media are asked to refer the calls to the Office of Public Affairs at 301-415-8200

Two important reminders:

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

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

No response to this message is required.

**THIS IS NOT A DRILL**

coc/16

**From:** Sheron, Brian  
**To:** 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: USNRC Earthquake/Tsunami Status Update  
**Date:** Friday, March 11, 2011 3:00:23 PM  
**Attachments:** Earthquake-TsunamiUpdate.031111.1330EST.docx  
**Importance:** High

---

**From:** Mroz (Sahm), Sara  
**Sent:** Friday, March 11, 2011 2:58 PM  
**To:** Batkin, Joshua; Pace, Patti; Bubar, Patrice; Sosa, Belkys; Nieh, Ho; Sharkey, Jeffry; Thomas.Hipsch@nrc.gov; Marshall, Michael; Batkin, Joshua; Castleman, Patrick; Snodderly, Michael; Orders, William; Bubar, Patrice; Franovich, Mike; Wittick, Brian; Andersen, James; Trapp, James; Leeds, Eric; Brenner, Eliot; Miller, Charles; James.Wiggins@nrc.gov; Johnson, Michael; Sheron, Brian; Schmidt, Rebecca; Catherine.Hainey@nrc.gov  
**Cc:** LIA12 Hoc; LIA01 Hoc; HOO Hoc  
**Subject:** USNRC Earthquake/Tsunami Status Update  
**Importance:** High

Attached, please find a status update from the US Nuclear Regulatory Commission's Emergency Operations Center regarding the impacts of the earthquake/tsunami on March 11, 2011.  
Please call the Headquarters Operations Officer at 301-816-5100 with questions.  
-Sara

Sara K. Mroz  
Communications and Outreach  
Office of Nuclear Security and Incident Response  
US Nuclear Regulatory Commission  
[sara.mroz@nrc.gov](mailto:sara.mroz@nrc.gov)

ccc/17

Attachment Earthquake-TsunamiUpdate.031111.1330EST.docx (23505 Bytes) cannot be converted to PDF format.



**From:** [Nathan Siu](#)  
**To:** [Wagner, Brian](#); [Lui, Christiana](#); [Coyne, Kevin](#)  
**Subject:** This seems to be updated more regularly than CNN and IAEA sites  
**Date:** Saturday, March 12, 2011 12:57:36 AM

---

[http://www3.nhk.or.jp/daily/english/12\\_38.html](http://www3.nhk.or.jp/daily/english/12_38.html)

ccc/18

**From:** Nathan Siu  
**To:** Coyne, Kevin  
**Subject:** Fwd: Nuclear Power Plants and Earthquakes  
**Date:** Saturday, March 12, 2011 10:56:56 AM

---

Includes design basis for Japanese plants and past experience with earthquakes.

<http://www.world-nuclear.org/info/inf18.html>

cecl/19

**From:** Borchardt, Bill  
**To:** Virgilio, Martin  
**Subject:** Fw: Message from Mr. Sogabe  
**Date:** Saturday, March 12, 2011 7:40:05 AM

---

Bill Borchardt  
Via blackberry

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

From: Doane, Margaret  
To: Mamish, Nader; Borchardt, Bill; Foggie, Kirk  
Sent: Sat Mar 12 07:38:19 2011  
Subject: Fw: Message from Mr. Sogabe

Are you aware of this note. The message also went to the Chairman.  
Mergie

Sent from an NRC Blackberry  
Margaret Doane

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

From: iwamoto-akiko@jnes.go.jp <iwamoto-akiko@jnes.go.jp>  
To: Doane, Margaret  
Cc: Jaczko, Gregory; sato-tatsuo@jnes.go.jp <sato-tatsuo@jnes.go.jp>; sogabe-katsuhiro@jnes.go.jp <sogabe-katsuhiro@jnes.go.jp>; tomita-kazuhide@jnes.go.jp <tomita-kazuhide@jnes.go.jp>  
Sent: Sat Mar 12 06:24:17 2011  
Subject: Message from Mr. Sogabe

Dear Ms. Doane,

President of JNES, Mr. Sogabe, thanks you for your transmitting the warm thoughts and expression from Mr. Jaczko. It is indeed terrible disaster and we are very sorry for the victims of the earthquakes and tsunamis.

We also appreciate your offer of support. For the time being, we feel we grasp well the situation, but it is very encouraging that the experienced American experts are ready to support us.

As for BWR experts, we have already enough support from Japanese BWR vendors, but your kind offer reassures us. In case we will need further expertise, we will let you know.

Right now, we are working hard to have the situation under control. This is the worst event that we ever had in our country, but we hope to get through the challenge.

We will, of course, try to share the information on the event with you as far as we can spare our efforts for that.

With best regards,

\*\*\*\*\*

Akiko Iwamoto  
Assistant Director  
Office of International Programs  
Japan Nuclear Safety Organization (JNES)

ccc/20

Tel. +81-3-4511-1911 (direct)

Fax. +81-3-4511-1998

Email: iwamoto-akiko@jnes.go.jp

\*\*\*\*\*

**From:** [LIA04 Hoc](#)  
**To:** [Hayden, Elizabeth](#); [Harrington, Holly](#)  
**Cc:** [Turtill, Richard](#)  
**Date:** Saturday, March 12, 2011 11:53:30 PM  
**Attachments:** [11-039 radiation monitoring.pdf](#)

---

FYI Attached is WA State press release. Still working with State on POC

ccc/21



# News Release

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**For immediate release: March 12, 2011**

**(11-039)**

**Contacts:**     Gordon MacCracken, Communications Office  
                  Tim Church, Communications Office

**360-236-4072**  
**360-236-4077**

## **Nuclear event in Japan poses no health risk in Washington; state monitoring**

**OLYMPIA** — The state Department of Health is conducting ongoing air monitoring for radiation to see if the nuclear plant incident in Japan has affected radiation levels in Washington. There have been no elevated readings.

The agency's Radiation Protection staff expects no public health risk in Washington, and the monitoring is precautionary. If the situation changes in Washington, the Department of Health will inform the public.

State health officials are monitoring the events in Japan, and are in contact with the federal Nuclear Regulatory Commission and Environmental Protection Agency. An explosion took place at the Japan reactor site Saturday.

The nuclear plant incident in the wake of the earthquake in Japan has raised concerns among some people in Washington about windblown radiation coming to our state. Air sample readings in our state remain normal. The Department of Health Radiation Protection Program doesn't expect any change in environmental measurements taken in Washington.

Even in the event of a significant release from the reactor, radiation would be diluted before reaching our state and levels would be so low no protective action would be necessary. The state health department will continue its monitoring work as the situation in Japan develops and changes.

###

Visit the Washington Department of Health website at <a href="http://www.doh.wa.gov">http://www.doh.wa.gov</a> for a healthy dose of information.
---

---

**From:** PMT03 Hoc  
**Sent:** Saturday, March 12, 2011 8:00 PM  
**To:** PMT07 Hoc  
**Subject:** test

testing

ccc/22

---

**From:** PMT07 Hoc  
**Sent:** Saturday, March 12, 2011 8:43 PM  
**To:** LIA07 Hoc  
**Cc:** PMT07 Hoc  
**Subject:** Paragraph on Radiological Monitoring Capability at Nuclear Power Plants

Rosetta,

Please let me know how this reads to you. Although there are a few plants that have offsite environmental stations, we don't require it. If a specific State inquires about more detail about a specific plant, we might be able to research it, but don't have ready access to all sites. We sanity checked this among the PMT. Let me know if you need more. Tx greg

US nuclear power plants have sensitive equipment to monitor the status of radiological conditions, which are located within buildings and on ventilation systems. Some of this equipment is sensitive enough to record very slight changes in background radiation levels, and could possibly be an indication that radioactive material released from Japan (should a catastrophically large release of radioactive material occur). Additionally, personnel at nuclear power plants have specific knowledge in radiological field monitoring techniques and could assist State and Federal personnel in environmental sampling activities, should that be necessary to evaluate public health and safety concerns.

cc/23



---

**From:** Brandon, Lou  
**Sent:** Saturday, March 12, 2011 1:32 AM  
**To:** PMT02 Hoc; PMT11 Hoc; PMT07 Hoc; PMT09 Hoc  
**Subject:** FW: RASCAL 4.1 Released  
**Attachments:** RASCAL 4.1 Installation.pdf

---

**From:** RASCAL Distribution [mailto:rascal@atheyconsulting.com]  
**Sent:** Monday, January 24, 2011 12:26 PM  
**To:** rascal-info@atheyconsulting.com  
**Subject:** RASCAL 4.1 Released

January 24, 2011

To: Registered RASCAL Users

From: Lou Brandon  
Office of Nuclear Security and Incident Response  
U. S. Nuclear Regulatory Commission  
[Lou.Brandon@nrc.gov](mailto:Lou.Brandon@nrc.gov)  
301-415-8013

RASCAL 4.1 has been released. This update corrects some problems, enhances some features, and adds some new capabilities. See the attached PDF file for details on the changes and information on how to obtain and install RASCAL 4.1.

At this time the RASCAL technical document updates have not been completed. As soon as the revised document is ready it will be made available for download. Registered RASCAL users will receive e-mail notification of the document availability.

We appreciate all the feedback we have been receiving on RASCAL. Your input definitely helps improve the software.

If you have any questions or problems installing RASCAL 4.1, contact George Athey at [george.athey@atheyconsulting.com](mailto:george.athey@atheyconsulting.com).

Attached files:

RASCAL 4.1 Installation.PDF

ccc/24

# RASCAL 4.1 Installation

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The installation and documentation files for RASCAL 4.1 (January 2011) are available for download at the following web address:

[atheyconsulting.com/RASCAL4\\_files.html](http://atheyconsulting.com/RASCAL4_files.html) (must be entered exactly as shown)

See the following table for descriptions of the files available for download.

File	File description and procedure
RASCAL 4.1 Installer	<p>The installation program for RASCAL 4.1 (January, 2011).</p> <p>Download and run the setup file and follow the prompts. The installer will update an existing RASCAL 4.0 or completely install a new RASCAL 4.1.</p>
MapWinGIS Installer	<p>The installation program for MapWinGIS</p> <p>This program needs to be downloaded and installed only if you will be using the new export footprint to GIS shapefile function. Otherwise, this program is not needed.</p> <p>Download and run the setup file and follow the prompts.</p>
RASCAL 4.1 Workbook (pdf)	<p>This document is used in RASCAL training classes and provides many hands-on exercises.</p>
RASCAL 4 Tech Doc (pdf)	<p>This document describes the models and methods of the RASCAL programs.</p>

If you have any questions or problems contact:

George Athey  
Athey Consulting  
[george.athey@atheyconsulting.com](mailto:george.athey@atheyconsulting.com)

# Changes in RASCAL 4.1

---

The following sections summarize the changes in RASCAL v4.1.

## Field Measurement to Dose

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Modified the cloudshine dose labels on the early phase doses report. If an air sample, dose is called cloud immersion; if a ground sample, dose is called cloud submersion.

Added an optional user input text field on the sample screen to record when the sample was deposited.

Fixed a problem that occurred when the user tried to enter 60 nuclides in the sample.

## Source Term to Dose

---

Modified the I-131 air concentration units to display as  $\mu\text{Ci}/\text{cm}^3$ . Also adjusted the range for the footprints to cover a more useful range.

Modified the footprint ranges for deposition to cover a more useful range.

Removed the option on the time core uncovered source term screen that allowed normal coolant (core not uncovered). Instead, refer the user to the specified core damage endpoint source term method.

Added a warning to the user when calm conditions are used in the model calculations. This will appear as a popup notification at the end of calculations and as a note added to the end of the close-in max value table. Wind direction is uncertain in calm conditions and close-in doses should be used with care.

Modified the source term export function to provide the option of stripping the '\*' off the nuclide names with implicit daughters. This makes things easier for other models that do not recognize the '\*' to import the file (e.g. TurboFRMAC).

Modified the close-in modeling distance to allow it down to 10 m (from the previous lower limit of 100 m). A warning is displayed to the user and added to the case summary when a distance less than 100 m is specified. At these close distances the point source assumptions may not be valid (see Tech Doc).

Added a tool to calculate a correction factor that can be used to estimate the total dose from a direct reading dosimeter (DRD). A correction factor is shown on the dose vs. time plot screen when viewing the gamma exposure rate.

Added a release rate calculator to the Effluent Releases – by Mixtures source term screen. This allows the user to calculate a release rate from a concentration and flow rate.

Corrected the iodine partitioning in the puff dispersion model. The default partitioning in RASCAL 4.0 was 25% I<sub>2</sub> and 30% particles. This partitioning was inconsistent with the partitioning in the plume model used for close-in calculations and the description in the RASCAL 4 Tech Doc. The default partitioning in the puff models is now 30% I<sub>2</sub> and 25% particles.

The calm wind model used for close-in calculations in RASCAL 4.1 has been changed to improve the consistency of dispersion estimates.

There has been a second, less significant change in the treatment of calm winds in RASCAL 4.1. If the surface level wind speed is less than 1 mph in the plume model, or less than 0.5 mph in the puff model, the wind speed is not extrapolated to the release height. The wind speed is assumed to be calm. This change eliminates any unintended plume movement for elevated releases when a wind direction is specified with calm winds.

Updated the monitored mixture source term calculation to fix a minor problem with the *Case 3* scenario (see the Tech Doc).

Updated the effluent concentrations source term calculation to fix a problem when using units of *activity / hour*.

Updated the coolant sample source term calculation to fix a problem when using units of *activity / gallon*.

Updated the facility database to change the stack height for BWRs for which there is no stack or for which we do not have a stack height. The change applied only to Laguna Verde, Hope Creek 1, and the generic BWRs.

## Meteorological Data Processor

Improved the interpolation between observations and forecasts.

Display a warning to the user if the code is going to interpolate a wind direction difference greater than 90 degrees.

Display a warning to the user if forecast entries will be deleted because they have been superseded by observations.

Fixed a problem where the code mishandled missing stabilities.

Fixed a problem where the release point temperature value was being lost.

Fixed a problem that resulted in a *Stack overflow* error.

Fixed a problem that resulted in a *File not found* error.

## Installation

---

Modified the RASCAL installation program to remove the MapWinGIS components. This helps eliminate a problem some users were having getting the MapWinGIS package to operate. The MapWinGIS installer now handles all components for the tool.

Modified the RASCAL installation program to handle both new installations and the updating of existing RASCAL 4.0 installations. There is no need to uninstall RASCAL 4.0 and new users do not have to do incremental updates as was required in RASCAL 3.

**From:** Burnell, Scott  
**To:** Hayden, Elizabeth; Jaczko, Gregory  
**Subject:** RE: Draft NRC Statement  
**Date:** Sunday, March 13, 2011 1:42:53 AM

---

The Nuclear Regulatory Commission is coordinating closely with the Department of Energy and other federal agencies in providing whatever assistance the Japanese government requests as they respond to conditions at several nuclear power plant sites following the March 11 earthquake and tsunami.

The NRC works with other U.S. agencies to monitor radioactive releases and predict their path. All the available information indicates weather conditions have taken the small releases from the Fukushima reactors out to sea away from the population. Given the thousands of miles between the two countries, the U.S. public will likely avoid any health impacts from radioactive releases during this accident.

The NRC's rigorous safety regulations ensure that U.S. nuclear power plants are designed to withstand tsunamis, earthquakes and other severe natural hazards. The NRC has been working with several agencies to assess recent seismic research for the central and eastern United States; that work continues to indicate U.S. plants will remain safe even under those areas' revised possible earthquakes. The NRC also took part in multi-agency research following the 2004 Indonesian tsunami, and this effort has led to revised guidance for coastal U.S. nuclear power plants to consider when analyzing potential tsunami hazards.

The NRC will evaluate all the information being gathered from the earthquake, tsunami and reactor accident to determine what lessons might be applied to U.S. regulations and ongoing reviews of applications for new nuclear power plants.

ccc/25

**From:** [NATIONAL JIC](#)  
**To:** [NATIONAL JIC](#)  
**Subject:** SICCL Advisory: NRC Sees No Radiation at Harmful Levels Reaching U.S. From Damaged Japanese Nuclear Power Plants  
**Date:** Sunday, March 13, 2011 3:39:10 PM  
**Attachments:** [11-046.pdf](#)

---

## **NRC Sees No Radiation at Harmful Levels Reaching US from Damaged Japanese Nuclear Power Plants**

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

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

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

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

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

### **U.S. NUCLEAR REGULATORY COMMISSION**

Office of Public Affairs Telephone: 301/415-8200

Washington, D.C. 20555-0001

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

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

No. 11-046

March 13, 2011

*ccc/26*



# NRC NEWS

## U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Telephone: 301/415-8200

Washington, D.C. 20555-0001

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

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

No. 11-046

March 13, 2011

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

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

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###

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**From:** [Google Alerts](#)  
**To:** [Hayden, Elizabeth](#)  
**Subject:** Google Alert - Nuclear Regulatory Commission  
**Date:** Sunday, March 13, 2011 1:35:34 AM

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**News**

**2 new results for Nuclear Regulatory Commission**

[U.S. government deploys two \*\*nuclear\*\* experts to Japan](#)

WireUpdate

By BNO News WASHINGTON, DC (BNO NEWS) -- The US **Nuclear Regulatory Commission (NRC)** on Saturday sent two nuclear experts to quake-hit Japan where two nuclear power plants are in a state of emergency. The deployment comes hours after the **NRC** had spoken ...

[See all stories on this topic »](#)

[US sends rescue teams, \*\*nuclear\*\* experts to Japan](#)

Monsters and Critics.com

The US **Nuclear Regulatory Commission** was deploying two experts in boiling water nuclear reactors as Japanese engineers struggled to prevent a meltdown at a damaged nuclear power plant. 'We have some of the most expert people in this field in the world ...

[See all stories on this topic »](#)

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Tip: Use a minus sign (-) in front of terms in your query that you want to exclude. [Learn more.](#)

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ccc/27

**From:** [Google Alerts](#)  
**To:** [Hayden, Elizabeth](#)  
**Subject:** Google Alert - Nuclear Regulatory Commission  
**Date:** Sunday, March 13, 2011 6:29:41 AM

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## News

3 new results for **Nuclear Regulatory Commission**

### Voice of the Free Press: State must have say on Vermont Yankee

[BurlingtonFreePress.com](#)

The **Nuclear Regulatory Commission's** decision to grant Vermont Yankee permission to keep operating for another 20 years does nothing to negate this state's right to determine its own energy future. Federal law clearly empowers states to review a nuclear ...

[See all stories on this topic »](#)

### County sets two nights for public hearing

[istockAnalyst.com](#) (press release)

The federal **Nuclear Regulatory Commission** has the primary responsibility for overseeing such power plants. It has not granted a license to build a nuclear plant since 1978 nor issued a reactor operating license since 1996. But the **NRC** has overhauled ...

[See all stories on this topic »](#)

### GOP still pushing for Yucca Mountain as **nuclear** waste site

[Bellingham Herald](#)

Among other things, the legislation would require the **Nuclear Regulatory Commission** to complete its review of the Yucca Mountain site in Nevada "without political interference." That would be difficult, with top Democrats trying hard to scrap the ...

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---

Tip: Use site restrict in your query to search within a site (site:nytimes.com or site:.edu). [Learn more.](#)

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cccl 28

**From:** [Google Alerts](#)  
**To:** [Hayden, Elizabeth](#)  
**Subject:** Google Alert - Nuclear Regulatory Commission  
**Date:** Sunday, March 13, 2011 11:32:00 AM

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**News**

**2** new results for **Nuclear Regulatory Commission**

**ANALYSIS: Japan Tepco struggles to save stricken Fukushima-1 nuke unit**

Platts

The cause of the explosion is unclear, but could have been an accumulation of hydrogen in the concrete building from the interaction of fuel cladding materials and water, former US **Nuclear Regulatory Commission** member Peter Bradford said during the ...

[See all stories on this topic »](#)

**The man with a plan**

Pueblo Chieftain

That's one of the reasons (**Nuclear Regulatory Commission**) rules require that they be stored in a way that's recoverable. "One of the problems with nuclear power in this country is we haven't been doing the necessary research because there's been no ...

[See all stories on this topic »](#)

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Tip: Use a minus sign (-) in front of terms in your query that you want to exclude. [Learn more.](#)

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**From:** [Google Alerts](#)  
**To:** [Hayden, Elizabeth](#)  
**Subject:** Google Alert - Nuclear Regulatory Commission  
**Date:** Sunday, March 13, 2011 2:58:08 PM

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## News

## 5 new results for **Nuclear Regulatory Commission**

### Japanese quake could impact US **nuclear** projects

USA Today

Edward Markey, D-Mass., a member of the House Energy and Commerce Committee, sent a letter to the chairman of the **Nuclear Regulatory Commission** saying the disaster in Japan highlights "both the fragility of nuclear power plants and the potential ...

[See all stories on this topic »](#)

### Former US **Nuclear** Official Warns: It Can Happen Here

Forbes (blog)

By OSHA GRAY DAVIDSON As a former commissioner at the federal **Nuclear Regulatory Commission (NRC)**, Peter Bradford knows something about nuclear power accidents. He had been serving as one of the nation's top nuclear officials for over two years when, ...

[See all stories on this topic »](#)

### How people can help Japanese earthquake recovery

BlueRidgeNow.com

The **Nuclear Regulatory Commission** has sent two of its officials with expertise in boiling water nuclear reactors. They joined a disaster response team with the US International Agency for International Development, the primary federal agency that ...

[See all stories on this topic »](#)

### Congressmen call for more caution in nuke plant construction

MarketWatch

The US has 23 reactors licensed in the 1960s that built under the Boiling Water Mark One design, according to a list of US reactors from the **Nuclear Regulatory Commission**. The US has a total of 104 reactors. Some of the reactors now in focus on Japan ...

[See all stories on this topic »](#)

### Yucca Mountain still alive under GOP nuke plan

MiamiHerald.com

It would require the **Nuclear Regulatory Commission** to complete its review of the Yucca Mountain site "without political interference." That would be difficult, with top Democrats trying hard to scrap the project. In a speech to the Nevada legislature ...

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---

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ccc/30

**From:** [Google Alerts](#)  
**To:** [Hayden, Elizabeth](#)  
**Subject:** Google Alert - Nuclear Regulatory Commission  
**Date:** Sunday, March 13, 2011 11:45:41 PM

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## News

3 new results for **Nuclear Regulatory Commission**

### United States won't feel radiation from Japan

Jerusalem Post

By REUTERS WASHINGTON - The United States is not expected to experience "any harmful levels" of radiation from Japan's earthquake-hit nuclear power reactors, the US **Nuclear Regulatory Commission** said on Sunday. "All the available information indicates ...

[See all stories on this topic »](#)

### Ultimate impact of damage to Japan **nuclear** reactors still unknown

Washington Post

Such emissions would not endanger the United States, the **Nuclear Regulatory Commission (NRC)** announced Sunday in a statement. Given the thousands of miles between the countries, the United States is "not expected to experience any harmful levels of ...

[See all stories on this topic »](#)

### Japan's **nuclear** meltdown prompts talk of safety, Yucca Mountain's role

Las Vegas Sun

That new attention has, in turn, raised the question of what's to happen with Yucca Mountain -- Nevada's potential waste-dump site that hasn't yet been approved by the **Nuclear Regulatory Commission**, but hasn't been scratched either. ...

[See all stories on this topic »](#)

---

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ccc/31

**From:** Google Alerts  
**To:** Hayden, Elizabeth  
**Subject:** Google Alert - Nuclear Regulatory Commission  
**Date:** Sunday, March 13, 2011 7:20:30 PM

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## News

6 new results for **Nuclear Regulatory Commission**

### Harmful Nuclear Radiation From Japan Not Expected To Reach US - **NRC**

Wall Street Journal


NEW YORK (Dow Jones)--The US **Nuclear Regulatory Commission** said Sunday that no harmful radiation is expected to reach US shores from the damaged nuclear plants in Japan. A number of nuclear power plants in Japan went into emergency shutdown because of ...

[See all stories on this topic »](#)

### Can U.S. **Nuclear** Plants Handle a Major Natural Disaster?

ProPublica

Ed Markey, a Massachusetts Democrat who has spent years pushing the **Nuclear Regulatory Commission** toward stricter enforcement of its safety rules, has called for a reassessment. Several US reactors lie on or near fault lines, and Markey wants to beef ...

 [ProPublica](#)

[See all stories on this topic »](#)

### Will Japan Quake Change Thinking of California **Nuclear** Industry?

Yahoo! News

A **Nuclear Regulatory Commission** news release on Friday says the agency is monitoring the San Onofre and Diablo Canyon plants for an "unusual event." Officials emphasize the plants are protected from tsunami activity. Seismic activity in or near ...

[See all stories on this topic »](#)

### US lawmakers mull **nuclear** moratorium after quake

AFP

"We must ensure that America's nuclear power plants can withstand a catastrophic event and abide by the absolute highest standards for safety," Markey said. He sent a letter to the **Nuclear Regulatory Commission** seeking details on emergency plans for ...

[See all stories on this topic »](#)

### **Nuclear** Overreactions

Wall Street Journal

Proposals for 20 new reactors to be built over the next 15 to 20 years are in various stages of review in the multiyear approval process at the **Nuclear Regulatory Commission**, with two each in Georgia and South Carolina at the front of the line. ...

[See all stories on this topic »](#)

### Japan Does Not Face Another Chernobyl

Wall Street Journal

In response, he has called for an immediate suspension of licensing procedures for the Westinghouse AP1000, a "Generation III" reactor that has been laboring through design review at the **Nuclear Regulatory Commission** for seven years. ...

[See all stories on this topic »](#)

ccc/32

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**From:** [LIA08 Hoc](#)  
**To:** [Harrington, Holly](#); [Hayden, Elizabeth](#)  
**Subject:** FW: Update of the news issued by NISA/METI on the massive earthquake in the norther japan  
**Date:** Sunday, March 13, 2011 1:02:04 AM  
**Attachments:** [New Releases No\[1\].18 IAEA.pdf](#)  
**Importance:** High

---

FYI-Updated Press releases from NISA/METI

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

From: LIA02 Hoc  
Sent: Sunday, March 13, 2011 1:00 AM  
To: LIA08 Hoc  
Subject: FW: Update of the news issued by NISA/METI on the massive earthquake in the norther japan  
Importance: High

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

From: Doane, Margaret  
Sent: Sunday, March 13, 2011 12:58 AM  
To: LIA02 Hoc  
Subject: Fw: Update of the news issued by NISA/METI on the massive earthquake in the norther japan  
Importance: High

Here is the latest from the regulator

Sent from an NRC Blackberry  
Margaret Doane

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

From: [ozawa-yoshihiro@jnes.go.jp](mailto:ozawa-yoshihiro@jnes.go.jp) <[ozawa-yoshihiro@jnes.go.jp](mailto:ozawa-yoshihiro@jnes.go.jp)>  
To: [ozawa-yoshihiro@jnes.go.jp](mailto:ozawa-yoshihiro@jnes.go.jp) <[ozawa-yoshihiro@jnes.go.jp](mailto:ozawa-yoshihiro@jnes.go.jp)>; [okubo-masaki@jnes.go.jp](mailto:okubo-masaki@jnes.go.jp) <[okubo-masaki@jnes.go.jp](mailto:okubo-masaki@jnes.go.jp)>; [iwamoto-akiko@jnes.go.jp](mailto:iwamoto-akiko@jnes.go.jp) <[iwamoto-akiko@jnes.go.jp](mailto:iwamoto-akiko@jnes.go.jp)>  
Sent: Sun Mar 13 00:41:57 2011  
Subject: Update of the news issued by NISA/METI on the massive earthquake in the norther japan

Dear all,

Please find here attached the updated version of the news release issued by NISA/METI on the earthquake in the Northern Japan on 11 March in Japan time.

Sincerely,

#####

From Yoshihiro OZAWA, Dr of Eng.  
Office of International Programs  
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#####

March 13, 2011

Nuclear and Industrial Safety Agency

Seismic Damage Information(the 18<sup>th</sup> Release)  
(As of 04:30 March 13, 2011)

Nuclear and Industrial Safety Agency (NISA) confirmed the current situation of Higashidori and Onagawa NPSs, Tohoku Electric Power Co., Inc; Higashidori, Fukushima Dai-ichi, Fukushima Dai-ni and Kashiwazaki-Kariwa NPSs, Tokyo Electric Power Co., Inc. and electricity, gas, heat supply and complex as follows:

1. Summary of Damage(Earthquake at Sanriku-Ok)

- (1) Time of Occurrence: 14:46 (UTC 5:46) March 11, 2011, Friday
- (2) Epicenter: Off-Coast of Sanriku (North Latitude: 38; East Longitude: 142.9), 10km deep, M8.8
- (3) Seismic Intensity in Japanese Scale  
<Area of Seismic Intensity Larger Than and Including 4>  
7: Northern Miyagi Prefecture  
6+: Northern and southern Ibaraki Prefecture  
5+: Sanpachi-Kamikita Aomori Prefecture  
5-: Chuetsu, Niigata Prefecture  
<Municipality of Seismic Intensity Larger than and Including 4>  
6+: Naraha Machi, Tomioka Machi, Ookuma-machi, and Futaba-machi, Fukushima Prefecture  
6-: Ishinomaki-city and, Onagawa town (by Seismograph of NPP)of , Miyagi Prefecture and Tokaimura, Ibaraki Pref.  
5-: Kariwa-village, Niigata Prefecture  
4: Rokkasho-village, Higashidori-village, Aomori Prefecture, Kashiwazaki-city, Niigata Prefecture and Yokosuka-city, Kanagawa Prefecture  
1: Tomari-village, Hokkaido

2. The status of operation at Power Stations(Number of automatic shutdown(units): 10 (as of 11:00, March12)

a. Onagawa Nuclear Power Station (Onagawa-machi 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

Variation in the monitoring post readings: No

Variation in the main stack monitor readings: No

(3) Report concerning other malfunction

It is confirmed Smoke in the first basement of the Turbine Building was confirmed the extinguished at 22:55 on March 11th.

b. 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(784MW): in periodic inspection outage

Unit 5(784MW): in periodic inspection outage

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

(2) Readings at monitoring post

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 04:00, March 12 now.

MP4(Monitoring car data at the site boundary, North-west of Unit1):

40microSv/h(03:08, March13)

MP6 (at the main gate) 0.07microSv/h ->3.1 micro Sv/h

(04:00, March12->02:50, March 13)

MP8 (at the observation platform) 0.07microSv/h ->4.5 micro Sv/h

(04:00, March 12->02:50, March 13)

(3) Wind direction/wind speed(as of 20:38, March 12)

Wind direction: West

Wind Speed: 0.5m/s

(4)Report concerning other malfunction

Article 10\* of Act on Special Measures Concerning Nuclear Emergency

Preparedness (Fukushima Dai-ichi)

(\*A heightened alert condition)

Article 15\*\* of Act on Special Measures Concerning Nuclear Emergency

Preparedness (Fukushima Dai-ichi, Units 1 and 2)

(\*\* Nuclear emergency situation)

Situation of power source to recover water injection function at the Station.

-Cable from electric power generating cars are under connecting work(as of 15:04, March 12)

-Pressure in the containment vessel has arisen. Steam release is undertaking in order to relieve pressure.(as of 14:40, March 12)

-A radiation level exceeding 500 microSv/h was monitored at the site boundary(15:29, March 12). A large motion occurred due to an earthquake with close epicentre and an large sound was issued near Unit1 and smoke was observed.

c. Fukushima-Daini Nuclear Power Station(TEPCO)

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

(1) The status of operation

Unit1(1,100MW): automatic shutdown

Unit2(1,100MW): automatic shutdown

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

Unit4(1,100MW): automatic shutdown

(2) Readings at monitoring post etc.

Variation in the monitoring post readings: No

Variation in the main stack monitoring readings: No

(3) Direction and velocity of wind (As of 01:59, 13 March)

Direction: South-west

Velocity: 4.7m/s

(4) Report concerning other malfunction

No Report of fire, etc.

Article 10\* of Act on Special Measures Concerning Nuclear Emergency  
Preparedness (Fukushima Dai-ni, Unit 1)

(\*A heightened alert condition)

Article 15\*\* of Act on Special Measures Concerning Nuclear Emergency  
Preparedness (Fukushima Dai-ni, Units 1,2 and 4)

(\*\*Nuclear emergency situation)

### 3. Industrial Safety

#### ○Electricity

\* Tokyo Electric Power Co. (as of 04:30, March 13, 2011)

Scale of loss of electrical power: approx. 340 thousand houses

Power loss area:

Ibaraki Pref.: Whole area (approx. 332 thousand houses),

Tochigi Pref.: Mogi-cho, etc. (approx 7 thousand houses)

Chiba Pref.: Katori-shi, etc. approx 3 hundred houses)

\* Tohoku Electric Power Co. (as of 22:00, March 12, 2011)

Scale of loss of electrical power: approx.2150 thousand houses (under investigation)

Power loss area:

Iwate Pref.: Whole area, (approx 502 thousand houses)

Akita Pref: Some area (approx 600 houses)

Miyagi Pref: whole area (approx 1,283 thousand houses)

Aomori Pref.: area (approx 250 thousand houses)

Yamagata Pref: Recovered (as of 21:13, March 12)

Fukushima Pref: Some parts of Naka-dori and Hama-dori (approx 114 thousand houses)

Niigata Pref.: Recovered(as of 15:51, March 12)

\* Hokkaido Electric Power Co. (as of 14:00, March 12, 2011)

Electrical outage be restored

\*Chubu Electric Power Co. (as of 17:11, March 12, 2011)

Electrical outage be restored in Naomachi (as of 17:11, March 12)

○General Gas (as of 21:30, March 12)

The Japan Gas Association dispatched its six advance teams of thirty staff (five teams for Sendai and one team for Joban area) at 07:00, 12 March upon request from Sendai-shi.

Sendai-city municipal Gas, Kesennuma-city municipal Gas, Ishinomaki Gas have trouble contacting at 1:00 12 March. The Japan Gas Association confirmed that there are no supply disruption in the supply area of city gas in Hokkaido, Yamagata, and Akita prefecture.

\* Tokyo Gas Co. (whole area of Hitachi-shi)

Hitachi branch: 30,007 houses are in supply disruption. There is no damage in equipment, however, equipment is inoperable due to loss of power. Walkdown unit of eight person departed at 18:45, March 11 and already arrived at 06:00, March 12. Recovery plan will be established by 12 afternoon. Time of recovery is not certain.

Eastern part of Joso: 453 houses were in supply disruption in Ushiku (supply restarted at 17:10, March 11)

471 houses were in supply disruption in Ushiku-shi  
Ushiku-cho (supply restarted at 22:36 March 11)

77 houses are in supply disruption in  
Ryuugasaki (supply restarted at 16:20, March 11)

40 houses are in supply disruption in Nishi-ku,  
Yokohama-shi (supply restarted at 17:29, March 11)

Gas leaked from a Nozzle of an LNG tank at Sodegaura but no ignition (restored on 02:30, March 12)

\*Gas Bureau of Sendai-shi: whole supply disruption (approx. 360 thousand houses)

\*Shiogama Gas Co.: approx. 12,382 houses are in supply disruption. Shiogama-shi, Tagashiro-shi, Nanahama-shi and Rihusyo are out of service due to no supply from Gas Bureau of Sendai)

\*Hachinohe Gas (Several part of Hachinohe-shi): approx. 1,300 houses are in supply disruption.

\*Kamaishi Gas Co. : approx. 10,000 houses are in supply disruption. First

floor of this Gas facility sank.

\*Hatano Gas Co.: Approx. 380 houses are in supply disruption. Restoration will be expected 13<sup>th</sup> of March.

\*Keiyo Gas Co.: Leakage occurred at 5 locations of middle pressure conduit  
Leakage occurred at many parts of Low pressure conduits  
5,445 houses in Urayasu-shi are in supply disruption.  
Supply to Yachiyo Station stopped.

\*Kujukuri choei Gas: Approx 258 houses are in supply disruption.

\*Atsugi Gas Co: leakage occurred at 1 location of middle pressure conduit.

\*Fukushima Gas Co.: (A part of Fukushima-shi) About 2,726 houses are in supply disruption

\*Tohoku Gas (part of Shirakawa-shi): 300 houses are in supply disruption

\*Joban kyodo Gas(Iwaki-shi): 14,000 houses (whole customer) are in supply disruption

\*Tobu Gas Fukushima-shisya: 7,500 houses are in supply disruption  
(Koriyama-shi, Iwaki-shi) leakage occurred at 2 locations of middle pressure conduit, leakage occurred at 54 locations of low pressure conduits and another leakage occurred on 85 locations. 39 houses in supply disruption.

\*Tobu Gas (a part of Tsuchiura-shi) 7,500 houses in supply disruption  
(a part of Mito-shi) 330 houses in supply disruption

\*Joban Toshi Gas (Mito-shi) 60 houses in supply disruption

\*Tosai Gas(Kasukabe-shi) Gas leakage occurred from conduit. 150 houses in apartment are in supply disruption. Supply restarted in the afternoon 12 March.

\*Odawara Gas(Odawara-shi)

leakage occurred at 1 locations of low pressure branch conduit and 3 locations of ex-core inner conduit and have restored at 21:30 11 March. Other areas are under investigation.

○Community Gas(as of 15:50, March 12)

Severe damage has not been reported to Japan Community Gas Association so far. No information is available about the damage in North part of Ibaraki prefecture.

\*Tokyo Gas Energy (North part of Ibaraki): Factory stopped supply to 943

houses in Nakago-New Town due to the leakage from pipe.

\*Sato Kosan (based in Iwatsuki-ku, Saitama City) Iwatsuki-housing complex: Gas leakage occurred from conduit. 451 sites are in supply disruption.

\*Syutoken Gas (based in Sakura-City) Chitose-housing complex: 1,320 houses are in supply disruption

\*Kashima Marui Gas (Kamisu-shi): Gas conduit was damaged. 527 houses are in supply disruption. Time of recovery is not certain.

\*Nagashima Central Gas (Katori-shi) Tamatsukuri-housing complex, 222 houses are in supply disruption due to short circuit now under recovery works.

\*Taihei Sangyo (Takahagi-shi) Hagigaoka-housing complex 112 houses are in supply disruption due to short circuit. Recovery has completed at 21:00 11 March. (Takahagi-shi) Ishidaki-housing complex 648 houses and (Hitachi-shi) Hitachi-Densen Akasaka-housing complex 222 houses are in supply disruption. Under recovery works.

\*Taiyo Nissan Energy Kanto Kajima Branch: (Kamisu-shi) Mitsubishi Chemicals Yatabe Complex: 90 houses are in supply disruption due to activation. Investigation is underway for possible gas leakage on the main pipe.

\*Nihon Gas (Yaita-shi) Narita Koufuku high residential complex: Production of gas is stopped due to partial damage of the specific production building. 140 houses are in supply disruption[

(Nasukarasuyama-shi) Kounodai New Town: Gas leakage from Main Pipe. 27 houses are in supply disruption.

(Itako-shi) Kajima Hinode Housing Complex: 1876 houses are in supply disruption due to damage in the main and branch/torch in and out pipes

(Tokai-mura) Arayadai Housing Complex of JAEA Gas supply was disrupted due to smell of gas in the specified gas production facility.

(Tokai-mura) Nagahori Housing Complex of JAEA 145 houses were in



supply disruption due to brake of mid-pressure pipe. Affected parts are under repair..

(Hitachioota-shi) Mayumigaoka New Town: 482 gas supply stopped due to autonomy request.

(Inashiki-shi) Yuisa Flat: There are possibilities of breaks in main and branch pipes and supply pipes. 94 houses are in supply disruption. Gas conduit is under repair.

\*Imaichi Gas: Gas leakage occurred from conduit at the simple gas complex in Nikko-shi: 240 houses were in gas supply disruption.

\*Nihon Gas: Gas leakage occurred from conduit at simple gas complex in the jurisdiction: 76 houses in Nasu-karasuyama-shi, 97 houses in Inashiki-shi, 594 houses in Tokai-mura, Natsu-gun, 370 houses in Yaita-shi, and 3,299 houses in Itako-shi were in gas supply disruption.

These areas other than Itako-shi will be restored on March 19. Residents in 1876 houses of Hinode housing complex in Itako-shi evacuated from this region due to liquefaction of the ground. Time of recovery is not certain.

212 houses in Noda-shi were in gas supply disruption. This area has been restored in March 11.

\*Horikawa Industry (Bando city, Ibaraki Pref.) : Iwai Greenland Due to liquefaction of the ground, 566 houses are in supply disruption.

\*Tajima : 250 houses were in gas supply disruption at the simple gas complex in Hachiooji-city. This area will be restored within March 12.

\*Iwatani Kanto (Saitama-shi) Sashiogi Housing Complex: 6 houses are stopped supply. Currently leakage location is under remedy.

○Gas conduit Operators (as of 15:50, March 12)

\*JX Nikko Nisseki Energy: Hachinohe LNG Base

Premise, electric room and in-house electricity generator equipment, were flooded by the 2<sup>nd</sup> wave of tsunami and the gas supply was stopped.

Pipe line and bubble station Petroleum Resources Development around Sendai-shi appeared to be flooded with water. Disruption of gas supply does not pose impediment because demands for gas were also disrupted.

○Heat supply (as of 15:50, March 12)

West side area at Morioka station: heat supply was stopped due to power failure.

\*Yamagata Netsu Kyokyu (Yamagata-shi): Supply was stopped due to emergency shut down condition.

\*Onahama Haiyu (Onahama, Iwaki-shi): stopped heat supply due to the breakage of pipe. Heat supply pipes underground might be affected. Time of recovery is not certain.

\*"HITACHI NETSU ENERGY"(Hitachi City): stopped heat supply due to the electrical outage at 15:19, March 11.

\*"CHIBA NETSU KYOKYU"(Chiba-city): stopped freezer, etc. at 16:19, March 11. Supply was stopped and walkdown is conducted at 16:19, March 11.

\*"NISHI-IKEBUKURO NETSU KYOKYU": stopped freezer and boiler at 15:45, March 11.

\*"TOKYO NETSU KYOKYU";

-stopped boiler in Takeshiba and Yurakucho areas at 15:20, March 11

-stopped supply to one of the building complex at Hikarigaoka for approx. 3 hours due to the leakage of pipe at 21:35, March 11 (Restart supplying at 00:05, March 12)

\*"Yokohama Business Park NETSU KYOKYU (Hodogaya-ku, Yokohama city)

15:50 Stopped steam and cold water supply to PREZZO building

16:20 restored by temporary repair

○Complex (as of 11:00, March 12)

**\*Cosmo Oil factory Chiba branch**

A column of Butane Butylene storage tank was broken. Fire occurred due to gas leakage. One person suffered serious-injury, 4 persons suffered minor injury.

**\*JX Nippon Oil&Energy Corporation Sendai oil factory (sendai-city, Miyagi prefecture)**

-Fire occurred from an explosion of low temperature LPG tank

**4. 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, Units 1,2 and 3.

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

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

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

19:03 : Government declared the state of nuclear emergency

20:50: Fukushima prefecture's emergency preparedness headquarters - issued a directive 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 Governor of Fukushima, Mayor of Ooka and Mayor of Futaba were issued regarding the accident occurred at Fukushima-Dai-ichi Nuclear Power Station, TEPCO, pursuant to Paragraph 3, Article 15 of the Act for 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.

(March12)

5:22 Unit 1 of Fukushima Dai-ni notified NISA of the situation of the Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

5:32 Unit 2 of Fukushima Dai-ni 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 Units 1,2 and 4 of Fukushima Dai-ni NPS, TEPCO reported NISA in accordance with Article 15 of Act on Special Measures Concerning Nuclear Emergency Preparedness.

6:50 According to the article 64, 3 of nuclear regulation act, government order to control the internal pressure in Fukushima-daiichi unit No. 1 and 2

7:45 Directives from Prime Minister to Governor of Fukushima, Mayors of Hirono, Naraha, Tomioka, Ookuma and Futaba were issued regarding the accident occurred at Fukushima-Dai-ni Nuclear Power Station, TEPCO, pursuant to Paragraph 3, Article 15 of the Act for Special Measures Concerning Nuclear Emergency Preparedness as follows:

- Residents living in the area of 3km radius from Fukushima-Dai-ni Nuclear Power Station must evacuate.
- Residents living in the area of 10km radius from Fukushima-Daini 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 Nuclear Power Station.(NPS).

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

- 
- 18:25 Prime Minister directed evacuation of the residents living within the 20km radius from the Fukushima Dai-ichi NPS
- 19:55 Directives from Prime Minister was issued regarding sea water injection to Unit No.1 of Fukushima Dai-ichi NPS.
- 20:05 According to the article 64, 3 of nuclear regulation act and concerning to directives from Prime Minister, government ordered to inject sea water Unit No.1 of Fukushima Dai-ichi NPS.

## <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.

(Contact Person)

Mr. Toshihiro Bannai

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NISA/METI

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**From:** OPA Resource

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

**Subject:** Revised - NRC Sees No Radiation at Harmful Levels Reaching U.S. From Damaged Japanese Nuclear Power Plants

**Date:** Sunday, March 13, 2011 4:26:37 PM

**Attachments:** 11-046.docx

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For Immediate Release

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# NRC NEWS

## U.S. NUCLEAR REGULATORY COMMISSION

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

No. 11-046

March 13, 2011

(Revised)

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

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

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

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

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

###

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

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**To:** DOI; DTRA; chardin; rfraass@crccd.org; james.d.lloyd@nasa.gov; PN Distribution; FDA; State Dept; White House Sit Room; Bernie Beaudin; Canadian Nuclear Safety Commission (CNSC); eoc2@cnscccsn.gc.ca; DOEHQEOC@OEM.DOE.GOV; fldr-nrc@comdt.uscg.mil; EOC.EPAHQ@EPAMAIL.EPA.GOV; Lawrence Koleff; SIOC; FEMA-operations-center@dhs.gov; Health Canada Operations Center; IAEA Emergency Response Unit; USDA; Screnci, Diane; Sheehan, Neil; Dricks, Victor; Clifford, James; Gamberoni, Marsha; Heater, Keith; Holian, Brian; Kay Gallagher; Kinneman, John; Lew, David; Nick, Joseph; ODaniell, Cynthia; Powell, Raymond; R1 IRC; Roberts, Darrell; Thompson, Margaret; Davenport, Patricia; McCallie, Karen; Miles, Patricia; Quinones-Navarro, Joylynn; R2 IRC; Rudisail, Steven; R3 IRC; Smith, Desiree; Alferink, Beth; Andrews, Tom; Howell, Linda; R4 IRC  
**Subject:** NRC Revised Press Release #5  
**Date:** Sunday, March 13, 2011 4:10:39 PM  
**Attachments:** Revised Press Release 5.pdf

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

The NRC is responding to an event.

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

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# NRC NEWS

## U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Telephone: 301/415-8200

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

No. 11-046

March 13, 2011

(Revised)

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

**From:** OPA Resource

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

**Subject:** Press Release Being Published Shortly

**Date:** Sunday, March 13, 2011 2:23:44 PM

**Attachments:** 11-046.docx

---

Press Release – NRC Sees No Radiation At Harmful Levels Reaching U.S.

ccc/36



# NRC NEWS

## U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Telephone: 301/415-8200

Washington, D.C. 20555-0001

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

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

No. 11-046

March 13, 2011

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

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

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

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

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

###

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


**From:** US Airways e-Saver  
**To:** Hayden, Elizabeth  
**Subject:** Your US Airways e-Saver  
**Date:** Wednesday, March 16, 2011 3:05:14 AM

Please add esaver@myusairways.com to your personal address book to ensure delivery. Please do not reply to this email.



## US Airways Twitter



From	To	Each way*
Albany, NY	Washington, DC (DCA)	\$89
Charlotte, NC	Pittsburgh, PA	\$94
Philadelphia, PA	Richmond, VA	\$79
Pittsburgh, PA	Washington, DC (DCA)	\$79
Philadelphia, PA	Boston, MA	\$249 
Phoenix, AZ	Oakland, CA	\$269 
Charlotte, NC	Mexico City, Mexico	\$231
Baltimore, MD	Mexico City, Mexico	\$149
Phoenix, AZ	Puerto Vallarta, Mexico	\$165
Seattle, WA	Puerto Vallarta, Mexico	\$157

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Terry Fator



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**\*Restrictions, taxes and fees may apply. Click on each offer for details, terms and conditions.** Air fares are per person and do not include a federal excise tax of \$3.70 per segment (a flight segment is defined as a takeoff and a landing), the September 11th Security Fee of \$2.50 per enplanement, Passenger Facility Charges of up to \$18 per roundtrip itinerary, U.S. International Travel Facilities tax of up to \$8.20 per segment on flights beginning or ending in Hawaii, International air transportation taxes of up to \$18 per person (\$20.50 each way for travel to/from Mexico), foreign departure taxes, customs and immigration fees, health inspection and tourism fees (\$38 - \$47 per person for travel to/from Mexico), passenger duty tax or passenger services fees from \$78 - \$117 per person and a federal excise tax of \$16.30 per international segment. Vacation package sample prices are per person, based on double occupancy and include all government taxes and fees. Part or all of the service may be provided by US Airways or US Airways Express carriers Air Wisconsin, Chautauqua, Colgan, Mesa, Piedmont, PSA, Republic and Trans States or United®. Seats are limited and may not be available on all flights. Prices may vary significantly based on origin city and departure date. Prices are subject to availability and may change at any time. Blackout dates may apply. Additional fees: Checked baggage fees may apply to all vacation packages and air travel; visit [usairways.com/baggage](http://usairways.com/baggage) for details. All vacation packages and air travel purchased through our call center or our reservations desk incur additional fees of up to \$35 per person. All discounts reflected in prices shown.

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**From:** HOO Hoc  
**To:** HOO Hoc  
**Subject:** SID Notice: 3/13/2011  
**Date:** Sunday, March 13, 2011 7:21:21 PM  
**Attachments:** Redacted\_SID.pdf

---

~~FOR OFFICIAL USE ONLY~~ - LIMITED DISTRIBUTION

SID#: 3922 ; GINNA ; Open

The following attached report may contain "law enforcement sensitive" information. Please do not relay this information to individuals who do not have a "need to know".

NOTE:

Adobe Acrobat Reader and a password are required to open the attached Emergency Response Officer's Report. A password has been sent to you by separate notification (emailed to NRC recipients). To open a password protected pdf document, start Adobe Reader and enter the password in lower case when prompted as the document is opened.

Headquarters Operations Officer  
U.S. Nuclear Regulatory Commission  
Phone: 301-816-5100  
Fax: 301-816-5151  
email: hoo.hoc@nrc.gov  
secure e-mail: hoo1@nrc.sgov.gov

ccc/38

**From:** Mitlyng, Viktoria  
**To:** Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly  
**Cc:** Chandrathil, Prema  
**Subject:** Region 3 TNT  
**Date:** Sunday, March 13, 2011 6:11:53 PM

---

MONTICELLO - OPA provided background information to the Minneapolis Fox News about regulatory standards for US nuclear plants and provided the reporter with the summary of the NRC's actions during the events in Japan, including the most recent press release stating the agency sees no harmful radiation reaching the US from damaged Japanese reactors. Xcel officials will be on the 5 PM news talking about Monticello, which is a BWR. The reporter asked to speak to an NRC BWR expert. We told him we would get back to him on the request.

ccc/39

**From:** Harrington, Holly  
**To:** McIntyre, David; Brenner, Eliot; Couret, Ivonne; Hayden, Elizabeth; Burnell, Scott  
**Subject:** RE: You Tube  
**Date:** Sunday, March 13, 2011 3:38:28 PM

---

Access is good. Still not usage, though. But I don't expect to try and pull that out of our hat this minute anyway . . .

---

**From:** McIntyre, David  
**Sent:** Sunday, March 13, 2011 3:34 PM  
**To:** Brenner, Eliot; Harrington, Holly; Couret, Ivonne; Hayden, Elizabeth; Burnell, Scott  
**Subject:** You Tube

The lovely young lady from NSIR just informed me that OIS has agreed that although they have not completed the policy review to allow us to access You Tube and Twitter, due to the exigencies of the moment, all NRC will have access in about 20 minutes.

ccc/40

**From:** Akstulewicz, Brenda  
**To:** Brenner, Eliot  
**Cc:** Hayden, Elizabeth; Harrington, Holly  
**Subject:** Tomorrow Morning  
**Date:** Sunday, March 13, 2011 2:44:30 PM

---

Hi Eliot,

Hope all is going smoothly today. Just wondering if you need/want me to come in prior to my usual 7:30 start time tomorrow morning.

Thanks,  
b

ccc/41

**From:** Screnci, Diane  
**To:** Brenner, Eliot; Hayden, Elizabeth  
**Subject:** RE: Illustration of Japanese reactor  
**Date:** Sunday, March 13, 2011 1:18:48 PM

---

Eliot,

Keeping in mind that I was in high school during the TMI accident.... and have no first-hand knowledge - it's my understanding the fact that fuel melted was not determined until years later when the company used a remote camera to look at the condition of the core. I've never actually paid much attention to this diagram before, but assume that it's based on the agency's understanding of the condition of the core... and was created years after the fact.

The meltdown did not breach the reactor.

Diane Screnci  
Sr. Public Affairs Officer  
USNRC  
610/337-5330

---

**From:** Brenner, Eliot  
**Sent:** Sunday, March 13, 2011 12:02 PM  
**To:** McClain, Dylan  
**Cc:** Hayden, Elizabeth; Screnci, Diane  
**Subject:** RE: Illustration of Japanese reactor

Beth/diane .. need some history help here.

---

**From:** McClain, Dylan [mailto:mcclaind@nytimes.com]  
**Sent:** Sunday, March 13, 2011 12:01 PM  
**To:** Brenner, Eliot  
**Subject:** Re: Illustration of Japanese reactor

Eliot,

Couple of questions about TMI. The image below is from the NRC, but I can't seem to find the original report that I assume it came from...

<http://www.nrc.gov/images/reading-rm/photo-gallery/20071114-006.jpg>

We'd like to get the image sent to us so that we can use it or copy it (it is a bit too low resolution off the Web).

Also, does anyone know on what basis it was drawn? Meaning, how did the illustrator come up with the image? Was it based on some sort of photograph? We just want to know if it is an interpretation, or drawn from real life...

Finally, do you know if the meltdown breached the reactor?

Thank you.

--

Dylan McClain  
The New York Times

ccc/42

---

**From:** "Brenner, Eliot" <[Eliot.Brenner@nrc.gov](mailto:Eliot.Brenner@nrc.gov)>  
**Date:** Sat, 12 Mar 2011 19:22:34 -0500  
**To:** Dylan McClain <[mcclaind@nytimes.com](mailto:mcclaind@nytimes.com)>  
**Subject:** RE: Illustration of Japanese reactor

Looks good on our end. Nice job.

**From:** McClain, Dylan [<mailto:mcclaind@nytimes.com>]  
**Sent:** Saturday, March 12, 2011 5:36 PM  
**To:** Brenner, Eliot; Margaret Harding; KEREKES, Steven  
**Subject:** Illustration of Japanese reactor

Can you please look over the attached illustration and let me know if you see any problems or mistakes? Thank you.

--

Dylan McClain  
The New York Times

**From:** Brenner, Eliot  
**To:** Sheehan, Neil  
**Cc:** Hayden, Elizabeth; Harrington, Holly  
**Subject:** RE: Media calls today on Japan reactor event  
**Date:** Sunday, March 13, 2011 12:05:40 PM

---

Yes. Plan on a couple of days.

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

From: Sheehan, Neil  
Sent: Sunday, March 13, 2011 12:01 PM  
To: Brenner, Eliot  
Subject: Re: Media calls today on Japan reactor event

How are things looking today? Do you still need me to come down later today?

Neil Sheehan  
NRC Public Affairs Officer  
Sent from NRC Blackberry

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

From: Brenner, Eliot  
To: Sheehan, Neil  
Sent: Sat Mar 12 17:00:02 2011  
Subject: RE: Media calls today on Japan reactor event

8p-8a

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

From: Sheehan, Neil  
Sent: Saturday, March 12, 2011 3:59 PM  
To: Brenner, Eliot  
Subject: Re: Media calls today on Japan reactor event

Sounds like a plan

What time would you want me to start tomorrow night?

Neil Sheehan  
NRC Public Affairs Officer  
Sent from NRC Blackberry

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

From: Brenner, Eliot  
To: Sheehan, Neil; Dean, Bill; Lew, David  
Cc: Harrington, Holly; Hayden, Elizabeth; Screnci, Diane  
Sent: Sat Mar 12 15:57:52 2011  
Subject: RE: Media calls today on Japan reactor event

Nothing fresh. Press releases parallel our talking points.

As for tomorrow, I would like you come down and work the overnight tomorrow night in the Ops Center and be prepared to also work Monday night. There is a reservation for you at the Marriott across the street in your name, on my credit card. Strongly suggest you substitute your own card. If you wake up at 4 p.m. and I tell you it is not necessary to work a second night ... the Marriott will only charge for a

ccc/43

single night.

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

From: Sheehan, Neil

Sent: Saturday, March 12, 2011 3:55 PM

To: Brenner, Eliot; Dean, Bill; Lew, David

Subject: Media calls today on Japan reactor event

So far today I have received calls from the Union Leader (of Manchester, N.H.), the York (Pa.) Daily Record, the Journal News (of Westchester, N.Y.) and the Pottstown (Pa.) Daily Record.

Any updates of the talking points would be appreciated.

Neil Sheehan

NRC Public Affairs Officer

Sent from NRC Blackberry



**From:** Operations Center Bulletin  
**To:** OST02 HOC  
**Subject:** FW: NRC IS RESPONDING TO AN EMERGENCY OUTSIDE of the United States  
**Date:** Sunday, March 13, 2011 11:16:10 AM

---

## **THIS IS NOT A DRILL**

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

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

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

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

### **Two important reminders:**

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

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

### **Other Sources of Information:**

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

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

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

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

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

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

No response to this message is required.

**THIS IS NOT A DRILL**

**From:** Dennis K Rathbun  
**To:** Vietti-Cook, Annette  
**Cc:** Hayden, Elizabeth  
**Subject:** Witnessing  
**Date:** Sunday, March 13, 2011 9:32:32 AM

---

Annette

Beth is going to be out of the office this coming week. So if OK with you, let's shoot for sometime the week of Mar 21.  
OK with you??

. I guess this thing is Japan is pretty bad.

Dennis

ccc/45

**From:** Burnell, Scott  
**To:** Lee, Jun; Couret, Ivonne; Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; McIntyre, David  
**Cc:** Hardy, Sally  
**Subject:** RE: web stuff  
**Date:** Sunday, March 13, 2011 8:13:59 AM

---

Thanks Jun! We'll let you know when we've got something for you.

---

**From:** Lee, Jun  
**Sent:** Sunday, March 13, 2011 8:13 AM  
**To:** Couret, Ivonne; Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; Burnell, Scott; McIntyre, David  
**Cc:** Hardy, Sally  
**Subject:** RE: web stuff

Just wanted to let you know that I'm in the office this morning, 3/13, till this afternoon when Sally will be available.

Thanks,

Jun

---

**From:** Couret, Ivonne  
**Sent:** Saturday, March 12, 2011 4:17 PM  
**To:** Lee, Jun; Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; Burnell, Scott; McIntyre, David  
**Cc:** Hardy, Sally  
**Subject:** RE: web stuff

Thanks Jun...you have been a great support this entire day...Ivonne

Ivonne L. Couret  
Public Affairs Officer  
Office of Public Affairs



(301) 415-8205

[ivonne.couret@nrc.gov](mailto:ivonne.couret@nrc.gov)

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

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

NRC Employees can read interesting insight on the OPA Blog  
<http://portal.nrc.gov/OCM/opa/blog/default.aspx>



Please consider the environmental impact before printing this email.

---

**From:** Lee, Jun  
**Sent:** Saturday, March 12, 2011 4:16 PM  
**To:** Brenner, Eliot; Couret, Ivonne; Hayden, Elizabeth; Harrington, Holly; Burnell, Scott; McIntyre, David  
**Cc:** Hardy, Sally

ccc/46

**Subject:** RE: web stuff

Just wanted to let everyone know that Sally will be picking things up and she can be reached via her cell or Blackberry.

Thanks,

Jun

---

**From:** Brenner, Eliot

**Sent:** Saturday, March 12, 2011 9:43 AM

**To:** Couret, Ivonne; Hayden, Elizabeth; Harrington, Holly; Burnell, Scott; McIntyre, David; Lee, Jun

**Cc:** Hardy, Sally

**Subject:** web stuff

To follow up on the fact sally hardy will be available., Jun Lee is going to be working web posting issues through the day, and Sally will pick up in the afternoon. June is at 415-1337. And sally we know how to track down.

Meanwhile, I have a boatload of PDFs of BWRs should we need them. They could be linked with a blog.

**From:** [Hayden, Elizabeth](#)  
**To:** [Brenner, Eliot](#)  
**Cc:** [Burnell, Scott](#); [Harrington, Holly](#)  
**Subject:** Additional Questions re Japan  
**Date:** Sunday, March 13, 2011 4:06:00 AM

---

We received these questions from Lara. Some of our Q&A will answer a few of these questions while others will need answers. Should we get these into the Reactor Safety Team or some other approach? Maybe Rob could corral these.

Does the Diablo Canyon design basis include protection from both a worse case earthquake combined with a subsequent tsunami?

Could what's happened in Japan, happen at a plant here in the US? [See our Q&A]

Are US plants susceptible to the same sort of loss of all diesel power?

Now after the Japan tragedy, will the NRC finally hear us (ANR) and postpone DC license renewal until seismic studies are complete? How can you be sure that what happened there is not going to happen at Diablo with a worse case quake and tsunami?

SONGS received a white finding in 2008 for a bolt issue related to their EDGs that went undetected for 4 years. NRC issued the white as there was risk the EDGs may not have started under seismic conditions. Aren't all plants susceptible to the unknown? Is there any assurance the emergency cooling systems will function as desired in a Japan like emergency?

ccc/47

**From:** Brenner, Eliot  
**To:** Hayden, Elizabeth; Harrington, Holly  
**Subject:** RE: Tomorrow's schedule  
**Date:** Sunday, March 13, 2011 6:56:49 AM

---

Sounds good

---

**From:** Hayden, Elizabeth  
**Sent:** Sunday, March 13, 2011 3:48 AM  
**To:** Brenner, Eliot; Harrington, Holly  
**Subject:** Tomorrow's schedule

Eliot,

Since I am still here at the Ops Center, and it appears there will be a host of folks here early in the day, I do not plan to come in until around 7 pm to help Holly out who may be the only one here at that time. If that doesn't work, please let me know.

Beth

ccc/48

**From:** Hayden, Elizabeth  
**To:** Harrington, Holly  
**Subject:** Re: Tomorrow's schedule  
**Date:** Sunday, March 13, 2011 2:58:54 PM

---

No. I was OK. Didn't know the WH and Chairman were going to start working on a statement at midnight!

---

**From:** Harrington, Holly  
**To:** Hayden, Elizabeth  
**Sent:** Sun Mar 13 14:55:32 2011  
**Subject:** RE: Tomorrow's schedule

Ohmigod. I'm sorry that you had to stay so late. I was fried . . . I hope I didn't leave you in the lurch.

---

**From:** Hayden, Elizabeth  
**Sent:** Sunday, March 13, 2011 3:48 AM  
**To:** Brenner, Eliot; Harrington, Holly  
**Subject:** Tomorrow's schedule

Eliot,

Since I am still here at the Ops Center, and it appears there will be a host of folks here early in the day, I do not plan to come in until around 7 pm to help Holly out who may be the only one here at that time. If that doesn't work, please let me know.

Beth

ccc/49



**From:** Hayden, Elizabeth  
**To:** Brenner, Eliot  
**Cc:** Uselding, Lara; Sheehan, Neil; Mitlyng, Viktoria; Screnci, Diane; Chandratil, Prema; Hannah, Roger; Ledford, Joey; Dricks, Victor; Couret, Ivonne; McIntyre, David  
**Subject:** FW: Emailing: State Q&A Rev 1.pdf for Distribution to SLOs  
**Date:** Sunday, March 13, 2011 4:13:00 AM  
**Attachments:** State Q&A Rev 1.pdf

---

fyi

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

From: LIA04 Hoc  
Sent: Sunday, March 13, 2011 3:38 AM  
To: McNamara, Nancy; Tifft, Doug; Trojanowski, Robert; Woodruff, Gena; Barker, Allan; Logaras, Haral; Maier, Bill; Browder, Rachel; Turtill, Richard  
Cc: Hayden, Elizabeth; Harrington, Holly; Burnell, Scott; Thaggard, Mark; Blount, Tom; LIA06 Hoc; LIA04 Hoc; LIA02 Hoc; LIA03 Hoc; LIA12 Hoc; LIA11 Hoc; LIA01 Hoc; LIA10 Hoc  
Subject: FW: Emailing: State Q&A Rev 1.pdf for Distribution to SLOs

RSLOs - The information attached has been vetted with OPA and the NRC Executive Team and has been approved for dissemination to the Governor-appointed State Liaison Officers.

Rich Turtill will be reporting to the Ops Center @ 7:00 am Sunday 3/13 and will be your POC.

Thank you for your assistance today.

Rosetta

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

From: LIA09 Hoc  
Sent: Sunday, March 13, 2011 3:28 AM  
To: LIA04 Hoc  
Subject: Emailing: State Q&A Rev 1.pdf

The message is ready to be sent with the following file or link attachments:

State Q&A Rev 1.pdf

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

ccc/50

**From:** [Hayden, Elizabeth](#)  
**To:** [Courret, Ivonne](#); [McIntyre, David](#)  
**Subject:** Fw: WASHINGTON INQUIRIES  
**Date:** Sunday, March 13, 2011 10:37:54 AM

---

---

**From:** Hayden, Elizabeth  
**To:** LIA04 Hoc  
**Cc:** Virgilio, Rosetta  
**Sent:** Sun Mar 13 01:49:04 2011  
**Subject:** RE: WASHINGTON INQUIRIES

What press release? Please forward the url for the website.

---

**From:** LIA04 Hoc  
**Sent:** Sunday, March 13, 2011 12:11 AM  
**To:** Hayden, Elizabeth; Harrington, Holly  
**Cc:** Turtill, Richard  
**Subject:** WASHINGTON INQUIRIES

See State of Washington's preference that inquiries be referred to the website listed on the press release

---

**From:** DOH HAN Alert [mailto:HANALERT@doh.wa.gov]  
**Sent:** Sunday, March 13, 2011 12:08 AM  
**To:** LIA04 Hoc  
**Cc:** Banks, Dan (DOH)  
**Subject:** Re: Request from Rosetta Virgilio, NRC Liaison

Please refer them to the press release or the website.

Thanks

---

**From:** LIA04 Hoc <LIA04.Hoc@nrc.gov>  
**To:** DOH HAN Alert  
**Cc:** Duty Officer (EMD)  
**Sent:** Sat Mar 12 20:54:49 2011  
**Subject:** RE: Request from Rosetta Virgilio, NRC Liaison

Thanks much – I assume NRC can refer calls to the POCs on the press release, right?

Contacts: Gordon MacCracken, Communications Office 360-236-4072  
Tim Church, Communications Office 360-236-4077

---

**From:** DOH HAN Alert [mailto:HANALERT@doh.wa.gov]  
**Sent:** Saturday, March 12, 2011 11:36 PM  
**To:** LIA04 Hoc  
**Cc:** Duty Officer (EMD)  
**Subject:** RE: Request from Rosetta Virgilio, NRC Liaison

All,

ccc/51

Please find attached today's press release concerning DOHs radiation monitoring.

DOH Duty Officer

---

**From:** LIA04 Hoc [mailto:LIA04.Hoc@nrc.gov]  
**Sent:** Sat 3/12/2011 8:33 PM  
**To:** DOH HAN Alert; DutyOfficer@doh.wa.gov  
**Cc:** Turtill, Richard  
**Subject:** Request from Rosetta Virgilio, NRC Liaison

Dan/Dan – This is in follow up to our telecon asking for State of Washington points of contact to whom NRC can refer members of the public who are asking about Washington State's response to the Japanese event

Rosetta O. Virgilio  
NRC State Liaison Team  
301-816-5100

**From:** Hayden, Elizabeth  
**To:** Couret, Ivonne; McIntyre, David  
**Subject:** Fw: OREGON POC FOR PUBLIC INQUIRIES  
**Date:** Sunday, March 13, 2011 10:38:40 AM

---

---

**From:** LIA04 Hoc  
**To:** Hayden, Elizabeth; Harrington, Holly  
**Cc:** Turtill, Richard  
**Sent:** Sun Mar 13 01:08:20 2011  
**Subject:** OREGON POC FOR PUBLIC INQUIRIES

Christine Stone is the Oregon Public Information Officer; she can be reached – in order of preference - at [Christine.L.Stone@state.or.us](mailto:Christine.L.Stone@state.or.us) or at the office (during business hours) at 971-673-1282

ccc/52

**From:** [LIA04 Hoc](#)  
**To:** [Hayden, Elizabeth](#)  
**Subject:** FW: Request from Rosetta Virgilio, NRC Liaison  
**Date:** Sunday, March 13, 2011 1:09:33 AM  
**Attachments:** [11-039 radiation monitoring.pdf](#)

---

See attached

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**From:** DOH HAN Alert [mailto:HANALERT@doh.wa.gov]  
**Sent:** Saturday, March 12, 2011 11:36 PM  
**To:** LIA04 Hoc  
**Cc:** Duty Officer (EMD)  
**Subject:** RE: Request from Rosetta Virgilio, NRC Liaison

All,

Please find attached today's press release concerning DOHs radiation monitoring.

DOH Duty Officer

---

**From:** LIA04 Hoc [mailto:LIA04.Hoc@nrc.gov]  
**Sent:** Sat 3/12/2011 8:33 PM  
**To:** DOH HAN Alert; DutyOfficer@doh.wa.gov  
**Cc:** Turtill, Richard  
**Subject:** Request from Rosetta Virgilio, NRC Liaison

Dan/Dan – This is in follow up to our telecon asking for State of Washington points of contact to whom NRC can refer members of the public who are asking about Washington State's response to the Japanese event

Rosetta O. Virgilio  
NRC State Liaison Team  
301-816-5100

ccc/53

**From:** LIA04 Hoc  
**To:** Hayden, Elizabeth; Harrington, Holly  
**Cc:** Turtil, Richard  
**Subject:** CALIFORNIA CONTACT INFO  
**Date:** Sunday, March 13, 2011 1:27:07 AM

---

Ladies – FYI, was just informed by Gary Butner, CA Dept of Public Health that he's still waiting on POC information for referring calls and said he likely won't have that info until tomorrow morning. He will follow up with Rich Turtil, who will be on duty tomorrow morning.

ccc/54

**From:** OST03 HOC  
**To:** DOI; DTRA; chardin; rfraass@crcpd.org; james.d.lloyd@nasa.gov; PN Distribution; FDA; State Dept; White House Sit Room; Bernie Beaudin; Canadian Nuclear Safety Commission (CNSC); eoc2@cnscccsn.gc.ca; DOEHOEOC@OEM.DOE.GOV; fldr-nrc@comdt.uscg.mil; EOC.EPAHQ@EPAMAIL.EPA.GOV; Lawrence Koleff; SIOC; FEMA-operations-center@dhs.gov; Health Canada Operations Center; IAEA Emergency Response Unit; USDA; Screnci, Diane; Sheehan, Neil; Dricks, Victor; Clifford, James; Gamberoni, Marsha; Heater, Keith; Holian, Brian; Kay Gallagher; Kinneman, John; Lew, David; Nick, Joseph; ODaniell, Cynthia; Powell, Raymond; R1 IRC; Roberts, Darrell; Thompson, Margaret; Davenport, Patricia; McCallie, Karen; Miles, Patricia; Quinones-Navarro, Joylynn; R2 IRC; Rudisail, Steven; R3 IRC; Smith, Desiree; Alferink, Beth; Andrews, Tom; Howell, Linda; R4 IRC  
**Subject:** NRC Press Release #1 through 5 - Japan Event Earthquake/Tsunami  
**Date:** Sunday, March 13, 2011 3:08:48 PM  
**Attachments:** [Press Release 1.pdf](#)  
[Press Release 2.pdf](#)  
[Press Release 3.pdf](#)  
[Press Release 4.pdf](#)  
[Press Release 5.pdf](#)

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

The NRC is responding to an event.

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

ccc/55



# NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs

Telephone: 301/415-8200

Washington, D.C. 20555-0001

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

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

No. 11-042

March 11, 2011

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

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

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

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

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

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

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

###

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





# NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

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

No. 11-043

March 11, 2011

## NRC CONTINUES TO TRACK EARTHQUAKE AND TSUNAMI ISSUES

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

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

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

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

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

###

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# NRC NEWS

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

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No. 11-044

March 12, 2011

### NRC IN COMMUNICATION WITH JAPANESE REGULATORS

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

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

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

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

###

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



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

No. 11-045

March 12, 2011

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

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

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

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

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

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

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

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

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

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

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

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

###

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# NRC NEWS

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

No. 11-046

March 13, 2011

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

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

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

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

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

###

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

**From:** [Hayden, Elizabeth](#)  
**To:** [Courret, Ivonne](#); [McIntyre, David](#)  
**Subject:** Fw: Request from Rosetta Virgilio, NRC Liaison  
**Date:** Sunday, March 13, 2011 10:35:00 AM  
**Attachments:** [11-039 radiation monitoring.pdf](#)

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**From:** LIA04 Hoc  
**To:** Hayden, Elizabeth  
**Sent:** Sun Mar 13 01:09:30 2011  
**Subject:** FW: Request from Rosetta Virgilio, NRC Liaison

See attached

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**From:** DOH HAN Alert [<mailto:HANALERT@doh.wa.gov>]  
**Sent:** Saturday, March 12, 2011 11:36 PM  
**To:** LIA04 Hoc  
**Cc:** Duty Officer (EMD)  
**Subject:** RE: Request from Rosetta Virgilio, NRC Liaison

All,

Please find attached today's press release concerning DOHs radiation monitoring.

DOH Duty Officer

---

**From:** LIA04 Hoc [<mailto:LIA04.Hoc@nrc.gov>]  
**Sent:** Sat 3/12/2011 8:33 PM  
**To:** DOH HAN Alert; [DutyOfficer@doh.wa.gov](mailto:DutyOfficer@doh.wa.gov)  
**Cc:** Turtill, Richard  
**Subject:** Request from Rosetta Virgilio, NRC Liaison

Dan/Dan – This is in follow up to our telecon asking for State of Washington points of contact to whom NRC can refer members of the public who are asking about Washington State's response to the Japanese event

Rosetta O. Virgilio  
NRC State Liaison Team  
301-816-5100

ccc/sb



# News Release

**For immediate release: March 12, 2011**

**(11-039)**

**Contacts:** Gordon MacCracken, Communications Office  
Tim Church, Communications Office

**360-236-4072**  
**360-236-4077**

## **Nuclear event in Japan poses no health risk in Washington; state monitoring**

**OLYMPIA** — The state Department of Health is conducting ongoing air monitoring for radiation to see if the nuclear plant incident in Japan has affected radiation levels in Washington. There have been no elevated readings.

The agency's Radiation Protection staff expects no public health risk in Washington, and the monitoring is precautionary. If the situation changes in Washington, the Department of Health will inform the public.

State health officials are monitoring the events in Japan, and are in contact with the federal Nuclear Regulatory Commission and Environmental Protection Agency. An explosion took place at the Japan reactor site Saturday.

The nuclear plant incident in the wake of the earthquake in Japan has raised concerns among some people in Washington about windblown radiation coming to our state. Air sample readings in our state remain normal. The Department of Health Radiation Protection Program doesn't expect any change in environmental measurements taken in Washington.

Even in the event of a significant release from the reactor, radiation would be diluted before reaching our state and levels would be so low no protective action would be necessary. The state health department will continue its monitoring work as the situation in Japan develops and changes.

###

Visit the Washington Department of Health website at <http://www.doh.wa.gov> for a healthy dose of information.

---

**From:** PMT07 Hoc  
**Sent:** Sunday, March 13, 2011 12:33 PM  
**To:** LIA07 Hoc  
**Subject:** PMT Comparison of Fukushima Daiishi to TMI and Chernobyl Accidents.doc  
**Attachments:** PMT Comparison of Fukushima Daiishi to TMI and Chernobyl Accidents.doc

Here you go...

ccc/57

PMT Comparison of Fukushima Daiishi to TMI and Chernobyl Accidents (Rev 0, Mar 13, 11)

Nuclide Group	FD Unit 1 – 10% core melt/1%/day design leakage/CTMT intact	FD Unit 1 and 3 combined 100% core melt/CTMT failure	TMI	Chernobyl
Noble Gases	274,000 curies	178 million curies	2.5 million curies	170 million curies
Radioiodines	12,000 curies	96.5 million curies	15 curies	48 million curies
Others	4000 curies	100 million curies	negligible	72 million

Notes:

FD unit 1 US plant comparison used for data was Oyster Creek, which is a similar design but larger core inventory.

FD Unit 1 and 3 release comparison used a single unit core melt/ loss of CTMT scenario from Grand Gulf, which is the largest US BWR. Comparison is likely approximate (not confirmed) but best guess considering the limitations of RASCAL.



---

**From:** LIA07 Hoc  
**Sent:** Sunday, March 13, 2011 12:34 PM  
**To:** PMT07 Hoc  
**Subject:** RE: PMT Comparison of Fukushima Daiishi to TMI and Chernobyl Accidents.doc

Thank you!!!

---

**From:** PMT07 Hoc  
**Sent:** Sunday, March 13, 2011 12:33 PM  
**To:** LIA07 Hoc  
**Subject:** PMT Comparison of Fukushima Daiishi to TMI and Chernobyl Accidents.doc

Here you go...

ccc/58

---

**From:** LIA07 Hoc  
**Sent:** Sunday, March 13, 2011 12:35 PM  
**To:** PMT07 Hoc  
**Subject:** RE: PMT Comparison of Fukushima Daiishi to TMI and Chernobyl Accidents.doc

Do you have the RASCAL runs that go along with this?

---

**From:** PMT07 Hoc  
**Sent:** Sunday, March 13, 2011 12:33 PM  
**To:** LIA07 Hoc  
**Subject:** PMT Comparison of Fukushima Daiishi to TMI and Chernobyl Accidents.doc

Here you go...

cac/59

**From:** Hayden, Elizabeth  
**To:** Brenner, Eliot  
**Cc:** Harrington, Holly; Powell, Amy  
**Subject:** Chairman's Qs and As  
**Date:** Sunday, March 13, 2011 11:59:00 PM

---

It would be helpful if we could get a complete set of the Chairman's Qs and As that have been prepared for the Wed. hearing.

ccc/led

**From:** Hayden, Elizabeth  
**To:** Orban, John  
**Cc:** Burnell, Scott  
**Subject:** RE: Request for Posters  
**Date:** Sunday, March 13, 2011 11:25:00 PM

---

These are perfect. Please put them on posterboard ASAP as I specified in an earlier e-mail and notify Scott Burnell when they are ready for pickup. We need them for a career fair this week.

Thanks

**From:** Orban, John  
**Sent:** Thursday, March 03, 2011 1:00 PM  
**To:** Hayden, Elizabeth  
**Subject:** RE: Request for Posters

Hi Beth,

Please see attached,  
On the second page I insert two extra photographs,  
If you have any concern of the content of  
those photos, please let me know.

Thanks Beth.  
John

---

**From:** Hayden, Elizabeth  
**Sent:** Wednesday, March 02, 2011 6:15 PM  
**To:** GRAPHICS Resource  
**Cc:** Orban, John; Burnell, Scott  
**Subject:** FW: Request for Posters

Do you have a map and collage ready for me to pick up per my request sent Feb. 17?

*Beth Hayden*  
*Senior Advisor*  
*Office of Public Affairs*  
*U.S. Nuclear Regulatory Commission*  
*--- Protecting People and the Environment*  
*301-415-8202*  
*elizabeth.hayden@nrc.gov*

---

**From:** Hayden, Elizabeth  
**Sent:** Thursday, February 17, 2011 5:39 PM  
**To:** GRAPHICS Resource  
**Cc:** Burnell, Scott  
**Subject:** Request for Posters

I need the following 2 posters for a career fair by **March 1**.

Please enlarge the U.S. d map from the photo gallery of U.S. Operating Commercial Nuclear Power Reactors and mount it on posterboard size approx. 20" X 30".

*ccc/kl*

Put together a collage of photos and mount on a 20" (wide) by 25" (tall) poster. Use the photos (not the map) in the collage at: <http://www.nrc.gov/reading-rm/photo-gallery/> intermingled with NRC inspectors [237.08 KB], In the News Date: June 4, 2010 [144.84 KB], NRC-licensed teletherapy unit provides treatment to patient. [156.85 KB], Radiation Detection Device [200.89 KB]

Thanks

*Beth Hayden*

*Senior Advisor*

*Office of Public Affairs*

*U.S. Nuclear Regulatory Commission*

*--- Protecting People and the Environment*

*301-415-8202*

*elizabeth.hayden@nrc.gov*

**From:** Hayden, Elizabeth  
**To:** Hardy, Sally  
**Subject:** RE: Gap in today's e-mails  
**Date:** Sunday, March 13, 2011 11:22:00 PM

---

Thanks, Darren called me and I think the problem has been resolved.

---

**From:** Hardy, Sally  
**Sent:** Sunday, March 13, 2011 9:31 PM  
**To:** Hayden, Elizabeth  
**Cc:** Lee, Jun; Ash, Darren  
**Subject:** RE: Gap in today's e-mails

No I do not. Is this with your Blackberry or online using outlook? I did notice a delay in emails showing up on my blackberry today.

Sally

---

**From:** Hayden, Elizabeth  
**Sent:** Sunday, March 13, 2011 8:19 PM  
**To:** Hardy, Sally  
**Cc:** Lee, Jun; Ash, Darren  
**Subject:** Gap in today's e-mails

Sally,  
Do you know why there is a gap in our emails today from ~3 pm to 6:30 pm?

Beth

ccc/62

**From:** Uselding, Lara  
**To:** Harrington, Holly; Brenner, Eliot; Hayden, Elizabeth; Burnell, Scott; McIntyre, David; Couret, Ivonne; Shannon, Valerie; Janbergs, Holly; Akstulewicz, Brenda; Screnci, Diane; Sheehan, Neil; Chandrathil, Prema; Mitlyng, Viktoria; Hannah, Roger; Ledford, Joey; Dricks, Victor  
**Subject:** Re: upcoming week  
**Date:** Sunday, March 13, 2011 8:45:09 PM

---

Hi- I emailed Elliot and offered my support from RIV. I don't see me on the roster so please feel free to work me into the schedule. I am happy to discuss by phone.

Lara

Lara Uselding

NRC Region 4 Public Affairs

817-917-0321

---

**From:** Harrington, Holly  
**To:** Brenner, Eliot; Hayden, Elizabeth; Burnell, Scott; McIntyre, David; Couret, Ivonne; Shannon, Valerie; Janbergs, Holly; Akstulewicz, Brenda; Screnci, Diane; Sheehan, Neil; Chandrathil, Prema; Mitlyng, Viktoria; Hannah, Roger; Ledford, Joey; Dricks, Victor; Uselding, Lara  
**Sent:** Sun Mar 13 19:54:02 2011  
**Subject:** RE: upcoming week

This may be a duplicate e-mail, but we're having e-mail issues, so just to be sure I'm resending for Eliot. This schedule assumes we'll be doing late night/over nights through Wednesday.

Monday and Tuesday:

Eliot: 7:30 a.m. – 6:30 p.m. (Eliot will be out 2:30 to 5:30 on Tuesday)

Beth: 7:30 a.m. to 4 p.m. (leaving for Europe)

Scott: 7:30 a.m. – 6:30 p.m.

Brenda: 7:30 – 6 p.m.

Val: 6:45 – 4:30 p.m. (regular hours)

Ivonne: 9 a.m. to 7 p.m.

Bethany: 9:30 a.m. – 7:30 p.m.

Rob: 11 a.m. to 8 p.m.

Dave: noon to 10 p.m.

Holly: 2 p.m. to midnight (on Tuesday leaving at 10:30 p.m. if workload permits)

Neil: 10 p.m. to 8 a.m.

Wednesday

Eliot: 2 p.m. – 6:30 p.m. (morning on the Hill)

Holly: 8 a.m. to 6 p.m.

Scott: 7:30 a.m. - 6:30 p.m.

Brenda: 7:30 – 6 p.m.

Val: 6:45 – 4:30 p.m. (regular hours)

Bethany: 9:30 a.m. – 7:30 p.m.

Ivonne: Out on sick leave

ccc/63

Rob: noon to 10 p.m.

Dave: 2 p.m. to midnight (may shift to noon to 10 p.m. if late coverage not needed)

Neil: 10 p.m. to 8 a.m. **If needed only**

---

**From:** Brenner, Eliot

**Sent:** Sunday, March 13, 2011 7:02 PM

**To:** Hayden, Elizabeth; Burnell, Scott; Harrington, Holly; McIntyre, David; Couret, Ivonne; Shannon, Valerie; Janbergs, Holly; Akstulewicz, Brenda; Screnci, Diane; Sheehan, Neil; Chandrathil, Prema; Mitlyng, Viktoria; Hannah, Roger; Ledford, Joey; Dricks, Victor; Uselding, Lara

**Subject:** upcoming week

OPA Staffers:

It has been a very hectic weekend and a good test of our crisis communication planning. Thank you to the headquarter's folks who sacrificed their weekends (and their sleep) to come in. And thank you to the regional folks who fielded a number of calls about our response and the impact of the Japanese situation on our plants. Some things worked very well – the blog was a great way to get information out besides our standard press releases and NSIR released access to YouTube and Twitter by mid-day Sunday so we could do more monitoring of what information was “in the public domain.”

Please take the time Monday morning to review all the press releases that went out and the blog posts as well. Please use these to guide any media responses you provide. While we know more than what these say, we're sticking to this story for now.

Stay tuned as the week unfolds. We anticipate staffing the Op Center on a 24-hour basis at least through Wednesday. Neil will be helping us out in that regard, and we may need to ask for further regional assistance if we need to continue the full-court-press through next weekend.

The chairman has a hearing on the hill on Wednesday morning, which will occur a lot of my time and may be the place where we really push out our message.

We expect fall-out over this to continue for a time along the lines of:

Can this happen in the U.S. and what is the NRC doing about it? This is a marathon not a 50-yard dash. While I am expecting us to need full staffing for a while and may ask that you put off non-essential time off, we also need to conserve our energy. So be sure to take time when you need it.

Thank you all for your help!



**From:** Hardy, Sally  
**To:** Hayden, Elizabeth  
**Subject:** RE: Gap in today's e-mails  
**Date:** Sunday, March 13, 2011 9:43:04 PM

---

Beth

Let me know if its with your BB, I just check/compared all my emails I had today with OPA and it looks like the last email that show up on my BB was at 5pm, I just did a reconcile now to see if that would pull the others in, but it did not work for me. So some emails I have in my outlook are not showing up on my BB, not sure why and I wondering if that is the same gap your seeing....

Sally

---

**From:** Hayden, Elizabeth  
**Sent:** Sunday, March 13, 2011 8:19 PM  
**To:** Hardy, Sally  
**Cc:** Lee, Jun; Ash, Darren  
**Subject:** Gap in today's e-mails

Sally,  
Do you know why there is a gap in our emails today from ~3 pm to 6:30 pm?

Beth

ccc/64

**From:** Hayden, Elizabeth  
**To:** Harrington, Holly  
**Subject:** RE: upcoming week  
**Date:** Monday, March 14, 2011 12:09:00 AM

---

FYI--Made a slight adjustment to my time.

---

**From:** Harrington, Holly  
**Sent:** Sunday, March 13, 2011 7:54 PM  
**To:** Brenner, Eliot; Hayden, Elizabeth; Burnell, Scott; McIntyre, David; Couret, Ivonne; Shannon, Valerie; Janbergs, Holly; Akstulewicz, Brenda; Screnci, Diane; Sheehan, Neil; Chandrathil, Prema; Mitlyng, Viktoria; Hannah, Roger; Ledford, Joey; Dricks, Victor; Uselding, Lara  
**Subject:** RE: upcoming week

This may be a duplicate e-mail, but we're having e-mail issues, so just to be sure I'm resending for Eliot. This schedule assumes we'll be doing late night/over nights through Wednesday.

Monday and Tuesday:

Eliot: 7:30 a.m. – 6:30 p.m. (Eliot will be out 2:30 to 5:30 on Tuesday)  
Beth: 8:30 a.m. to 2 p.m. (leaving for Europe)  
Scott: 7:30 a.m. – 6:30 p.m.  
Brenda: 7:30 – 6 p.m.  
Val: 6:45 – 4:30 p.m. (regular hours)  
Ivonne: 9 a.m. to 7 p.m.  
Bethany: 9:30 a.m. – 7:30 p.m.  
Rob: 11 a.m. to 8 p.m.  
Dave: noon to 10 p.m.  
Holly: 2 p.m. to midnight (on Tuesday leaving at 10:30 p.m. if workload permits)  
Neil: 10 p.m. to 8 a.m.

Wednesday

Eliot: 2 p.m. – 6:30 p.m. (morning on the Hill)  
Holly: 8 a.m. to 6 p.m.  
Scott: 7:30 a.m.- 6:30 p.m.  
Brenda: 7:30 – 6 p.m.  
Val: 6:45 – 4:30 p.m. (regular hours)  
Bethany: 9:30 a.m. – 7:30 p.m.  
Ivonne: Out on sick leave  
Rob: noon to 10 p.m.  
Dave: 2 p.m. to midnight (may shift to noon to 10 p.m. if late coverage not needed)  
Neil: 10 p.m. to 8 a.m. **If needed only**

---

**From:** Brenner, Eliot

ccc/65

**Sent:** Sunday, March 13, 2011 7:02 PM

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Thank you all for your help!

**From:** Hayden, Elizabeth  
**To:** Brenner, Eliot; Harrington, Holly; McIntyre, David; Couret, Ivonne; Burnell, Scott; Janbergs, Holly  
**Subject:** 3/13 11:30 pm TA Call  
**Date:** Monday, March 14, 2011 12:06:00 AM

---

Hydrogen explosion at Unit #3 at approximately 11 pm; primary containment intact.  
Confirmed by Tony and John (our 2 guys in Japan). We know there is fuel damage.

#2 unit is stable.

Still no offsite power. Batteries being used (and recharged) and DGs brought in to pump water.

Both #1 and #3 had uncovered fuel for several hours.

Following explosion, telling those who hadn't evacuated to shelter

Neil is here through the night.

ccc/bw

**From:** Hayden, Elizabeth  
**To:** Brenner, Eliot  
**Cc:** Harrington, Holly; Couret, Ivonne; Burnell, Scott; Akstulewicz, Brenda  
**Subject:** Radio Interview Request  
**Date:** Monday, March 14, 2011 12:25:00 AM

---

Chip Franklin, KOGO Radio in the San Onofre area called to ask if someone from NRC would talk on his program (8 am our time) about the safety of the SO plant in view of the Japan event. Are we confident the plant is safe, etc. He said the producer, Don Ayres, would contact us and I told Chip to send an e-mail to [OPAResource@nrc.gov](mailto:OPAResource@nrc.gov) and we would try to get back to him tomorrow. The number there is 858-560-6604.

ccc/b7

**From:** Treier Anton  
**To:** Jean.GAUVAIN@oecd.org; amcgarry@rpil.ie; besenyei@haea.gov.hu; vc@aerb.gov.in; valentina.ionescu@cncan.ro; david.tredinnick@arpana.gov.au; roberto.ranieri@isprambiente.it; marli.vogels@minvrom.nl; fgrande@cnsns.gob.mx; moisiibogdan@cncan.ro; miyake-ryo@meti.go.jp; risto.isaksson@stuk.fi; sunni.locatelli@cncs-ccsn.gc.ca; kees.jansen@minvrom.nl; dagmar.zemanova@ujd.gov.sk; anneli.hallgren@ssm.se; deniz.yueksel@bmu.bund.de; watanabe-makoto@meti.go.jp; mkelly@rpil.ie; schwang@kins.re.kr; mcle@csn.es; emmanuel.bouchot@asn.fr; i.sokolova@gosnadzor.ru; otake-fumie@jnes.go.jp; stanislaw.janikowski@paa.gov.pl; brafferty@rpil.ie; anne.marit.ostreng@nrpa.no; wolfgang.hilden@ec.europa.eu; niina.yliknuussi@ec.europa.eu; yhhah@kins.re.kr; karina.debeule@fanc.fgov.be; r.spiegelberg-planer@iaea.org; soaresjc@ci.fc.ul.pt; camelia.liutiev@cncan.ro; Hayden, Elizabeth; aurele.gervais@cncs-ccsn.gc.ca; marek.bozenhard@sujb.cz; gerard.westerhof@minvrom.nl; lise.roberts@hse.gsi.gov.uk; ddawson@rpil.ie  
**Subject:** AW: NEA/CNRA - WGPC-12 meeting will be held as scheduled but with flexibility  
**Date:** Monday, March 14, 2011 4:02:17 AM

---

Dear WGPC members,

in Switzerland, we have a very big media interest concerning the earthquakes and accidents in Japan und the safety of NPPs.

My workload for the media is enormous. That is the reason that I cannot participate at the WGPC-meeting of this week in Paris. I am very sorry about this, and I hope you understand our decision.

I think, we have to talk about these events in Japan at a later workshop of the WGPC.

All the best for you and specially for the japaneese people.

Best regards,  
Anton Treier

Swiss Federal Nuclear Safety Inspectorate ENSI  
Industriestrasse 19  
CH-5200 Brugg  
Phone +41 56 460 85 70  
anton.treier@ensi.ch  
www.ensi.ch

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-----Ursprüngliche Nachricht-----

Von: Jean.GAUVAIN@oecd.org [mailto:Jean.GAUVAIN@oecd.org]

Gesendet: Samstag, 12. März 2011 15:42

An: amcgarry@rpil.ie; besenyei@haea.gov.hu; vc@aerb.gov.in; valentina.ionescu@cncan.ro; david.tredinnick@arpana.gov.au; roberto.ranieri@isprambiente.it; marli.vogels@minvrom.nl; fgrande@cnsns.gob.mx; moisiibogdan@cncan.ro; miyake-ryo@meti.go.jp; risto.isaksson@stuk.fi; Treier Anton; sunni.locatelli@cncs-ccsn.gc.ca; kees.jansen@minvrom.nl; dagmar.zemanova@ujd.gov.sk; anneli.hallgren@ssm.se; deniz.yueksel@bmu.bund.de; watanabe-makoto@meti.go.jp; mkelly@rpil.ie; schwang@kins.re.kr; mcle@csn.es; emmanuel.bouchot@asn.fr; i.sokolova@gosnadzor.ru; otake-fumie@jnes.go.jp; stanislaw.janikowski@paa.gov.pl; jean.gauvain@oecd.org; brafferty@rpil.ie; anne.marit.ostreng@nrpa.no; wolfgang.hilden@ec.europa.eu; niina.yliknuussi@ec.europa.eu; yhhah@kins.re.kr; karina.debeule@fanc.fgov.be; r.spiegelberg-planer@iaea.org; soaresjc@ci.fc.ul.pt; camelia.liutiev@cncan.ro; elizabeth.hayden@nrc.gov; aurele.gervais@cncs-ccsn.gc.ca; marek.bozenhard@sujb.cz; gerard.westerhof@minvrom.nl; lise.roberts@hse.gsi.gov.uk; ddawson@rpil.ie  
Betreff: NEA/CNRA - WGPC-12 meeting will be held as scheduled but with flexibility

Dear WGPC Members,

Probably most of you are exceptionally on duty during this week-end. Al out thoughts arec with our Japanese colleagues severely affected by the Tohoku pacific ocean earthquake and the subsequent Tsunami.

With the Chair we have considered the possibility to postpone our annual WGPC meeting.

ccc/68

However, after considering advantages (unique opportunity to discuss NRO real-life issues) and disadvantage (problem should be only in countries with a single staf in charge of public communication), and also considering that it would be strange not to use the situation to discuss "Crisis communication" it was decided to maintain the meeting as scheduled, taking into account the necessary flexibility in case one member coul not attend the whole meeting.

At the NEA you will have Internet Connexion and we can also facilitate telephone access to your Capital during the leeting if needed.

Tuesday Afternoen there wil be a preparatory meeting with the Chair and the Team Leaders.  
The Regular meeting will be from Wednesday to Friday.

IN case you cannot be replaced in your organisation we wil fully understand, but we would appreciate that you let us know.

Best Regards

Jean Gauvain  
NEA/NSD

---

From: [k195hyh@kins.re.kr]  
Sent: 12 March 2011 15:28  
To: REIG Javier, NEA/SURN  
Cc: GAUVAIN Jean, NEA/SURN; yhhah@kins.re.kr  
Subject: Re: WGPC meeting will be held as scheduled?

Thank you, Javier and Jean,

I've just came back home from the office where key KINS staff members including President are still working at the KINS Emergency Response Center.

Fortunately, Korea will not be impacted from Japan accident because their wind direction is working the opposite way toward the Pacific Ocean.

On my side, no change with my travel plan is expected. So Jean, no problem to meet you at the NEA office around 12:00 next Tuesday as originally scheduled.

Enjoy your weekend and see you soon.

Best regards,  
Yeonhee

## **March 16 Reporter**

### **Women's History Month**

The observance of Women's History Month continues. [More.](#)

### **Agency Responds to Japanese Earthquake**

The Nuclear Regulatory Commission has been responding to the Japanese earthquake as part of United States government's response to the disaster. [More.](#)

### **NRC Blog Keeps Public Informed**

The NRC Blog has been keeping the public informed about the aftermath of the Japanese earthquake. [More.](#)

### **RIC Gets Rave Reviews**

This year's Regulatory Information Conference drew rave reviews as the best and the best attended yet. [More.](#)

### **Commission Approves Vermont Yankee Renewal**

The Nuclear Regulatory Commission will renew the Vermont Yankee Operating License for an additional 20 years. [More.](#)

### **Commissioner Ostendorff Speaks to Lawyers' Group**

Commissioner William Ostendorff recently addressed a meeting of the Nuclear Energy Institute Lawyers Committee. [More.](#)

### **IRRS Report Available**

The final report Integrated Regulatory Review Service report is now available. [More.](#)

### **Staff To Host Meeting on Crystal River**

The NRC staff will host a meeting next week to discuss the restart of the Crystal River plant. [More.](#)

### **This Is Sunshine Week**

This is Sunshine Week, part of a national initiative to promote discussion on the importance of open government and freedom of information. [More.](#)

### **Engineers Visit Schools**

As part of the observance of *National Engineers Week*, three Headquarters staff members visited a local middle school. [More.](#)

### **Board Hearing Oral Argument on Victoria County ESP**

An Atomic Safety and Licensing Board is hearing oral argument today and tomorrow relating to the Victoria County Station Early Site Permit. [More.](#)

### **NRO Celebrates ESBWR Milestones at RIC**

The Office of New Reactors held a small ceremony at the Regulatory Information Conference to issue the Final Safety Evaluation Report and Final Design Approval for the GE-Hitachi Economic simplified boiling-water reactor. [More.](#)

### **Public Service Partnership Holding Video Contest**

Here's your chance to spotlight public service workers. [More.](#)

ccc/b9



**ASLB Offers Hearing Opportunity on Uranium Facility Application**

An Atomic Safety and Licensing Board is offering interested governmental agencies an opportunity to participate in the agency's mandatory hearing on the environmental review of an application to construct and operate a uranium enrichment facility in Idaho. [More.](#)

**BIG Winners Announced**

The NRC Chapter of Blacks In Government has announced the winners of its Spring Renewal Raffle. [More.](#)

**HR Operations and Policy Holds Annual Oscar Event**

The Office of Human Resources Operations and Policy staff recently held its annual "Oscar" event. [More.](#)

**FSME Honors Employee of the Quarter, Other**

Sophie Holiday of the Division of Materials Safety and State Agreements recently was honored as Employee of the Quarter for the Office of Federal and State Material and Environmental Management Programs. [More.](#)

**Toastmasters Meet Tomorrow**

The NRC Toastmasters Club will meet from noon to 1 p.m. tomorrow. [More.](#)

**EWRA Sells Merchandise at RIC**

In response to popular request, the Employees Welfare and Recreation Association this year for the first time offered merchandise for sale at the Regulatory Information Conference. [More.](#)

**TIPS:** When you prepare for disaster, are you thinking of the entire family? [More.](#)

**It's Time To Meet:** Brian Anderson of the Office of New Reactors. [More.](#)

**What's Coming Up:** Your link to events this week, this month, this year, and more.

**From:** [Hayden, Elizabeth](#)  
**To:** [Brenner, Eliot](#)  
**Cc:** [Harrington, Holly](#)  
**Subject:** Fw: Google Alert - Nuclear Regulatory Commission  
**Date:** Monday, March 14, 2011 4:38:43 PM

---

Getting Diaz and Klein out there would be good balance to Bradford.

---

**From:** Google Alerts <googlealerts-noreply@google.com>  
**To:** Hayden, Elizabeth  
**Sent:** Mon Mar 14 10:19:54 2011  
**Subject:** Google Alert - Nuclear Regulatory Commission

## News

4 new results for **Nuclear Regulatory Commission**

### The week ahead: **Nuclear** safety, EPA climate rules in focus

The Hill (blog)

By Ben Geman - 03/14/11 08:05 AM ET The crisis at quake-damaged Japanese nuclear reactors will lead to questions about US nuclear safety on Capitol Hill this week. **Nuclear Regulatory Commission** Chairman Gregory Jaczko and Energy Secretary Steven Chu ...  
[See all stories on this topic »](#)

### Former **Nuclear Regulatory** Commissioner Warns State

Clean Energy News (press release)

What: State Representative Pricey Harrison will host a press conference with Mr. Peter Bradford, former Commissioner with the US **Nuclear Regulatory Commission** and former Chair of the Maine and New York Public Utility Commissions. ...  
[See all stories on this topic »](#)

### Japan earthquake: **Nuclear** power under fire

Telegraph.co.uk

India plans to build at least 20 during this decade and Russia is aiming to double its nuclear capacity within the same timescale. The US **Nuclear Regulatory Commission (NRC)** has received applications for 25 new ones, while Japan is planning another 15 ...

[See all stories on this topic »](#)



[Telegraph.co.uk](#)

### Yucca Mountain site still alive under GOP **nuclear** power plan

Bellingham Herald

If approved, the US would begin building nuclear plants on an unprecedented scale: Currently, the nation gets 20 percent of its electricity from 104 nuclear reactors. Among other things, the legislation would require the **Nuclear Regulatory Commission** ...  
[See all stories on this topic »](#)

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**From:** Google Alerts  
**To:** Hayden, Elizabeth  
**Subject:** Google Alert - Nuclear Regulatory Commission  
**Date:** Monday, March 14, 2011 7:27:45 PM

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## News

7 new results for **Nuclear Regulatory Commission**

### US **nuclear** agency chief leaves reporters with more questions than answers

CBS News

White House Press Secretary Jay Carney brought a special guest to the briefing room today - Chairman of the **Nuclear Regulatory Commission** Gregory Jaczko. He was asked repeatedly about the safety of US nuclear power plants, but his answers did little to ...

[See all stories on this topic »](#)

### **NRC**: Japan Plant Explosions Will Not Affect US Operations

Shopfloor

Even as Japan continues to take control of the plant and the nation's power grid, the United States **Nuclear Regulatory Commission (NRC)** used a White House briefing today to announce that events in Japan will not affect its day-to-day operations, ...

[See all stories on this topic »](#)

### In 2010, **NRC** said it would examine seismic activity at nuke plants

York Daily Record

By SEAN ADKINS The area around Peach Bottom Atomic Power Station has recently shown a slight increase in seismic activity, according to updated data analyzed by the US **Nuclear Regulatory Commission**. The federal agency, using data from both the US ...

[See all stories on this topic »](#)

### **NRC** Says Radiation No Threat to Hawaii; Hawaii Trial Judges' Have Worst Pay in ...

Hawaii Reporter

The head of the **Nuclear Regulatory Commission** reiterated his agency's view that there's a low likelihood of harmful radiation from a damaged Japanese nuclear power plant will reach Hawaii or the West Coast. **NRC** Chairman Gregory Jaczko, speaking at a ...

[See all stories on this topic »](#)

### Georgia **Nuclear** Plans Under Scrutiny

GPB

(Photo by Noel Brown)) Plant Vogtle in Burke County is where Southern Company plans to build the first new nuclear reactors the country has seen in three decades. The reactors' design still needs approval from the **Nuclear Regulatory Commission**. ...

**Commission**. ...

[See all stories on this topic »](#)



GPB

### **Nuclear Regulatory Commission** sends special inspection team to Global Nuclear ...

WWAY NewsChannel 3

The **Nuclear Regulatory Commission** has sent a Special Inspection Team to Global Nuclear Fuel-Americas, LLC, to examine the circumstances associated with an event in which the licensee failed to maintain required process control over a small quantity of ...

[See all stories on this topic »](#)

### Germany suspends power station extension plans as **nuclear** jitters

ccc/71

## spread

The Guardian

In the US, Barack Obama reaffirmed his support for nuclear power. At a White House press conference, the head of the **Nuclear Regulatory Commission (NRC)**, Gregory Jaczko, said the 104 reactors in the US were built to withstand earthquakes and tsunamis. ...

The Guardian

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**To:** Hayden, Elizabeth  
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The Hill (blog)

By Ben Geman - 03/14/11 08:05 AM ET The crisis at quake-damaged Japanese nuclear reactors will lead to questions about US nuclear safety on Capitol Hill this week. **Nuclear Regulatory Commission** Chairman Gregory Jaczko and Energy Secretary Steven Chu ...

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[Telegraph.co.uk](http://Telegraph.co.uk)

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**From:** [Google Alerts](#)  
**To:** [Hayden, Elizabeth](#)  
**Subject:** Google Alert - Nuclear Regulatory Commission  
**Date:** Monday, March 14, 2011 4:52:42 AM

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## News

4 new results for **Nuclear Regulatory Commission**

### **NRC** spokesman: Check of US nuke plants was planned before Japanese quake

[Yorkdispatch.com](#)

Three Mile Island Nuclear Power Plant (TMI), however, wasn't on the list of seven plants across the county to be examined, said spokesman Neil Sheehan for the **Nuclear Regulatory Commission**. The commission found TMIs seismic force estimate is still ...

[See all stories on this topic »](#)

### Death toll climbs in Japan...Trying to cool reactors...**NRC** reassures Americans

9&10 News

WASHINGTON (AP) — The **Nuclear Regulatory Commission** doesn't expect harmful levels of radioactivity from Japan to reach the United States. The **NRC** says that's because thousands of miles separate the two countries, and weather conditions appear to have ...

[See all stories on this topic »](#)

### Senior **Nuclear** Scientist Warns Use of Recycled Fuel Containing Plutonium at ...

HNN [Huntingtonnews.net](#)

Since interpretation vary, we assembled an opinion from nuclear expert , Ed Lyman, who has testified before Congress and the **Nuclear Regulatory Commission** from <http://allthingsnuclear.org>. The multiple cooling system failures at Fukushima Dai-Ichi ...

[See all stories on this topic »](#)



HNN  
[Huntingtonnews.net](#)

### Factbox: **Nuclear** accidents: Fukushima vs Three Mile

Reuters

The Three Mile Island accident was caused by a combination of personnel error, design deficiencies and component failures, according to the US **Nuclear Regulatory Commission (NRC)**. \* After Three Mile Island, the **NRC** strengthened safety standards for all ...

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**From:** [Google Alerts](#)  
**To:** [Hayden, Elizabeth](#)  
**Subject:** Google Alert - Nuclear Regulatory Commission  
**Date:** Monday, March 14, 2011 10:59:14 PM

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## News

5 new results for **Nuclear Regulatory Commission**

### Fallout from Japan's **nuclear** crisis felt in Minn.

Minneapolis Star Tribune

US nuclear power plants, like those in Japan, are built with multiple backup systems to cool reactors in an emergency. Last year the **Nuclear Regulatory Commission (NRC)** ordered Xcel Energy to remedy such a risk at Prairie Island Unit 2. ...

[See all stories on this topic »](#)

### US dispatches eight more **nuclear** experts to Japan

MSN India

This is in addition to the two experts sent earlier, the US **Nuclear Regulatory Commission (NRC)** said. The team is led by Charles A Casto, deputy regional administrator of the **NRC**'s Center of Construction Inspection, based in **NRC**'s office in Atlanta. ...

[See all stories on this topic »](#)

### Comanche Peak **nuclear** expansion delayed

Fort Worth Star Telegram (blog)

The US **Nuclear Regulatory Commission** recently informed Luminant that it was delaying by 18 months its safety review of the proposed plant expansion. Luminant is now projecting that it will put the two new units into commercial operation in the ...

[See all stories on this topic »](#)

### California **Nuclear** Plants Face Scrutiny After Japan Crisis

Wall Street Journal

Last year, the San Luis Obispo Board asked the US **Nuclear Regulatory Commission** to delay PG&E's relicensing request for Diablo Canyon until pending seismic studies were completed. In particular, they wanted more information on a new fault discovered in ...

[See all stories on this topic »](#)

### **Nuclear** crisis like Japan's unlikely at Fla. reactors

Palm Beach Post

In the 39 years since the first nuclear reactor began operating in Florida, there has never been an evacuation incident associated with any of the plants, according to the **Nuclear Regulatory Commission**. "It could be that what happened in Japan is ...

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Breaking News Alert: Japan steps closer to a full-blown nuclear catastrophe  
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Japan stepped closer to a full blown nuclear catastrophe Tuesday after the third explosion in four days appeared to have damaged equipment inside the reactor, apparently creating a path for the escape of radioactive materials, and a fire broke out at a separate reactor where spent fuel and hydrogen ignited.

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## News

8 new results for **Nuclear Regulatory Commission**

### US says Japan asked for equipment to cool reactors

Reuters

WASHINGTON, March 14 (Reuters) - Japan has asked the United States for additional equipment to help provide water and other resources to keep quake-damaged nuclear reactors cool, the head of the US **Nuclear Regulatory Commission** said on Monday. ...

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### NRC looks at seismic risk at Peach Bottom, 26 other nuclear plants

Yorkdispatch.com

Advances in seismic science prompted the **NRC** to re-evaluate safeguards at some of the nation's nuclear power plants if an earthquake were to occur, said spokesman Neil Sheehan for the **Nuclear Regulatory Commission**. The agency's plans to examine that ...

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### NRC: US nuclear reactors are safe

The Hill (blog)

By Andrew Restuccia - 03/14/11 11:44 AM ET The **Nuclear Regulatory Commission** says the country's nuclear reactors can withstand natural disasters like tsunamis and earthquakes. In a short statement posted on the **NRC** website Sunday, **NRC** spokesman Eliot ...

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### The GOP's Legislation to Build 200 New Nuclear Power Plants

Slate Magazine (blog)

The part you're looking for: Subject to the requirements of this subtitle and in accordance with existing law, the **Nuclear Regulatory Commission** shall issue operating permits for 200 new commercial nuclear reactors, enough to triple current megawatt ...

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### Many Worried About Ark. Nuclear Plant After Japan Earthquake

KHBS-KHOG Northwest Arkansas

In addition to these design protections, Entergy has extensive training programs to test operators' ability to respond to worst case events, including practice drills and evaluations by the US

**Nuclear Regulatory Commission**. ...

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### Japanese Crisis Only The Latest Hurdle For US Nuclear Industry

Huffington Post

"There's no question in my mind that the situation in Japan will delay any major activities in the United States," said Forrest Remick, a former member of the US **Nuclear Regulatory Commission** and a professor emeritus of nuclear engineering at ...

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### Life Near A Nuclear Power Plant

W\*USA 9

The **Nuclear Regulatory Commission** says there are 104 reactors located at 68 sites in this country. All were built to withstand earthquakes, tornadoes and other potential disasters. Emergency plans are tested at every facility, including Calvert Cliffs, ...

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## US **nuclear** safety in focus after Japan quake

CBS News

There are currently no nuclear plants under construction, although applications for licenses to operate plants are under consideration by the **Nuclear Regulatory Commission**. by knownukes March 14, 2011 1:55 PM EDT Jeez: I thought we took care of this ...

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[CBS News](#)

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Good morning,

Attached for your review are the proposed heads and leads for this week's NRC Reporter. As always your comments are most welcome.

Ann Thomas

cccl 76



# NUCLEAR REGULATORY COMMISSION NEWS SUMMARY

MONDAY, MARCH 14, 2011 7:00 AM EDT

[WWW.BULLETINNEWS.COM/NRC](http://WWW.BULLETINNEWS.COM/NRC)

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## NRC NEWS:

### As Japan Grapples With Disaster, Debate Underway In US About Nuclear Energy.

The ongoing nuclear alert in Japan dominated US media coverage last night and this morning, with front-page pieces in major print outlets and ABC World News (the only network newscast that aired last night, 8.2M) devoting all but 50 seconds of its broadcast to the story. In the US, the growing fear about the integrity of Japan's facilities has sparked a debate about the dangers of nuclear energy. As lawmakers and commentators weigh in, the general media consensus is that the unfolding crisis could deliver a very serious blow to the future of the nuclear industry in the US.

The story goes on to note a statement by Sen. Joe Lieberman on CBS's Face The Nation (which was quoted or referenced in a number of other reports). Lieberman said the US should "put the brakes on right now until we understand the ramifications of what's happened in Japan." In fact, "even staunch supporters of nuclear power are now advocating a

pause in licensing and building new reactors in the United States."

USA Today (3/14, Vergano, Leinwand, 1.83M) offers a similar assessment under the headline "Japan Disaster May Set Back Nuclear Power Industry."

ABC's senior White House correspondent Jake Tapper, also on ABC's This Week (3/13, Amanpour) reported, "Administration officials are, of course, concerned, in general, about the potential for the spreading of radioactive material. And that's why they've sent a whole number of experts to the region to monitor the situation -- to help the Japanese, of course -- but also to get our own information firsthand." On ABC's This Week (3/13, Amanpour), ABC's Bob Woodruff reported, "The disaster in Japan could again sway public opinion against nuclear power despite the industry's insistence that safety is better than ever."

**Nuclear Critics Sound Concerns.** Rep. Ed Markey (D-MA) said on MSNBC (3/13, 12:35pm), the NRC should do a "design basis review" of nuclear plant vulnerabilities, like the one at San Onofre, which he says was only built to withstand a 7.0 magnitude earthquake. He cites his recent letter to the NRC about vulnerabilities with the Westinghouse AP1000

reactor design. Markey's comments were rebroadcast in multiple local TV news broadcasts across the country, including WRC-TV Washington DC; WSFA-TV Montgomery, Alabama; KWQC-TV Davenport, Iowa; WLBT-TV Jackson, Mississippi and WCMH-TV Columbus, Ohio among others.

Nuclear power critic Paul Gunter of Beyond Nuclear appeared on Fox News (3/13, 3:15pm) to discuss problems at the Fukushima and Onagawa plants, and cooling systems are failing and information is behind events. Similarly, Kevin Kamps of Beyond Nuclear suggested on Fox News (3/13, Rivera) that the NRC is "pretty infamous for trying to downplay" risks of radioactive contamination traveling across the Pacific Ocean, saying it was still early to be sure of such things and there were populations much closer to the accident who are at risk.

**Bradford Says Fukushima Emergencies Show Shortsightedness Of Nuclear Power Industry.** On his Forbes (3/14, 914K) blog, Osha Gray Davidson wrote that he spoke to former NRC commissioner Peter Bradford about the "claims, widespread in the media and in press statements released by some in the nuclear power industry, that the current situation in Fukushima Dai-Ichi, Japan, is not as grave as the accident at TMI thirty-two years ago. 'I'll be quite surprised if the events at Fukushima are ultimately considered to be less serious than TMI,' he responded, adding that more people have already been exposed to high levels of radiation in Japan than were exposed at TMI." Bradford added, "The phrase, 'it can't happen here,' has been a harbinger of trouble in the nuclear industry." He added, "No doubt the next accident will also be different in its specifics. Nuclear spokespeople in every other country will then spout owl and well-financed explanations of why it cannot happen to them."

**Lieberman Says Plant Construction Should Be Put On Hold.** On CBS News "Face the Nation" (3/13), Senate Homeland Security Committee chairman Joe Lieberman discussed "putting the brakes on" building nuclear power plants in this country. He said, "I've been a big supporter of nuclear power because it's domestic. It's ours and it's clean. But we've had a good safety record with nuclear power plants here in the United States. But I think we've got to...stop the building of nuclear power plants but I think we've got to kind of quietly and put the brakes on until we can absorb what has happened in Japan as a result of the earthquake and the tsunami and then see what more, if anything, we can demand of the new power plants that are coming online."

**Leaders Weigh In On Future Of Nuclear Power.** Sen. Charles Schumer said new nuclear must be done "safely and carefully," on MSNBC (3/13, 4:07pm).

Fox News (3/13, Doocy) offered a background primer on nuclear power, and whether other energy sources will be able to capitalize on the situation in Japan.

Reps. Frank Pallone (D-NJ) and Phil Gingree (R-GA) appeared on Fox News (3/13, 12:05pm EDT) to discuss nuclear power. Both men agreed there is a need for more nuclear power, though Pallone urged more attention to safety, especially for older plants.

Former CDC emergency preparedness official, Dr. Richard Besser, joined ABC Sunday Evening News (3/13, 7:21), and was asked whether the Japanese are doing the right thing in their response to the radiation leaks. Besser said, "What you want to do in a disaster like this is prevent people from being exposed. They've had people evacuate and they're monitoring people to see if they have had any exposure. At the same time, you want to make sure your workers are protected."

Jack Spencer of Heritage Foundation joined "Fox and Friends" on Fox News (3/13) and spoke about the safety of nuclear power and whether standards for US plants need to be changed in light of events in Japan. Spencer said: "I don't think we need to do that. The Nuclear Regulatory Commission's role is to determine the standards that need to be met in order to protect public health and safety and are fully capable of doing that and the nuclear industry is fully capable of doing that and these, I think, should be largely decisions made in the private sector, whether or not to go forward with nuclear."

**US Has 23 Reactors With GE Mark 1 Containment Systems.** On its website, MSNBC (3/14, Dedman) "The General Electric-designed nuclear reactors involved in the Japanese emergency are very similar to 23 reactors in use in the United States, according to Nuclear Regulatory Commission records." Twenty-three "of the 104 nuclear plants in the US are GE boiling-water reactors with GE's Mark I systems for containing radioactivity, the same containment system used by the reactors in trouble at the Fukushima Daiichi plant." Those units are in "Alabama, Georgia, Illinois, Iowa, Massachusetts, Michigan, Minnesota, Nebraska, New Jersey, New York, North Carolina, Pennsylvania and Vermont."

The Huffington Post's Elise Foley (3/14) reports that "a spokesman for the Obama administration told the Huffington Post on Sunday that the president was waiting to get more information on the deterioration of Japan's nuclear power plants before making any policy decision about the White House's domestic energy approach." White House spokesman Clark Stevens said, "Information is still coming in about the events unfolding in Japan, but the administration is committed to learning from them and ensuring that nuclear energy is produced safely and responsibly here in the US."

After being reminded that President Obama included \$36 billion in his budget to promote the nuclear industry, Bill Kristol, on Fox News Sunday (3/13, Wallace), quipped, "We can probably save \$36 billion from the 2012 budget." Kristol

added that the Japanese crisis is "obviously a setback to nuclear power, and I think it makes even stronger the case for going after natural gas and oil domestically."

AFP (3/14, Crane) notes that Rep. Edward Markey, "a nuclear power critic," "called for a moratorium on building reactors in seismically active areas." The Hill (3/14, Needham, 21K) reports that "House Energy and Commerce Committee Chairman Fred Upton (R-Mich.) plans to question the top US nuclear power regulator next week about damage to Japanese nuclear reactors." Upton said in a statement, "[W]e will use that opportunity to explore what is known in the early aftermath of the damage to Japanese nuclear facilities, as well as to reiterate our unwavering commitment to the safety of US nuclear sites."

Politico (3/14, Samuelsohn, 25K) reports that yesterday, "two senators who have leaned toward nuclear power offered wait-and-see assessments." Senate GOP leader Mitch McConnell told Fox News Sunday, "I don't think right after a major environmental catastrophe is a very good time to be making American domestic policy."

The Wall Street Journal (3/14, Simon, 2.09M) runs a similar assessment under the headline "US Could Rethink Nuclear Reliance," while the Washington Post (3/14, Yang, 605K) reports that "the timing is tough for the industry, which recently has been enjoying more support in Washington than on Wall Street," where "banks and investors worry that the plants are too expensive and risky to finance." Now, adds the Post, "the crisis in Japan could jeopardize or at least tone down political support for nuclear energy just as the industry needs all the financial backing it can get from the government."

In Japan, ABC World News (3/13, story 5, 2:35, Muir, 8.2M) reported, "there are now four nuclear power plants in trouble," and "they are watching this very closely in Washington," because (Kerley) "the Japanese reactors, designed by General Electric, are more than four decades old and they are common in the United States. There are 23 of them." ABC added that "nuclear energy is one of the cornerstones of President Obama's efforts to wean this country from fossil fuels. But tonight, one prominent senator says it is time for a moratorium on new nuclear construction. The White House won't go as far, telling ABC News, in a statement, that the President is committed to learning lessons from the Japan accident, so that nuclear energy can be produced here safely."

Last night, hundreds of local TV broadcasts across the country also reported on lawmakers calling for "a step back" from nuclear energy. Over 200 of those local stories featured variations of a report from NBC News, as shown in this Iowa report: KWQC-TV Davenport, Iowa (3/13, 11:14 p.m. EDT) reported US officials are "asking tough questions about the vulnerability" of our nation's 104 nuclear facilities. Obama's

"2012 budget sets aside \$36 billion for new plants, but some lawmakers are...demanding to know whether current and future plants are safe enough." Comments by Markey and Lieberman were then shown.

WJXX-TV Jacksonville, Florida (3/13, 11:04 p.m. EDT) reported that "news of a partial meltdown at a crippled nuclear reactor is threatening the future of nuclear power on our shores...nuclear power provides about 20 percent of America's energy needs...some lawmakers are demanding to know whether current and future plants are safe enough."

WUSA-TV Washington, DC (3/13, 11:03 p.m. EDT) reported there are 104 reactors at 68 sites in the US, and all "were built to withstand earthquakes, tornadoes, and other potential disasters. Emergency plans are tested at every facility" annually. The station reported from Maryland's Calvert Cliffs Nuclear Power Plant, "one of the area's largest employers since 1975." They asked residents about living near the plant and reported a disaster is "something the locals rarely considered...until Japan."

WLWT-TV Cincinnati, Ohio (3/13, 6:10 a.m. EDT), in an exclusive interview with Rep. John Boehner, asked the Speaker about "the impact this tragedy could have on his push for more nuclear power plants." Boehner said Japan is "very prone to earthquakes...I don't think it has much impact on our nuclear energy business because we've got parts of our country that are more stable than anything you'd find in Japan."

ABC World News (3/13, story 7, 2:05, Harris, 8.2M) went on to note that "in the US...the Nuclear Regulatory Commission felt compelled to come out and say there is no danger of radiation reaching this country." AFP (3/14) reports that the NRC said in its statement, "Given the thousands of miles between the two countries, Hawaii, Alaska, the US Territories and the US West Coast are not expected to experience any harmful levels of radioactivity." AFP notes that "the NRC is coordinating with the US Department of Energy and other federal agencies in providing 'whatever assistance the Japanese government requests' following the March 11 earthquake and tsunami."

The New York Times (3/14, Broad, 1.01M) reports that "officials insisted that unless the quake-damaged nuclear plants deteriorated into full meltdown, any radiation that reached the United States would be too weak to do any harm." According to a "senior official," the US "had 'hypothetical plots' for worst-case plume dispersal within hours of the start of the crisis," whose "aim...was 'more to help Japan' than the United States, since few experts foresaw high levels of radiation reaching the West Coast."

Asked, on NBC's Meet The Press (3/13, Todd), if Americans should be concerned about nuclear plants in California, Marvin Fertel, president of the Nuclear Energy Institute, said, "All of our power plants, whether they are in

California, which is a high earthquake area...or other places are required by the Nuclear Regulatory Commission to [be] designed to be able to withstand the maximum credible earthquake. And the NRC continues to update and upgrade what the requirements are. ... We've done things post-9/11 to make sure that if something happened to our plant, like in Japan, where we lost all power, we could get water to the core and continue to cool it."

In an editorial, the Wall Street Journal (3/14, 2.09M) casts US media coverage of the disaster in Japan (focused on the nuclear facilities) as an overreaction, which it says is sowing confusion about the source of the many tragic deaths actually caused by the previous tsunami and quake.

Author William Tucker, also in the Wall Street Journal (3/14, 2.09M), writes that Japan's nuclear woes cannot be compared to Russia's in the 1980s. If anything, he concludes, the current problems should lead the industry to speed up plans for Generation III reactors – whose design would eliminate the facilities' vulnerability.

***Navy Personnel Exposed To Radiation.*** New York Times (3/14, Shanker, 1.01M) reports, "American Navy officials in Japan said early Monday that 17 military personnel who had been aboard three helicopters assisting in the earthquake relief effort had been exposed to low levels of contamination." Cmdr. Jeff A. Davis, a spokesman for the American Seventh Fleet in Japan, said the personnel "received very, very low levels of contamination."

***NRC Sends Two Boiling Water Reactor Experts To Japan.*** AFP (3/13) reports that the US Nuclear Regulatory Commission "has sent two experts to Japan, where authorities were seeking to calm fears of a reactor meltdown." NRC Chairman Gregory Jaczko said the commission's operations center in Maryland also is "operating on a 24-hour basis."

ABC World News (3/12, story 4, 1:10, Muir, 8.2M) reported that "the Obama Administration [is] watching developments, particularly with this explosion at this nuclear facility today." ABC (Raddatz) added that "it's not just the Japanese people who are concerned about what the Japanese government is telling them. US officials are concerned as well. ... US officials said the Japanese officials were very concerned about what's going on at the nuclear power plant, but they weren't telling people they were worried. They were in effect saving face. Now obviously it's only gotten worse since then." ABC added that "US officials say they have reached out to the Japanese government many times but a lot of those calls haven't been returned."

In its "Embassy Row" column, the Washington Times (3/14, Morrison, 77K) reports the US Ambassador in Tokyo, John Roos, said Sunday that "disaster teams from the US Agency for International Development and experts from the Energy Department, the Nuclear Regulatory Commission and

the Department of Health and Human Services...have arrived in Japan." The ambassador also said he has not received any reports of Americans injured or killed in Friday's earthquake.

Japan, the New York Times (3/14, A1, Fackler, McDonald, 1.01M) reports on its front page, has been left reeling from "a rapidly unfolding disaster of epic scale" that has left more than 10,000 people dead and threatens the nation's economy. The nation is facing "partial paralysis as many industries shut down and the armed forces and volunteers mobilized for the far more urgent effort of finding survivors, evacuating residents near the stricken power plants and caring for the victims." The Times notes that arrival of foreign search teams, including a "combined search squad from Los Angeles County and Fairfax County," Virginia "with 150 personnel and a dozen dogs."

***NRC Says No Harmful Levels Of Radiation Expected To Reach US Shores.*** The AP (3/14) reports, "The Nuclear Regulatory Commission says harmful levels of radioactivity are not expected in the United States due to damaged nuclear reactors in Japan." In a statement Sunday, the "NRC said weather conditions appear to have taken the small releases of radioactivity from the damaged reactors out to sea." The NRC does not expect any harmful levels of radiation to reach the US over the thousands of miles of open water.

The Los Angeles Times (3/14, Hennessy-Fiske, 681K) notes that the NRC statement said: "All the available information indicates weather conditions have taken the small releases from the Fukushima reactors out to sea away from the population," adding, "Given the thousands of miles between the two countries, Hawaii, Alaska, the US Territories and the US West Coast are not expected to experience any harmful levels of radioactivity."

On its website, KCBS-TV San Francisco (3/13) reported that according to the NRC, "even if the Japanese reactors go into full meltdown, no dangerous levels of radiation would be expected to reach the United States." Professor of radiology and radiation oncology, Jerrold Bushberg "said he agrees with that assessment. 'The large distance and great line of air, being at those levels of radioactivity, (the chance) that would reach the United States would be very, very small and not of any significant health concern,' he said."

NextGov (3/11, Lunney) reported that the NRC monitored the west coast "nuclear power plants that could be affected, including the Diablo Canyon Power Plant near San Luis Obispo, Calif., where authorities are tracking 'an unusual event,' according to a statement. The agency also is overseeing materials sites in Hawaii and Alaska. 'NRC staff is working closely with its resident inspectors who are on-site to ensure safe operations,' said commission chairman Gregory Jaczko."

The Oregonian (3/13, Young, 271K) reported that DOE spokesperson Stephanie Mueller, said there "is no indication whatsoever that materials from the incidents in Japan have potential to have any meaningful effect on the US homeland." Mueller also said that "US officials continue to work with the Japanese government to review the situation and 'will provide whatever assistance they request to help them bring the reactors under control.'" Reuters (3/14, Mason) and Dow Jones Newswires (3/14, Malik) also noted the NRC news release.

***Nuclear Plants Said To Be Designed To Hold Up To Major Quakes.*** The Christian Science Monitor (3/11, Clayton, 48K) reports that as in the United States, "Japan has requirements that call for nuclear power plants to be able to withstand a serious earthquake." Charles Becht V, of Becht Engineering Co. said while seismic rules for plant construction in Japan are slightly different than those in the US, but, they fall into two major categories. "First, there is the 'operating basis earthquake ground motion,' or OBE – quakes that can be expected to occur multiple times in the life of a plant," during which a plant is shut down and inspected. Then there is the "'design basis earthquake,' or DBE, is one so big that it would be expected to occur only once in the life of a plant, Becht explains in an e-mail. The DBE design requirement for a plant simply 'requires that a plant can shut down without release of radioactive material.'"

NextGov (3/11, Brewin) noted that the NRC "said in a statement that 'Nuclear power plants are built to withstand environmental hazards, including earthquakes and tsunamis. Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster.'"

***NRC Sends Two Boiling Water Reactor Experts To Japan.*** MarketWatch (3/14, Gelsi) reports noted the "comment from the US government's lead regulatory body for nuclear power came as Japanese authorities reported radioactive releases from plants following the massive earthquake and tsunami Friday in the northeast part of the country." The NRC "said it's coordinating with the Department of Energy and other federal agencies to provide, 'whatever assistance the Japanese government requests' as they respond to conditions at several nuclear power plants."

On his "Clean Beta" blog for Forbes (3/13, 914K) William Pentland, noted that the two NRC officials "with expertise in boiling water nuclear reactors," were deployed as part of a US International Agency for International Development. NRC Chairman Gregory Jaczko said, "We have some of the most expert people in this field in the world working for the NRC and we stand ready to assist in any way possible." CNN International (3/14, Martinez) noted that the US also sent "supplies, several warships, search-and-rescue teams," and "radiation-contamination specialists," along with

the "two officials from the US Nuclear Regulatory Commission with expertise in boiling water nuclear reactors." Politico (3/13, 25K) and CNN (3/13) also noted the assistance.

***Obama Reiterates Support For Nuclear Power.*** On its "E2-Wire" blog, The Hill (3/13, Gemen, 21K) reported that the "Obama administration continues to back nuclear power as part of a broader energy portfolio," following the accidents in Japan. White House spokesman Clark Stevens said that while information "is still coming in about the events unfolding in Japan," the Administration "is committed to learning from them and ensuring that nuclear energy is produced safely and responsibly here in the US."

***Accident May Derail Nuclear Resurgence.*** The New York Times (3/13, A12, Onishi, Fountain, Zeller, 1.01M) said the earthquake incident "underscores the Japanese nuclear industry's troubled history, and years of grass-roots objections from a people uniquely sensitive to the ravages of nuclear destruction." The Times added the crisis "feeds into a resurgence of doubts about nuclear energy's safety — even as it has gained credence as a source of clean energy in a time of mounting concerns about the environmental and public health tolls of fossil fuels."

International Business Times (3/13) suggested that Japan's "battle to avert a full-scale meltdown could damage the global nuclear energy industry, derailing plans to build dozens of new power plants and forestalling any surge in demand for uranium to fuel them." The accident "could trigger a sharp drop in shares of nuclear plant builders such as General Electric, its Japanese partner Hitachi and France's Areva as investors reconsider the possibility of a renaissance for the industry."

***Former NRC Member Says Incident Threatens Nuclear Renaissance.*** Bloomberg News (3/12, Polson, Chipman) reported that Peter Bradford, a former member of the US Nuclear Regulatory Commission, said Japan's struggle to "prevent a meltdown at a reactor damaged by a record earthquake" is a "significant setback for the so-called nuclear renaissance." Bradford added that the "image of a nuclear power plant blowing up before your eyes on a television screen is a first." However, Richard Myers, vice president for policy at the Nuclear Energy Institute, said that it is "too early to speculate on US political and financial fallout from the accident in Fukushima."

***Reassessment Seen As Likely To Reexamine Safety Threats.*** According to the Wall Street Journal (3/14, Smith, 2.09M) former NRC Chairman Richard Meserve suggested the reactors in Japan were hit by a "one-two punch of events beyond what anyone could expect or what was conceived." Meserve said a reassessment of safety threats to boiling-water reactors, especially those on the coast and at risk of tidal waves, will likely emerge from the crisis. Meantime, the Journal says, Peter Bradford suggested the situation exposed



shortcomings the risk analysis of the plant designs as well as their engineering. "The redundancy, such as it was, obviously was inadequate to the event that actually happened," he said and added that the licensing review process always discounts certain risks as "so highly unlikely that you don't have to plan for them."

**California Officials Keeping Close Eye On Events At Fukushima Plant.** AFP (3/14) reports that news stories suggesting radiation could be "blown out across the Pacific" from the quake-damaged Japanese nuclear plant, has California officials "closely monitoring efforts" to contain the leaks. California Department of Public Health spokesman Michael Sicilia, said "we are monitoring the situation closely in conjunction with our federal partners," adding, "California does have radioactivity monitoring systems in place for air, water and the food supply and can enhance that monitoring if a danger exists."

The AP (3/12) reported NRC regulators said "California's Diablo Canyon and San Onofre nuclear power plants are operating normally and are being monitored by inspectors during the West Coast tsunami threat. Nuclear Regulatory Commission spokesman Neil Sheehan says the San Luis Obispo and northern San Diego County plants are taking precautions because of Friday's magnitude-8.9 Japanese earthquake and tsunami."

The North County (CA) Times (3/14, Sisson) reported that situation in Japan, where "crews struggled to keep cooling water flowing through five nuclear reactors at two power plants," was exactly "the scenario that US regulators worked to prevent when they identified faulty electrical wiring at San Onofre Nuclear Generating Station in 2008." NRC officials said "the faulty wiring was never so bad that it would have caused San Onofre's backup generators to fail in an emergency. But the problem — which has been fixed, the regulator said — was severe enough that it put the seaside plant under heightened scrutiny for two years."

PennEnergy (3/11, Troy) noted, "The NRC is closely monitoring all nuclear facilities in the tsunami warning zone, including the Diablo Canyon nuclear power plant, the [San] Onofre nuclear power plant, the Humboldt Bay spent fuel storage site and the NRC-regulated nuclear materials sites in Hawaii and Alaska." The San Diego Union-Tribune (3/14, Soto, 264K), Laguna Niguel Patch (3/14, Townsend), KPBS-Radio San Diego (3/14, Joyce), San Diego Union-Tribune (3/14, Lee, 264K), and Electric Light & Power (3/14) also covered the warnings in California.

**Diablo Canyon Power Plant Cancels "Unusual Event" Alert.** Both on its website and on the air, KSBY-TV (3/12) San Luis Obispo, California, an NBC affiliate, reported the "unusual event" has been lifted at Diablo Canyon Nuclear Power Plant, according to a spokesperson for PG&E." The

TV station said "the event was lifted at 3:28 p.m. after the tsunami warning was downgraded to an advisory."

**Washington Monitoring Airborne Radiation Levels.**

On its "Boomer Consumer" blog, the Seattle Post Intelligencer (3/13) reports that the Washington "Department of Health is conducting ongoing air monitoring for radiation to see if the nuclear plant incident in Japan has affected radiation levels in Washington. There have been no elevated readings, the department said in a statement." State health "officials are monitoring the events in Japan and are in contact with the federal Nuclear Regulatory Commission and US Environmental Protection Agency."

**Upton Says Hearing With NRC Chairman Will Focus On Japanese Reactor Troubles.** On its "E2-Wire" blog, The Hill (3/14, Geman, 21K) reports, "House Energy and Commerce Committee Chairman Fred Upton (R-Mich.) plans to question" NRC Chairman Gregory Jaczko "next week about damage to Japanese nuclear reactors stemming from the catastrophic earthquake and tsunami." Upton said "the committee's planned March 16 hearing" with Jaczko "will focus on the Japanese crisis. '[W]e will use that opportunity to explore what is known in the early aftermath of the damage to Japanese nuclear facilities, as well as to reiterate our unwavering commitment to the safety of US nuclear sites,' Upton said in a statement about the hearing, which was scheduled to review the NRC and Energy Department budget plans."

**Constellation Energy Emphasizes Safety Of Plants In Wake Of Japanese Crisis.**

The Baltimore Sun (3/13, Dresser, 228K) reports that "Mark Sullivan, a spokesman for the Constellation Energy Nuclear Group, said the company's plants, including Calvert Cliffs, are designed to withstand any shock" indicated by the "seismic history of the geographic areas in which they're located." Sullivan also said, "CENG's highest passion and value is safety; nuclear safety, public safety, worker safety and environmental safety." Drawing coverage from the Baltimore Sun, the AP (3/13) also ran the report.

The Oswego (NY) Palladium-Times (3/14, Rebeor-Dexter, 9K) reports, "With three nuclear plants in Oswego County, residents here are watching with special interest the ongoing crisis in Japan at the Fukushima Dai-ichi Unit 3 nuclear reactor, which was damaged by Friday's devastating earthquake and the resulting tsunami." The Palladium-Times adds that Constellation Energy spokeswoman Jill Lyon said, "Our plants are all outside of the known high-hazard earthquake zones as identified by the US Geological Survey," adding, "They are designed and constructed ... to withstand ground motion and designed to automatically shut down if certain seismic thresholds are reached."

**NRC Senior Staffers Signed Written Dissents Against Yucca Shutdown.** The Las Vegas Review-Journal (3/12, Tetreault, 178K) reports that according to documents that were made public on Friday, three senior Nuclear Regulatory Commission staff members signed written dissents in regards to the closing of the Yucca Mountain project. The staffers signed this dissents in January and early February and NRC spokesman David McIntyre said that staffers are allowed to make these documents available to the public. So far, no action has been taken on these protests.

**Republicans Want To Build 200 Nuclear Plants, Revive Yucca Plan.** McClatchy (3/14, Hotakainen) reports, "While opponents" of the plan to store nuclear waste under Yucca mountain in Nevada "have gained the upper hand in trying to block the project in recent years – in 2009, Energy Secretary Steven Chu said that 'Yucca Mountain as a repository is off the table' – a group of House Republicans is fighting back. They want to revive the site as part of a broader plan that calls for building 200 new nuclear plants by 2030." Republican legislation would "require" the Nuclear Regulatory Commission "to complete its review of the Yucca Mountain site 'without political interference.'"

**NRC To Conduct Seismic Survey Of Peach Bottom, Limerick Plants.** The Norristown (PA) Times Herald/Pottstown Mercury (3/12, Brandt) reported that as the world watches Japan struggle with multiple crises at several nuclear plants, NRC regulators "will soon be taking a 'closer look' at Exelon Nuclear's Limerick Generating Station to see if it is at risk from seismic forces." NRC spokesman Neil Sheehan said the timing was a coincidence, though he noted that advances in "seismic science have prompted his agency to undertake a project to review safeguards at some of the nation's nuclear power plants as they relate to any seismic issues specific to each plant's location and the Limerick plant is on the list of those to be reviewed, Sheehan said." Peach Bottom plant is also on the list of plants to be examined.

The York (PA) Dispatch (3/14, Whetzel, 22K) reports that in the "wake of the nuclear power plant crisis in Japan, government regulators in the United States plan to take a closer look at Exelon Nuclear's Peach Bottom Atomic Power Station and Limerick Generating Station to see if either is at risk from seismic forces." Three Mile Island Nuclear Power Plant, "however, wasn't on the list of seven plants across the county to be examined, said spokesman Neil Sheehan for the Nuclear Regulatory Commission."

The York (PA) Daily Record (3/14, Landauer, 58K) reported that when "engineers built Three Mile Island and Peach Bottom Atomic Power Station more than 35 years ago, handling big natural disasters was part of the equation." The Record says, "Every nuclear power plant in the US was built

to operate without external power for at least one month. Most, like TMI and Peach Bottom, have diesel generators that start within 10 seconds of an outage, said Tom Kauffman, spokesman for the Nuclear Energy Institute."

**Vermont Yankee, State Government On Collision Course.** The AP (3/11, Gram) reports, "A long-awaited showdown between the state government and Vermont's lone nuclear plant is on, and neither side has given any indication it will back down." The AP added that while the NRC announcement was not unusual or unexpected, what is unusual "is that the plant is in a state where the governor wants it shut down, where the state Senate has voted 26-4 against the plant continuing to operate past March 2012 and where state law says the Legislature has to give the OK before regulators can give the plant a new state license."

**Entergy Says Indian Point Has Layers Of Protection.** New York's Mid-Hudson News (3/13) reports that Indian Point owner Entergy Nuclear said Saturday in the wake of the radiation leaks in Japan, "the facility has many layers of protection. 'There are many layers of protection at nuclear power plants like Indian Point, including concrete walls around key components that are more than six feet thick, steel-lined fuel pools, two sets of diesel backup generators, a natural gas generator and equipment that is designed to safely shut down the plants after an earthquake,' Indian Point spokesman Jerry Nappi said." He also noted that in testimony before the NRC, Charles F. Richter, who developed the Richter scale said the magnitude of earthquakes in the region are "of minor magnitude and relatively trivial."

**NRC: US Nuclear-Power Output Up.** Bloomberg News (3/12, McClelland) reported, "US nuclear-power output rose 0.4 percent as Energy Future Holdings Corp. boosted production by the Comanche Peak 2 reactor in Texas, the Nuclear Regulatory Commission said." Bloomberg said nationwide output "increased by 390 megawatts to 87,914 megawatts, or 87 percent of capacity, according to a report" Friday "from the NRC and data compiled by Bloomberg." Notably, 14 "of the nation's 104 reactors were offline."

**Markey Criticizes NRC Over Its Handling Of Pilgrim Security Breach.** The Quincy (MA) Patriot Ledger (3/10, Chesto, 43K) reported, "US Rep. Edward Markey is criticizing the Nuclear Regulatory Commission for failing to disclose details about a security issue that was discovered at the Pilgrim nuclear power plant last fall." The paper said "Markey sent a letter to NRC Chairman Gregory Jaczko last week that asked a series of questions about the unspecified security 'deficiency.'" According to the Ledger,

"most notably, Markey asked why the federal agency hasn't released details regarding the incident to the public."

**Nuclear Plant Helps Revive Coffey County In Kansas.** The Pueblo (CO) Chieftain (3/13, Strescino) reported, "A county in Kansas, with the nuclear power plant closest to Pueblo, has risen from economic ashes as a result of the plant, officials there say." The paper said "Coffey County, in east-central Kansas, 115 miles east-northeast of Wichita, is home to Wolf Creek Generating Station Unit 1." In a few days, "local lawyer Don Banner will seek permission from Pueblo County commissioners to begin the process of building a nuclear power plant here." The plant, commissioned in 1985, "brought more than \$27 million in property taxes to the county in 2010. Total property taxes in Coffey County last year was almost \$35 million," County Treasurer Brenda Cherry said.

**Appeals Court Reduces Southern Co.'s \$77 Million Spent Fuel Award.** Bloomberg News (3/12, McQuillen) reported, "Southern Co. (SO)'s \$77 million legal award against the US government was cut about 78 percent by a federal court and further proceedings on damages were ordered." The article said the US Court of Appeals for the Federal Circuit in Washington Friday "affirmed \$17 million of the initial July 2007 award, where Southern had claimed the Energy Department breached contracts by failing to accept spent nuclear fuel for storage." The company's subsidiaries wanted damages "for the cost of constructing storage facilities and additional costs at three power plants."

**Susquehanna Nuclear Plant's Unit 1 Reactor Back In Service.** The Energy Business Review (3/11) reported, "The Unit 1 reactor at the Susquehanna nuclear power plant in Luzerne County, Pennsylvania, has returned to service." The article said the plant's operator, PPL Corp., last week "shut down this unit for a maintenance work on a valve, which is part of a backup system that can provide cooling water to the reactor in the unlikely event normal systems became unavailable."

**Local Businesses Booming During Kewaunee Plant Refueling.** The Green Bay Press-Gazette (3/12, Gerds) reports, "Local businesses are booming during what is usually the quiet off-peak season as both the Kewaunee Nuclear Power Plant and Point Beach Nuclear Plant begin their refueling and maintenance outages." Combined, "the outage has brought an additional 2,550 supplemental workers — 950 in Kewaunee and 1,600 at Point Beach — to the area for the monthlong projects." Kewaunee Power Station's Mark Kranz said, "We go in and replace one third of the fuel that is

in there currently and we will re-rack the fuel that is staying in there."

**Republican Backers Of Minnesota Nuclear-Plant Unhappy With Conditions.** The St. Paul Pioneer-Press (3/12, Lien, 198K) reported, "A top energy adviser for Democratic Gov. Mark Dayton laid out three conditions Friday to get the governor's support to lift a ban on new nuclear power, prompting resistance from several Republican backers." The paper said "Dayton has consistently opposed lifting a 17-year ban on new nuclear power plants, saying future ratepayers must be protected against up-front costs and later cost overruns, a clear plan must be provided for radioactive waste storage at new nuclear plants and no weapons-grade plutonium can be produced here." The House-Senate conference committee, which is looking to "reconcile different versions of legislation passed earlier this session," met for on Friday in an attempt to thrash out "a compromise that both bodies could pass again and send to Dayton."

**GE-Hitachi's New Reactor Gets NRC Nod.** Dan Yurman writes for the Energy Collective (3/11, Yurman) blog, "GE-Hitachi is due a victory lap after learning this week that the NRC has issued the final safety evaluation report for the firm's 1,500 MW Economic Simplified Boiling Water Reactor (ESBWR) reactor design. The article said "it is a major milestone toward certifying the reactor for sale in the US" Notably, "the NRC certification is considered to be the 'gold standard' internationally" and could "boost the reactor's prospects for sales" in other countries.

**SRS, Plant Vogtle Prepared For Catastrophic Events.** The Augusta (GA) Chronicle (3/12, Pavey) reported that "Georgia isn't prone to catastrophic earthquakes, but nuclear facilities such as Plant Vogtle and Savannah River Site are nonetheless required to plan for the worst," including "earthquakes, plane crashes, floods, dam breaks, hurricanes — even tsunamis." SRS, and its facilities that store nuclear materials, and Vogtle have "critically located seismic monitors that can record any movement."

**INL Director Says Laboratory Is Prepared If Earthquake Occurs.** KIFI-TV Idaho Falls, ID (3/12) reported on its website that after witnessing Japan struggle with nuclear reactor damages as a result of a massive earthquake, "many people in eastern Idaho" were wondering if the same thing could happen since they are in a place where "active earthquake faults" surround "Idaho National Laboratory's" nuclear facility. However, INL's "emergency director Riley Chase said on Saturday that the nuclear test reactor outside of Idaho Falls is very different from the

commercial reactors in Japan." Chase also said that if they "were to have a seismic event, the safety systems would shut that reactor down before you could even feel it personally yourself."

**DOE To Hold Beryllium Meeting For Former Hanford Employees.** The Tri-City (WA) Herald (3/14, Cary) reports that the DOE "is bringing experts in beryllium exposure to the Tri-Cities to help former Hanford workers learn more about whether their health could be affected by the metal." While Hanford's contractors conduct briefings for current employees to learn more about beryllium, "DOE also wanted former employees to have a chance to learn more about beryllium, its hazards, how to be screened for chronic beryllium disease and financial compensation available for those who are ill." DOE spokesman Geoff Tyree said it will be "the first beryllium information meeting DOE has held for former Hanford workers."

Drawing coverage from the Tri-City (WA) Herald, the AP (3/14) says that "at least 32 workers have been diagnosed at Hanford with chronic beryllium disease, including 17 people still at the nuclear reservation. But that does not count workers whose illness was not diagnosed before they left Hanford."

**Bannister's Beryllium Cleanup Standards Not As Stringent As Other Plants'.** In a front-page story, the Kansas City Star (3/14, A1, Dillon, 233K) reports that other nuclear weapons plants "have been cleaned to much higher standards" than the Bannister Federal Complex. "Several other Department of Energy plants are at least five times more stringent than the Bannister plant in removing" beryllium, a dangerous carcinogen, from walls, floors and ceilings. Mark Fisher, who is chairman of the Hanford Beryllium Awareness Group, an employee organization that shares oversight of beryllium standards, said, "That's way too high," adding, "Somebody should be held liable or responsible. The way we do business at Hanford that would not be allowed at all." However, Gayle Fisher, a spokeswoman for the plant, said the "beryllium management program has been developed and maintained with worker protection being the primary consideration."

The St. Louis Post-Dispatch (3/14, 238K) also reports this story, drawing coverage from the Kansas City Star.

## **INTERNATIONAL NUCLEAR NEWS:**

**Second Blast Rocks Troubled Japanese Plant.** ABC World News (3/13, story 5, 2:35, Muir, 8.2M) reported that "there are now four nuclear power plants in trouble,"

including two reactors that "have suffered partial meltdowns." The "series of unstable nuclear plants," the Washington Post (3/14, Harlan, 605K) says, "threatened to compound the nation's difficulties." At the Fukushima Daiichi nuclear plant, "one containment building housing an overheated reactor had already exploded," and the AP (3/14, Talmadge, Yuasa) reports another hydrogen explosion occurred at the plant on Monday. Chief Cabinet Secretary Yukio Edano, however, said the "reactor's inner containment vessel holding nuclear rods is intact."

The New York Times (3/14, A7, Tabuchi, Wald, 1.01M) reports the explosion blew "the roof off a containment building," but did not harm the reactor. Still, the explosion "underscores the difficulties Japanese authorities are having in bringing several stricken reactors under control." Operators, it adds, "fear that if they cannot establish control...the reactors could experience full meltdowns." But also on Monday, "the company that operates both plants said it had restored the cooling systems at two of three reactors experiencing problems," leaving "a total of four reactors at the two plants with pumping difficulties."

As a precaution, the Washington Post (3/14, Harlan, Mufson, 605K) reports, "some 170,000 people have been evacuated around a 12-mile radius of the plant," but a "spokesman for Japan's nuclear agency said as many as 160 people may have been exposed to radiation and were being tested at a hospital to determine if levels were dangerous."

The Wall Street Journal (3/14, Hayashi, 2.09M) reports there are also growing concerns about troubles at the Onagawa power plant in Sendai after elevated radiation levels were detected outside the plant.

A front page story in the New York Times (3/14, A1, Sanger, Wald, 1.01M) reports that "a series of intense interchanges between Tokyo and Washington and the arrival of the first American nuclear experts in Japan, officials said they were beginning to get a clearer picture of what went wrong over the past three days, and as one senior official put it, 'under the best scenarios, this isn't going to end anytime soon.'"

Also reporting on Japan's efforts to gain control over the troubled facilities are the Financial Times (3/14, Soble, 448K), USA Today (3/14, Welch, 1.83M), Washington Times (3/14, Johnson, 77K), AFP (3/14, Hiyama), and Los Angeles Times (3/14, Maugh, 681K), among other news outlets.

**Operators Flood Stricken Japanese Reactors With Seawater.** The New York Times (3/14, A1, Sanger, Wald, 1.01M) reports that given the scale of Japan's nuclear crisis, experts are beginning to believe that the "country is now facing a cascade of accumulating problems that suggest that radioactive releases of steam from the crippled plants could go on for weeks or even months." Desperate to "avoid [the] much bigger problem" of a "full meltdown of the nuclear cores

in [the] two reactors at the Fukushima Daiichi Nuclear Power Station," operators flooded the "stricken reactors with seawater." The Times adds that reestablishing normal cooling will "require restoring electric power" which may "require plant technicians working" in highly contaminated areas.

#### ***Steam Venting Emits Radiation Into Atmosphere.***

The Washington Post (3/14, Mufson, 605K) reports TEPCO used fire pumps on "entered Day 4 of its battle against a cascade of failures at its two Fukushima nuclear complexes," to "inject tens of thousands of gallons of seawater into two reactors to contain partial meltdowns of ultra-hot fuel rods. Japanese officials say they believe a hydrogen explosion occurred at the Fukushima Daiichi nuclear plant, similar to an earlier one at a different facility." The action created high pressures in the unit, which TEPCO "vented into its containment structures and then into the air, raising concerns about radioactivity levels in the surrounding area where people have already been evacuated." Even so, the Post says, experts said the "limited vapor emissions" were "far less dire than the consequences of" a meltdown.

***TEPCO Operators Flood Daiichi No. 1 With Seawater, As Cooling Fails At No. 3 Unit.*** The New York Times (3/13, A1, Tabuchim, Wald, 1.01M) reported that Japanese officials "struggled on Sunday to contain a widening nuclear crisis" following the "earthquake and tsunami, saying they presumed that partial meltdowns had occurred at two crippled reactors and that they were facing serious cooling problems at three more." Saturday, officials flooded "the crippled No. 1 reactor at Fukushima Daiichi Nuclear Power Station, 170 miles north of Tokyo, with seawater in a last-ditch effort to avoid a nuclear meltdown." Then Sunday, cooling failed at the No. 3 reactor "and core melting was presumed at both, said the top government spokesman, Chief Cabinet Secretary Yukio Edano." On its website, New York Times (3/13, 1.01M) ran an interactive display of the troubled Daiichi plant.

#### ***Japanese Experts Say Event Is A 4 On IAEA Scale.***

The New York Times (3/13, O'Connor, 1.01M) reported on the IAEA's seven-tiered rating system for the "severity of radiological events, with a scale starting at one, an 'anomaly,' and rising to seven, a 'major' accident. Six and seven designate full meltdown," while partial meltdowns – in which the fuel is damaged – are rated four or five. The Times added that Saturday, "before emergency measures were announced at a second reactor at that plant, Japanese nuclear safety experts rated the accident a four, putting it just behind the Three Mile Island accident in 1979 near Harrisburg, Pa."

***Radiation Risk To Public Appears Low.*** The New York Times (3/14, A9, Grady, 1.01M) reports that while a number of "plant workers are ill from radioactive exposure in

Japan, the radiation risk to the public appears low so far, experts said. 'At least as of now, what we're looking at is rather more like Three Mile Island than Chernobyl,' said Dr. David J. Brenner, director of the Center for Radiological Research at Columbia University." The Times adds that at the current rate of exposure reported at the Fukushima Daiichi plant fence line, "it would take many weeks" before symptoms would be noticed.

***Japanese Stocks Down 5%.*** The Washington Post (3/14, Schneide, 605K) reports, "Japanese stock markets fell more than 5 percent Monday as the country's manufacturers shuttered plants to assess damage and deal with power shortages, and the nation's economy wrestled with the impact of not only a natural disaster but lingering concerns about nuclear safety."

The New York Times (3/14, Lohr, 1.01M) reports that "as the humanitarian and nuclear crises in Japan escalated after the devastating earthquake and tsunami, the impact on the country's economy appeared to be rising steadily as well." The country's "economic outlook, already problematic, is now even more uncertain, economists and analysts say, because the dimensions of the disaster remain unclear, especially at the damaged nuclear plants."

The Financial Times (3/14, Nakamoto, 448K), meanwhile, notes that the Bank of Japan said Monday that it plans to inject a record \$183 billion into the nation's banking system. The bank said in a statement, "The bank will do its utmost to continue ensuring stability in the financial markets and securing smooth settlement of funds."

***Nuclear Meltdowns Feared From Massive Earthquake.*** As of Sunday morning, the ongoing crisis in Japan continued to dominate media coverage. ABC and NBC devoted a combined 31 minutes to the topic Saturday evening; CBS was preempted. Major newspapers across the US ran multiple front-page stories on the aftermath of the earthquake and on the risk of meltdowns at several nuclear plants.

Early Sunday, the AP (3/13, Talmadge, Yamaguchi) reported that Japan was "struggling...with a growing nuclear crisis and the threat of multiple meltdowns, as more than 170,000 people were evacuated." The AP added that one Japanese official said that "a partial meltdown was already likely under way at one nuclear reactor," as "operators were frantically trying to keep temperatures down at the power plant's other units and prevent the disaster from growing even worse." Moreover, Chief Cabinet Secretary Yukio Edano warned "that a hydrogen explosion could occur at Unit 3 of the Fukushima Dai-ichi nuclear complex, the reactor that could be melting down."

ABC World News (3/12, lead story, 4:40, Muir, 8.2M) reported that "there are two crises unfolding. First, the recovery efforts continue after that earthquake and tsunami,"

and "while all of this unfolded today, another major headline. A nuclear power plant, there was an explosion. The wall around one of the reactors crumbling."

NBC Nightly News (3/12, lead story, 4:40, Holt, 8.37M) reported, "Right about now, people here in Japan are starting to ask themselves how much worse can things get, after what they have been through the last few days. Struck...by one of the largest earthquakes ever on record. Entire communities swept away under a 30-foot high tsunami and now this. Thousands forced to flee from a path of a radioactive leak."

ABC World News (3/12, story 2, 1:20, Amanpour, 8.2M) added that "quite clearly, this is the worst nuclear accident in Japanese history and it may shape up to be one of the worst in the world ever. The prime minister of Japan went on television and urged calm, saying that the utmost priority for the nation is the safety of those people within the radiation zone. As you know, the evacuation order has now doubled to about 20 kilometers or 13 miles around the nuclear power plant and what we have seen lately is pictures on Japanese television of people being treated for possible radiation sickness, people being tested."

NBC Nightly News (3/12, story 2, 1:50, Holt, 8.37M) added, "Japanese officials say they have calculated that at least 160 people, they believe, have been exposed to radioactivity. ... 160,000 people have been evacuated from around two nuclear plants, most of those from the one that suffered the explosion." NBC (Thompson) added, "Of all the aftershocks, nothing frightened the world more than this. An explosion at the troubled Fukushima One Nuclear Power Plant."

AFP (3/13) reports that the US Nuclear Regulatory Commission "has sent two experts to Japan, where authorities were seeking to calm fears of a reactor meltdown." NRC Chairman Gregory Jaczko said the commission's operations center in Maryland also is "operating on a 24-hour basis."

ABC World News (3/12, story 4, 1:10, Muir, 8.2M) reported that "the Obama Administration [is] watching developments, particularly with this explosion at this nuclear facility today." ABC (Raddatz) added that "it's not just the Japanese people who are concerned about what the Japanese government is telling them. US officials are concerned as well. ... US officials said the Japanese officials were very concerned about what's going on at the nuclear power plant, but they weren't telling people they were worried. They were in effect saving face. Now obviously it's only gotten worse since then." ABC added that "US officials say they have reached out to the Japanese government many times but a lot of those calls haven't been returned."

On its front page, the New York Times (3/13, Fackler, McDonald, 1.01M) reports that "Japan mobilized a nationwide rescue effort on Saturday to pluck survivors from collapsed

buildings and rush food and water to thousands in an earthquake and tsunami zone under siege, without water, electricity, heat or telephone service. Entire villages in parts of Japan's northern Pacific coast have vanished under a wall of water," with "many communities...cut off, and a nuclear emergency...unfolding at two stricken reactors at one plant as the country tried to absorb the scale of the destruction after Friday's powerful earthquake and devastating tsunami." The death toll was estimated at up "to 1,700, but the total could rise."

**Saturday: Japanese Nuclear Officials Declare Emergencies At Fukushima Daiichi, Daini Plant.** The New York Times (3/12, A10, Wald, 1.01M) noted that while Japanese nuclear safety officials by Saturday morning "had declared states of emergency for five reactors at the two [Daiichi and Daini] plants, an escalation that added to worries about the safety of nuclear facilities in the quake-prone Japanese islands." The "Daiichi and Daini plants are 10 miles apart in Fukushima Prefecture, about 150 miles north of Tokyo and close to the quake's epicenter off the coast." The "plants' problems were described as serious but were far short of a catastrophic emergency like the partial core meltdown that occurred at the Three Mile Island plant near Harrisburg, Pa., in 1979."

**Saturday: Fukushima Daiichi Unit 1 Plant Building Explosion Increases Core Meltdown Fears.** The looming nuclear emergency became the key story Saturday, with wire services and others focusing on the chance of a meltdown.

The AP (3/12, Kageyama) reported that the nuclear emergency escalated as "the walls of a building at nuclear power station crumbled...as smoke poured out and Japanese officials said they feared the reactor could melt down following the failure of its cooling system." The AP said it was not initially "clear if the damaged building housed the reactor," although "several workers" were reported injured.

The AP (3/12, Yamaguchi, Donn) also reported that "Japan declared states of emergency for five nuclear reactors at two power plants after the units lost cooling ability in the aftermath of Friday's powerful earthquake. Thousands of residents were evacuated as workers struggled to get the reactors under control to prevent meltdowns." Authorities also expanded an evacuation zone from two miles around the plant to 6.2 miles after they "detected eight times the normal radiation levels outside" the Fukushima Daiichi plant and "1,000 times normal inside Unit 1's control room." The AP adds that workers at Unit 1 "scrambled ferociously to tamp down heat and pressure inside the reactor."

The Washington Post (3/12, A1, Mufson, 605K) noted the state of emergency at the five reactors and says "military and utility officials scrambled to tame rising pressure and radioactivity levels inside the units and stabilize the systems used to cool the plants' hot reactor cores."

ABC World News (3/11, story 3, 2:50, Sawyer, 8.2M) reported Friday night on a "growing fear, the 40-year-old nuclear plant damaged by the earthquake. Its power knocked out. A crucial cooling system disabled, with pressure building inside the reactor. Japan declared a state of emergency at the plant. Its first ever." ABC (Cuomo) added, "So, what started as a natural disaster has now the potential to become even a more threatening man-made disaster. The Fukushima nuclear power plant is one of the largest and oldest in the world. And now, it is in great jeopardy."

NBC Nightly News (3/11, story 3, 1:40, Williams, 8.37M) continued with the "issue of nuclear safety," which "grew more ominous as this day went on. ... Specifically, the reports that one nuclear plant north of Tokyo is in trouble. NBC (Thompson) added, "In fact, there are two nuclear plants north of Tokyo that are in trouble tonight, and one of them...there is a report that the officials there say they have lost control of two reactors. And this is a very disturbing development. The fear is if Japanese officials have lost control of these two reactors, the reactors could be on a path to a meltdown."

The CBS Evening News (3/11, lead story, 6:05, Couric, 6.1M) reported that "the extent of the catastrophe is becoming painfully clear. ... The first estimate of the damage: \$10 billion. That damage includes a nuclear reactor in northeastern Japan. Radiation levels are soaring and the area is being evacuated. Most flights between the US and Japan have been canceled."

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Nuclear News Flashes

Monday, Mar 14, 2011

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\*\*\* Fukushima I radiation levels 'significant': IRSN chairman

Agnes Buzyn, chairman of France's Institute of Radiological Protection and Nuclear Safety, IRSN, said radiation levels around Japan's Fukushima I site are "significant" but refused to quantify that term.

During a Paris press conference March 14, Buzyn and Andre-Claude Lacoste, chairman of France's Nuclear Safety Authority, said they could not provide any numbers indicating the radiation doses people near the Fukushima I might have received, because they did not know enough about the measurements involved. Buzyn said voluntary venting of radioactive gases from the nuclear units would lead to peaks of radiation that might not be representative of potential dose rates over a longer period.

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## FIELD REPORT#3

Topic	Low-Carbon Power Generation
Location	Worldwide

### Deploy nuclear and renewables to build a sustainable low-carbon generation portfolio now - and later.

New regulations require utilities to reduce emissions, while adapting to regional resources and producing profitable, competitive power in today's global economy. Utilities can build a sustainable energy mix that satisfies current requirements and future goals for low-carbon power generation by investing in an optimum combination of nuclear and renewable technologies from AREVA. AREVA's flexible, multi-solution approach gives utilities many options to make investments based on timelines and resources to meet short-term, medium and longer term needs. They can add more megawatts to the grid by upgrading existing plants and by building new solar, wind, biomass or nuclear plants. AREVA has a fully complementary, low-carbon portfolio with diversified energy sources and power outputs, allowing scalable investment and financing. AREVA and key partners have even designed energy parks that combine nuclear and renewable energy sources to generate the most electricity from the same footprint. Find out how AREVA can help build a low-carbon energy portfolio with the right mix of innovative nuclear and renewable technologies that makes economic sense for you now and later.

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Workers attempting to keep the Fukushima I units cooled have no doubt received larger doses, Lacoste and Buzyn said, but could not quantify them.

Tokyo Electric Power Co., the plant operator, released data measured March 14 showing dose rates near the site perimeter of up to 10 mSv/h but varying widely by time and place.

The statutory limit of public dose for planning purposes is 1 mSv per year but that does not apply to accident conditions.

\*\*\* Fukushima I accident could worsen: French nuclear safety chief

The accident at Japan's Fukushima-I reactor site is already more severe than the 1979 Three Mile Island-2 accident in the US and could get worse, the chairman of France's Nuclear Safety Authority Andre-Claude Lacoste told a Paris press conference March 14.

Lacoste said there was "no doubt" that fuel had melted in the cores of Fukushima I-1 and -3, and that "[most probably], a core melt has begun at unit 2."

He said the degree of severity depended on how long operator Tokyo Electric Power Co. is able to maintain cooling of nuclear fuel at these units and others along Japan's east coast north of Tokyo. The area was hit by an extreme earthquake and tsunami March 11.

For the time being, he said, "it's not a nuclear catastrophe, but we cannot guarantee that it will not become a nuclear catastrophe."

Lacoste said events at Fukushima were of "unprecedented proportions" in that



several nuclear power units were simultaneously facing a major accident risk and potentially up to 11 units could be at risk at Fukushima I and II, Onagawa and Tokai.

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\*\*\* Onagawa, Tokai sites 'under control,' ASN says

The situation at the Onagawa and Tokai nuclear power sites appears less severe than at Tokyo Electric Power Co.'s Fukushima I and II sites, French nuclear safety officials said March 14, citing Japanese authorities and other sources of information.

Tohoku Electric Power Co. operates three BWRs at Onagawa; Japan Atomic Power Co. operates one BWR at Tokai. All are on Japan's Pacific coast, which was hit by an earthquake and a tsunami of unprecedented force March 11. Tokai is about 120 kilometers (about 75 miles) north of Tokyo. Tepco's Fukushima stations are about 50 km farther north and about 167 km south of Onagawa.

Thomas Houdre of safety agency ASN said at a press briefing in Paris that a site emergency had been declared at Onagawa when increased radiation levels were measured. But ASN said the radiation was confirmed as being due to releases from Fukushima I. "There doesn't seem to be any particular problem from a technical viewpoint" at Onagawa, he said. ASN, in a statement late March 14, quoted Japanese authorities as saying the three units were "under control."

At Tokai, ASN said, a seawater pump powered by a diesel generator was knocked out by the tsunami but a backup pump used to cool the reactor was operating normally, according to Japanese authorities. ASN said JAPC "is in control of the situation and the temperature in the reactor is decreasing steadily."

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## March 15, 2011 Headlines

### U.S. Nukes Brace As Japan Fights To Cool Reactors

Amid growing indications that the overseas emergency will increase regulatory scrutiny of the U.S. nuclear industry, U.S. and Japanese officials yesterday acknowledged at least partial fuel meltdown at a third reactor at the Fukushima Daiichi nuclear power plant following Friday's earthquake and tsunami, as plant workers scrambled Monday to flood the reactors with boron-laced seawater to avert full meltdown and widespread radiation release. In a Monday morning update on the crisis, Tokyo Electric Power Co. (TEPCO) acknowledged that fuel rods at Fukushima Daiichi unit 2 reactor had been more than half-exposed following failure of that unit's emergency cooling system. Although TEPCO said seawater injections by late morning had boosted coolant levels to "the halfway point," the World Nuclear Association later reported that "serious damage to the reactor core of Fukushima Daiichi 2 seems likely after all coolant was lost for a period." Unit 2 was the latest reactor to lose its cooling...

### EPA Gives Biomass Three-Year Reprieve From GHG Rules

In a partial victory for the biomass industry, the Environmental Protection Agency announced Monday that carbon dioxide emissions from biomass power plants and other biogenic sources will not be subject to the agency's greenhouse gas permitting rules for three years, saying it will use the period to review the latest science on the contribution of biomass to global warming and develop a rulemaking to address emissions from biomass and other biogenic sources such as ethanol production. In letters to Senate Agriculture, Nutrition and Forestry Committee Chairman Debbie Stabenow (D-Mich.), Senate Finance Committee Chairman Max Baucus (D-Mont.) and Rep. Peter DeFazio (D-Ore.), EPA Administrator Lisa Jackson said the agency by July 1 would complete a rulemaking codifying the three-year deferral from requirements of EPA's greenhouse gas tailoring rule. Jackson said over the next three years the agency will conduct a rigorous scientific review that will guide the agency as it develops a new...

### S&P: Shale Boom Straining Pipelines' Credit Profiles

In a new dynamic for the pipeline industry's "once-staid" credit profile, booming, low-cost shale gas production is boosting competitive pressure on some pipelines carrying higher-priced conventional gas, increasing the risk that these pipelines may have to lower their transportation rates—and suffer lower future cash flows—to compete with newer pipelines that transport shale gas, Standard & Poor's said last week. In an analysis released March 8, the credit ratings

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agency said few gas pipelines are likely to see their business risk classifications scored worse than "satisfactory" over time due to changing natural gas supply dynamics. However, S&P said "rate discounting is likely for some pipelines to remain competitive" with the slew of new pipelines being built to ship surging new supplies from fast-growing shale plays to demand centers across the country. The S&P analysis follows moves by the ratings agency to lower ratings on at least two major natural gas...

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**From:** IGA, DHS  
**Subject:** DHS ANNOUNCES KEY STEP TOWARD REDUCING REGULATORY BURDEN  
**Date:** Monday, March 14, 2011 10:34:26 AM

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Press Office  
U.S. Department of Homeland Security

# Press Release

March 14, 2011  
Contact: DHS Press Office, (202) 282-8010

## DHS ANNOUNCES KEY STEP TOWARD REDUCING REGULATORY BURDEN

WASHINGTON—The Department of Homeland Security (DHS) today announced the opening of a 30-day comment period to solicit public input on whether any existing significant regulations should be modified, streamlined, expanded, or repealed to better serve the American people and reduce regulatory burden—a key step in the Obama administration’s efforts to measure, and seek to improve, the results of federal regulatory requirements.

To better engage with the American public as it implements Executive Order 13563, DHS is encouraging individuals and organizations, and State, local, and tribal entities to submit comments using the IdeaScale public dialogue tool—a simple, web-based forum that facilitates a two way conversation about how DHS regulations can best serve the public while still meeting their regulatory objectives.

“We are committed to continuing to increase efficiency, transparency and accountability in the regulatory process,” said Secretary of Homeland Security Janet Napolitano. “I look forward to working with the American people and the business community on how DHS can design regulations that best serve the interests of the public.”

In January, President Obama signed Executive Order 13563, requiring all federal agencies to review existing regulations and determine what, if any, should be amended, supplemented, or retracted. The Executive Order sets out principles and requirements that promote public participation in government and encourage agencies to coordinate, simplify, and harmonize regulations to reduce costs and promote consistency for businesses and the public.

DHS today published a notice in the *Federal Register* seeking public comment on how best to develop a preliminary plan for a Department-wide review of significant existing regulations. Under this plan, DHS will review current regulations to identify and eliminate obsolete or unnecessary rules while strengthening and modernizing requirements, where applicable.

To view the *Federal Register* notice and provide comments, please click [here](#). Public comments may also be submitted [here](#) using the IdeaScale public dialogue tool.

###

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**From:** [NRC Announcement](#)  
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**Subject:** Daily: 5 New Items from Monday, March 14, 2011  
**Date:** Monday, March 14, 2011 10:04:51 PM

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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](#).

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If you have difficulty accessing a Web link in this announcement, contact the [NRC Announcement Coordinator](#), Beverly Martin, ADM/DAS, 301-492-3674.



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

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**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)

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**Security/Safety: Japan Earthquake and Tsunami Disaster Fake Web**

ccc/81

## **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 13<sup>th</sup> 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)

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## **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)

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## **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](#).

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If you have difficulty accessing a Web link in this announcement, contact the [NRC Announcement Coordinator](#), Beverly Martin, ADM/DAS, 301-492-3674.



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# NUCLEAR REGULATORY COMMISSION NEWS CLIPS

MONDAY, MARCH 14, 2011 7:00 AM EDT

[WWW.BULLETINNEWS.COM/NRC](http://WWW.BULLETINNEWS.COM/NRC)

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## **NRC NEWS:**

### **Experts Race To Contain Reactor Risk (USAT)**

By Dan Vergano And Donna Leinwand, Usa Today

USA Today, March 14, 2011

Amid an unprecedented double whammy of massive earthquake and devastating tsunami, Japan faces days of dealing with near-nuclear disaster.

The question remains how big a risk exists from one reactor said to be close to a meltdown and another facing that possibility.

The disaster that struck Friday severely damaged the reactor units at the Fukushima Dai-ichi plant, leading to venting of radioactive gases. Japan's Chief Cabinet Secretary Yukio Edano had warned that a partial meltdown in Unit 3 of the Dai-ichi plant was "highly possible."

"We're in a race against time, where no news is good news," says physicist Kenneth Bergeron, author of *Tritium on Ice: The Dangerous New Alliance of Nuclear Weapons and Nuclear Power*. "The more days and hours those cores go without overheating, the higher the chances of not seeing a meltdown."

Meanwhile Japanese officials also vented gas to relieve pressure at another reactor unit at the nearby Fukushima Daiichi Nuclear Power Station.

The 1979 Three Mile Island accident was a partial reactor meltdown, triggered by a valve releasing coolant from the reactor core, and operators blundering in recognizing the problem. The Japanese reactors now under threat lost water for cooling when the tsunami knocked out power to the plant's cooling system. In a bid to overcome the loss of regular cooling water, engineers introduced seawater to keep the reactor cool.

The failure of the cooling pumps meant that the water level inside reactor units dropped, likely exposing the top of the reactor's fuel rods to air and steam. "They need water to stay cool," says Douglas Chapin of the engineering firm MBR Associates of Alexandria, Va. Although the reactors had been stopped, the fuel rods continued to decay and get hotter. Pressure grew, which led plant operators to vent gas containing hydrogen and some radioactive elements generated from the melting tips of the exposed fuel rods, Chapin says.

In the worst case, the effort to cool those rods with seawater fails, and the fuel rods melt completely to the floor of the facility. A bigger worry, although Chapin calls it unlikely, is that the tips of the rods exposed to air melt completely and "slump off" to the floor of the reactor. Much more radioactive gas could be vented in that case.

The pattern of prevailing winds suggests any contamination would be blown out to sea, where it would dissipate safely, says Eric Hall, director of the Center for Radiological Research at Columbia University in New York. Because the radioactive material would be dispersed, it wouldn't pose a hazard to wildlife or fish that people eat, he says.

Cynthia McCollough, a medical physicist at the Mayo Clinic in Minnesota, notes that the International Atomic Energy Agency has rated the danger from the situation in Japan as a 4 on a 7-point scale. That is lower than the risks caused by the meltdown at Three Mile Island in 1979, which rated a 5, and the Chernobyl disaster in 1986, rated a 7.

## **Former US Nuclear Official Warns: It Can Happen Here (FORBES)**

By Osha Gray Davidson

Forbes, March 14, 2011

As a former commissioner at the federal Nuclear Regulatory Commission (NRC), Peter Bradford knows something about nuclear power accidents. He had been serving as one of the nation's top nuclear officials for over two years when, in March 1979, more than half of the fuel in the Unit 2 reactor at Three Mile Island (TMI) melted down – the worst nuclear power accident ever to have occurred in the United States.

I asked Bradford today what he thought of the claims, widespread in the media and in press statements released by some in the nuclear power industry, that the current situation in Fukushima Dai-ichi, Japan, is not as grave as the accident at TMI thirty-two years ago.

"I'll be quite surprised if the events at Fukushima are ultimately considered to be less serious than TMI," he responded, adding that more people have already been exposed to high levels of radiation in Japan than were exposed at TMI.

Bradford, who served on the NRC from 1977 to 1982, also warned against a mindset common in the US nuclear power industry that what is happening now in Japan can't happen here.

"The phrase, 'it can't happen here,' has been a harbinger of trouble in the nuclear industry," he said. "Soviet experts came to TMI and solemnly intoned that such an accident could not happen in the Soviet Union because they did not have that type of reactor. They got Chernobyl. After Chernobyl, experts from many nations deplored the unique inadequacies of the Soviet system – inadequate containment, dangerous design, complacency, secrecy. Of course the [Soviet] design did not exist in their countries, one of which now has Fukushima. No doubt the next accident will also be different in its specifics. Nuclear spokespeople in every other country will then spout owlish and well-financed explanations of why it cannot happen to them."

Bradford's experience at TMI – where the full extent of the damage to the reactor core wasn't known until a decade after the accident – makes him skeptical of broad assessments concerning the current situation in Japan.

"It's important to realize that we know only a small percentage of what we will need to know to reach firm conclusions one way or the other," he says. "Three days into TMI, much that we believed we knew turned out to be wrong."

## **General Electric-Designed Reactors In Fukushima Have 23 Sisters In US (MSNBC)**

**Open Channel**

By Bill Dedman, Investigative Reporter, msnbc.com

msnbc.com, March 14, 2011

The General Electric-designed nuclear reactors involved in the Japanese emergency are very similar to 23 reactors in use in the United States, according to Nuclear Regulatory Commission records.

The NRC database of nuclear power plants shows that 23 of the 104 nuclear plants in the US are GE boiling-water reactors with GE's Mark I systems for containing radioactivity, the same containment system used by the reactors in trouble at the Fukushima Daiichi plant. The US reactors are in Alabama, Georgia, Illinois, Iowa, Massachusetts, Michigan, Minnesota, Nebraska, New Jersey, New York, North Carolina, Pennsylvania and Vermont.

In addition, 12 reactors in the US have the later Mark II or Mark III containment system from GE. These 12 are in Illinois, Louisiana, Mississippi, New York, Ohio, Pennsylvania and Washington state. See the full list below.

(General Electric is a parent company of msnbc.com through GE's 49 percent stake in NBCUniversal. NBCUniversal and Microsoft are equal partners in msnbc.com.)

Msnbc.com sent questions Saturday to GE Energy, asking whether the Japanese reactors differed from those of the same general design used in the US

A GE spokesman, Michael Tetuan, referred all questions to the Nuclear Energy Institute, an industry trade and lobbying group. Tetuan said GE nuclear staff members in Wilmington, N.C., are focused on assisting GE employees in Japan and standing by to help the Japanese authorities if asked to help. The NEI on Sunday confirmed that the figure of 23 is correct.

The six reactors at the Fukushima Daiichi power plant, which had the explosion on Saturday, are all GE-designed boiling-water reactors, according to the anti-nuclear advocacy group Nuclear Information and Resource Service. The group says that five have containment systems of GE's Mark I design, and the sixth is of the Mark II type. They were placed in operation between 1971 and 1979.

A fact sheet from the group contends that the Mark I design has design problems, and that in 1972 an Atomic Energy Commission member, Dr. Stephen Hanauer, recommended that this type of system be discontinued.

"Some modifications have been made to US Mark I reactors since 1986, although the fundamental design deficiencies remain," NIRS said. The group has a commentary online describing what it says are hazards of boiling-water reactors: human intervention needed to vent radioactive steam in the case of a core meltdown, and problems with aging.

Since the earthquake struck Japan on Friday, the early statements by the industry's Nuclear Industry Institute have emphasized that only six plants in the US have precisely the same generation of reactor design (GE boiling-water reactor model 3) as the first reactor to have trouble in Fukushima Daiichi. Problems then developed at different reactors of GE model 4.

But aside from the generation of reactor design, the following 23 US plants have GE boiling-water reactors (GE models 2, 3 or 4) with the same Mark I containment design used at Fukushima, according to the NRC's online database:

- Browns Ferry 1, Athens, Alabama, operating license since 1973, reactor type GE 4.
- Browns Ferry 2, Athens, Alabama, 1974, GE 4.
- Browns Ferry 3, Athens, Alabama, 1976, GE 4.
- Brunswick 1, Southport, North Carolina, 1976, GE 4.
- Brunswick 2, Southport, North Carolina, 1974, GE 4.
- Cooper, Brownville, Nebraska, 1974, GE 4.
- Dresden 2, Morris, Illinois, 1970, GE 3.
- Dresden 3, Morris, Illinois, 1971, GE 3.
- Duane Arnold, Palo, Iowa, 1974, GE 4.
- Fermi 2, Monroe, Michigan, 1985, GE 4.
- FitzPatrick, Scriba, New York, 1974, GE 4.
- Hatch 1, Baxley, Georgia, 1974, GE 4.
- Hatch 2, Baxley, Georgia, 1978, GE 4.
- Hope Creek, Hancock's Bridge, New Jersey, 1986, GE 4.
- Monticello, Monticello, Minnesota, 1970, GE 3.
- Nine Mile Point 1, Scriba, New York, 1969, GE 2.
- Oyster Creek, Forked River, New Jersey, 1969, GE 2.
- Peach Bottom 2, Delta, Pennsylvania, 1973, GE 4.
- Peach Bottom 3, Delta, Pennsylvania, 1974, GE 4.
- Pilgrim, Plymouth, Massachusetts, 1972, GE 3.
- Quad Cities 1, Cordova, Illinois, 1972, GE 3.
- Quad Cities 2, Moline, Illinois, 1972, GE 3.



- Vermont Yankee, Vernon, Vermont, 1972, GE 4.

And these 12 newer GE boiling-water reactors have a Mark II or Mark III design:

- Clinton, Clinton, Illinois, 1987, GE 6, Mark III.
- Columbia Generating Station, Richland, Washington, 1984, GE 5, Mark II.
- Grand Gulf, Port Gibson, Mississippi, 1984, GE 6, Mark III.
- LaSalle 1, Marseilles, Illinois, 1982, GE 5, Mark II.
- LaSalle 2, Marseilles, Illinois, 1983, GE 5, Mark II.
- Limerick 1, Limerick, Pennsylvania, 1985, GE 4, Mark II.
- Limerick 2, Limerick, Pennsylvania, 1989, GE 4, Mark II.
- Nine Mile Point 2, Scriba, New York, 1987, GE 5, Mark II.
- Perry, Perry, Ohio, 1986, GE 6, Mark III.
- River Bend, St. Francisville, Louisiana, 1985, GE 6, Mark III.
- Susquehanna 1, Salem Township, Pennsylvania, 1982, GE 4, Mark II.
- Susquehanna 2, Salem Township, Pennsylvania, 1984, GE 4, Mark II.

Other resources:

Details on each US reactor are in the NRC list.

The NRC has an explainer on boiling-water reactors and the various GE containment designs.

Here's an earthquake hazard map of the lower 48 United States from the US Geological Survey showing the areas with the greatest risks. More detailed state-by-state maps from the USGS are here.

Scientific American looks at the technical situation facing the engineers in Japan. And The Wall Street Journal describes how this emergency calls into question the redundancies that nuclear plant designers rely on.

The Wall Street Journal reported that Tokyo Electric tested the Fukushima plant to withstand an earthquake less severe than the one that struck last week:

Separately, company documents show that Tokyo Electric tested the Fukushima plant to withstand a maximum seismic jolt lower than Friday's 8.9 earthquake. Tepco's last safety test of nuclear power plant Number 1 – one that is currently in danger of meltdown – was done at a seismic magnitude the company considered the highest possible, but in fact turned out to be lower than Friday's quake. The information comes from the company's "Fukushima No. 1 and No. 2 Updated Safety Measures" documents written in Japanese in 2010 and 2009. The documents were reviewed by Dow Jones.

The company said in the documents that 7.9 was the highest magnitude for which they tested the safety for their No. 1 and No. 2 nuclear power plants in Fukushima.

Simultaneous seismic activity along the three tectonic plates in the sea east of the plants – the epicenter of Friday's quake - - wouldn't surpass 7.9, according to the company's presentation.

The company based its models partly on previous seismic activity in the area, including a 7.0 earthquake in May 1938 and two simultaneous earthquakes of 7.3 and 7.5 on November 5 of the same year.

## **Obama Administration, Senators Stand Behind Nuclear Power Amid Japan Meltdown Scare (HUFFPOST)**

By Elise Foley

Huffington Post, March 14, 2011

UPDATE: A spokesman for the Obama administration told the Huffington Post on Sunday that the president was waiting to get more information on the deterioration of Japan's nuclear power plants before making any policy decision about the White House's domestic energy approach. That said, the president continues to view nuclear power as a component of a broader policy needed to meet the nation's needs, provided it is "produced safely and responsibly."

"The administration's first priority right now is to support Japan, as well as American citizens in Japan, as they respond to and recover from this event, and we continue to monitor the situation and provide assistance," said Clark Stevens, a White House spokesman. "The president believes that meeting our energy needs means relying on a diverse set of energy sources that includes renewables like wind and solar, natural gas, clean coal and nuclear power. Information is still coming in about the events unfolding in Japan, but the administration is committed to learning from them and ensuring that nuclear energy is produced safely and responsibly here in the US"

\*\*\*\*\*

WASHINGTON -- As Japan braces for the possibility of a nuclear meltdown, Sens. Chuck Schumer and Mitch McConnell said on Sunday morning they are still open to expanding nuclear power capabilities in the United States.

Schumer (D-N.Y.), one of the top Democrats in the Senate, said on NBC's "Meet the Press" that he is "still willing to look at nuclear" despite the catastrophic events in Japan.

"We are going to have to see what happens here – obviously still things are happening – but the bottom line is we do have to free ourselves of independence from foreign oil in the other half of the globe," he said. "Libya showed that. Prices are up, our economy is being hurt by it, or could be hurt by it. So I'm still willing to look at nuclear. As I've always said it has to be done safely and carefully."

Both sides of the debate over nuclear power have used recent global events in their arguments, with supporters of nuclear power claiming upheaval in the Middle East shows its necessity. A recent earthquake in Japan, however, demonstrated the possible dangers of nuclear power. The earthquake damaged two nuclear reactors, which workers are now working to cool to prevent core meltdowns that devastated Chernobyl and Three Mile Island.

McConnell, the Senate's leading Republican, told Fox News Sunday that he stands behind his support for nuclear power despite the devastation in Japan.

"I don't think right after a major environmental catastrophe is a very good time to be making American domestic policy," McConnell said.

Sen. Joe Lieberman (I-Conn.) offered a slightly different take on the issue, telling CBS' "Face the Nation" that he believes the United States should halt permits for new nuclear power plants until they can determine what went wrong with nuclear reactors in Japan. Still, he said he supports nuclear power in the larger sense.

"The reality is that we're watching something unfold and we don't know where it's going with regard to the nuclear power plants in Japan right now," he said. "I think it calls on us here in the US naturally not to stop building nuclear power plants but to put the brakes on right now until we understand the ramifications of what's happened in Japan." Subscribe to the HuffPost Hill newsletter!

## **US Lawmakers Say Go Slow On Nuclear Energy (AFP)**

By Magan Crane

AFP, March 14, 2011

WASHINGTON (AFP) – The unfolding nuclear disaster in Japan at reactors damaged by a massive earthquake and tsunami has led some lawmakers to call for putting the "brakes" on US nuclear development.

"I've been a big supporter of nuclear power because it's domestic – it's ours and it's clean," Senator Joseph Lieberman told the CBS News television program "Face The Nation" Sunday.

Nevertheless "I think we've got to ... quietly and quickly put the brakes on until we can absorb what has happened in Japan as a result of the earthquake and the tsunami," said Lieberman, who is chairman of the Senate Homeland Security Committee.

Experts must then "see what more, if anything, we can demand of the new power plants that are coming online."

President Barack Obama wants to increase nuclear power as part of a US effort to decrease the nation's dependence on coal and foreign oil. The administration has allocated \$18.5 bn in Department of Energy loan guarantees to spur nuclear development.

The Obama administration "is committed to the re-launching of the nuclear power industry as a key part of moving the country to a clean energy economy," a US official told AFP in December, citing benefits like reducing greenhouse gas emissions and creating jobs.

US Representative Edward Markey, a nuclear power critic, called for a moratorium on building reactors in seismically active areas on Friday, The New York Times reported.

The disaster in Japan "serves to highlight both the fragility of nuclear power plants and the potential consequences associated with a radiological release caused by earthquake-related damage," Markey said in a statement.

"We must ensure that America's nuclear power plants can withstand a catastrophic event and abide by the absolute highest standards for safety," Markey said.

He sent a letter to the Nuclear Regulatory Commission seeking details on emergency plans for the US nuclear industry.

Nuclear energy however still has supporters on Capitol Hill.

Senator Charles Schumer told NBC's "Meet the Press" on Sunday that the unrest in oil-rich Libya is evidence that "we do have to free ourselves of independence from foreign oil."

"Prices are up. Our economy is being hurt by it or could be hurt by it. So I'm still willing to look at nuclear. As I've always said it has to be done safely and carefully," the New York Democrat said.

Senate Minority Leader Mitch McConnell told the Fox News Sunday program that lawmakers shouldn't make snap judgments.

"I don't think right after a major environmental catastrophe is a very good time to be making American domestic policy," the powerful Republican said.

Friday's colossal 8.9 earthquake and subsequent tsunami, which sparked an emergency at two of Japan's nuclear power plants and could result in catastrophic meltdowns, has many US nuclear energy advocates thinking twice.

Part of a reactor at Japan's aging Fukushima No. 1 atomic plant blew up Saturday, a day after the biggest quake ever recorded in Japan unleashed a 10-meter (33-foot) tsunami.

Excessive radiation levels were recorded at a second Japanese nuclear facility, Onagawa, on Sunday, although authorities insisted the facility's three reactor units were "under control."

"It is considered to be extremely unlikely but the (nuclear) station blackout has been one of the great concerns for decades," said Ken Bergeron, a physicist who has worked on nuclear reactor accident simulation.

The reactor problems in Japan are "obviously a significant setback for the so-called nuclear renaissance," in the United States, said Peter Bradford, a former NRC member. Both Bergeron and Bradford spoke to reporters on Saturday.

## **Should The US 'put The Brakes' On Nuclear? Some Dems Think So (HILL)**

By Vicki Needham

The Hill, March 14, 2011

Some US lawmakers are looking to "put the brakes" on building new nuclear power plants after witnessing the crisis at several Japanese reactors that were rocked by Friday's massive earthquake and tsunami.

Sen. Joe Lieberman (I-Conn.) called for a temporary moratorium on the construction of nuclear power plants in the United States following the Japanese quake, which damaged two reactors at a nuclear facility in the country's northeast.

"The reality is that we're watching something unfold," he said on CBS' "Face the Nation." "I think it calls on us here in the US naturally – not to stop building nuclear power plants – but to put the brakes on right now until we understand the ramifications of what's happened in Japan."

Lieberman said he believed in the benefits on nuclear power, but he reiterated his concern over safety in a possible future natural disaster.

"I've been a big supporter of nuclear power because it's domestic, it's ours and it's clean," Lieberman said. "I don't want to stop the building of nuclear power plants, but I think we've got to kind of quietly, quickly put the brakes on until we can absorb what has happened in Japan as a result of the earthquake and the tsunami and then see what more, if anything, we can demand of the new power plants that are coming online."

Sen. Chuck Schumer (D-N.Y.) said he, too, was watching the dangers at Japan's nuclear plants and considering the domestic implications.

"I'm still willing to look at nuclear, but it has to be done safely and carefully," he said on NBC's "Meet the Press." "Bottom line is we do have to free ourselves from our dependence on foreign oil."

When asked on Fox News Sunday, Senate Minority Leader Mitch McConnell (R-Ky.) said domestic policy decisions shouldn't be made right now based on an event in Japan.

"I don't think that right after a major environmental catastrophe is a very good time to be making American domestic policy," he said. "I think that we ought to be concentrating on helping the Japanese on any way that we can."

Rep. Edward Markey of Massachusetts, the senior Democrat on the House Natural Resources Committee, warned Saturday that the US is vulnerable to the same type of nuclear accident.

"I am also struck by the fact that the tragic events now unfolding in Japan could very easily occur in the United States," Markey said. "What is happening in Japan right now shows that a severe accident at a nuclear power plant can happen here."

Markey called on the Obama administration and the Nuclear Regulatory Commission to consider the implementation of several policy changes in light of the disaster.

Among the proposed reforms, he called for a moratorium of siting new nuclear reactors on seismically active areas and called for reactors in seismically active zones to be retrofitted with stronger containment systems.

House Energy and Commerce Committee Chairman Fred Upton (R-Mich.) plans to question the top US nuclear power regulator next week about damage to Japanese nuclear reactors.

"[W]e will use that opportunity to explore what is known in the early aftermath of the damage to Japanese nuclear facilities, as well as to reiterate our unwavering commitment to the safety of US nuclear sites," Upton said in a statement about the hearing, which was scheduled to review the NRC and Energy Department budget plans.

There are 104 nuclear plants operating in the United States, with construction on all of them beginning in 1974 or earlier.

Although there has been a push in the past several years for more plants – Sen. John McCain (R-Ariz.) has called for upward of 100 new plants within 20 years – there are only about a dozen in with works with most companies bowing out because of high construction costs.

The trade association for the US nuclear industry does not think that domestic plans should change because of the current situation. "It's premature to draw any conclusions from the tragedy in Japan," said Steve Kerekes, a spokesman for the Nuclear Energy Institute.

There are some 16 potential nuclear reactors with applications in front of the Nuclear Regulatory Commission, and all of those exceed current safety standards set by the commission, according to Kerekes.

Japanese authorities said Sunday that they were unable to restart the cooling system at one of the reactors damaged by Friday's earthquake, as officials struggled to bring several other damaged reactors under control.

Some nuclear experts estimated it would be at least several days before it's known whether the situation is under control and a crisis has been averted.

Japanese Prime Minister Naoto Kan called the disaster the country's biggest crisis since World War II. Kan said that along coastal areas workers are having a "hard time" distributing food. The government was exploring the possibility of delivering food by sea or air, given the problems with roads en route to the north.

Ichiro Fujisaki, Japan's ambassador to the United States, downplayed concerns over a partial meltdown in several of the nation's nuclear reactors, saying he felt like efforts to cool the reactors with a mixture of clean and sea water would work – even as some said that those measures would be a last-ditch attempt to avoid a major crisis.

"I do not know if you call it desperate, but we have tried to take other measures but now think this is the right result to do that," he said on NBC's "Meet the Press."

He explained that the situation doesn't involve the melting of the core reactor or even "a substantial part of the reactor."

Japanese officials are evacuating about 170,000 residents within about 13 miles of Fukushima Daiichi nuclear plant to avoid potential risks to the population.

"We have to take quick action, and we have to take a cautious attitude – and also mobilize all our forces," Fujisaki said.

Chief Cabinet Secretary Yukio Edano said workers haven't been able to successfully cool the overheated reactors and concern was growing about the possibility of partial nuclear meltdown.

He said there was trouble with two units at the nuclear facility, including one that lost its outer containment wall in an explosion on Saturday.

In line with Fujisaki's comments, Edano insisted that an explosion wouldn't create a health hazard.

Edano said that a similar explosion could soon occur at another unit, although he added that it could withstand an explosion.

"At the risk of raising further public concern, we cannot rule out the possibility of an explosion," Edano said.

Japanese officials also declared a state of emergency at a nuclear power plant in Onagawa, where excessive radiation levels were reported.

This story was updated at 4:00 p.m.

## **Will Nuclear Industry Feel Fallout? (POLITCO)**

By Darren Samuelsohn

Politico, March 14, 2011

Japanese officials continue to struggle to contain the damage at a nuclear plant in Fukushima, but it may be much harder to limit the fallout for the future of nuclear energy in the United States.

Images of an explosion Saturday and word of a possible partial meltdown have rippled around the globe and are expected to linger for US nuclear advocates already wrestling with their own economic and political challenges. Japanese authorities were frantically attempting Sunday to avoid the threat of meltdowns in more than one reactor.

"This is obviously a significant setback for the so-called nuclear renaissance; the image of a nuclear plant blowing up on the television screen is a first," said Peter Bradford, a former commissioner for the US Nuclear Regulatory Commission and a frequent industry critic. "Those cannot be good things for an industry that's looking for votes in the Congress and in the state legislatures."

Already, some on Capitol Hill are bringing back memories of the nuclear disasters at Three Mile Island and Chernobyl.

Rep. Ed Markey (D-Mass.) called Saturday for the NRC to impose a moratorium on building new nuclear reactors in seismically active areas until a sweeping new safety review is completed, and he demanded reviews of the Japanese plant's design to determine if there were flaws that could repeat themselves elsewhere.

On Sunday, two senators who have leaned toward nuclear power offered wait-and-see assessments.

"I don't think right after a major environmental catastrophe is a very good time to be making American domestic policy," Senate Minority Leader McConnell (R-Ky.) said on "Fox News Sunday."

And Sen. Chuck Schumer said on NBC's "Meet the Press" said that nuclear safety is paramount. "We're going to have to see what happens," he said.

Sen. Joe Lieberman (D-Conn.), though, called for a halt to permitting for new US nuclear power plants until the scenarios that led to the serious reactor problems in Japan are determined.

"We've got to quietly - quickly put the brakes on, until we've absorbed....what's happening in Japan," Lieberman said Sunday on CBS's "Face the Nation."

Still, Lieberman made clear he's long been a supporter of nuclear power. "It's domestic, it's ours and it's clean," he said.

Nuclear regulators insisted Saturday that the 104 reactors in the United States have undergone extensive safety checks for natural disasters.

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

Nuclear proponents have been on something of a roller-coaster ride in recent months. Republicans campaigned in 2010 with big promises for the industry, and President Barack Obama said in his State of the Union speech earlier this year that he wanted nuclear power counted as part of a "clean energy" standard for the country. Even some outspoken industry opponents in Congress and the environmental community were saying nice things about nuclear power, if only to try to pass a global warming bill.

But inexpensive natural gas, uncertainty over the Yucca Mountain permanent nuclear waste repository and the failure of the cap-and-trade legislation — which federal estimates suggested would have lead to construction of 100 new reactors — already had the industry recalculating its position.

On Capitol Hill, Republicans such as Energy and Commerce Committee Chairman Fred Upton have expressed unhappiness with the pace with which permits are issued. And prior to this week's events, many expected nuclear power to be part of the various energy bills House Republicans will try to pass later this year.

"We want to find out why it takes so long to go from start to finish on a new nuclear reactor," Upton said Thursday — a day before the earthquake and tsunami struck. "Why does it take us 10 to 12 years and it takes the French and Japanese four to five years? We want to see what we can do to change that. By lowering the number years, we can lower the cost."

At the Nuclear Energy Institute, it was all hands on deck Saturday monitoring the fast-moving events. Richard Myers, the group's vice president for policy development, said it was inappropriate to make comparisons between the 1970s-era plant in Japan and the US fleet of existing and new plants. He also dismissed suggestions the Japan disaster would dampen support for the industry among federal policymakers.

"In terms of the impact on the nuclear power industry going forward in the United States, given our safety record in this country, given the robust regulatory infrastructure we have in place, given the defense in depth that governs operations and designs, given the differences between the US and Japan seismologically, I'm not sure that we're going to see a major impact," he said.

The earliest test may come Wednesday, when Energy Secretary Steven Chu and NRC Chairman Gregory Jaczko are scheduled to testify before two House Energy and Commerce subcommittees. Chu is known to be a big supporter of nuclear technology and has often spoken of it as an international market in which the United States should once again be competitive.

In the US, nuclear power provides about 20 percent of the country's electricity. Reactors at a dozen plants are now undergoing permit reviews to continue operating. And there are five reactors under construction, starting with the Tennessee Valley Authority's new \$2.5 billion unit that will be first to come online in 2012.

Four more reactors in Georgia and South Carolina are due later this decade, with an additional 16 in permitting stages with construction to be completed after 2020, NEI's Myers said.

Bradford said he welcomed a more stringent review process, particularly with respect to the Diablo Canyon and San Onofre nuclear reactors in Southern California. He said that the situation in Japan, where Friday's earthquake and subsequent tsunami threw off the power supply and backup generators to the cooling system, should cause nuclear regulators to "rethink the licensing and design process in ways that are less self-confident about deeming certain events to be impossible."

Nuclear power proponents pushed back Saturday against the idea that the Japanese disaster would have lasting effects here.

"It'd be poor form for anyone to criticize the nuclear industry or pronounce the end of nuclear power because of a natural disaster that's been a national tragedy for the Japanese people, said Robert Dillon, a spokesman for Sen. Lisa Murkowski, the ranking Republican of the Senate Energy and Natural Resources Committee.

"What we're seeing is a classic ready-fire-aim scenario, where various advocacy groups that had positions set before the disaster are now rushing ahead to use the same talking points they'd have used a week ago," said Joshua Freed, director of the Clean Energy Initiative at Third Way.

"It's ridiculous and appalling that less than 48 hours after the earthquake and tsunami hit Japan that they're trying to make political hay out of this and turn it into an American political debate," Freed added.

"There's no such thing as a risk-free source of energy," said Jason Grumet, president of the Bipartisan Policy Center. "Almost every major facet of our energy system has suffered a high-profile catastrophe somewhere in the world in the last 24 months. That may, in combination with high gasoline prices, provide the public pressure to encourage Congress to engage on a complex piece of legislation."

But for all the talk about safety, it has been only one of the issues slowing the development of nuclear power in the United States. Economics is another.

"Except with massive subsidies, there's really nothing one can do to make a whole lot of nuclear plants economic right now," John Rowe, the CEO of Chicago-based Exelon, owner of the nation's largest nuclear fleet, said in an interview with POLITICO last week before the earthquake in Japan.

Rowe noted that a handful of companies operating in certain parts of the US have jumped into the permitting process because of a loan-guarantee program created by the 2005 energy law. "I respect them for doing so. But they wouldn't do it if they were in my market environment," Rowe said. "They may be better off 20 years from now because they have done so. But in my environment, you couldn't afford the first 10. I think patience is a big thing right now."

Darius Dixon contributed to this report.

## **US Could Rethink Nuclear Reliance (WSJ)**

### **Industry Ponders Political Fallout in America Following the Problems in Japan**

By Stephanie Simon

Wall Street Journal, March 14, 2011

Full-text stories from the Wall Street Journal are available to Journal subscribers by clicking the link.

## **Japan Disaster May Mean Setback For US Nuclear Industry (WP)**

By Jia Lynn Yang

Washington Post, March 14, 2011

Stymied by concerns about safety and cost, the US nuclear power industry has struggled to make a comeback for decades. Now the revival may have to wait even longer, as earthquake damage to a reactor in northern Japan has again highlighted the potential hazards of going nuclear.

The timing is tough for the industry, which recently has been enjoying more support in Washington than on Wall Street. President Obama as well as Republican leaders on Capitol Hill want to lend the industry billions of dollars in additional taxpayer funds to help pay for building new nuclear plants. Even some environmentalists had begun to embrace nuclear energy in the wake of last summer's oil spill in the Gulf of Mexico and amid concerns about global warming.

But banks and investors worry that the plants are too expensive and risky to finance. The crisis in Japan could jeopardize or at least tone down political support for nuclear energy just as the industry needs all the financial backing it can get from the government.

"The nuclear renaissance in the US was on the rocks in any case," said Peter Bradford, former commissioner of the US Nuclear Regulatory Commission. "There's no way this is a positive for a technology that's dependent entirely on political support."

Cost remains the biggest obstacle for any revival of nuclear energy. Billions of dollars are required to build a single plant. And lenders have been leery of financing projects because of a history of incomplete projects, blown budgets and bankrupted companies.

Momentum for a comeback also has been slowed because other energy sources remain less expensive. Natural gas is cheap, especially with the expansion of supplies from shale rock, and there's been no legislative action to tax carbon emissions.

Representatives of the nuclear industry said Saturday that it's too soon to know what impact the disaster in Japan could have on US policy.

"Until we know exactly what happened in the plants in Japan it's very hard to know what conclusions to draw," said Alex Flint, senior vice president of governmental affairs for the Nuclear Energy Institute, a group that lobbies for the industry.

Just over a year ago, Obama pledged more than \$8 billion in additional loan guarantees for the construction of the first nuclear power plant in the United States in almost three decades. The president has also touted the potential of nuclear energy in two State of the Union speeches.

"He is as supportive as any administration in recent history," Flint said.

On Saturday, the White House said it supports developing a variety of energy sources, of which nuclear is only one.

"The president believes that we need to continue to diversify our nation's energy supply, including a focus on clean energy sources from renewables like wind and solar, to natural gas, clean coal and nuclear power," said Clark Stevens, a spokesman for the White House. "The administration is committed to ensuring that nuclear energy is produced safely and responsibly, and will continue to incorporate best practices and lessons learned into that process."

Meanwhile the Republican takeover of the House last year catapulted one of the industry's biggest backers, Rep. Fred Upton (R-Mich.), to the head of the Energy and Commerce Committee.

"The details of this tragedy are still unfolding," Upton said in a statement Saturday evening. "The head of the Nuclear Regulatory Commission is scheduled to testify before the Energy and Commerce Committee next week, and we will use that opportunity to explore what is known in the early aftermath of the damage to Japanese nuclear facilities, as well as to reiterate our unwavering commitment to the safety of US nuclear sites."

Momentum for the nuclear industry grew following the passage of the Energy Policy Act in 2005, which included several subsidies for nuclear energy.

Of the 65 reactors being constructed worldwide, three are in the United States, according to NEI. Flint estimates that by 2020, four to eight new plants will be running.

Nuclear energy provides 20 percent of this country's electricity, compared with 30 percent in Japan.

Unlike past crises such as Three Mile Island and Chernobyl, which did not involve natural disasters, the problems at the plant in Japan were triggered by earthquakes, which disrupted the power supply to the reactors' cooling systems. As a result, some experts said that two plants in California that lie near fault lines — Diablo Canyon and San Onofre — could come under extra scrutiny. Both plants have been checked by the Nuclear Regulatory Commission for their ability to withstand tsunamis and earthquakes.

"Just when Japan needed power most for recovering from the natural disaster, the collapse of the electrical grid system basically complicated the crisis because the nuclear power plants themselves had to shut down to mitigate the inherent radiation hazard," said Paul Gunter, director of the Reactor Oversight Project at Beyond Nuclear. "It clearly demonstrates that this technology in times of national crisis . . . cannot be relied upon when you need it the most."

## **Japan Radiation Unlikely To Reach US: Officials (AFP)**

AFP, March 14, 2011

WASHINGTON (AFP) – Radiation from nuclear plants damaged in Japan's earthquake is unlikely to reach US territory in harmful amounts, US nuclear officials said Sunday.

"Given the thousands of miles between the two countries, Hawaii, Alaska, the US Territories and the US West Coast are not expected to experience any harmful levels of radioactivity," the federal Nuclear Regulatory Commission (NRC) said in a statement.

"All the available information indicates weather conditions have taken the small releases from the Fukushima reactors out to sea away from the population," the statement read.

The office also said it sent two boiling-water reactor experts as part of a US Agency for International Development (USAID) emergency team helping respond to the crisis in Japan.

The NRC is coordinating with the US Department of Energy and other federal agencies in providing "whatever assistance the Japanese government requests" following the March 11 earthquake and tsunami, the statement read.

However nuclear expert Joseph Cirincione, speaking on Fox News Sunday, was less optimistic. He said that in a "worst-case scenario" radioactivity would get into the ground, air and water.

"Some of the radioactivity could carry in the atmosphere to the West Coast of the United States," said Cirincione, president of the Ploughshares Fund, which advocates for the elimination of nuclear weapons.

That scenario is "absolutely" possible, he said, pointing to the Chernobyl meltdown in Ukraine in 1986, when "the radioactivity spread around the entire Northern Hemisphere. It depends how many of these cores melt down and how successful they are on containing it once the disaster happens."

Japan on Sunday struggled to contain a possible meltdown of two reactors at a quake-hit nuclear plant.

An explosion at the aging Fukushima No. 1 atomic plant blew apart the building housing one of its reactors Saturday, one day after the biggest quake ever recorded in Japan unleashed a monster tsunami.

The emergency escalated Sunday as crews struggled to prevent overheating at a second reactor where the cooling system has also failed, and the government warned that it could also be hit with a blast.

## **Military Crew Said To Be Exposed To Radiation, But Officials Call Risk In US Slight (NYT)**

By William J. Broad

New York Times, March 14, 2011

The Pentagon was expected to announce that the aircraft carrier Ronald Reagan, which is sailing in the Pacific, passed through a radioactive cloud from stricken nuclear reactors in Japan, causing crew members on deck to receive a month's worth of radiation in about an hour, government officials said Sunday.

The officials added that American helicopters flying missions about 60 miles north of the damaged reactors became coated with particulate radiation that had to be washed off.

There was no indication that any of the military personnel had experienced ill effects from the exposure. (Everyone is exposed to a small amount of natural background radiation.)

But the episodes showed that the prevailing winds were picking up radioactive material from crippled reactors in northeastern Japan. Ever since an earthquake struck Japan on Friday, the authorities worldwide have been laying plans to map where radioactive plumes might blow and determine what, if any, danger they could pose to people.

Blogs were churning with alarm. But officials insisted that unless the quake-damaged nuclear plants deteriorated into full meltdown, any radiation that reached the United States would be too weak to do any harm.

Washington had "hypothetical plots" for worst-case plume dispersal within hours of the start of the crisis, a senior official said Sunday. The aim, the official added, was "more to help Japan" than the United States, since few experts foresaw high levels of radiation reaching the West Coast.

For now, the prevailing winds over Japan were blowing eastward across the Pacific. If they continue to do so, international stations for radioactive tracking at Wake or Midway Islands might detect radiation later this week, said Annika Thunborg, a spokeswoman for an arm of the United Nations in Vienna that monitors the planet for spikes in radioactivity.

"At this point, we have not picked up anything" in detectors midway between Japan and Hawaii, Ms. Thunborg said in an interview on Sunday. "We're talking a couple of days — nothing before Tuesday — in terms of picking something up."

Agencies involved in the tracking efforts include the World Meteorological Organization, the International Atomic Energy Agency and the Comprehensive Test Ban Treaty Organization, which runs a global network of more than 60 stations that sniff the air for radiation spikes.

In the United States, the Departments of Defense and Energy maintain large facilities and cadres of specialists for tracking airborne releases of radiation, both civilian and military.

On Sunday, the Nuclear Regulatory Commission said it expected no "harmful levels of radioactivity" to move on the winds to Hawaii, Alaska or the West Coast from the reactors in Japan, "given the thousands of miles between the two countries."

In interviews, some private nuclear experts called a windborne threat unlikely. Others urged caution.

"We're all worrying about it," said Robert Alvarez, a nuclear expert who, from 1993 to 1999, was a policy adviser to the secretary of energy, who runs the nation's nuclear complex.

"It's going to be very important," he added, "for the Japanese and US authorities to inform the public about the nature of the plumes and any need for precautionary measures."

The plume issue has arisen before. In 1986, radiation spewing from the Chernobyl disaster in Ukraine was spread around the globe on winds and reached the West Coast in 10 days. It was judged more of a curiosity than a threat.

Since then, scientists have refined their abilities to monitor such atmospheric releases. The advances are rooted in the development of new networks of radiation detectors, flotillas of imaging satellites and the advent of supercomputers that can model the subtle complexities of the wind to draw up advanced forecasts.

With the Japanese crisis, popular apprehension has also soared.

"Concern has been raised about a massive radioactive cloud escaping and sweeping over the West Coast," said a recent blog, recommending whole grains and health foods for fighting radiation poisoning.



On another blog, someone asked, "Should I take iodine now?" That referred to pills that can prevent poisoning from the atmospheric release of iodine-131, a radioactive byproduct of nuclear plants that the Japanese authorities have identified as escaping into the atmosphere.

While federal officials expected little danger in the United States from Japanese plumes, they were taking no chances. On Sunday, Energy Department officials, speaking on the condition of anonymity, said the agency was working on three fronts.

One main player is the Lawrence Livermore National Laboratory in California. Officials said they had activated its National Atmospheric Release Advisory Center, which draws on meteorologists, nuclear scientists and computer scientists to forecast plume dispersal.

Separately, energy officials said the agency was readying plans to deploy two-person monitoring and sampling teams, if necessary. The teams would travel to consulates, military installations and Navy ships to sample the air in a coordinated effort to improve plume tracking.

Finally, the department was preparing what it calls its Aerial Measuring System. Its detectors and analytical equipment can be mounted on a variety of aircraft. Officials said the equipment and monitoring team are staged out of the department's Remote Sensing Laboratory at Nellis Air Force Base in Nevada, and are on two-hour call.

"We're on top of this," a department official said.

David E. Sanger contributed reporting from Washington.

## **Nuclear Overreactions (WSJ)**

**Modern life requires learning from disasters, not fleeing all risk.**

Wall Street Journal, March 14, 2011

Full-text stories from the Wall Street Journal are available to Journal subscribers by clicking the link.

## **Japan Does Not Face Another Chernobyl (WSJ)**

**The containment structures appear to be working, and the latest reactor designs aren't vulnerable to the coolant problem at issue here.**

By William Tucker

Wall Street Journal, March 14, 2011

Full-text stories from the Wall Street Journal are available to Journal subscribers by clicking the link.

## **Navy Says 17 Americans Were Treated For Contamination (NYT)**

By Thom Shanker

New York Times, March 14, 2011

WASHINGTON — American Navy officials in Japan said early Monday that 17 military personnel who had been aboard three helicopters assisting in the earthquake relief effort had been exposed to low levels of contamination.

Cmdr. Jeff A. Davis, a spokesman for the American Seventh Fleet in Japan, said the Navy personnel — who apparently had flown through a radioactive plume from a damaged nuclear power plant — had been ordered to dispose of their uniforms and to undergo a decontamination scrub that had successfully removed radioactive particles.

"They received very, very low levels of contamination," Commander Davis said in a telephone interview from Japan early Monday.

"It certainly is not cause for alarm," he said. "It is something we have to watch very carefully and make sure we are able to monitor, and to mitigate against this environmental hazard."

The Navy personnel aboard the three helicopters had received the equivalent of one month's natural background radiation from the sun, rocks or soil, he said.

The helicopter crew members had landed aboard the USS. Ronald Reagan, a nuclear-powered aircraft carrier whose on-board sensors had indicated that the warship, too, had been exposed to airborne contamination at very low levels. The helicopter crew members were tested individually with hand-held radiation monitors.

The carrier and its strike group were operating about 100 miles northeast of the damaged power plant at the time, but the helicopters had flown closer to assist in relief missions near Sendai, the city that bore much of the brunt of the tsunami after Friday's earthquake.

The Ronald Reagan and other American warships have now sailed to areas where they will not be in the path of radiation carried in the wind.

"As a precautionary measure, USS. Ronald Reagan and other US Seventh Fleet ships conducting disaster-response operations in the area have moved out of the downwind direction from the site to assess the situation and determine what appropriate mitigating actions are necessary," Commander David said.

But he stressed that the fleet remains "committed to our mission of providing assistance to the people of Japan."

## **US Deploys Two Nuclear Experts To Japan (AFP)**

AFP, March 13, 2011

WASHINGTON (AFP) – The US Nuclear Regulatory Commission said Saturday it has sent two experts to Japan, where authorities were seeking to calm fears of a reactor meltdown in the aftermath of a massive earthquake.

"We have some of the most expert people in this field in the world working for the NRC and we stand ready to assist in any way possible," commission chairman Gregory Jaczko said in a statement announcing the deployment.

The NRC – an independent agency mandated by Congress to regulate US commercial nuclear power plants and other nuclear materials – said the pair were experts in boiling water nuclear reactors and are part of a broader US aid team sent to the disaster zone.

The commission has activated "its Maryland-based headquarters Operations Center since the beginning of the emergency in Japan, and is operating on a 24-hour basis," the statement added.

A blast at a Japanese nuclear plant triggered fears of a meltdown after a massive earthquake and tsunami left more than 1,000 dead and at least 10,000 unaccounted for.

As workers doused the stricken reactor with sea water to try to avert catastrophe, Japan's Prime Minister Naoto Kan said the chaos unleashed by Friday's 8.9 magnitude quake was an "unprecedented national disaster."

On Sunday in Japan, the operator of the plant said the cooling system of another reactor was not working and risked a possible explosion.

## **Embassy Row (WT)**

By James Morrison, The Washington Times

Washington Times, March 14, 2011

### **EMERGENCY**

The US Embassy in Tokyo is searching for Americans in Japan and dispatching relief teams with military precision as US diplomats respond to the devastating earthquake, tsunami and nuclear disaster that crippled America's closest Asian ally.

"We have and continue to mobilize all appropriate resources," Ambassador John Roos said Sunday in a message to American citizens.

He warned them to beware of "misinformation" and urged them to follow the instructions of Japanese civil defense authorities.

The ambassador said he has received no report of any American injured or killed in the earthquake that struck Japan on Friday. Of 160,000 Americans in Japan, about 1,300 are in areas most affected by the disaster, Mr. Roos said. He dispatched consular officers to those areas to find and help them.

Disaster teams from the US Agency for International Development and experts from the Energy Department, the Nuclear Regulatory Commission and the Department of Health and Human Services also have arrived in Japan, the ambassador said.

Rescue teams from Fairfax County, Va., and Los Angeles, along with dogs trained to find victims buried in the rubble of collapsed buildings, are on the ground, Mr. Roos said.

"It goes without saying that we feel great sorrow, and our hearts go out to the people of Japan and to all of those who have been affected by the events of the last few days. Japan is our close ally and partner," Mr. Roos told reporters at an embassy news conference Saturday.

He was flanked by Air Force Lt. Gen. Burt Field, commander of US forces in Japan; Navy Capt. Justin Cooper, the embassy's defense attache; John Breed, the USAID counselor, and Consul General Paul Fitzgerald.

Mr. Roos urged US citizens trying to find information on friends or relatives in Japan to send an e-mail to the State Department at [JapanEmergencyUSC@state.gov](mailto:JapanEmergencyUSC@state.gov) and include the full name, date of birth and place of birth of the people they are seeking.

### **DIPLOMATIC TRAFFIC**

Foreign visitors in Washington this week include:

Tuesday

- A delegation from Kazakhstan: Marat Beketayev, executive secretary at the Ministry of Justice; Kuandyk Bishimbayev, vice minister for Economic Development and Trade; and Nurlan Yermekbayev, a top adviser to President Nursultan Nazarbayev. They will meet with administration officials.

Wednesday

- John Finucane, son of Patrick Finucane, a human rights lawyer murdered by loyalist paramilitaries in Northern Ireland in 1989; Raymond McCord, father of Raymond McCord Jr., also murdered in Belfast by loyalist paramilitaries in 1997; John Teggart, son of Daniel Teggart, victim of the 1971 Ballymurphy massacre by British soldiers; Ciaran McAirt, grandson of Kitty Irvine, a victim of the 1971 McGurks Bar bombing by a loyalist paramilitaries; and Jane Winter, director of British Irish Rights Watch. They testify before the congressional Commission on Security and Cooperation in Europe at 2 p.m. in Room 210 of the Cannon House Office Building.

Thursday

- Prime Minister Enda Kenny of Ireland, who meets President Obama.

Friday

- Jahangir Hajiyev, chairman of the International Bank of Azerbaijan, and Nazim Muzaffari, a former member of the Azerbaijan parliament. They address the School for Advanced International Studies at Johns Hopkins University.

## **Death Toll Estimate In Japan Soars As Relief Efforts Intensify (NYT)**

By Martin Fackler And Mark McDonald

New York Times, March 14, 2011

SENDAI, Japan — Japan reeled from a rapidly unfolding disaster of epic scale on Sunday, pummeled by the death toll, destruction and homelessness caused by the earthquake and tsunami and new hazards from damaged nuclear reactors that were leaking radiation. The prime minister called it Japan's worst crisis since World War II.

Japan's \$5 trillion economy, the third largest in the world, was threatened with severe disruptions and partial paralysis as many industries shut down and the armed forces and volunteers mobilized for the far more urgent effort of finding survivors, evacuating residents near the stricken power plants and caring for the victims of the record 8.9 magnitude quake that struck on Friday.

The disaster has left more than 10,000 people dead, many thousands homeless and millions without water, power, heat or transportation.

The most urgent worries concerned the failures at two reactors at the Fukushima Daiichi Nuclear Power Station, where engineers were still struggling Sunday to avert meltdowns and where some radiation had already leaked. Fukushima Daiichi and another power station, Fukushima Daiini, about 10 miles away, have been under a state of emergency since the quake.

The collective anxiety about Japan caused a rout in the Japanese stock market on Monday morning, with the main index falling 5.5 percent, the worst drop in three years.

Worried about the severe strains on the banking and financial systems, the Bank of Japan pumped about \$86 billion into the economy on Monday, and the government was discussing an emergency tax increase to help finance relief and recovery work.

The Tokyo Electric Power Company, which operates the country's crippled nuclear power grid, announced a series of rotating blackouts to conserve electricity — the first controlled power cuts in Japan in 60 years.

The death toll was certain to climb as searchers began to reach coastal villages that essentially vanished under the first muddy surge of the tsunami, which struck the nation's northern Pacific coast near the port city of Sendai. In one town alone, the port of Minamisanriku, a senior police official said the number of dead would "certainly be more than 10,000." That is more than half the town's population of 17,000.

Prime Minister Naoto Kan told a news conference in Tokyo late Sunday: "I think that the earthquake, tsunami and the situation at our nuclear reactors makes up the worst crisis in the 65 years since the war. If the nation works together, we will overcome."

The government ordered 100,000 troops — nearly half the country's active military force and the largest mobilization in postwar Japan — to take part in the relief effort. An American naval strike group led by the nuclear-powered aircraft carrier Ronald Reagan also arrived off Japan on Sunday to help with refueling, supply and rescue duties.

The quake and tsunami did not reach Japan's industrial heartland, although economists said the power blackouts could affect industrial production — notably carmakers, electronics manufacturers and steel plants — and interrupt the nation's famously efficient supply chain. Tourism was also bound to plummet, as the United States, France and other nations urged citizens to avoid traveling to Japan.

AIR Worldwide, a risk consultant in Boston, said its disaster models estimated property damage to be as high as \$35 billion. The company said 70 percent of residential construction in Japan was wood, and earthquake insurance was not widely used.

Amid the despair and mourning, and the worry over an unrelenting series of strong aftershocks, there was one bright moment when the Japanese Navy rescued a 60-year-old man who had been floating at sea for two days.

The man, Hiromitsu Arakawa, clung to the roof of his tiny home in the town of Minamisoma after it was torn from its foundations by the first wave of the tsunami, the Defense Ministry said. He saw his wife slip away in the deluge, but he hung on as the house drifted away. He was discovered late Sunday morning, still on his roof, nine miles south of the town where he lived and nine miles out to sea.

The quake was the strongest to hit Japan, which sits astride the "ring of fire" that marks the most violent seismic activity in the Pacific Basin.

About 80,000 people were ordered to evacuate danger zones around the two compromised atomic facilities in Fukushima Prefecture. Japanese officials reported that 22 people showed signs of radiation exposure and as many as 170 were feared to have been exposed, including some who had been outside one of the plants waiting to be evacuated. Three workers were suffering what medical officials described as full-blown radiation sickness.

In a televised address the trade minister, Banri Kaieda, asked businesses to limit their use of power as they returned to operation on Monday. He asked specifically for nighttime cutbacks of lights and heating. The power company said the rolling blackouts would affect three million customers, including homes and factories.

The Japan Railways Group cut operations at six of its commuters lines and two bullet trains to 20 percent of normal to conserve electricity.

Tokyo and central Japan continued to be struck by aftershocks off the eastern coast of Honshu Island, and United States agencies recorded 90 smaller quakes throughout the day Saturday. A long tremor registering 6.2 caused buildings in central Tokyo to sway dramatically on Sunday morning.

Search teams from more than a dozen nations were bound for Japan, including a unit from New Zealand, which suffered a devastating quake last month in Christchurch. A Japanese team that had been working in New Zealand was called home.

A combined search squad from Los Angeles County and Fairfax County, Va., arrived from the United States with 150 personnel and a dozen dogs that would help in the search for bodies.

Assistance teams also were expected from China and South Korea, two of Japan's most bitter rivals.

Tokyo's acceptance of help — along with a parade of senior officials who offered updates at televised news conferences on Sunday — was in marked contrast to the government's policies after the 1995 Kobe earthquake, which killed more than 6,000 people. Japan refused most offers of aid at the time, put restrictions on foreign aid operations and offered little information about the disaster.

Here in Sendai, a city of roughly a million people near the center of the catastrophe, many buildings cracked but none had collapsed. Still, city officials said that more than 500,000 households and businesses were without water, and many more lacked electricity as well.

Soldiers surrounded Sendai's city hall, where officials were using two floors to shelter evacuees and treat the injured, using power drawn from a generator. Thousands of residents sought refuge inside and waited anxiously for word from their relatives. A line of people waited outside with plastic bottles and buckets in hand to collect water from a pump.

Masaki Kokubun, 35, has been living at the city hall since the quake. He had worked at a supermarket, and his neighborhood lost power and water. He said he had not slept in three days.

"I can't sleep," he said as he sat in a chair in a hallway. "I just sit here and wait."

## **No Harmful Levels Of Radioactivity Expected In US (AP)**

Associated Press, March 14, 2011

WASHINGTON — The Nuclear Regulatory Commission says harmful levels of radioactivity are not expected in the United States due to damaged nuclear reactors in Japan.

Earthquakes and a tsunami have damaged at least two nuclear complexes in Japan. Officials have declared states of emergency at six of the country's 55 reactors.

In a statement Sunday, the NRC said weather conditions appear to have taken the small releases of radioactivity from the damaged reactors out to sea.

Given the thousands of miles separating Japan and the US, including Hawaii, Alaska, US territories and the US West Coast, the agency said no harmful levels of radioactivity are expected.

The NRC is coordinating with the Energy Department and other federal agencies in providing any assistance the Japanese government requests during the crisis.

## **Radiation From Japan Not Bound For US, Says Nuclear Agency (LAT)**

**The US Nuclear Regulatory Commission says it does not expect the US to experience any harmful levels of radiation released by Japan's Fukushima reactors.**

By Molly Hennessy-Fiske

Los Angeles Times, March 14, 2011

The United States is not expected to experience "any harmful levels" of radiation from Japan's earthquake-damaged nuclear power reactors, according to the US Nuclear Regulatory Commission.

"All the available information indicates weather conditions have taken the small releases from the Fukushima reactors out to sea away from the population," the NRC said in a statement released Sunday. "Given the thousands of miles between the two countries, Hawaii, Alaska, the US Territories and the US West Coast are not expected to experience any harmful levels of radioactivity."

## **Japanese Nuclear Release Not Expected To Reach California « CBS (KCBS)**

KCBS-TV San Francisco, CA, March 13, 2011

SAN FRANCISCO (KCBS) – At least two nuclear reactors have been badly damaged by the earthquake and tsunami in Japan, raising fears about the release of harmful radiation, including possibly reaching as far as California.

But the Nuclear Regulatory Commission said even if the Japanese reactors go into full meltdown, no dangerous levels of radiation would be expected to reach the United States.

UC Davis professor of radiology and radiation oncology Jerrold Bushberg said he agrees with that assessment.

"The large distance and great line of air, being at those levels of radioactivity, (the chance) that would reach the United States would be very, very small and not of any significant health concern," he said.

Bushberg said there's no need for anyone in California to take any precautions against radiation exposure.

But the same cannot be said for northern Japan, where Michael Martin is doing just that and buying potassium iodine.

"My Tokyo friends are on edge about this. I found some tablets online on Amazon and sent the link to my friends and one of them has already ordered packages in bulk," said Martin.

Dr. Bushberg said the iodine keeps your body from absorbing radiation if you are exposed.

Officials in Japan have declared states of emergency at six of the country's 55 reactors.

## **Government Uses New And Old Media To Get Its Message Out After Japan Disaster (NextGov)**

By Kellie Lunney

Nextgov, March 14, 2011

The government is using different modes of communication -- from conference calls to Twitter feeds -- to disseminate information related to Friday's earthquake in Japan and the subsequent tsunami impact on the West Coast of the United States.

Craig Fugate, administrator of the Federal Emergency Management Agency, already posted a video online early Friday morning urging viewers to listen to local officials, and he briefly touched on the federal response on the West Coast.

"Our immediate priority is the safety of the people and communities in the affected areas," Fugate said in an online statement. We remind everyone who lives in the region to monitor their local news for instructions from their state and local officials and if told to evacuate -- evacuate."

FEMA also is making use of its Twitter feed, posting links to tsunami advisories for specific regions, preparedness tips and live streaming from inside state emergency centers on the West Coast.

As for more traditional forms of outreach, Fugate held a conference call Friday afternoon with reporters, and appeared on television to answer the media's questions. FEMA's Western Regional Offices 9 and 10 are working with state and local officials in the affected areas, and the agency sent emergency staff to Hawaii to coordinate with Gov. Neil Abercrombie's team. "FEMA is fully activated," said President Obama during a Friday afternoon press conference.

Tsunami warnings and watches were issued for the US territories of Guam, the Commonwealth of the Northern Marianas Islands, as well as portions of coastal areas in Hawaii, Alaska, California, Oregon and Washington state. Multiple federal agencies responded to calls for assistance and provided outreach and guidance via their websites, the news media and on Facebook and Twitter.

"We are incredibly active on social media," said Rachel Racusen, a spokeswoman for FEMA. In addition to headquarters, each of the agency's 10 regional offices has its own Twitter feed, as does Craig Fugate. Racusen said social media is critical for the agency to keep track of what's actually happening on the ground and to disseminate messages, especially from local and state entities, on such events as road closures and evacuation plans.

FEMA also posts information on its blog and Facebook page and has launched a mobile website where people can get emergency information and register directly for disaster assistance.

In addition to the government's domestic response, the US Agency for International Development has dispatched urban search-and-rescue teams to Japan, at that country's request. US Coast Guard response crews in Northern California are monitoring port conditions via air and ship in San Francisco and Monterey.

The Nuclear Regulatory Commission is monitoring nuclear power plants that could be affected, including the Diablo Canyon Power Plant near San Luis Obispo, Calif., where authorities are tracking "an unusual event," according to a statement. The agency also is overseeing materials sites in Hawaii and Alaska.

"NRC staff is working closely with its resident inspectors who are on-site to ensure safe operations," said commission chairman Gregory Jaczko. Racusen said FEMA is in close contact with NRC and other federal agencies regarding any effects from the tsunami.

Secretary of State Hillary Clinton said the State Department has offered immediate disaster relief assistance to Japan, and was working to gather information and assist US citizens in Japan who have been affected by the earthquake.

## **Oregon Officials Say No Public Health Risk To State From Japan Nuclear Emergency (OREG)**

By Molly Young

The Oregonian, March 13, 2011

Nuclear experts from Oregon and the US responded Saturday to an explosion at a Japanese nuclear plant, saying there's no reason to believe large waves of radiation will cross the Pacific Ocean.

Air quality remained normal in Oregon, the Oregon Health Authority said Saturday afternoon. In a written statement, department officials said the blast posed no risk to the state.

The US Energy Department also said Saturday there were no immediate impacts in the United States.

"There is no indication whatsoever that materials from the incidents in Japan have potential to have any meaningful effect on the US homeland," Stephanie Mueller, the US energy department's press secretary, wrote in an e-mail to The Oregonian.

Mueller said US officials continue to work with the Japanese government to review the situation and "will provide whatever assistance they request to help them bring the reactors under control."

Yet, many people wrote in blogs and online forums, questioning whether a jet stream might carry the radiation over to the US. Asked one Oregon Live commenter, co2: "Should I tell my grandson that he possibly is being exposed to extra radiation here in Oregon from this event? Or that the wind will bring it over in a week or so?"

Saturday's hydrogen explosion ripped through a concrete shell around the reactor, but didn't tear the primary steel container that housed the nuclear reactor. That means the plant's radioactive materials remain largely contained, said Brian Woods, an Oregon State nuclear engineering professor who studies reactor safety.

"Although it sounds really, really bad, the reality is that this primary containment is in contact," Woods said. "And as long as it's intact, no large amounts of radioactive material will make it out."

For that reason, Woods characterized Saturday's explosion as entirely different than the Chernobyl disaster. The reactor lacked the critical primary container, Woods said, and the reactor burned in the open-air.

Although Saturday's explosion likely released some radioactive material into the air, Woods called the amount relatively small. Areas closest to the reactor would be the most affected, he said.

"We're 3,000 miles away," Woods said. "I would really anticipate a very, very negligible amount of radioactive material making it as far as the US"

## **US Won't Feel Radiation From Japan: US Nuclear Agency (REU)**

By Jeff Mason

Reuters, March 14, 2011

Full-text stories from Reuters currently cannot be included in this document. You may, however, click the link above to access the story.

## **Harmful Nuclear Radiation From Japan Not Expected To Reach US - NRC (DJNews)**

By Naureen S. Malik

Dow Jones Newswires, March 14, 2011

Full-text stories from the Wall Street Journal are available to Journal subscribers by clicking the link.

## **Japan Nuclear Plant In State Of Emergency, As Cooling Power Runs Low (CSM)**

**A nuclear plant in Japan is said to declare a state of emergency, as backup power used to cool three reactors runs low. Help is on the way. 'It's a dicey situation,' says nuclear specialist in US.**

By Mark Clayton, Staff Writer

Christian Science Monitor, March 11, 2011

At least 11 of Japan's 52 nuclear power reactors are shut down and three of those may pose a danger to the public after a massive magnitude 8.9 earthquake hit the island nation Friday. One plant, 150 miles north of Tokyo, is reported to be in a state of emergency. It is relying on limited battery power to cool the three problematic reactors, and officials say they plan to release some radioactive gases to the atmosphere to cope with the problem.

The Japanese government issued an evacuation advisory to people living within a 3-kilometer (1.8-mile) radius of the Fukushima 1 nuclear power plant, according to Japan Broadcasting Corp.'s NHK World website.

Tokyo Electric Power Co. says an equipment failure had made it "impossible to cool two reactors" at the Fukushima 1 plant. Air that may contain radioactive materials will be vented from the plant, the company told NHK World late Friday. The decision to release the gases was to avoid the breakdown of the reactors, the news agency reported. Tokyo Electric told NHK World that the release would be small and that the company will notify residents near the plant before it starts the release and will monitor the amount of radioactivity in the gas.

RELATED: Top 10 most nuclear-dependent nations

The company reported that its power plant lacked sufficient electricity to cool the reactors, which automatically stopped operating when the quake struck, NHK World reported. Six reactors are inside Fukushima 1, and three were already offline prior to the quake.

But the quake knocked reactors 1, 2, and 3 offline. Then, about an hour after the quake, the diesel generators that provide emergency power for the cooling system on the reactors failed – putting the system on a battery backup system. Uncooled, a reactor's uranium core can overheat to the point of meltdown, and in a worst case become an event like the 1986 Chernobyl disaster in the Ukraine region of the former Soviet Union, which spread radiation across much of Europe.

Apparently in "a blackout condition," the plant is relying on a Reactor Core Isolation Cooling System backup, which needs batteries for valves, gauges, and instruments – and is reported to have about an eight-hour capacity, says Edwin Lyman, a nuclear specialist with the Union of Concerned Scientists in Washington.

At the time of writing, reactor pressure was said to be rising to dangerous levels inside the Fukushima plant's No. 1 reactor and might require venting [which would that release radiation], and water levels in reactor No. 2 were reported to be dropping [which causes the reactor to overheat], says Dr. Lyman. Failure of the cooling system can lead to a meltdown [of the reactor core], in which fire could release harmful levels of radioactivity into the environment.

"They're operating on battery power now, and if they lose the batteries, they lose core cooling," Lyman says. "The [Japanese] military is supposed to be ferrying in batteries now, but it's a dicey situation."

The military and other authorities are sending power generators to the site, NHK reported. The government characterized the evacuation of residents near the plant as a precaution, and it also asked people living within 10 kilometers (6.2 miles) of the plant to stay indoors, NHK said.

"The government's Nuclear and Industrial Safety Agency says cooling system failure has made it impossible to cool the second reactor after it automatically stopped operating after the earthquake," NHK reported Friday. "The plant has been declared to be in a state of emergency after the quake caused the technical failure."

As is the case in the United States, Japan has requirements that call for nuclear power plants to be able to withstand a serious earthquake. Seismic rules for nuclear plant construction are slightly different from those in the US, but, like the US, fall into two major categories, says Charles Becht V, a senior engineer at Becht Engineering Co. in Liberty Corner, N.J., which has done consulting work in Japan.

First, there is the "operating basis earthquake ground motion," or OBE – quakes that can be expected to occur multiple times in the life of a plant. When such an earthquake occurs, plants are shut down and inspected.

A "design basis earthquake," or DBE, is one so big that it would be expected to occur only once in the life of a plant, Becht explains in an e-mail. The DBE design requirement for a plant simply "requires that a plant can shut down without release of radioactive material."

"Extensive damage is still expected with significant inspection being required for any restart," he writes. "In general, a significant number of systems can become faulted in a nuclear power plant without containment [of radiation] being compromised."

Constructing a nuclear power plant so that it can ride out a major earthquake without damage is possible, but such practice is not widespread, says Michael Constantinou, a civil engineering expert at University of Buffalo, State University of New York, who has studied the issue. Just three plants in the world – two in France and one in South America – use shock absorbers to physically isolate the reactors from surrounding ground movement.

The Nuclear Energy Institute in Washington, a trade group, has been monitoring Japan's nuclear industry website and gathering other information. "From what I understand, they have been able to cool the Fukushima No. 2 reactor with no danger of fuel being exposed [to the air]," says spokesman Mitch Singer. The group characterizes the situation in Japan as safe and stabilizing.

"The most important thing is that the Japanese have it under control," says Mr. Singer. "The emergency shut-down procedures worked as planned. The coolant level may be down, but it's still within the safety margin." He acknowledged that pressure is reported to be rising in the No. 1 reactor but had no further information.

Earlier, a fire was reported in a turbine building of Tohoku Electric Power's Onagawa nuclear plant, which was contained, the Kyodo news agency reported and Mr. Singer confirmed.

President Obama told reporters at a press conference that the US would help Japan if asked and said he was certain that "if in fact there have been breaches in the safety systems of these plants, that they will be dealt with right away."

The Japanese experience highlighted concerns Union of Concerned Scientists has about the adequacy of backup power and other safety systems at the 104 nuclear power reactors across the US, Lyman says. The group backs nuclear power as one option to help combat climate change, but has concerns about plants' safety.

"We do not think safety standards for US nuclear reactors are enough to protect the public today," he says in an interview.

The US Nuclear Regulatory Commission said its standards are sufficient.

"Nuclear power plants are built to withstand environmental hazards, including earthquakes and tsunamis," the NRC said in a press release. "Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster."

After the quake in Japan, the NRC said it is monitoring the two nuclear reactors at the Diablo Canyon Power Plant, located on the coast near San Luis Obispo, Calif., because of the West Coast tsunami warning Friday morning.

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

Both Diablo Canyon reactors are stable and both units remain on-line. The plant is "well protected against tsunami conditions as required by NRC regulations" and has NRC staff on site to track its response.

Events in Japan could have a negative impact on American attitudes as the nuclear power industry in the US pushes for a "nuclear renaissance" and more non-greenhouse-gas-emitting power sources, some energy analysts said.

"Nuclear power's status as a 'clean fuel' could be compromised," writes Kevin Book, senior analyst for CleanView Energy Partners, a Washington energy markets research firm. "Although events in Japan may actually validate the safety of nuclear power despite a severe earthquake, energy accidents that can reach well outside the immediate sites of production carry a significant political 'fear factor.'"

## **Defense Prepares Response To Massive Earthquake In Japan (NextGov)**

By Bob Brewin

Nextgov, March 14, 2011

US military forces reacted quickly after a powerful earthquake and tsunami struck Japan on Friday. The Air Force flew emergency coolant to a damaged nuclear reactor and the Navy's 7th Fleet began moving ships to support relief operations there.

Secretary of State Hillary Clinton told attendees at a meeting of President Obama's Export Council that a Japanese nuclear power plant "came under a lot of stress as a result of the quake and did not have enough coolant." The Air Force, she said, made an emergency delivery of coolant to the plant.

The New York Times reported that Tokyo Electric Power had shutdown its plant in Fukushima, a two-hour drive north of the city, and declared an atomic power emergency after a mechanical failure in the cooling system.



Navy Cmdr. Jeff Davis, a spokesman for the 7th Fleet, said in an e-mail from the USS Blue Ridge that the command has directed all helicopter-capable ships in the fleet to be ready to sail to Japan in the next 24 hours to aid in relief operations. The Blue Ridge, the 7th Fleet command ship, was docked in Singapore when Davis sent his message.

Davis, said the USS Essex, a helicopter carrier currently in Malaysia, will sail for Japan tomorrow and added the USS Tortuga, a landing ship dock, left Sasebo, Japan, on Friday to pick up Air Force MH-53 helicopters based in Korea.

The USS Ronald Reagan carrier strike group, currently operating in the Western Pacific, was directed to proceed at the best safe speed to the main Japanese island of Honshu, the epicenter of the earthquake, with arrival expected in 36 hours, Davis said. The 7th Fleet also redirected two other dock landing ships to Japan – the USS Harpers Ferry and USS Germantown, Davis said.

The Blue Ridge will depart for Japan tomorrow after loading humanitarian kits that include water, blankets, tarps, surgical masks, body bags, water purification tablets, and other supplies, Davis said. It is expected to arrive in six days.

Lt. Cmdr. Bill Clinton, a spokesman for the US Pacific Command, said most US military bases in Japan had "no significant damage" from the earthquake. Davis said the headquarters of the Navy's Maritime Patrol and Reconnaissance Force in Misawa, located at the northern tip of Honshu, lost electric power and was operating with generators.

Command-and-control functions for the patrol force have been shifted to installations in Atsugi, south of Tokyo, and Kadena, on the island of Okinawa.

The quake also cut a high-capacity undersea cable circuit from Afghanistan, which the Defense Department uses at its connection point with landlines in Misawa, Nextgov has learned. The quake severed the connection between the underseas cable and a land circuit KDDI, a Japanese telecommunications company.

Japan's Ministry of Internal Affairs reported the earthquake knocked out 20 million phone lines operated by KDDI, along with submarine cables. Laura Williams, a spokeswoman for the Defense Information Systems Agency, which operates the military global network, declined for national security reasons to comment on the status of its circuits in Japan and elsewhere in the Pacific.

Pacific Gas and Electric, which operates a nuclear power plant near the shoreline of San Luis Obispo, Calif., issued a precautionary "notice of unusual event" after receiving a tsunami warning from the West California Emergency Management Agency.

Gregory Jaczko, chairman of the Nuclear Regulatory Commission, said, "The NRC is closely monitoring this situation as it unfolds with respect to nuclear facilities within the United States." NRC also said it is monitoring the San Onofre nuclear power plant, located on the shoreline six miles south of San Clemente, Calif.

NRC said in a statement that "Nuclear power plants are built to withstand environmental hazards, including earthquakes and tsunamis. Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster."

Editor's note: The Pacific Tsunami Warning Center estimated the earthquake's magnitude at 9.1, the measurement cited in this story originally. The US Geological Survey estimated the earthquake's magnitude was 9.0.

## **Feds: Leaked Radiation From Japan Won't Hurt US (MRKTWTCH)**

By Steve Gelsi

MarketWatch, March 14, 2011

NEW YORK (MarketWatch) -- The US Nuclear Regulatory Commission said Sunday that areas of the continental US as well as Hawaii and Alaska aren't expected to receive any harmful levels of radioactivity from nuclear plant leaks in Japan.

The comment from the US government's lead regulatory body for nuclear power came as Japanese authorities reported radioactive releases from plants following the massive earthquake and tsunami Friday in the northeast part of the country. See story on Japan's nuclear plants.

"All the available information indicates weather conditions have taken the small releases from the Fukushima reactors out to sea away from the population," the NRC said. "Given the thousands of miles between the two countries, Hawaii, Alaska, the US Territories and the US West Coast are not expected to experience any harmful levels of radioactivity."

Prime Minister: Japan will beat crisis

Prime Minister Naoto Kan says he is confident Japan will overcome the earthquake-tsunami crisis. Video courtesy Reuters.

The NRC said it's coordinating with the Department of Energy and other federal agencies to provide, "whatever assistance the Japanese government requests" as they respond to conditions at several nuclear power plants.

The NRC said it sent two boiling-water reactor experts to Japan as part of a team assembled by the US Agency for International Development. Some of the plants affected by the earthquake are characterized as boiling water reactors, a classification of the technology used to produce power.

"In response to nuclear emergencies, the NRC works with other US agencies to monitor radioactive releases and predict their path.

The NRC said it will not comment on hour-to-hour developments at the Japanese reactors.

"This is an ongoing crisis for the Japanese who have primary responsibility," the NRC said.

## **Blog: Clean Beta: US Nuclear Commission Puts Boots On The Ground In Japan (FORBES)**

By William Pentland

Forbes, March 14, 2011

Two officials from the US Nuclear Regulatory Commission with expertise in boiling water nuclear reactors have deployed to Japan as part of a US International Agency for International Development (USAID) team.

"We have some of the most expert people in this field in the world working for the NRC and we stand ready to assist in any way possible," said Chairman Gregory Jaczko. The NRC has stood up its Maryland-based headquarters Operations Center since the beginning of the emergency in Japan, and is operating on a 24-hour basis.

Officials at Nuclear Regulatory Commission headquarters in Rockville, Md., have spoken with the agency's counterpart in Japan, offering the assistance of US technical experts. The NRC is coordinating its actions with other Federal agencies as part of the US government response. The NRC is examining all available information as part of the effort to analyze the event and understand its implications both for Japan and the United States. The NRC's headquarters Operations Center is operating on a 24-hour basis.

USAID is the federal government agency primarily responsible for providing assistance to countries recovering from disaster.

## **International Relief Extended To Devastated Japan (CNNINTL)**

By Michael Martinez

CNN International, March 14, 2011

(CNN) – The 8.9-magnitude earthquake and coastline-devouring tsunami that hit Japan has led 49 countries, the European Union and even the International Atomic Energy Agency to band together and offer relief to the devastated island nation.

With Japan's death toll at 686 people, the international relief effort has been spurred by the stark, globally televised videos of homes and offices rattled to near collapse and entire waterfront communities being washed away by a rising ocean.

The international community's assistance complemented the United States' expansive relief mission, which includes supplies, several warships, search-and-rescue teams, radiation-contamination specialists, and two officials from the US Nuclear Regulatory Commission with expertise in boiling water nuclear reactors.

On Sunday, the nuclear-powered aircraft carrier USS Ronald Reagan arrived off the coast of Honshu to support Japanese forces in disaster relief operations, the US Department of Defense said in a statement.

Also Sunday, the Chinese government sent a 15-member team to assist in the search for survivors, Xinhua News Agency reported. The team brought with them four tons of equipment and material for the search as well to provide power and telecommunications to areas that have temporarily lost those services because of the quake.

In addressing one of the bigger potential threats, the international atomic agency's Incident and Emergency Centre has offered technical assistance to Japan in the wake of an explosion at the Fukushima Daiichi nuclear plant. An evacuation order for a 20-kilometer (12.4-mile) radius around the plant is affecting tens of thousands of people.

On Saturday, the United Kingdom said it was sending a team of 59 fire service search-and-rescue specialists, two rescue dogs and a medical support team, according to the Foreign and Commonwealth Office.

With a scheduled arrival on Sunday, the crew will immediately join the international search for survivors in shattered and inundated communities, the British office said.

The teams will take up to 11 tonnes of rescue equipment, including heavy lifting and cutting equipment to extract people trapped in debris, the government said.

The UK foreign office also dispatched a 10-member consular response team, including British Red Cross workers, to Japan on Saturday morning, the government said.

South Korea is sending two rescue dogs, two handlers and three assistants to carry out what are expected to be dramatic searches of people inside collapsed structures. The rescue teams were scheduled to arrive Saturday, Japan's Ministry of Foreign Affairs said in a written statement.

In China, Premier Wen Jiabao, who expressed "deep sympathy" to the Japanese government and people, made a formal offer of assistance. Members of the country's international rescue team were ready to depart for Japan if needed, Chen Jianmin, director of the China Earthquake Administration, told the government's Xinhua News Agency.

The United States is providing as many as 11 warships, with their helicopters, to assist Japanese authorities in rescue and recovery missions.

The US Agency for International Development was dispatching two urban search-and-rescue teams, one from Fairfax County, Virginia, and the second from Los Angeles County – totaling 150 people and 12 canines trained to find survivors. They are scheduled to arrive Monday morning in Japan.

On Saturday, the Japanese foreign ministry listed the 49 countries extending offers of relief, in no particular order: Australia, Taiwan, the United States, South Korea, China, Mexico, Thailand, New Zealand, Israel, Singapore, Indonesia, Azerbaijan, India, Russia, Turkey, Germany, France, Belgium, Ukraine, Slovakia, United Arab Emirates, Switzerland, Hungary, Poland, Jordan, the United Kingdom, Chile, Spain, Greece, Hong Kong, Pakistan, Denmark, Serbia, Uruguay, Mongolia, Ecuador, Iran, Kyrgyz Republic, Malaysia, Argentina, Philippines, Canada, Italy, Sweden, Kosovo, Iceland, Norway, Romania, and Slovenia.

## **US Sends Nuclear Experts To Japan (POLITCO)**

Politico, March 14, 2011

Fire department officials wait for arriving residents evacuated from areas surrounding the Fukushima nuclear facilities. Anne Schroeder Mullins Close

The US Nuclear Regulatory Commission has dispatched two officials to Japan who are experts in the type of nuclear reactors currently at risk for a meltdown in the wake of Friday's massive earthquake.

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

The NRC staffers are traveling to Japan as part of a US Agency for International Development mission that includes specialized rescue teams from Fairfax County, Va., and Los Angeles. USAID said its "Disaster Assistance Response Team (DART)" is already in Japan and working to coordinate the overall US Government response effort."

## **US Troops, USS Ronald Reagan Arrive In Japan (CNN)**

By The CNN Wire Staff

CNN, March 14, 2011

(CNN) – The nuclear-powered aircraft carrier USS Ronald Reagan arrived off the coast of Japan Sunday to support Japanese forces in disaster relief operations, the US Department of Defense said in a statement.

More US aid – in the form of equipment, staffers and search-and-rescue teams – was expected to arrive Sunday to address the widespread devastation caused by the 8.9-magnitude earthquake and resulting tsunami.

Near Honshu, Japan, the USS Ronald Reagan will support the Japan Self-Defense Force by providing refueling operations for Japanese helicopters and transporting the island country's troops to disaster areas, according to the Pentagon statement.

Accompanying the Reagan are the guided-missile cruiser USS Chancellorsville and the destroyer USS Preble.

The United States is part of a growing international effort offering relief to Japan, whose government said it had received interest from 49 countries and the European Union.

In addressing a potential crisis, the US Nuclear Regulatory Commission sent two experts in boiling-water nuclear reactors to Japan as crews there flooded the Fukushima Daiichi nuclear plant with sea water in hopes of preventing a meltdown of its core Saturday.

A concrete building surrounding the reactor experienced an explosion caused by a failed pump system Saturday, but the reactor wasn't damaged, Japanese officials said.

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

In Shiroishi, a town near the area hardest hit by the quake, two SH-60 helicopters from US Naval Air Facility Atsugi delivered 1,500 pounds of rice and bread donated by people in Ebina, southeast of Tokyo, the US 7th Fleet said in a statement Saturday. The fleet is headquartered in Yokosuka, just outside Tokyo.

Two destroyers, the USS McCampbell and USS Curtis Wilbur, were off Japan's Boso Peninsula, which shelters Tokyo Bay, and were preparing to assist Japanese authorities with at-sea rescue and recovery operations, the 7th Fleet said.

An additional destroyer, the USS Mustin, will depart Yokosuka on Sunday. Eight other US ships were en route to Japan from various locations, set to arrive Sunday or later in the week, according to the 7th Fleet. One, the USS Tortuga, departed Japan on Saturday night to pick up two helicopters in South Korea and would return in about two days.

Three ships composing the USS Ronald Reagan Carrier Strike Group also are among the eight ships, the military said.

Meanwhile, the III Marine Expeditionary Force, based on the island of Okinawa, south of Japan, said it was "prepositioning forces and supplies in support of humanitarian assistance and disaster relief operations."

The force was sending staffers, a cargo aircraft and transport helicopters to the mainland, it said in a written statement. Additional aircraft and supplies will be sent in the next few days.

The military assistance operation is known as Operation Tomodachi, or "friendship," the statement said. The name was chosen by the Japanese.

US Forces Japan, based at Yokota Air Base near Tokyo, is the lead military command for coordinating humanitarian assistance, the military said. Shortly after the quake struck, the air base was designated as an alternate airfield for flights that could not land at Tokyo's Narita Airport, and it received a handful of commercial flights.

A total of 570 passengers and 29 crew members were taken to the Taiyo Community Center, where they received food, water, lodging and bedding overnight, the air base said in a statement. The base itself converted a facility into a shelter for another 600 people.

"We have units from all of our services, with a multitude of capabilities, from medical to communications to civil engineering, poised and ready to support where needed," John Roos, US ambassador to Japan, told reporters Saturday. "The bottom line: Our military is working closely with their Japanese counterparts to support where requested and needed."

The US Agency for International Development said it was deploying two urban search-and-rescue teams, one from Fairfax County, Virginia, and the second from Los Angeles County. The Virginia team departed Washington on Saturday and was stopping in Los Angeles to pick up the second team.

Both teams – composed of 150 people and 12 canines trained to find survivors – are set to arrive Monday morning in Misawa, Japan, where they will "immediately begin the search for live victims" alongside Japanese and other international teams, USAID said.

Journalists, including two CNN staffers, are traveling with the teams. Much of the teams' gear was shipped ahead. The kits include sophisticated detection equipment such as cameras and listening devices, as well as jackhammers and giant saws for use in freeing trapped people. The Virginia team is also bringing swift-water rescue specialists and four inflatable boats.

The dogs, meanwhile, are traveling in seats alongside their handlers on the 767. They include Cadillac, a Labrador who worked with Los Angeles Fire Department Capt. Jasmine Segura to find victims after the earthquake in Haiti last year. Others have worked in Turkey and elsewhere.

A USAID Disaster Assistance Response team is already in Japan, the agency said.

The Federal Emergency Management Agency and its partner agencies are on standby in case their assistance is needed, the agency said Friday.

California Gov. Jerry Brown said in a news release that he has "directed California's Emergency Management Agency to make state resources available to the Japanese government."

Baseball Commissioner Bud Selig even promised assistance from the major league. Citing "our shared love of baseball for more than a century," Selig said in a statement that Japan is "a particularly special place to us" and that the league will provide aid in the coming days and weeks.

The American Red Cross is communicating with the Japanese Red Cross Society and its global partners, according to a statement from the agency. So far, the American Red Cross has not received any requests for blood.

The organization is encouraging people with loved ones in Japan to use the Red Cross "Safe and Well" website, an online tool that helps families connect during natural disasters and emergencies.

On Friday, President Barack Obama pledged to help the island country. "I offer our Japanese friends whatever assistance is needed," he said. "Today's events remind us how fragile life can be."

Roos said that as of Saturday, there had been no confirmed reports of US citizens killed or seriously injured in Japan.

"We know that many people are worried about the welfare of their friends and families who are here in Japan," he said. "We understand also that some telephone landlines have been interrupted. Of course, we are recommending that people continue to contact loved ones here in Japan by e-mail, text, SMS message or social media."

On Friday, Secretary of State Hillary Clinton offered "immediate disaster relief assistance" and added the United States is working closely with the Japanese government. Roos echoed those comments Saturday.

The State Department on Friday issued an alert against nonessential travel to Japan.

The alert also said strong aftershocks are likely "for weeks" and included instructions for what to do if caught in an earthquake or aftershock.

Earlier, American Airlines told CNN that it would resume flights into Japan on Saturday. Both American and Delta Airlines canceled flights to Tokyo on Friday. It was unclear if flights to other Japanese airports also were affected. In addition, Delta, United and Continental airlines announced they were waiving change fees for people whose travel plans involving Japan were affected by the disaster.

At the State Department, Assistant Secretary of State for Consular Affairs Janice Jacobs said a 24-hour consular task force has been set up to help Americans affected by the earthquake.

Americans in Japan who need help, or people seeking information about a loved one in Japan, can send an e-mail to [japanemergencyusc@state.gov](mailto:japanemergencyusc@state.gov), Jacobs said. Americans outside Japan but in tsunami-affected areas who need help, or people seeking information about an American in affected areas outside Japan, can e-mail [pacifictsunamiusc@state.gov](mailto:pacifictsunamiusc@state.gov), she said.

A telephone information line also has been set up at 1-888-407-4747, said Jacobs, who encouraged people to use the e-mail options if possible. When seeking information about Americans in Japan or other affected areas, Jacobs said, people should provide the full name, birth date and location of the person, as well as any pre-existing medical conditions, and if they are elderly or a child.

CNN's Michael Martinez, Dugald McConnell and Brian Todd contributed to this report.

## **White House Re-states Nuclear Power Support, Committed To 'learning' From Japanese Crisis (HILL)**

By Ben Geman

The Hill, March 14, 2011

The Obama administration continues to back nuclear power as part of a broader energy portfolio, a White House spokesman said, comments that come as the Japanese reactor crisis is spawning calls to re-think plans for new US nuclear plants.

"The President believes that meeting our energy needs means relying on a diverse set of energy sources that includes renewables like wind and solar, natural gas, clean coal and nuclear power. Information is still coming in about the events unfolding in Japan, but the administration is committed to learning from them and ensuring that nuclear energy is produced safely and responsibly here in the US," Clark Stevens, a White House spokesman, said in a statement Sunday.

Friday's massive earthquake and tsunami that damaged multiple Japanese reactors has led some US lawmakers to call for a pause in plans for an expansion of nuclear power in the US

The strongest comments came from Rep. Ed Markey (D-Mass.), a senior member of House committee that oversee energy policy. He said on Saturday the Obama administration should weigh a moratorium on siting new nuclear reactors in seismically active areas.

The moratorium should remain until completion of a "top-to-bottom review of seismic and tsunami reactor design resiliency, emergency response and evacuation plans," his office said, and also called for consideration of other steps, such as requiring stronger containment systems at existing reactors in seismic zones.

Sen. Joe Lieberman (I-Conn.), speaking on CBS Sunday, also said the Japanese crisis – which has forced emergency efforts to cool overheating reactors at the Fukushima Daiichi plant and problems at other facilities as well – warrants new review.

"I think it calls on us here in the US naturally – not to stop building nuclear power plants – but to put the brakes on right now until we understand the ramifications of what's happened in Japan," he said.

The damage to the Japanese reactors is creating new uncertainty about plans by a suite of power companies to win approval for building the first new US reactors in decades.

The Obama administration backs efforts to expand nuclear power. The administration last year approved over \$8 billion worth of loan guarantees for Southern Company's proposal to build two new reactors in Georgia.

The White House's fiscal year 2012 budget plan also seeks another \$36 billion worth of loan guarantee authority to support new reactors. President Obama is also pushing Congress to create a "clean energy standard" that calls for an expansion of low-carbon electricity generation from sources including nuclear power.

Various power companies in recent years have submitted applications to the Nuclear Regulatory Commission for construction of over 20 new reactors, although the projects face often-daunting financial hurdles even without renewed safety concerns.

The NRC has not yet issued licenses for construction and operation of new commercial power reactors, although the Tennessee Valley Authority is completing a second reactor at its Watts Bar plant. Construction on the unit – first approved in 1973 – was suspended in the mid-1980s but the project was revived several years ago.

Preliminary site preparation and construction activities have begun at the Southern Company project and another proposed new plant in South Carolina that South Carolina Electric & Gas is developing, according to the Nuclear Energy Institute, a trade group.

The companies are expected to receive NRC licenses to build and operate the plants late this year or in early 2012, according to the trade group, although it would be years before the projects actually begin commercial operation if they're allowed to proceed.

Stevens, the White House aide, also said that "The administration's first priority right now is to support Japan, as well as American citizens in Japan, as they respond to and recover from this event, and we continue to monitor the situation and provide assistance."

## **Crisis Underscores Fears About Safety Of Nuclear Energy (NYT)**

By Norimitsu Onishi, Henry Fountain and Tom Zeller Jr.

New York Times, March 12, 2011

The official announcement that two reactors at an earthquake-damaged nuclear plant could be suffering meltdowns underscores the Japanese nuclear industry's troubled history, and years of grass-roots objections from a people uniquely sensitive to the ravages of nuclear destruction.

The unfolding crisis at the two reactors, both at the Fukushima Daiichi Nuclear Power Station, feeds into a resurgence of doubts about nuclear energy's safety – even as it has gained credence as a source of clean energy in a time of mounting concerns about the environmental and public health tolls of fossil fuels.

The crisis stems from failures of the cooling systems at the reactors at the 40-year-old Fukushima Daiichi plant. At a nearby nuclear plant, Daini, three more reactors lost their cooling systems, and Japanese officials were scrambling Sunday to determine whether the systems could be revived or would also need injections of cooling seawater.

Critics of nuclear energy have long questioned the viability of nuclear power in earthquake-prone regions like Japan. Reactors have been designed with such concerns in mind, but preliminary assessments of the Fukushima Daiichi accidents suggested that too little attention was paid to the threat of tsunami. It appeared that the reactors withstood the powerful earthquake, but the ocean waves damaged generators and backup systems, harming the ability to cool the reactors.

It was not until Sunday that the increasingly dangerous nature of the problems at Daiichi became clear. But even on Saturday, with Reactor No. 1 there having suffered a radiation leak and an explosion, James M. Acton of the Carnegie Endowment for International Peace said the nuclear industry would be shaken. While Japan may try to point to the safety of its newer facilities, concerns may run too deep, he said. Decades ago, after the Chernobyl and Three Mile Island accidents, Mr. Acton said, the nuclear industry tried to argue that newer reactors incorporated much better safety features. "That made very little difference to the public," he said.

Japan's status as the only target of nuclear attack, in Hiroshima and Nagasaki in 1945, adds to the public's sensitivity.

Benjamin Leyre, a utilities industry analyst with Exane BNP Paribas in Paris, also speaking on Saturday, said that politicians in Europe and elsewhere would almost certainly come under increased pressure to revisit safety measures.

"What is likely to come will depend a lot on how transparent the regulators in Japan are," Mr. Leyre said. "There will be a lot of focus on whether people feel confident that they know everything and that the truth is being put in front of them."

Over the years, Japanese plant operators, along with friendly government officials, have sometimes hidden episodes at plants from a public increasingly uneasy with nuclear power.

In 2007, an earthquake in northwestern Japan caused a fire and minor radiation leaks at the world's largest nuclear plant, in Kashiwazaki City. An ensuing investigation found that the operator – Tokyo Electric – had unknowingly built the facility directly on top of an active seismic fault. A series of fires inside the plant after the earthquake deepened the public's fear. But Tokyo Electric said it upgraded the facility to withstand stronger tremors and reopened in 2009.

Last year, another reactor with a troubled history was allowed to reopen, 14 years after a fire shut it down. The operator of that plant, the Monju Prototype Fast Breeder Reactor, located along the coast about 220 miles west of Tokyo, tried to cover up the extent of the fire by releasing altered video after the accident in 1995.

In the hours after the blast at Reactor No. 1, nuclear advocates argued that Daiichi's problems were singular in many ways and stemmed from a natural disaster on a scale never before experienced in Japan. They pointed out that the excavation of fossil fuels has its own history of catastrophic accidents, including coal mine collapses and the recent BP oil spill in the Gulf of Mexico.

Some also said there might have been missteps in handling Reactor No. 1. A quick alternative source of water for cooling the destabilizing core should have been immediately available, said Nils J. Diaz, a nuclear engineer who led the United States Nuclear Regulatory Commission from 2003 to 2006 and had visited the Daiichi plant.

Mr. Diaz suggested that the Japanese might have acted too slowly to prevent overheating, including procedures that might have required the venting of small amounts of steam and radiation, rather than risk a wholesale meltdown. Fear among Japanese regulators over public reaction to such small releases may have delayed plant operators from acting as quickly as they might have, he said – a problem arising in part from the country's larger nuclear regulatory culture.

"They would rather wait and do things in a perfect manner instead of doing it as good as it needs to be now," Mr. Diaz said. "And this search for perfection has often led to people sometimes hiding things or waiting too long to do things."

With virtually no natural resources, Japan has considered nuclear power as an alternative to oil and other fossil fuels since the 1960s. It has regarded its expertise in nuclear power as a way to cut down on its emission of greenhouse gases and to capture energy-hungry markets in Asia.

Japan is one of the world's top consumers of nuclear energy. The country's 17 nuclear plants – boasting 55 reactors – have provided about 30 percent of its electricity needs.

To make plants resistant to earthquakes, operators are required to build them on bedrock to minimize shaking and to raise anti-tsunami seawalls for plants along the coast. But the government gives power companies wide discretion in deciding whether a site is safe.

In the case of Saturday's blast, experts said that problem was avoidable.

Mr. Diaz said that a comprehensive nuclear power plant safety program developed in the United States after the Sept. 11 attacks would have prevented a similar accident at any of the nation's nuclear facilities.

## **Nuclear Renaissance Could Fizzle After Japan Quake (INTLBIZ)**

International Business Times, March 14, 2011

Japan's battle to avert a full-scale meltdown could damage the global nuclear energy industry, derailing plans to build dozens of new power plants and forestalling any surge in demand for uranium to fuel them.

The worst nuclear accident since the 1986 Chernobyl explosion could trigger a sharp drop in shares of nuclear plant builders such as General Electric, its Japanese partner Hitachi and France's Areva as investors reconsider the possibility of a renaissance for the industry.

Likewise, Canada's Cameco, Uranium One and other uranium producers could tumble when stock markets open on Monday.

Fresh interest in nuclear power as an alternative to expensive fossil fuels has boosted spot uranium prices by more than 50 percent since July and sent uranium equities soaring. Investors are likely to reverse some of those gains as a result of the unfolding crisis in Japan, analysts said.

"If there is a nuclear accident," said Salman Partners senior mining analyst Raymond Goldie, "it would certainly provoke a global sentiment against nuclear power, and that would certainly affect the long-term demand for uranium."

Shares of Australia's top uranium miners – some of the world's biggest – fell sharply when trade opened in Sydney on Monday. Energy Resources of Australia, a unit of Rio Tinto, fell 9.5 percent in early trade while shares of Paladin dropped 11 percent.

Meanwhile, engineers in Japan were pumping seawater into damaged nuclear reactors to prevent a catastrophic full-scale meltdown, but major damage probably has already occurred and the plants won't operate again, experts said.

While Japanese authorities appear to have prevented a worst-case scenario from unfolding, the political impact of the crisis was already hitting home in the United States.

Senator Joe Lieberman, who chairs the US Senate's homeland security panel, said on Sunday the United States should "put the brakes on" new nuclear power plants until the impact of the incident in Japan became clear.

The United States currently has 104 nuclear reactors operating, and analysts expect four to eight new reactors to be built. In 2008, there were more than 30 reactors in the planning stage – most of which fell prey to the economic downturn.

"The nuclear renaissance was on the rocks in any case," said Peter Bradford, a former commissioner on the US Nuclear Regulatory Commission. He served on the commission in 1979 during the Three Mile Island accident in the US state of Pennsylvania.

Bradford said a video of the explosion that destroyed a structure at the reactor at Japan's Fukushima complex would have a deep impact on the world's perception of nuclear power

"It's going to be difficult to erase that from people's mental image of nuclear power for a long time," he said.

But industry advocates were quick to call for calm.

"It's probably a little premature to draw conclusions from what's going on in Japan," said Mitch Singer, a spokesman for the US Nuclear Energy Institute. "Even the most seriously damaged of the ... reactors has not yet released radiation at a level that is dangerous to the public."

#### RECONSIDERING A RENAISSANCE

Even so, the perception of the industry is likely to suffer a severe setback, analysts said.

In 2007, GE combined its nuclear ventures with Hitachi on expectations of a nuclear renaissance in the coming years. The prevailing view was that concerns about carbon dioxide emissions and rising oil prices would push the world to look more favorably on nuclear power generation.

While the nuclear business is still just a small piece of GE's massive portfolio, investors could knock down its share price. The conglomerate built the Fukushima Daiichi Unit 1 reactor, where there was an explosion and radiation leak after Friday's quake and tsunami.

The backlash could also send shares of Cameco and Uranium One down sharply, after the uranium producers rose 55 and 100 percent, respectively, over the past eight months as investors bet on growing global demand for nuclear fuel.

The shutdown of 11 of the 54 operating reactors in Japan will likely depress the short-term market for uranium, with the country deferring deliveries and leaving producers with a surplus. The situation will only worsen as investor confidence sours on the overall future of the industry, pushing spot prices further down.

#### CHINESE PLANS MAY NOT CHANGE

While the incident could hurt nuclear roll-out in the United States and Japan, China and India are expected to push forward with plans to increase their nuclear footprint as they look to expand power sources to fuel rapid urbanization.

China plans to boost its nuclear generation from about 11 gigawatts a year to at least 80 gigawatts by 2020. The Asian nation has 50 reactors in the planning stage.

Current global demand for uranium is 180 million pounds a year, of which 140 million pounds comes from mine production. The rest is filled by stockpiles and downgraded weapons-grade uranium, according to Cameco.

China alone will need up to 60 million additional pounds a year if it is successful in its roll-out.

While analysts don't expect China to back down due to the situation in Japan, the Asian nation will face increased pressure to make sure its new reactors meet the highest safety standards.

"I would hope that since China is in an earthquake zone as well, that these events provoke the Chinese to install more safety precautions," said Salman Partner's Goldie.

The situation is less clear in India, which has plans to double its nuclear output over the next 10 to 15 years, but already faces massive bureaucratic delays in developing atomic power.

The Japanese quake could also slow Brazil's plans for new nuclear power generation to help meet growing demand – and prevent a repeat of recent blackouts.

"Nuclear power has gained traction in Brazil because it has less climate impact than fossil fuel generation, but this accident in Japan could renew environmental opposition to nuclear," said Adriano Pires, an energy expert at the Brazilian Center for Infrastructure.

While the full impact of Japan's nuclear accidents remain to be seen, opponents say that the risk has been made clear enough to force most governments to reconsider plans to build out nuclear capacity.

"This is what you would call a show-stopping event," said Robert Alvarez of the Institute for Policy Studies, who is an opponent of nuclear power development globally.

"At a minimum, I think there's going to be some reappraisal about the degree to which countries want to pursue a nuclear future."

## **Nuclear Renaissance Threatened As Japanese Reactor Struggles After Quake (BLOOM)**

By Jim Polson, Kim Chipman

Bloomberg News, March 12, 2011

Global expansion of nuclear power may draw more scrutiny and skepticism as the world watches Japan struggle to prevent a meltdown at a reactor damaged by a record earthquake, a former US atomic regulator said.



"This is obviously a significant setback for the so-called nuclear renaissance," said Peter Bradford, a former member of the US Nuclear Regulatory Commission. "The image of a nuclear power plant blowing up before your eyes on a television screen is a first."

An explosion at Tokyo Electric Power Co.'s Fukushima Daiichi No. 1 reactor, which had begun venting radioactive gas after its cooling system failed, injured four workers yesterday. The utility reported no damage to the building housing the reactor. It began flooding the reactor with sea water and boric acid today to prevent a meltdown and eliminate the potential for a catastrophic release of radiation.

There are 442 reactors worldwide that supply about 15 percent of the globe's electricity, according to the London-based World Nuclear Association. There are plans to build more than 155 additional reactors, most of them in Asia, and 65 reactors are currently under construction, the association said on its website.

Japan gets about a third of its electricity from 54 nuclear power plants, the third-most after the US and France. Two reactors are under construction and 12 more are planned, according to the World Nuclear Association.

China is tripling the number of its reactors, building 27 units to add to the 13 operating reactors on the mainland, according to the association. In the US, companies including Southern Co. (SO) and NRG Energy Inc. (NRG) have submitted applications to build as many as 21 new reactors, adding to 104 existing units.

#### 'Show-Stopping'

"Certainly it's going to cause some reappraisals because this is what you call a show-stopping event," said Robert Alvarez, a senior scholar at the Washington-based Institute for Policy Studies and former senior policy adviser at the US Energy Department.

US utilities canceled 14 nuclear plant orders in the wake of the 1979 partial meltdown at the Three Mile Island reactor in Pennsylvania, according to the International Atomic Energy Agency. The "immense" psychological effect of the accident spread through the Western world, the agency said in a report.

"The arguments that held sway during the Three Mile Island days will hold sway today with this accident," said Tom Cochran, a nuclear physicist at the New York-based Natural Resources Defense Council. "The situations are somewhat similar, assuming this doesn't blow up or breach the reactor vessel."

#### Climate Change

Those who advocate nuclear power, which emits virtually no carbon dioxide, as a way to combat climate change will now have to deal with a "greatly heightened skepticism" and "heightened unwillingness to have nuclear power plants located in one's own neighborhood," Bradford said.

The damaged Japanese reactor, designed by General Electric Co. (GE), began commercial operation in 1971 and is similar to units still running in the US, said Cochran, who advised US regulators on the cleanup of Three Mile Island.

Problems at the reactor may encourage the replacement of older models, said Sergei Novikov, a spokesman for Russia's state-owned nuclear holding company Rosatom Corp.

"The global nuclear industry will speed up phasing out first-generation power units and start building new ones," Novikov said.

Rosatom is building 15 new reactors worldwide, more than any other international supplier, five of them outside Russia.

GE, the largest US-based reactor builder, is focused on the situation at the reactor in Fukushima and staff weren't available to comment on the outlook for the industry, Michael Tetuan, a spokesman for the Fairfield, Connecticut-based company, said in an e-mailed message.

"In general, our business is going very well, but the situation in Japan is troubling," said Vaughn Gilbert, a spokesman for Toshiba Corp. (6502)'s Westinghouse nuclear unit.

Jarret Adams, a US-based spokesman for France's Areva SA (CEI), declined to comment on the Fukushima situation or its effect on the nuclear industry.

The US Nuclear Regulatory Commission is in talks with its Japanese counterparts, according to a press release. German Chancellor Angela Merkel and French Minister of Industry Eric Besson affirmed their nation's confidence in the safety of nuclear power.

"We know how secure our power stations are," Merkel told reporters in Berlin amid opposition calls for a rethink of Germany's use of nuclear power.

It's too early to speculate on US political and financial fallout from the accident in Fukushima, said Richard Myers, vice president for policy at the Washington-based Nuclear Energy Institute, which represents reactor owners and builders.

"We've been saying for five years now that we expect the renaissance of nuclear power would unfold slowly," Myers said. "We expected to see between four and eight new nuclear reactors between now and 2020 and we still believe that."

Preliminary construction has begun on new reactors in Georgia and South Carolina, where state regulators allow companies to recover the cost of reactors as they are built, he said.

Avoiding disaster in Japan may help the industry prove its ability to handle emergencies, said Dale Klein, a former US Nuclear Regulatory Commission chairman and a professor of nuclear engineering at the University of Texas at Austin.

"As long as they keep the core covered, as long as there's no significant radiation release, it will demonstrate that the safety systems for the most part worked," Klein said. "The human disaster that will be remembered will be the earthquake and the tsunami, which will have caused many more deaths."

## **Nuclear Industry Likely To Reassess Safety Systems (WSJ)**

By Rebecca Smith

Wall Street Journal, March 14, 2011

Full-text stories from the Wall Street Journal are available to Journal subscribers by clicking the link.

## **California 'Closely Monitoring' Japan Nuclear Leak (AFP)**

AFP, March 14, 2011

LOS ANGELES – California is closely monitoring efforts to contain leaks from a quake-damaged Japanese nuclear plant, a spokesman said Saturday, as experts said radiation could be blown out across the Pacific.

While officials downplayed any immediate danger, the US Nuclear Regulatory Commission deployed two experts to Japan, where the Fukushima plant, which was rocked by a large explosion earlier in the day in the aftermath of Japan's strongest-ever earthquake.

"At present there is no danger to California. However we are monitoring the situation closely in conjunction with our federal partners," Michael Sicilia, spokesman for California Department of Public Health, told AFP.

"California does have radioactivity monitoring systems in place for air, water and the food supply and can enhance that monitoring if a danger exists," he added.

He was speaking as Japanese authorities moved to calm fears of a meltdown and said a huge explosion Saturday had not ruptured the container surrounding the reactor, although there had already been some radiation leakage prior to the explosion.

Experts have suggested that, if there were a reactor meltdown or major leak at Fukushima, the radioactive cloud would likely be blown out east across the Pacific, towards the US West Coast.

"The wind direction for the time being seems to point the (nuclear) pollution towards the Pacific," said Andre-Claude Lacoste of the French Nuclear Safety Authority, briefing journalists in Paris on the Japanese crisis.

The Nuclear Regulatory Commission meanwhile said it has sent two experts to Japan, and has been in regular contact with Japanese officials about the crisis.

"We have some of the most expert people in this field in the world working for the NRC and we stand ready to assist in any way possible," commission chairman Gregory Jaczko said in a statement announcing the deployment.

He said the pair were experts in boiling water nuclear reactors and are part of a broader US aid team sent to the disaster zone.

Earlier the NRC said it was "examining all available information as part of the effort to analyze the event and understand its implications both for Japan and the United States."

While US nuclear experts acknowledged the seriousness of Japan's reactor crisis, some stressed that taking steps in the United States such as distributing iodine tablets – which prevent iodine 131 from being absorbed into the body – would be "vastly premature."

"It's a big ocean. These (radiation) releases are essentially going to be at ground level," said Ken Bergeron, a physicist who has worked on nuclear reactor accident simulation.

"We should not confuse it with health issues in the United States."

Japan is roughly 5,000 miles (8,000 kilometers) from the US West Coast.

## **Fed Regulators: CA Nuke Plants Operating Normally (AP)**

Associated Press, March 14, 2011

SAN LUIS OBISPO, Calif. – Federal regulators say California's Diablo Canyon and San Onofre nuclear power plants are operating normally and are being monitored by inspectors during the West Coast tsunami threat.

Nuclear Regulatory Commission spokesman Neil Sheehan says the San Luis Obispo and northern San Diego County plants are taking precautions because of Friday's magnitude-8.9 Japanese earthquake and tsunami.

The NRC resident inspector at the Diablo Canyon nuclear power plant is monitoring the plant's response to an area tsunami warning and Sheehan says the plant has declared an "unusual event," the lowest of four levels of emergency classification. It is operating normally.

Sheehan says in a statement that the San Onofre nuclear power plant is also operating normally.

The NRC says nuclear plants are designed to withstand tsunamis and earthquakes.

## **Regulatory Commission Had Concerns About Generators At Nuclear Plant (NCT)**

By Paul Sisson

North County (CA) Times, March 14, 2011

In the aftermath of Friday's devastating earthquake and tsunami in Japan, crews struggled to keep cooling water flowing through five nuclear reactors at two power plants in the country after critical generators failed to provide enough backup power.

It was exactly the scenario that US regulators worked to prevent when they identified faulty electrical wiring at San Onofre Nuclear Generating Station in 2008.

Officials with the Nuclear Regulatory Commission said Friday that the faulty wiring was never so bad that it would have caused San Onofre's backup generators to fail in an emergency. But the problem – which has been fixed, the regulator said — was severe enough that it put the seaside plant under heightened scrutiny for two years.

Both San Onofre and the reactors on Japan's northwest coast rely on electrical pumps and valves to circulate cool water through the reactors' cores in order to remove heat from uranium fuel pellets during an emergency shutdown. Diesel or battery-powered generators must be ready to start at a moment's notice to provide that critical power.

Government officials in Japan said Friday that the earthquake knocked out power supplies at two nuclear power plants, causing temperatures to rise and pressure to build inside reactors. Japanese operators released "slightly radioactive" cooling water and also evacuated thousands of nearby residents as a safety precaution.

The glitch in San Onofre's backup generators surfaced in August 2008, when the NRC announced that cables connecting batteries to the equipment had been "inoperable between March 2004 and March 2008. The federal agency found that Southern California Edison, the plant's operator, had failed to "establish appropriate instructions" for connecting the equipment.

Earlier this month, the NRC sent Edison a letter saying regulators were satisfied the company had fixed the problem.

On Friday, San Onofre officials reported no ill effects at the plant as tsunami waves from the earthquake arrived along the California coastline. A statement issued by Edison said San Onofre's 30-foot-tall seawall was more than adequate to deflect the waves.

According to the NRC, San Onofre was designed to withstand an earthquake registering 7.0 on the Richter scale, occurring five miles offshore on the Newport-Inglewood-Rose Canyon fault that runs parallel to the beach.

The agency, which regulates all nuclear power plants in the United States, told the North County Times in 2007 that the offshore fault would be expected to generate a tsunami wave of about 6.2 feet high during a 7.0-magnitude earthquake.

Some critics have called for Edison to conduct new seismic studies in order to more accurately calculate the potential size and strength of a quake, and a resulting tsunami off the coast.

## **Tsunami Threatens US Nuclear Power Plants (PENNENERGY)**

By Phaedra Friend Troy

PennEnergy, March 14, 2011

The US Nuclear Regulatory Commission (NRC) is monitoring various nuclear power plants and facilities across the United States due to the threat of a tsunami.

The eastern coast of Japan was hit with one of the largest earthquakes on record Friday. Measuring an 8.9 on the Richter Scale, the earthquake caused subsequent massive tsunamis to break across Japan. The natural disaster has caused widespread damage and hundreds are feared dead.

Additionally, more than 20 other countries are now on tsunami alert due to the earthquake, including Russia, countries in South America, and the entire US West Coast.

The NRC is closely monitoring all nuclear facilities in the tsunami warning zone, including the Diablo Canyon nuclear power plant, the San Onofre nuclear power plant, the Humboldt Bay spent fuel storage site and the NRC-regulated nuclear materials sites in Hawaii and Alaska.

All nuclear facilities are preparing for possible tsunami effects.

Notice of Unusual Event Declared

Located on the West Coast, the Diablo Canyon nuclear power plant near San Luis Obispo, California, has declared a notice of unusual event (NOUE) as it prepares for the threat of a tsunami.

The operator of the Diablo Canyon power plant Pacific Gas and Electric Co. (PG&E) declared a NOUE at 4:23 a.m. EST after receiving the tsunami warning from the West California Emergency Management Agency.

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

According to the NRC, nuclear power plants are constructed to withstand environmental hazards, including earthquakes and tsunamis.

## **San Onofre Nuclear Plant Tsunami-ready (SDUT)**

By Onell R. Soto

San Diego Union-Tribune, March 14, 2011

Both reactors at the San Onofre nuclear plant on the northern edge of the county continued operating normally through the day Friday as the tsunami waves reached Southern California.

"We're just monitoring the situation, watching the weather and the reports in regards to the tsunami," said Chris Abel, a spokesman for plant operator Southern California Edison.

The plant is protected by a 30-foot seawall, he said. "That's designed to withstand a tsunami without the loss of operational power."

The height of the wall was determined based the region's history with tsunamis.

In addition, the plant is designed to withstand a magnitude 7 earthquake striking five miles away. That is based on the proximity of the Newport-Inglewood-Rose Canyon Fault, also known as the Southern California Offshore Zone of Deformation, he said.

The 2,200 megawatts produced at San Onofre make up about 20 percent of the electricity used in the region.

Earthquake-related failures of cooling and backup systems at a nuclear plant in Japan led officials there to declare an emergency Friday and consider release of radioactive vapors to prevent dangerous pressure inside the plant.

Such a release is a last-ditch move.

Abel couldn't say whether similar failures could befall the San Onofre plant.

"I wouldn't want to speculate on what would cause a release of radiation or what wouldn't," he said.

San Onofre's signature domes are designed to contain radioactive steam in an emergency.

## **UPDATE: Official Says Tsunami Wall Protects San Onofre Nuclear Power Plant (LNP)**

**Official Says Tsunami Wall Protects San Onofre Nuclear Power Plant**

By Adam Townsend

Laguna Niguel Patch, March 14, 2011

Officials from the San Onofre Nuclear Generating Station told the public not to fear that the plant could be compromised by high wave activity; the fortifications can stand much more than what's happening in the ocean now.

This is the text of an e-mail sent by plant spokesman Gil Alexander to Southern California media:

The waves that could reach the Southern California coastline shortly after 8 a.m. (Pacific) today due to the 8.9 magnitude earthquake that struck Japan would pose no danger to the San Onofre Nuclear Generating Station. The plant's protective measures include a reinforced tsunami wall 30 feet above sea level.

The following is the text of a release from the city of San Clemente about the strong current caused by the Japanese earthquake last night:

In response to an 8.9 magnitude earthquake off the coast in Japan, and resulting tsunami advisory for California, the City of San Clemente activated its Emergency Operations Center (EOC) as a precautionary measure.

The impact of this tsunami will be stronger than normal currents and possible higher than normal tidal surges along the beaches. Stay out of the water. There will be a strong outgoing tidal current at the same time the tsunami arrives. The combined effect could produce very strong currents in harbors and bays. A tsunami event is a series of waves that can last for several hours. The first wave is usually not the strongest.

The City's emergency personnel at the Emergency Operations Center will coordinate activities with other agencies responding to events related to this earthquake should they arise. The City of San Clemente has closed its beaches, municipal pier and coastal trail until further notice.

There is no need for the public to take action at this time. If conditions warrant, instructions to the public will be broadcast over radio and television. City staff will continue monitoring the situation along with other government agencies until the emergency is terminated.

Do not call 9-1-1 unless you have a life threatening emergency. Please contact the Orange County Public Information Hotline at 714-628-7085 or the City of San Clemente at 949-361-8200.

Check back for updates. Earthquake magnitude information may change as officials issue new information.

## **San Onofre Plant Built To Withstand Quakes, Tsunamis (KPBS)**

### **But Plant Likely Would Not Withstand Japan-size quake**

By Ed Joyce

KPBS-Radio San Diego, CA, March 13, 2011

Southern California Edison spokesman Gil Alexander said the San Onofre Nuclear Generating Station (SONGS) could handle any predicted earthquake but not as strong as the 8.9 magnitude that hit Japan.

"US nuclear plants must be designed to exceed the maximum threat that scientists determine for the plant's specific geographic area," said Alexander. "When the San Onofre plant was being designed in the 1980s, a scientific review looked at a fault line five miles from the plant and it was determined that the maximum credible earthquake threat for our property was 6.5-6.6 magnitude."

Alexander said the policy at that time was for plants to exceed those threats and SONGS was built to survive a nearby earthquake with a magnitude of 7.0.

The US Geological Survey reported the quake that struck Japan was 8.9.

He said the plant is also designed to exceed the level of a predicted tsunami, again based on a scientific review in the 1980s.

"The best science forecast the worst case possibility of a tsunami wave of about 24 or 25 feet," said Alexander. "We have exceeded that at the San Onofre plant with a tsunami wall that reaches 30 feet above sea level."

Alexander said the best available scientific data on earthquakes and tsunamis in the Southern California region continues to show the San Onofre plant design meets the predicted threats of each.

He said the plant would automatically shut down if sensors detected a major earthquake.

The SONGS generates enough electricity for 1.4 million homes in Southern California. Alexander said it is likely valuable lessons will be learned from the nuclear problems in Japan resulting from the earthquake and tsunami.

But he said it's still too early to know the full extent of what happened in Japan and whether those lessons can be applied to the US Nuclear industry.

"This earthquake and tsunami tragedy that has struck Japan is a human tragedy," added Alexander. "and our thoughts and prayers go out to all the families and people in Japan who have lost loved ones, homes and businesses."

## **San Diego's Top Quake Threat Is Rose Canyon Fault (SDUT)**

### **Would cut water lines, spark fires, crack freeways and cause other damage**

By Mike Lee

San Diego Union-Tribune, March 13, 2011

Japan's devastating one-two punch of an earthquake-powered tsunami isn't a likely worst-case scenario in San Diego County.

The biggest feasible threat remains the good old-fashioned quake that severs water supply lines, sparks fires, cracks freeways and damages vital infrastructure such as port facilities, local emergency officials said in the wake of the disaster in Japan.

The dangers posed by the southern San Andreas Fault have been studied and modeled time and again. The lesser-known problem — but possibly the more disabling one for county residents — is a major slip along the Rose Canyon Fault that runs through downtown San Diego, La Jolla and north along the coast.

"That is our number one threat," said Ron Lane, head of emergency services for San Diego County. "The San Andreas for the most part — even the 7.8 magnitude prediction — does very little damage. ... It's not the big one. For us, the big one is at Rose Canyon."

Even though San Diego County doesn't have a history of major earthquakes, county emergency officials said quake activity since 1984 has doubled that of the previous 50 years.

Emergency managers said they have stepped up preparations for a significant temblor with state and local response drills, construction of a major water supply backup system in San Diego County and seismic upgrades to Caltrans bridges.

But quakes hit without warning and often in unexpected places, leaving the best-laid plans up against the uncertainty of nature. Friday's magnitude 8.9 quake in Japan forced many Californians to ponder their emergency preparations — food and water for three days, fire extinguishers, family communications plans and the like.

"That could be California," said Richard McCarthy, executive director of the California Seismic Safety Commission.

Two earthquake scenarios that are deemed among the most likely to affect San Diego County would play out in dramatically different ways.

A major quake on the Rose Canyon Fault would create chaos rivaled only by major wildfires in recent San Diego history.

A quake on that fault could reach a magnitude of 6.9 to 7.2, according to county emergency planning documents. Though Rose Canyon has not produced a quake since well before European settlement of the region, it is considered active.

"The proximity of the fault to the city center and main economic hubs could put the entire area on hold for months or even years," said an assessment for a statewide disaster drill known as The Great California ShakeOut. "Most residents are less than 15 miles from the fault and ground shaking from a major event is sure to cause damage throughout the county."

If that happens, Interstate 5 from La Jolla Village Drive to Old Town — along with several smaller roads in the area — would be unusable. Total collapse of the interstate isn't considered likely, but the failure of on-ramps and shifting of the road bed would seriously impair its use.

Gas lines in Mission Valley also cross the Rose Canyon Fault near Old Town, creating a possible explosion hazard. County officials said power likely would be interrupted in some areas, possibly generating outages around the region.

While water deliveries from Northern California and the Colorado River wouldn't be interrupted, the local impact of broken water and sewer mainlines would be immediate. For instance, primary water pipes for Pacific Beach cross the Rose Canyon Fault near Balboa Avenue.

"The one thing we are really concerned about is water," Lane said. "The question is the distribution. How do you get it to the community if the water pipes aren't working or the treatment (plants) have been destroyed?"

A major Rose Canyon quake could shut down Lindbergh Field, county planning documents said. And some 750 brick buildings in the high-risk zone would likely suffer structural damage.

"The other challenge we have is that our wood-frame buildings perform pretty well in an earthquake, but they certainly are subjected to fire following an earthquake," said McCarthy at the state seismic safety office.

Operators of the San Onofre Nuclear Generating Station near Oceanside said the facility is designed to withstand a magnitude 7 earthquake striking five miles away on the Rose Canyon Fault. The 2,200 megawatts produced at San Onofre make up about 20 percent of the electricity used in the region.

Rose Canyon Fault is part of the Newport-Inglewood system that caused the 1933 temblor in Long Beach. It damaged schools so badly that the state set new standards for school safety that have helped to phase out century-old public school buildings.

"That is why you don't see really old school buildings in San Diego — they have been torn down" for seismic safety, said Jack Brandais, a spokesman for the San Diego Unified School District.

On Friday, neither the county Office of Education nor state architecture officials could produce a current list of schools that aren't up to seismic standards.

While a Rose Canyon quake would pierce the county's heart, a more likely scenario is movement on the southern San Andreas Fault.

Direct damage in San Diego County probably would pale compared with problems in Riverside and San Bernardino counties, but the entire region is expected to suffer if transportation and utility corridors are severed.

That stretch of the San Andreas is deemed by scientists the most likely in the state to produce a quake greater than magnitude 6.7. They have done detailed modeling of a magnitude 7.8 temblor in that area.

Shaking on that scale would produce more than 10,000 landslides, along with possible disruptions of hundreds of roads, fiber-optic cables, petroleum and natural gas pipelines and railroads, according to ShakeOut documents.

The study projected \$213 billion in total economic losses, along with 1,800 deaths and 50,000 injuries requiring emergency room care. The death toll could increase substantially if hospitals were unable to function.

The 1994 Northridge quake sidelined 23 hospital buildings, increasing concern about the safety of doctors, patients and those who need post-quake care.

Hospitals in San Diego County appear to be meeting earthquake standards that take effect in 2013, but most of them need to spend millions of dollars to meet tougher rules in 2030. By that date, hospitals must install utilities and communication systems that will continue to function after a strong quake.

County officials said they have backup plans to deploy hundreds of doctors and nurses to the hardest hit areas.

The ShakeOut study projects \$33 billion in damage to buildings across Southern California, particularly in old brick buildings that haven't been upgraded.

Damage to water and sewer lines from major shaking on the San Andreas Fault could hit \$1 billion. It would create special challenges for San Diego County, which relies almost entirely on water imported through two major aqueducts that run past Fallbrook from points north.

The San Diego County Water Authority is pumping \$1.5 billion into its Emergency Storage Project, designed to connect reservoirs and increase storage so that the region could survive without imported water.

"Once we complete the project, we will have six months worth of water so we will be self sustaining," said Frank Belock, deputy general manager at the water agency.

However, the keystone element of the plan — raising San Vicente Dam so it can hold back more water — won't be done for about two years and it will take a few more years to fill enlarged reservoir.

Particularly in places without water service, fire danger following the quake would be acute as power lines and gas lines ignite several hundred blazes. ShakeOut scientists predicted 1,200 fires too large to be controlled by one fire engine company.

If there's any good news, it's that the state's most famous fault line can't produce the kind of power that the quake did in Japan because of how the fault zone is structured.

"An 8.9 is just not possible on the San Andreas, even if it were to rupture from tip to tip," said Erik Pounders, a geologist at the US Geological Survey in Pasadena. "You just can't build that much seismic energy."

## **California Nuclear Plants On Alert As Tsunami Precaution (ELP)**

Electric Light & Power, March 14, 2011

San Francisco, March 11, 2011 – In a move PG&E Corp. calls routine, the power producer has put its Diablo Canyon nuclear power plant on alert due to a tsunami warning in California.

Much of the West Coast is under a tsunami warning following the 8.9 magnitude earthquake in Japan that has sent tsunami waves across the Pacific Ocean.

The Nuclear Regulatory Commission said there is nothing wrong with the plant, but a tsunami warning requires the plant to remain on alert as a precaution. All units are still in service and operating normally.

The NRC said the plants are located in an area that the expected waves should not impact, and furthermore that the plants are designed to deal with the sort of waves heading for the California coast.

Both reactors at Diablo Canyon were operating normally and at full capacity.

The NRC also said Edison International's San Onofre nuclear plant was monitoring the tsunami but was only under a tsunami watch.

Diablo is located in the middle of the Californian coast, about halfway between Los Angeles and San Francisco. San Onofre is on the Southern California coast between Los Angeles and San Diego.

## **Unusual Event Lifted At Diablo Canyon Power Plant (KSBY)**

KSBY-TV San Luis Obispo (CA), March 14, 2011

The "unusual event" has been lifted at Diablo Canyon Nuclear Power Plant, according to a spokesperson for PG&E.

The event was lifted at 3:28 p.m. after the tsunami warning was downgraded to an advisory.

An unusual event is the lowest of four levels of emergency classification.

Jim Becker, site vice president for Diablo Canyon Power Plant will be live in studio at 6 p.m. on KSBY.

## **Blog: State Monitoring Radiation Levels To Determine If Nuclear Event In Japan Poses Health Risks In Washington (SEAPI)**

Seattle Post Intelligencer, March 13, 2011

The state Department of Health is conducting ongoing air monitoring for radiation to see if the nuclear plant incident in Japan has affected radiation levels in Washington. There have been no elevated readings, the department said in a statement.

The agency's radiation protection staff expects no public health risk in Washington, and the monitoring is precautionary. If the situation changes here, the department will notify the public.

State health officials are monitoring the events in Japan and are in contact with the federal Nuclear Regulatory Commission and US Environmental Protection Agency. An explosion took place at the Japanese reactor site Saturday.

The nuclear plant incident in the following the earthquake in Japan has raised concerns among some people in Washington about windblown radiation coming to the state. Air sample readings here remain normal, the department said. It doesn't expect any change in environmental measurements taken in Washington.

For more information for boomer consumers, see my blog [The Survive and Thrive Boomer Guide](#).

## **Energy Chairman Vows Inquiry Into Japan Nuclear Plant Damage (HILL)**

By Ben Geman

[The Hill](#), March 14, 2011

House Energy and Commerce Committee Chairman Fred Upton (R-Mich.) plans to question the top US nuclear power regulator next week about damage to Japanese nuclear reactors stemming from the catastrophic earthquake and tsunami.

Upton – who is planning legislation to help spur construction of new US reactors – said Saturday night that the committee's planned March 16 hearing with Nuclear Regulatory Commission Chairman Gregory Jaczko will focus on the Japanese crisis.

"[W]e will use that opportunity to explore what is known in the early aftermath of the damage to Japanese nuclear facilities, as well as to reiterate our unwavering commitment to the safety of US nuclear sites," Upton said in a statement about the hearing, which was scheduled to review the NRC and Energy Department budget plans.

Upton's plans come amid reports that a meltdown may be underway at the damaged Fukushima Daiichi Nuclear Power Station in northeast Japan.

"A meltdown may have occurred at at least one nuclear power reactor in Japan, the country's chief cabinet secretary, Yukio Edano, said Sunday, adding that authorities are concerned about the possibility of another meltdown at a second reactor," CNN reported.

"Some 170,000 people have been ordered to evacuate the area covering a radius of 20 kilometers around the plant in Fukushima near Iwaki," the Associated Press reports.

The problems in Japan could create new hurdles for Upton and other advocates of helping the nuclear industry win permission and funding to build the first fleet of new US reactors in decades.

Rep. Ed Markey (D-Mass.), who is a senior member of the Energy and Commerce and nuclear industry critic, said Saturday that the US is also vulnerable to major nuclear accidents.

Markey called on the Obama administration and the NRC to consider the implementation of several policy changes in light of the disaster.

Among the proposed reforms, he called for a moratorium of siting new nuclear reactors on seismically active areas and called for reactors in seismically active zones to be retrofitted with stronger containment systems.

The NRC, meanwhile, has dispatched staff with expertise in boiling water nuclear reactors to Japan to assist with the unfolding crisis.

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

Upton also said, "As we extend our thoughts and prayers to those affected by this historic earthquake and the damage it wrought, we will carefully continue to assess and examine the situation."

## **Owner Says Calvert Cliffs Is Safe In Wake Of Japan Meltdown Threat (BSUN)**

**Opponents say disaster highlights safety concerns; Constellation says plants are rated to withstand quakes**

By Michael Dresser

[Baltimore Sun](#), March 13, 2011

The operator of Maryland's Calvert Cliffs twin reactors sought to reassure state residents that the facility remains safe, as Japan grapples with this weekend's explosion at a nuclear plant after an earthquake and tsunami.

Mark Sullivan, a spokesman for the Constellation Energy Nuclear Group, said the company's plants, including Calvert Cliffs, are designed to withstand any shock plants indicated by the seismic history of the geographic areas in which they're located.

Sullivan said company officials are closely monitoring the events at Japan's Fukushima Daiichi Nuclear Power Plant.

"CENG's highest passion and value is safety; nuclear safety, public safety, worker safety and environmental safety," Sullivan said. "As operators of nuclear power plants, Constellation Energy Nuclear Group's top priority is to ensure the health and safety of the public and our employees."



Industry critics said the Japanese disaster will raise safety concerns worldwide and perhaps bring to a halt the so-called "nuclear renaissance" — a resurgence of interest in reactor-generated energy spurred in part by high oil prices and concerns about climate change. French utility EDF Group is asking the state for help in developing a third nuclear reactor at Calvert Cliffs in Southern Maryland.

"This was always a theoretical possibility. Now it's real," Peter Bradford, a former member of the Nuclear Regulatory Commission, said during a conference call organized by nuclear opponents. "Having it explode — those can't be good things for an industry that's looking for votes in Congress and the state legislatures."

The NRC issued a statement saying that all US nuclear power plants — including those near Baltimore — are built to withstand dangers including earthquakes and tsunamis.

"Even those plants that are located outside of areas with extensive seismic activity are designed for safety in the event of such a natural disaster. The NRC requires that safety-significant structures, systems, and components be designed to take into account the most severe natural phenomena historically estimated for the site and surrounding area," the NRC said.

Ira Helfand, a board member of Physicians for Social Responsibility who also joined the phone conference with Bradford, called nuclear plants "weapons of mass destruction we build ourselves and site next to our cities." His group opposes nuclear power, citing safety, cost and pollution concerns.

Helfand said the questions could extend to nuclear plants that are not located in areas with a history of major earthquakes — including Maryland's Calvert Cliffs plant and Pennsylvania's Peach Bottom plant just across the state line from Harford County.

Sullivan said the Constellation group is holding discussions with industry leaders including other nuclear utilities, the Nuclear Regulatory Commission, the Nuclear Energy Institute, Electric Power Research Institute, the Institute of Nuclear Power Operations and World Association of Nuclear Power Operations.

"We also have emergency response plans in place which are approved at the federal, state and local government agencies," Sullivan said. "The plans have detailed procedures which are routinely reviewed and used in training of our personnel. We have routine training exercises to test our ability to effectively implement our plan and are formally evaluated by the NRC."

Sullivan noted that Calvert Cliffs Unit 2 is now in a planned refueling and maintenance outage.

## **Constellation Says Calvert Cliffs Is Safe (AP)**

Associated Press, March 14, 2011

The operator of two nuclear reactors in southern Maryland says the facility remains safe amid news of partial meltdowns at reactors in Japan triggered by an earthquake and tsunami.

Baltimore-based Constellation Energy Nuclear Group operates the reactors at Calvert Cliffs in Lusby. Spokesman Mark Sullivan says the company's plants are designed to withstand any events indicated by the seismic history of the places where they're located.

More than 180,000 people have evacuated the area around Japan's Fukushima Dai-ichi nuclear complex, and up to 160 may have been exposed to radiation.

Critics of nuclear energy say the crisis in Japan may bring to an end the so-called "nuclear renaissance" in which nuclear energy has been touted as a safer, cleaner alternative to fossil fuels.

The Nuclear Regulatory Commission says all US nuclear power plants are built to withstand earthquakes and tsunamis.

## **Local Nuclear Plant Officials Closely Monitor Situation In Japan (OSWEGOPT)**

By Janet Rebeor

Oswego (NY) Palladium-Times, March 14, 2011

With three nuclear plants in Oswego County, residents here are watching with special interest the ongoing crisis in Japan at the Fukushima Dai-ichi Unit 3 nuclear reactor, which was damaged by Friday's devastating earthquake and the resulting tsunami.

According to The Associated Press reports, nuclear plant operators in Japan were frantically trying to keep temperatures down in a series of nuclear reactors — including Dai-ichi Unit 3, where officials fear a partial meltdown could happen. The earthquake, with a preliminary magnitude of 8.9, was reported to be the most powerful in Japan's recorded history, and was immediately followed by a tsunami that ravaged the Asian country's northeastern coast with breathtaking speed and power.

The epicenter of the earthquake was in the Pacific Ocean about 80 miles from the city of Sendai, Japan. The Fukushima Dai-ichi nuclear power facility is located on the ocean, about 25 miles south of Sendai. Constellation Energy Nuclear Group (CENG) Senior Communications Consultant Jill Lyon said the local nuclear industry is closely monitoring the events in Japan. "It's premature for any of us to draw any conclusions since the activities are still in progress (in Japan)," Lyon said.

Lyon stressed that CENG is dedicated to the safety of its employees, residents and the community. "Our plants are all outside of the known high-hazard earthquake zones as identified by the US Geological Survey," Lyon said. "They are designed and constructed... to withstand ground motion and designed to automatically shut down if certain seismic thresholds are reached."

Throughout the nuclear industry there is an atmosphere of continuous improvement through learning from others, Lyon noted. Once the data is known from the current situation that Japanese operators are facing, Lyon said the nuclear industry would share that data. "Globally, we – as standard practice – incorporate what we call 'operating experience' from other facilities and lessons learned," Lyon said. "We have a formal (procedure) to review operating experience from other locations in the industry to determine if we need to take any action at our facility based on what might have happened someplace else. When we do fully understand things there, and get more detailed information, it will go through our operating experience process."

Hidehiko Nishiyama, a senior official of Japan's Economy, Trade and Industry Ministry, indicated the reactor core in Dai-ichi Unit 3 had melted partially, telling a news conference, "I don't think the fuel rods themselves have been spared damage," according to the Kyodo News agency.

The International Atomic Energy Agency (IAEA) reported that the explosion at the Dai-ichi Unit 1 reactor, which injured four workers, occurred outside the primary containment vessel, not inside. The plant operator, Tokyo Electric Power Company (TEPCO), has confirmed that the integrity of the primary containment vessel remains intact. Japan's Nuclear and Industrial Safety Agency (NISA) also confirmed the presence of caesium-137 and iodine-131 in the vicinity of Fukushima Dai-ichi Unit 1. According to the IAEA, initial increases were reported in levels of radioactivity around the plant, but those levels had been observed to lessen throughout the day.

A complete meltdown – the collapse of a power plant's ability to keep temperatures under control – could release uranium, which is radioactive, along with other dangerous contaminants into the environment and pose major, widespread health risks.

The AP reported that Chief Cabinet Secretary Yukio Edano said Sunday that a hydrogen explosion could occur at the complex's Unit 3, the latest reactor to face a possible meltdown. That would follow a hydrogen blast Saturday in the plant's Unit 1, where operators attempted to prevent a meltdown by injecting sea water into it.

As a countermeasure to limit damage to the reactor core, IAEA reported that TEPCO proposed to use sea water mixed with boron in primary containment vessel. This measure was approved by NISA and the injection procedure began Saturday. Boron is used to disrupt nuclear chain reactions.

"At the risk of raising further public concern, we cannot rule out the possibility of an explosion," Edano said. "If there is an explosion, however, there would be no significant impact on human health."

More than 180,000 people have evacuated as a precaution, though Edano said the radioactivity released into the environment so far was so small it didn't pose any health threats. Late Sunday evening, officials confirmed that radiation had exceeded the legal limit.

Edano said none of the Fukushima Dai-ichi reactors was near the point of complete meltdown, and he was confident of escaping the worst scenarios and for his part, denied there had been a meltdown in the Fukushima Dai-ichi complex, but other officials said the situation was not so clear.

The AP reports that Japanese officials have declared states of emergency at six reactors — three at Dai-ichi and three at another nearby complex — after operators lost the ability to cool the reactors using usual procedures. Local evacuations have been ordered at each location. The U.N. nuclear agency said a state of emergency was also declared Sunday at another complex after higher-than-permitted levels of radiation were measured there. It said Japan informed it that all three reactors there were under control.

A separate incident at the nearby Tokai Dai-Ni plant resulted when a pump for the cooling system failed after Friday's quake. A second pump operated normally, as did the reactor, according to the utility, the Japan Atomic Power Co.

According to AP reports, on Saturday, an explosion destroyed the walls and ceiling of Fukushima Dai-ichi's Unit 1 as operators desperately tried to prevent it from overheating and melting down by releasing steam.

Officials were aware that the steam contained hydrogen and were risking an explosion by venting it, acknowledged Shinji Kinjo, spokesman for the government's NISA, but chose to do so because they needed to reduce the pressure.

Scientists noted that shutting down the reactors is just the beginning of containing the problem. "You need to get rid of the heat," said Friedrich Steinhäusler, a professor of physics and biophysics at Salzburg University and an adviser to the Austrian government on nuclear issues. "You are basically putting the lid down on a pot that is boiling. They have a window of opportunity where they can do a lot." Using sea water as an emergency coolant is one tool operators can use. But if the heat is not brought down, the cascading problems can eventually be impossible to control. "This isn't something that will happen in a few hours. It's days," Salzburg said.

The US Nuclear Regulatory Commission announced Saturday that it was sending two of its officials with expertise in boiling water nuclear reactors to Japan as part of a US International Agency for International Development (USAID) team.

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

USAID is the federal government agency primarily responsible for providing assistance to countries recovering from disaster.

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

Despite assurances by the Japanese government, people remain concerned. "First I was worried about the quake," said Kenji Koshiba, a construction worker who lives near the Dai-ichi plant. "Now I'm worried about radiation."

Japan has a total of 55 reactors spread across 17 complexes nationwide. The Associated Press contributed to this report.

## **NRC Senior Staffers Protest Yucca Mountain Shutdown (LVSRJ)**

By Steve Tetreault

Las Vegas Review-Journal, March 12, 2011

Full-text stories from this source currently cannot be included in this document. You may, however, click the link above to access the story.

## **Yucca Mountain Still Alive Under GOP Nuke Plan (MCT)**

By Rob Hotakainen, McClatchy Newspapers

McClatchy, March 14, 2011

WASHINGTON — Yucca Mountain is still breathing.

It's been 24 long years since Congress first designated the desert locale in southern Nevada as the best place to store the nation's nuclear waste.

While opponents have gained the upper hand in trying to block the project in recent years — in 2009, Energy Secretary Steven Chu said that "Yucca Mountain as a repository is off the table" — a group of House Republicans is fighting back. They want to revive the site as part of a broader plan that calls for building 200 new nuclear plants by 2030.

Under that plan, the nation would begin building nuclear plants on an unprecedented scale: Currently, the nation gets 20 percent of its electricity from 104 nuclear reactors.

But there's one big problem: There's no place to put the waste.

The Republican legislation would take care of that. It would require the Nuclear Regulatory Commission to complete its review of the Yucca Mountain site "without political interference."

That would be difficult, with top Democrats trying hard to scrap the project.

In a speech to the Nevada legislature last month, Senate Majority Leader Harry Reid of Nevada boasted that Congress had "killed Yucca Mountain" because of fears it would hurt the state's tourism industry.

And President Barack Obama, who campaigned against the proposed repository in 2008, has included no money for Yucca Mountain in his 2012 budget.

Obama, though, has become a fan of nuclear power, reflecting how much things have changed since the "no-nukes" days of the 1970s. He regards nuclear power as an important part of his push for "clean energy."

And nuclear power is moving up on the agenda on Capitol Hill after the president talked it up in his State of the Union speech. Since then, Republicans have repeatedly cited nuclear power as an issue that could result in their cooperation with the White House.

The president promoted the issue again last month in his 2012 budget, which called for spending another \$36 billion on loan guarantees to help build more nuclear plants. The guarantees could save power companies billions in financing costs.

However, the nuclear risk rising from Japan's Friday earthquake is likely to revive anti-nuclear power sentiments in this country, and could tilt political momentum against the radioactive power source.

Senate Homeland Security Committee Chairman Joe Lieberman (I-Conn.) said Sunday on CBS News' "Face the Nation" that he's been a "big supporter" of nuclear power and that the US has "got a good safety record." But he said the tragedy in Japan requires the US to take care before proceeding.

"I think it calls on us here in the US naturally not to stop building nuclear power plants but to put the brakes on right now until we understand the ramifications of what's happened in Japan," Lieberman said.

Still, for now House Republicans have upped the ante, with a group of 64 signing onto the bill that would triple the nation's nuclear capacity in 19 years. The legislation also promises to reignite an old battle by calling for energy exploration in Alaska's Arctic National Wildlife Refuge.

The issue is of particular importance for a number of states with complexes that built nuclear weapons during World War II and the Cold War and are currently storing large amounts of radioactive waste, including:

- \_ Washington, home to the Hanford Nuclear Reservation, the nation's largest atomic waste dump;
- \_ South Carolina and Georgia, on whose border sits the Savannah River Site;
- \_ Tennessee, site of the Oak Ridge National Laboratory;
- \_ and Idaho, home of the Idaho National Laboratory.

Washington state and South Carolina sued the Obama administration in April 2010, claiming the Department of Energy had no right to junk the Yucca Mountain plan. The project calls for digging deep tunnels into mountainsides, about 90 miles northwest of Las Vegas, where high-level nuclear waste could be stored and buried for 10,000 years as it decays.

"There's a fundamental issue here, and that is Yucca Mountain was created statutorily," said Republican Rep. Doc Hastings, the chairman of the House Natural Resources Committee, whose western Washington district includes the Hanford Nuclear Reservation. "No executive, I don't care which party he is, can unilaterally say, 'I don't want to carry out the law.' And that's precisely what this president is saying."

It's not only Republicans who are complaining.

Rep. Norm Dicks of Washington state, the top-ranking Democrat on the House Appropriations Committee, said the Yucca Mountain project "is being stopped without Congress changing the law."

"I think it's a travesty, and we're wasting billions of dollars," Dicks said.

South Carolina Republican Sen. Lindsey Graham, one of the Senate's strongest supporters of nuclear energy, said the president's decision to close Yucca Mountain "was ill-advised and leaves our nation without a disposal plan for spent nuclear fuel or Cold War waste."

"It was a political, not scientific, decision," Graham said. "It is incumbent on the administration to come up with a disposal plan for this real problem facing our nation."

The White House and its allies contend that the administration has the power to stop the Yucca Mountain project after concluding the site was not a workable option.

During a debate on the House floor, Nevada Republican Rep. Dean Heller told his colleagues that the Yucca project is dead and that it was time to "acknowledge reality" and find a new site.

"Yucca Mountain is in my district, and our state has been dealing with this boondoggle project literally for decades. ... I continue to be disappointed at the House's insistence of reviving the Yucca Mountain boondoggle," Heller said.

But Hastings and other Republicans said the House will continue to provide funding for Yucca Mountain in their budgets.

"We're going to continue to fight the administration's position and we have the goal of opening Yucca Mountain," said Republican Rep. Cathy McMorris Rodgers of Washington state, whose district borders Hastings'.

In the Senate, the issue has divided leadership along parochial lines, with Washington state Democrat Patty Murray, who ranks fourth in power, opposing Reid.

Congress chose Yucca Mountain as the sole repository in 1987, after a search had been narrowed to three locations: Yucca; Hanford, which began producing plutonium for nuclear weapons during World War II; and Deaf Smith County, in the Texas Panhandle. In Washington state, some fear that Hanford could again emerge as Plan B if Yucca is scuttled for good.

Backers of the Yucca plan note that the government's failure to build the repository has been costly, leading to more than 70 lawsuits filed by utilities against the government, \$1 billion in settlements being paid, and roughly \$16.2 billion in potential liabilities to settle the remaining cases.

And Republican proponents said their plan to build another 200 power plants would be good for the economy, creating 480,000 construction jobs and 140,000 permanent jobs, while adding \$20 billion a year in local, state and federal tax collections.

(James Rosen of the Washington Bureau contributed.)

## **Limerick Plant On Agency's Seismic Checklist (NORRISTH)**

By Evan Brandt

Norristown (PA) Times Herald, March 14, 2011

LIMERICK – With the world watching Japan grapple with the crisis of a nuclear power plant damaged by an earthquake and tsunami, government regulators in the US will soon be taking a “closer look” at Exelon Nuclear’s Limerick Generating Station to see if it is at risk from seismic forces.

Neil Sheehan, a spokesman for the Nuclear Regulatory Commission, said the coincidence is just that.

He noted that the agency’s plans to examine this aspect of nuclear plant safety was undertaken long before Friday’s earthquake and tsunami damaged the Fukushima Dai-ichi nuclear plant, 170 miles northeast of Tokyo.

The incident in Japan has been declared a “level 4” incident by the International Atomic Energy Agency. By way of comparison, the disaster at Chernobyl was rated a “level 7” incident while the disaster at Three Mile Island was declared a “level 5.”

Advances in seismic science have prompted his agency to undertake a project to review safeguards at some of the nation’s nuclear power plants as they relate to any seismic issues specific to each plant’s location and the Limerick plant is on the list of those to be reviewed, Sheehan said.

Also on the list is the Peach Bottom nuclear plant, also in Pennsylvania, said Sheehan.

“These plants were all built to withstand seismic activity,” Sheehan said of the 104 nuclear power plants in the United States.

“But a lot of them were built in the 60s and the 70s and our ability to gather seismic data and do computer modeling on that data is much improved since then,” Sheehan said of the NRC’s reasons for undertaking the survey.

Even though the plant at Limerick is one of the nation’s newest, Sheehan said it is nevertheless on the list of those at which the NRC wants to take a closer look.

One reason for undertake in the review is because, for the first time in decades, the agency is receiving applications for the construction of new nuclear plants, Sheehan said.

But he confirmed that large disasters like the one in Japan can trigger agency reviews, Sheehan said, although he said it is “too early to tell” if the events in Japan will have any kind of impact on NRC regulations or actions.

He noted that in 2009, the NRC released a report assessing the threat that tsunamis pose to US nuclear plants and that was prompted by the devastating Indian Ocean earthquake and tsunami that hit the Indonesian peninsula in 2004.

Sheehan noted, however, that “I don’t think the Limerick Generating Station has anything to worry about from tsunamis.”

Whether it is also at risk from earthquakes is what the NRC will attempt to assess.

One nuclear plant famous for its proximity to a seismic fault is the Indian Point Nuclear plant.

Built north of New York City along the Hudson River, it began operations in 1963, and was subsequently found to sit near the northern terminus of the “Ramapo Fault line system,” a system of faults forming the boundary between two geological formations in the Mid-Atlantic which runs from New York, through New Jersey and into Pennsylvania.

The southern terminus for this 200 million-year-old fault, which has a northeast to southwest orientation, is near Schaefferstown in Lebanon County, PA, according to information from Columbia University’s Earth Institute.

The Ramapo has several smaller fault systems associated with it, including the Chalfont, Flemington and Hopewell faults, but it appears seems to traverse Pennsylvania to the north of the immediate area near Limerick.

Although this fault is very inactive, two small earthquakes were recorded along the fault in northern New Jersey in February 2009.

Sheehan said he does not know if the Ramapo fault was a factor in NRC’s decision to put Limerick on the list of plants for which it will be forming an updated seismic analysis.

As for Japan, Sheehan confirmed that two NRC experts have already left for Japan and that it was his understanding that the Japanese may have reached out to some American companies, including Exelon, which has the largest “fleet” of nuclear plants in the US.

Marshall Murphy, a spokesman for Exelon, said the company has been “very active” in monitoring events at the Japanese plant and the company “stands ready to help in any way we can.”

Murphy said most American plants have computer modeling systems which would allow them to provide the Japanese with a set of likely consequences for any particular action they chose to take in dealing with the crisis at the plant.

Questions about any similarities between the Fukushima situation and how it compares to US plants for similar disasters were all referred to the Nuclear Energy Institute, the primary advocacy group for the US nuclear industry.

NEI spokesman Tom Kauffman said his agency has been in touch with the Japanese utility that runs the Fukushima plant. Despite being described in some news reports as having been declared “earthquake proof,” Kauffman said, “it’s clear that plant did not withstand the force of the earthquake.”

He confirmed reports that the quake triggered a shut-down of the plant but diesel back-up generators meant to provide electricity to operate the pumps to keep water flowing and keep the fuel cool ceased to operate after being damaged by the tsunami.

Kauffman said nuclear plants in the United States are designed to withstand "the maximum postulated earthquake that could occur where it sits."

He concurred with Sheehan that today's science and improved instrumentation allows for much better measurement of earth moving activity and a better understanding of risk.

However he said to his knowledge, this better understanding has never led to the retro-fitting of any US nuclear plant.

## **NRC Spokesman: Check Of US Nuke Plants Was Planned Before Japanese Quake (YORKDIS)**

### **Check of US nuke plants was planned before Japanese quake**

By Lauren Whetzel

York (PA) Dispatch, March 14, 2011

Nuclear plants in the county are designed to withstand the maximum projected earthquake that could occur where they sit.

That's why, in wake of the nuclear power plant crisis in Japan, government regulators in the United States plan to take a closer look at Exelon Nuclear's Peach Bottom Atomic Power Station and Limerick Generating Station to see if either is at risk from seismic forces.

Three Mile Island Nuclear Power Plant (TMI), however, wasn't on the list of seven plants across the county to be examined, said spokesman Neil Sheehan for the Nuclear Regulatory Commission.

The commission found TMIs seismic force estimate is still deemed accurate, Sheehan said.

Advances in seismic science prompted the NRC to reevaluate safeguards at some of the nation's nuclear power plants if an earthquake were to occur, he said.

The agency's plans to examine this aspect of nuclear plant safety, however, were undertaken long before Friday's earthquake and tsunami damaged the Fukushima Dai-ichi nuclear plant 170 miles northeast of Tokyo, Sheehan said.

Many nuclear plants were built more than three decades ago, so it's important to ensure the earthquake level estimates of the particular areas are still accurate today, he said.

Major disasters, such as that in Japan, can trigger the agency to review its safety measures and see if there are any "lessons to be learned," said spokesman Tom Kauffman of Nuclear Energy Institute, the primary advocacy group for the US nuclear industry.

However, since the Sept. 11, 2001, attacks, nuclear power plants across the county have been provided redundant power supply and put additional safety systems in place, such as cooling units and emergency diesel generators, that would have been able to withstand the disasters that swept through Japan Friday, Kauffman said.

Researchers will determine the root causes of the nuclear power plant radiation leak in Japan and see if their lessons learned can be applied to nuke plants in United States, he said.

The crippled Fukushima reactor is a grim reminder of the 1979 Three Mile Island crisis because it has some common technical and safety aspects.

It also brings to mind "broken promises by the industry" to resolve open safety issues, said Eric Epstein of Three Mile Island Alert, a non-profit TMI monitoring organization.

Epstein said the first indication that the Fukushima reactor was in serious trouble came from reports that the Japanese military was flying batteries to the plant.

"This clue made it clear that the operators were having more problems than just trouble with circulating reactor coolant," he said.

It revealed that the operators were losing or had lost electrical control of the reactor systems and that the emergency diesel generators were not working. But the Japanese government and the industry continued to downplay the dire conditions facing them. - Reach Lauren Whetzel at 505-5432 or [lwhetzel@yorkdispatch.com](mailto:lwhetzel@yorkdispatch.com).

## **How Would TMI, Peach Bottom Fare In Massive Power Outage? (YDRPA)**

By Bill Landauer

York (PA) Daily Record, March 14, 2011

York, PA – When engineers built Three Mile Island and Peach Bottom Atomic Power Station more than 35 years ago, handling big natural disasters was part of the equation.

Today, the Nuclear Regulatory Commission is checking whether any additional safeguards should be taken, spokesman Neil Sheehan said.

The agency frequently reassesses how well nuclear plants are equipped to handle any possible disasters. And at the moment, given the push to build more than 20 new nuclear reactors, "it's a good time to take a fresh look," Sheehan said. York County probably isn't going to face a tsunami or a massive earthquake anytime soon. But what happens at Three Mile Island or Peach Bottom if there is a prolonged power outage?

Every nuclear power plant in the US was built to operate without external power for at least one month. Most, like TMI and Peach Bottom, have diesel generators that start within 10 seconds of an outage, said Tom Kauffman, spokesman for the Nuclear Energy Institute. Also, banks of batteries add to emergency power.

The reactor also shuts down automatically when an outage happens.

Shutting down means proton absorbing control rods stop the nuclear fission reactions that create heat. However, cooling down the nuclear reactor is still of paramount importance, Kauffman said, and the diesel generators will keep electric pumps adding cool water even when there's no electricity. Could what occurred at Fukushima Daiichi Nuclear Power Station conceivably happen at TMI or Peach Bottom? What's in place to prevent that?

Kauffman wouldn't speculate about it until all the facts about what happened in Japan were made clear.

However, he said, every nuclear reactor in the US was designed to withstand earthquakes more powerful than the most powerful quake ever experienced within a 200-mile radius.

In the past couple of years, the Dillsburg area experienced small temblors that topped out at 2.9 on the Richter scale.

"These plants are built with a very large margin of safety," Sheehan said. For example, all nuclear reactors are built with equipment that determines seismic activity and can automatically shut down the reactor if necessary. Then what?

A danger still exists because of the time it takes to cool the reactor, Sheehan said.

That's why the reactor is built within steel-reinforced concrete walls and various levels of protection to prevent leakage, he said.

In 1979, a protective layer melted as a result of heat from the TMI reactor core, but for the most part the containment building "did its job" of keeping radiation from being released. Doesn't Japan have similar safeguards in place? Why didn't those work?

Kauffman said nuclear agencies will closely watch Fukushima to determine what went wrong and what lessons can be learned.

The country is not without its nuclear accidents. For example, in 1999, two workers died in a uranium accident at a Japanese nuclear plant. Some Japanese anti-nuclear activists say the country hasn't done enough to create contingency plans in case of earthquakes.

Representatives from Peach Bottom and Three Mile Island directed all questions about plant safety to the Nuclear Energy Institute. Also of interest - Three Mile Island emergency indelibly written into memories.

## **Vt., Nuclear Plant Appears Headed For Showdown (AP)**

By Dave Gram, Associated Press

Associated Press, March 11, 2011

MONTPELIER, Vt. – A long-awaited showdown between the state government and Vermont's lone nuclear plant is on, and neither side has given any indication it will back down.

The Vermont Yankee nuclear plant got the word Thursday that the federal Nuclear Regulatory Commission had approved its request for a 20-year license extension that would allow it to operate until 2032. There was nothing unique or surprising about the announcement — the NRC has never rejected a license extension.

What is unusual is that the plant is in a state where the governor wants it shut down, where the state Senate has voted 26-4 against the plant continuing to operate past March 2012 and where state law says the Legislature has to give the OK before regulators can give the plant a new state license.

The plant's owner, New Orleans-based Entergy Corp., has been running broadcast and newspaper ads touting the plant as a carbon-free source of electricity and warning of the dangers to the state's economy if Vermont loses its biggest source of power.

Entergy has been mostly mum about its strategy, but Chairman and CEO J. Wayne Leonard made clear in a conference call with investors last month that the company regards the decision about Vermont Yankee's future as a federal matter.

Vermont Yankee spokesman Larry Smith said Friday the company would not make Leonard available for a follow-up interview and would not discuss legal issues that might arise from the state's effort to shut it down.

A big question among lawmakers and others in Vermont is whether Entergy will file a lawsuit claiming that federal law pre-empts states from ordering the closure of a nuclear plant.

In his remarks on the investor call, Leonard stopped short of saying the company would do that but hinted broadly that it was ready for a fight.

"We want to be regarded as good partners with Vermont," Leonard said. "But at the same time, in some respects, we're being pushed into a bit of a corner here. And there's a point where there's a line in the sand and we've got to make a decision whether we're pushed any further or not."

He added, "We strongly believe that this is federal jurisdiction. We have choices that need to be made and we'll make them at the appropriate time."

When Entergy bought Vermont Yankee in 2002 from a group of New England utilities, it signed a memorandum of understanding with the sellers and with the state Department of Public Service. In it, the company promised not to seek federal pre-emption of a state ruling that blocked operation past 2012.

One possibility being talked about at the Statehouse this week is that the company could say it promised to comply with an order of the state Public Service Board. If the Legislature blocks the board from making an order, the company could say it has nothing with which to comply.

But the language of the 2002 agreement appears to block that path. In it, the company agrees to apply for a new state certificate of public good to operate the plant beyond 2012, and that will continue to operate only if that application is "made and granted."

Some wondered if the NRC might go to court with Entergy to block any move by the state that might be seen as threatening the agency's authority. But NRC Chairman Gregory Jaczko, in a conference call with reporters on Thursday, repeatedly said the state has a role in determining the plant's future.

Jaczko said there are "a variety of permits and requirements for this facility to operate," adding that, "I would defer any of those actions (aside from the NRC's approval) to the state or other authorities."

Elizabeth Miller, commissioner of the Vermont Department of Public Service, said she was pleased to hear that assurance from the NRC chairman.

"Vermont has made clear to Entergy that the state approval process is required and we expect that to be followed, and we're pleased that the NRC recognizes that as well," Miller said.

Richard Saudek, a former Vermont utility regulator who has advised lawmakers on issues related to Vermont Yankee, said: "I think everybody is expecting there will be litigation. But everybody's kind of hunkering in to see who makes the first move and what it might be."

## **Entergy Says Indian Point Is Safe In Earthquake Situation (MIDHUD)**

Mid-Hudson News, March 14, 2011

BUCHANAN — In the wake of radiation leaks following damage to nuclear power plants in Japan after the massive earthquake and tsunami struck Friday, the owner of the Indian Point nuclear power plant in Buchanan said Saturday the facility has many layers of protection.

"There are many layers of protection at nuclear power plants like Indian Point, including concrete walls around key components that are more than six feet thick, steel-lined fuel pools, two sets of diesel backup generators, a natural gas generator and equipment that is designed to safely shut down the plants after an earthquake," Indian Point spokesman Jerry Nappi said.

"In regard to the magnitude of earthquakes, in testimony before the NRC, Charles F. Richter, who developed the Richter scale, stated that the earthquakes in this region are 'of minor magnitude and relatively trivial'," Nappi said.

According to an August 2008 paper in the Bulletin of the Seismological Society of America, there are concerns. "A study by a group of prominent seismologists suggests that a pattern of subtle but active faults makes the risk of earthquakes to the New York City area substantially greater than formerly believed," the US Geological Survey reported. "Among other things, they say that the controversial Indian Point nuclear power plants, 24 miles north of the city, sit astride the previously unidentified intersection of two active seismic zones."

The report said lead author Lynn Sykes noted the data "show that large quakes are infrequent around New York compared to more active areas like California and Japan, but that the risk is high, because of the overwhelming concentration of people and infrastructure."

## **US Nuclear Output Rises On Boost To Comanche Peak 2 In Texas (BLOOM)**

By Colin McClelland



Bloomberg News, March 14, 2011

US nuclear-power output rose 0.4 percent as Energy Future Holdings Corp. boosted production by the Comanche Peak 2 reactor in Texas, the Nuclear Regulatory Commission said.

Output nationwide increased by 390 megawatts to 87,914 megawatts, or 87 percent of capacity, according to a report today from the NRC and data compiled by Bloomberg. Fourteen of the nation's 104 reactors were offline.

Energy Future raised output at the 1,150-megawatt Comanche Peak 2 to full power from 77 percent of capacity yesterday.

The Comanche Peak plant, which has two units, is 66 miles (106 kilometers) southwest of Dallas. The 1,200-megawatt Comanche Peak 1 was operating at full power.

PPL Corp. (PPL) boosted its 1,149-megawatt Susquehanna 1 reactor in Pennsylvania, 50 miles northwest of Allentown, to 17 percent of capacity from 9 percent yesterday. The 1,140-megawatt Susquehanna 2 unit was operating at 94 percent of capacity.

Some reactors close for maintenance and refueling during the spring and fall in the US, when demand for heating and cooling is lower. The outages can increase consumption of natural gas and coal to generate electricity.

The average US reactor refueling outage lasted 41 days in 2009, according to the Nuclear Energy Institute.

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## **Markey Slams Nuclear Agency Over Its Handling Of Pilgrim Security Breach (QPL)**

Quincy (MA) Patriot Ledger, March 14, 2011

Markey slams nuclear agency over its handling of Pilgrim security breach

GateHouse Media, Inc.

Thursday, March 10, 2011 12:00 AM

US Rep. Edward Markey is criticizing the Nuclear Regulatory Commission for failing to disclose details about a security issue that was discovered at the Pilgrim nuclear power plant last fall.

Markey sent a letter to NRC Chairman Gregory Jaczko last week that asked a series of questions about the unspecified security "deficiency." Most notably, Markey asked why the federal agency hasn't released details regarding the incident to the public.

The agency disclosed last week that an inspection in October and November discovered a security issue of "low to moderate significance" at the Plymouth plant, but the agency declined to specify what was found. An NRC spokesman said plant owner Entergy Corp. took immediate corrective actions to address the issue.

But Markey, in his letter, asked what kind of consequences Entergy will face for this most recent violation, and whether the NRC will impose higher penalties considering there have been 11 other security-related violations at Pilgrim since 2006. Markey also wants to know whether the agency has identified similar violations at other nuclear power plants.

Markey's congressional district north and west of Boston isn't near Plymouth. But Markey is one of the leaders on energy issues in Congress and has taken a keen interest in what happens at Pilgrim.

Neil Sheehan, a spokesman for the federal agency, said the agency decided several years ago that the appropriate response to such issues was to let the public know a security violation occurred without disclosing the details. This approach, Sheehan said, was based on balancing transparency with a desire not to indicate the nature of any security vulnerabilities to potential terrorists.

Markey's questioning comes as Entergy's request to renew its license for the Pilgrim plant is still pending before the NRC. A three-judge panel has been weighing the request to extend Entergy's license for another 20 years after it expires in 2012. The process has gone on for more than five years, setting a record with a sister plant in Vermont for the longest pending relicensing request for a nuclear plant.

The panel met in Plymouth on Wednesday to hold hearings on concerns raised by the Pilgrim Watch community group. Mary Lampert, the group's founder, testified on behalf of her organization. The concerns that Lampert says still need to be addressed by Entergy's license application include the potential aftereffects of a severe accident at Pilgrim and the safety of submerged electric cables at the plant's waterfront site.

Lampert said she welcomed Markey's scrutiny on the lapse in security at Pilgrim. Without more details, she said, the public has no way of knowing whether the security breach was a major issue or a minor one.

"If, in fact, whatever the security issue was has been fixed, then why can't we hear it?" she said. "If the public is never allowed to know what the problem was after it has been fixed, what assurance do we have that it's actually been fixed?"

Jon Chesto may be reached at [jchesto@ledger.com](mailto:jchesto@ledger.com).

By Anonymous  
Posted Aug 30, 2010 @ 07:01 AM  
Last update Aug 30, 2010 @ 05:49 PM

## Kansans Aglow Over Nuclear Power (PUEBLO)

By Strescino

Pueblo Chieftain, March 14, 2011

A county in Kansas, with the nuclear power plant closest to Pueblo, has risen from economic ashes as a result of the plant, officials there say.

Coffey County, in east-central Kansas, 115 miles east-northeast of Wichita, is home to Wolf Creek Generating Station Unit 1. The plant was commissioned in 1985 and had its license renewed in November 2008. The license expires in 2045.

The pressurized water reactor is 520 miles east of Pueblo.

This week, local lawyer Don Banner will seek permission from Pueblo County commissioners to begin the process of building a nuclear power plant here.

In calls to people in Coffey County, which encompasses several small towns and has a population of about 8,600 people, Wolf Creek was credited with renewing economic life in the county that "always battled with other Kansas counties for the position of poorest in the state," one man said.

County Treasurer Brenda Cherry said the plant brought more than \$27 million in property taxes to the county in 2010. Total property taxes in Coffey County last year was almost \$35 million, she said.

Residents around Wolf Creek were universally in favor of the reactor in telephone interviews. Only the state energy co-chairman of the Sierra Club had a negative reaction to the plant, and he said his doubts had little to do with potential environmental problems.

"Wolf Creek has been very positive for us," said Jon Hotaling, the county's economic development director. "During the 1980s, we got a new recreational center, new high school, new middle school and new elementary school and an airport built using taxes from the plant.

"In the '90s, we got all-new libraries, major hospital expansions, all-weather surfacing of roads, which was necessary partly because of the (Nuclear Regulatory Commission) regulations."

Hotaling, who in his job can be expected to gush over such subjects, said the community doesn't need to recruit heavy industry because Wolf Creek is leading the way.

He said 900 people work at the plant, and average jobs pay about \$65,000 a year. That works out to about \$58 million in wages annually.

Workers at the reactor live in a four-county area, he said, and at first fewer than half lived in Coffey County. "But we worked out the housing issues and now at least 60 percent live in the county."

The county is the only government that collects property taxes from Wolf Creek, but several efforts in the Kansas Legislature have been made to spread the money around the state.

"So far, we've been able to hold that off," Hotaling said.

The Coffey County commissioners have spread the money, on a per-capita basis, to the several small towns in the county, in what are called "infrastructure grants," he said.

"We were always in the running for the worst or next-to-worst economic county. Now we're always up to fifth or sixth best," Hotaling said.

He said he was at an economic development conference a few years ago when a speaker told the group that the way to economic prosperity was to build a nuclear power plant.

"I told him I thought he was absolutely right," Hotaling said.

Wolf Creek is one of 104 reactors in the United States, with four others currently OK'd for construction.

The plant is owned, judging by Cherry's detailed list of property-tax payers, by Kansas City Power & Light, which owns about half the business; Kansas Gas and Electric Co., 38 percent; Kansas Electric Power Cooperative, about 9 percent; and Western Energy, about 4 percent.

Coffey County gets none of its electricity from the plant.

A county worker contacted in Russellville, Ark., where Arkansas 1 and Arkansas 2 reactors are, praised the economic benefits of the plants, but did have a recommendation.

"It's created jobs and a lot of money, highly paid employees and lots of property taxes," said the man, who works for that city's emergency management staff. "The worst thing is what do we do with the waste.

"The biggest mistake we made was that his area gets no electricity from the plant. Pueblo should get assurances of getting cheap electricity from the developers before allowing the plant to be built."

The managing editor of the Coffey County Republican said that although his county gets no utility benefit from Wolf Creek, it's been a great deal for the people there.

"It's a lot of additional revenue for us," said Mark Petterson. "Our unemployment rate is below the state average. We always have the lowest rate in our part of the state, 6.4 percent in December."

Petterson said he has lived in the area most of his life and recalls there were a few protests when Wolf Creek was in the planning and construction phases, but not much since.

"Now it's not controversial at all. It's been very welcome in our community," he said. "They may occasionally have an event, but nothing serious. It's not a threat to public safety."

"The management there is very transparent. They live in the community. The NRC conducts routine inspections."

Petterson said an added economic benefit of the plant is that about every 18 months Wolf Creek has a planned "periodic outage."

"That brings in lots of temporary employees for two-three months, to inspect and work on the plant. About 1,500 extra employees come in," he said. "It really adds to the economy, hotels, motels and restaurants are filled. People rent out rooms of their homes to these workers."

Unable to find a dissenter within Coffey County, the next-best thing was Joe Spease, an energy co-chairman of the Kansas Sierra Club who lives in Overland Park, Kan., 80 miles from Wolf Creek.

"Wolf Creek is not an environmental problem, it's more of an economical problem," Spease said. "Yes, there are a huge amount of green-house gases emitted, but not during the steam process."

Spease said it's the costs of building and maintaining the plant that worries him. And the fact it could be a target of terrorists.

"The capital costs of a new nuclear plant will cost the consumers between \$6,000 and \$8,000 per kilowatt hour," he said. "Wind costs \$2,500 per kilowatt hour and coal, \$3,000 per kilowatt hour."

"The cost of electricity from a nuclear plant is unaffordable. Without huge taxpayer subsidies, nuclear power would not exist. The rates will triple and quadruple and the storage problem -- no one wants it."

Spease is a renewable-energy business owner.

He said that while the plant itself is almost impossible to penetrate, the waste — the spent fuel rods that by law can not be transported off-site — could be easy marks for terrorists.

"Terrorists will target the spent fuels," he said. "Just one small aircraft with C-4 (a plastic explosive 1.34 times more powerful than TNT) will destroy everything within a 50-mile radius," he said.

"Yes, nuclear plants are better planned and built today than in the 1970s, but they are also far more expensive and are subsidized by the taxpayer."

"I can almost guarantee, even with these improvements, there will be far more cancer in the area in the future because of Wolf Creek." More about Kansas

## **Southern's \$77 Million Spent-Fuel Storage Award Cut By Court (BLOOM)**

By William McQuillen

Bloomberg News, March 14, 2011

Southern Co. (SO)'s \$77 million legal award against the US government was cut about 78 percent by a federal court and further proceedings on damages were ordered.

The US Court of Appeals for the Federal Circuit in Washington today affirmed \$17 million of the initial July 2007 award, where Southern had claimed the Energy Department breached contracts by failing to accept spent nuclear fuel for storage. The Southern units sought damages for the cost of constructing storage facilities and additional costs at three power plants.

The ruling affirms the costs for one facility and sends the dispute on the other two back to a lower court. The US government had argued that Southern would have incurred the storage costs at the three plants even if the contracts weren't breached.

A lawyer for the units didn't immediately return a call seeking comment. Atlanta-based Southern is the biggest US utility owner by market value.

The case is Southern Nuclear Operating Co. v. US, 2008-5020, US Court of Appeals for the Federal Circuit (Washington).

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## **Unit 1 At Susquehanna Nuclear Plant In US Returns To Service (EGYBUS)**

Energy Business Review, March 14, 2011

The Unit 1 reactor at the Susquehanna nuclear power plant in Luzerne County, Pennsylvania, has returned to service.

Last week, the plant's operator PPL Corp shut down this unit for a maintenance work on a valve, which is part of a backup system that can provide cooling water to the reactor in the unlikely event normal systems became unavailable.

PPL chief nuclear officer Timothy Rausch said that in addition to working on the valve, plant personnel did a number of other maintenance tasks that can only be done when the unit is shut down.

The Unit 2 at the power plant continues to operate at full power, the company said.

The Susquehanna plant is owned jointly by PPL and Allegheny Electric Cooperative.

## **Nuclear Plants Refueling Outages Bring 2,550 Workers To Area (GBPG)**

By Warren Gerds

Green Bay (WI) Press-Gazette, March 14, 2011

Local businesses are booming during what is usually the quiet off-peak season as both the Kewaunee Nuclear Power Plant and Point Beach Nuclear Plant begin their refueling and maintenance outages. Kewaunee's outage began Feb. 26 and Point Beach's outage began March 1. Collectively, the outage has brought an additional 2,550 supplemental workers — 950 in Kewaunee and 1,600 at Point Beach — to the area for the monthlong projects.

Refueling outages occur every 18 months, and require the reactor to be shut down. Maintenance and routine inspections that cannot be performed when the plant is at full power is also done during the outage.

"We go in and replace one third of the fuel that is in there currently and we will re-rack the fuel that is staying in there," said Mark Kanz, local affairs manager at the Kewaunee Power Station.

"An outage is a very exciting time," said Sara Cassidy, communications manager for Next-Era Energy Resources, which owns and operates Point Beach Nuclear Plant, referring to the surge of activity at the plant and in the community. Although exciting, safety still remains the number one priority for the plants. Supplemental workers are thoroughly screened for the projects.

"It is just not anybody that can come and work at Point Beach. We still have very strict procedures and policies that need to be followed," said Cassidy. "But we are thankful for the additional supplemental workers who come to work side by side with us and then spend time in our local community and spend their hard earned dollars there."

And the influx of extra workers does make a difference to local businesses, and doubly so when both plants are in outages at the same time.

"Everybody's parking lots are full," said Vicki Vollenweider, owner of the Coho Motel in Kewaunee. "Both plants are doing work at the same time, so that makes it a little extra busy. They don't always land at the same time but on this go around they have."

Crews work 12-hour shifts with work continuing 24 hours a day to complete the refueling and maintenance as soon as possible.

Business is good not just in Kewaunee and Two Rivers but in neighboring communities as well. According to Scenic Shore Inn co-owner Bob Davis, hotels are filled in Algoma with workers having to find rooms as far away as Sturgeon Bay and Green Bay.

"This is the biggest workforce I have seen come over here," said Davis. "It is a big boost obviously to us and the all restaurants and grocery stores around here too. It has really helped out the whole economy."

Workers are filling usually vacant rooms, enjoying meals in restaurants and visiting bars and grocery stores.

"A lot of the guys will pick up something from the deli or store to take back to their room to eat after work," said Craig Peterman, owner of Algoma's Piggly Wiggly. "It is a great time of year for that as this is the typical time of year when we are a little bit slower."

Since the refueling outages occur on an 18-month cycle, many of the supplemental workers are repeat visitors to the area. For Michael Callsen, co-owner of the Cork Restaurant and Pub in Kewaunee, power plant outages mean both an increase in business as well as welcoming back some familiar faces.

"They come to town and you see them often, so when there is an outage, it is just like catching up with old friends," said Callsen, who said the pub has specials and organizes events to help make the workers feel welcome and at home away from home.

Vollenweider said that some workers have come from as far as California, South Carolina and Virginia and experiencing the cold temperatures and driving in the snow has been a big adjustment.

Another adjustment occurs for business owners challenged by winter utility costs and different housekeeping schedules to accommodate the 12-hour shifts that make operations a little different than servicing summertime guests. Even so, Vollenweider said she is glad to see the supplemental workers come to town.

"It is a different type of busy," said Vicki Vollenweider. "But it is definitely nice to have them here."

## **Minnesota Sponsors Of Nuclear-plant Bill Balk At Conditions (STPPP)**

### **Dayton wants three issues addressed**

By Dennis Lien

St. Paul Pioneer-Press, March 14, 2011

A top energy adviser for Democratic Gov. Mark Dayton laid out three conditions Friday to get the governor's support to lift a ban on new nuclear power, prompting resistance from several Republican backers.

The exchange between Deputy Commerce Commissioner Bill Grant and bill supporters took place at a House-Senate conference committee trying to reconcile different versions of legislation passed earlier this session.

Dayton has consistently opposed lifting a 17-year ban on new nuclear power plants, saying future ratepayers must be protected against up-front costs and later cost overruns, a clear plan must be provided for radioactive waste storage at new nuclear plants and no weapons-grade plutonium can be produced here.

The plutonium provision was added to a House bill approved last month but is not in the Senate version.

"The governor believes that all three of these issues need to be addressed before the ban on new nuclear plants is lifted," Grant, head of the agency's energy office, told the panel. "In other words, we're not interested in a two-out-of-three proposition."

Grant said Dayton is concerned that ratepayers in other states already have been asked to pay high up-front costs for projects.

While not calling the criteria prohibitive, the two chief sponsors of the bill, Senate Majority Leader Amy Koch, R-Buffalo, and Rep. Joyce Peppin, R-Rogers, saw them as big hurdles.

"It seems like the positions make it virtually impossible to make any of this happen," Peppin said.

The six-member committee, which met for the first time Friday, is working on a compromise that both bodies could pass again and send to Dayton.

Peppin said the committee could meet again as early as next week.

Minnesota has two nuclear plants, near Red Wing and Monticello. The ban on new plants was imposed in 1994 as part of a larger deal to allow high-level nuclear waste to be stored temporarily in the state.

In recent years, Republicans have pushed to overturn it, finally persuading the House and Senate, which are controlled by Republicans, to pass separate bills this year by large margins. The bills would lift a moratorium preventing state regulators from issuing permits for new nuclear plants.

## **High Five For GE-Hitachi New Reactor Design At NRC (ENERGYCOL)**

Energy Collective, March 14, 2011

GE-Hitachi is due a victory lap after learning this week that the NRC has issued the final safety evaluation report for the firm's 1,500 MW ESBWR reactor design.

It is a major milestone toward certifying the reactor for sale in the US. Because the NRC certification is considered to be the "gold standard" internationally in terms of regulatory scrutiny, this step will likely produce new interest in global markets and boost the reactor's prospects for sales.

The US Nuclear Regulatory Commission said in a press statement it issued a final safety evaluation report (FSER) and final design approval for GE-Hitachi's Economic Simplified Boiling Water Reactor (ESBWR).

The approval, which indicates the NRC finds the design technically acceptable but does not fully certify the design, is good for 15 years.

"The ESBWR is one final step away from becoming a reality," said Caroline Reda, (left) president and CEO of GEH. "The FSER and FDA mark a crucial step forward for the ESBWR's global commercial prospects. We appreciate the diligence of the NRC during the review process, which enables the ESBWR to remain on track to receive the NRC's final design certification by this fall."

US prospects improved over two years ago

Michigan utility DTE Energy has selected the ESBWR design for a potential reactor project, Fermi 3, next to its existing Fermi 2 plant south of Detroit. The NRC is currently reviewing DTE Energy's license application for the Fermi 3 project, which serves as the "reference combined license application" for the ESBWR design.

Assuming the auto industry comes back in Michigan, the car plants are going to need that electricity. Maybe to boost sales GE-Hitachi should take a page from Chrysler's playbook and start running TV ads like the two-minute macho masterpiece aired at the 2011 Superbowl.

A single ESBWR project would create several thousand construction jobs and several hundred permanent engineering positions while also creating opportunities for local equipment and service vendors.

#### International prospects better

Poland is proposing to build two nuclear power plants. GEH has been expanding its network of local equipment suppliers and engineering firms to prepare for potential reactor projects. In February 2011, GEH signed an MOU with the Institute of Atomic Energy in Poland (POLATOM), a research institute that advises the Polish government on nuclear energy issues.

In January 2011, in Gdansk, GEH signed preliminary agreements with Poland's Stocznia Gdansk, a major shipyard, and RAFAKO S.A., Europe's leading boiler equipment manufacturer, to pursue opportunities to build nuclear reactor components for GEH.

Separately, in February 2011, GEH and Lockheed Martin Corporation signed an agreement for Lockheed Martin Corporation to design and manufacture the main reactor control room systems for the ESBWR. It will be a digital system from the ground up.

#### India sticks it to US over liability law

Another of those key commercial prospects is India, which as part of its massive nuclear energy expansion program has identified a site that would feature multiple GEH ESBWR reactors. GEH CEO Caroline Reda has been gung ho in pursuit of business with India traveling there as part of an official US trade mission in February 2011.

To ink deals there, the Indian government will have to set aside a draconian supplier liability law that has locked out American firms from entering the market. Despite considerable diplomatic pressure, and a visit from President Obama last November, the Indian government hasn't budged on the issue.

Instead, it has inked deals with Russia's Atomstroyexport and French nuclear giant Areva. Two of the new Russian reactors, 1,000 MW VVER's, will be commissioned and enter revenue service this month.

#### Troubled past now overcome

The success this week at the NRC is a major turn around for GE-Hitachi. It hasn't always been this way. In the past three years, three major US utilities unceremoniously dumped the ESBWR as the referenced reactor design in their license applications for new reactors. Exelon, Entergy, and Dominion all changed their minds, albeit for different reasons.

Because of delays in the ESBWR reactor design certification process in 2008, the Department of Energy downgraded Exelon's application for a loan guarantee for the Texas site. Subsequently, Exelon changed its mind about a license application altogether and filed an Early Site Permit for the Victoria, Texas, site. It has proposed to build twin reactors there.

Entergy had plans to build new twin reactor sites in Louisiana and Mississippi. When the recession hit in 2008, it stopped work on both license applications and opted for an uprate to an operating reactor.

Dominion reconsidered a number of economic and technical factors and changed horses now referencing Mitsubishi's APWR reactor for its North Anna, Virginia site.

#### Final rule making ahead

NRC staff has spent approximately five years considering whether to certify the reactor. Separately, the NRC is considering GE-Hitachi's request to certify the design through rulemaking. The Commission is currently considering the NRC's staff's request to publish that proposed rule.

"Our technical experts have asked tough questions to ensure GE-Hitachi has appropriately addressed the NRC's requirements, and after their extensive technical evaluation they're satisfied with the ESBWR design," said Michael Johnson, director of NRC's Office of New Reactors.

"If the Commission agrees with the staff, we'll move on to fully certifying the design, incorporating it into our regulations using a rule-making process that includes a public comment period."

Neither a final design approval nor design certification grant permission to build or operate a reactor. Full certification, if granted by the Commission following the staff's recommendation, is valid for 15 years and allows a utility to reference the design when applying for a Combined License to build and operate a nuclear power plant. NRC has long sought standardization of nuclear power plant designs to help enhance safety and bring efficiency to the reactor licensing process.

#### Status of other reactor design certifications

The NRC has certified four other designs: the Advanced Boiling Water Reactor (ABWR), System 80+, AP600 and AP1000. The agency has issued proposed rules to certify revised versions of the ABWR and AP1000.

The staff is reviewing applications to certify two other designs: Areva's US Evolutionary Power Reactor (EPR) and Mitsubishi's US Advanced Pressurized Water Reactor (APWR).

The final rule on the AREVA EPR is due in winter 2013 according to a calendar published by the NRC.

The NRC has not published a date on its regulatory calendar for a final rule on the Mitsubishi APWR. Work on reactor license applications at Luminant's Comanche Peak (2 1700 MW APWRs) and Dominion's North Anna site (1 1500 MW APWR) has been delayed by 18 months by the NRC while it finishes design certification of the APWR.

The delays on the license applications are not seen as being that serious as neither utility is in a hurry to start construction. The reasons are the lack of federal loan guarantees and the need for improving demand for electricity.

ESBWR documents

The FSER will be available through the NRC's electronic documents database, ADAMS, by going to: and entering accession number ML103470210

More information about the ESBWR design review can be found on the NRC's website.

## **SRS Safeguards In Place In Case Of Disaster (AUGC)**

By Rob Pavey

Augusta Chronicle, March 14, 2011

Georgia isn't prone to catastrophic earthquakes, but nuclear facilities such as Plant Vogtle and Savannah River Site are nonetheless required to plan for the worst.

As part of a plan to add two reactors to the Vogtle site in Burke County, an 800-page safety evaluation report was prepared when regulators evaluated the project's vulnerability to earthquakes, plane crashes, floods, dam breaks, hurricanes – even tsunamis.

Every US nuclear power plant is designed to withstand the maximum projected earthquake in the sites geographic area.

Vogtle, like Savannah River Site and its facilities that store nuclear materials, has critically located seismic monitors that can record any movement.

Although severe quakes are rare along the East Coast, the Augusta region has a long history of smaller quakes.

For decades, scientists have monitored the region around the US Army Corps of Engineers' earth-and-concrete dam, which is outfitted with seismic monitors.

When the project took shape a half-century ago, contractors pumped hundreds of tons of concrete into cracked bedrock beneath the dam site that is part of a 250 million-year-old series of faults that run from Modoc, S.C., almost to Augusta.

According to the US Geologic Survey's National Earthquake Information Center in Golden, Colo., Thurmond Lake is one of the major earthquake centers in Georgia and South Carolina.

The largest quake measured at the dam, at magnitude 4.2, occurred Aug. 2, 1974.

## **Is The INL Nuclear Reactor At Risk If Earthquake Occurs? (KIFI)**

KIFI-TV Idaho Falls, ID, March 12, 2011

More explosions rocked one of the largest nuclear power plants in Japan following Friday's massive earthquake and tsunami. Residents were evacuated up to 12 miles away as rescue crews continue to search for survivors.

Many people in eastern Idaho are wondering if these images could ever happen here at home.

Idaho National Laboratory's emergency director Riley Chase said on Saturday that the nuclear test reactor outside of Idaho Falls is very different from the commercial reactors in Japan.

"A materials test facility runs at a much lower temperature and pressure for usually less than six weeks so, the margin of energy and safety build into the advanced test reactor is at a much lower level," said Chase.

Chase said that the INL is well aware of the active earthquake faults surrounding its nuclear facility, and safety measures are already in place.

"If we were to have a seismic event, the safety systems would shut that reactor down before you could even feel it personally yourself," said Chase.

Chase said that an emergency cooling system would automatically take over the reactor. According to Chase, the power source for cooling off the reactor should not suffer the same problems we are seeing in Japan.

"If we were to loose commercial power from a seismic event in the United States, we have diesel generators that run, and we have battery backed-up systems that will provide and constantly keep cooling until passive systems can take over," said Chase.

Chase also said that all employees are trained to act at a moments notice.

"We build procedures and processes so that we are ready the second it happens," said Chase.

However, the INL admits that it does not know everything, and they expect to learn from the mistakes made in Japan to better the safety procedures here in the US.

"We are interested in learning from any event that takes place, and take that back to what we have, and evaluate the applicability and how we would look at our systems and processes to minimize any chances of such an event in the future," said Chase.

According to INL, they have more than one million gallons of water on-site for cooling its nuclear reactor if an emergency occurs.

The INL has also extended an offer to Japan to provide service or expertise to help them during this time of need. They said that they are ready to send people if called upon.

## **Meeting About Beryllium Exposure Set For Monday (TRICITYH)**

By Annette Cary

Tri-City Herald (WA), March 14, 2011

RICHLAND -- The Department of Energy is bringing experts in beryllium exposure to the Tri-Cities to help former Hanford workers learn more about whether their health could be affected by the metal.

DOE has planned a meeting for former workers from 3:30 to 5 p.m. Monday at the Richland Red Lion Inn on George Washington Way.

Former employees might have been exposed to fine particles of beryllium when they worked at Hanford. In some people, it causes an incurable lung disease.

At least 32 workers have been diagnosed at Hanford with chronic beryllium disease, including 17 people still at the nuclear reservation. But that does not count people whose illness was not diagnosed while they still worked at Hanford.

Hanford contractors are conducting briefings for employees to learn more about beryllium. But DOE also wanted former employees to have a chance to learn more about beryllium, its hazards, how to be screened for chronic beryllium disease and financial compensation available for those who are ill.

It's the first beryllium information meeting DOE has held for former Hanford workers, said DOE spokesman Geoff Tyree.

Beryllium was used in the cladding for fuel fabricated at the Hanford 300 Area to produce plutonium at Hanford reactors. But fine particles of beryllium that may be inhaled also have been detected in buildings elsewhere at Hanford, including many buildings in central Hanford and buildings associated with the K Reactors.

It's also been found in buildings used by Pacific Northwest National Laboratory.

In some people, beryllium has no adverse effect, but in others their immune system sees beryllium as a foreign invader and builds an "army" of cells in the bloodstream that react to beryllium wherever they see it in the body. That can be detected in a blood test and those people are considered "beryllium sensitized" and at risk of developing chronic beryllium disease.

In addition to Hanford workers who have been diagnosed with chronic beryllium disease, another 113 workers have been diagnosed as beryllium sensitized since 1997.

There are no symptoms of beryllium sensitization, but people with chronic beryllium disease have scarring in their lungs. They might notice shortness of breath while walking, climbing stairs or other activity, as well as a dry cough that will not go away.

Some people also might experience fatigue, night sweats, chest and joint pain, and loss of appetite as the disease progresses.

Among those who will be speaking or answering questions at the Monday meeting are top decision makers in programs related to beryllium.

They include Dr. Sandy Rock; Mary Fields, the DOE program manager for the Former Worker Medical Screening Program; Doug Shoop, deputy manager of the DOE Richland Operations Office; Tracy Johnson of the national compensation program for ill nuclear workers and their survivors; and representatives of the Hanford Beryllium Awareness Group, including Tom Peterson, who is living with chronic beryllium disease.

The Beryllium Awareness Group requested the meeting.

Information tables will be set up to provide information on how to be screened for chronic beryllium disease and to help people apply for compensation under the Energy Employees Occupational Illness Compensation Program.

Read more: <http://www.tri-cityherald.com/2011/03/13/1406193/meeting-about-beryllium-exposure.html#ixzz1GZAb0rsV>

## **Experts Teach Hanford Workers About Beryllium (SEATIMES/AP)**



**The Department of Energy is bringing in experts to teach former Hanford Nuclear Reservation workers about beryllium exposure.**

Associated Press, March 14, 2011

RICHLAND, Wash. —

The Department of Energy is bringing in experts to teach former Hanford Nuclear Reservation workers about beryllium exposure.

Inhaling particles of the metal can cause incurable lung disease. The Tri-City Herald reports that at least 32 workers have been diagnosed at Hanford with chronic beryllium disease, including 17 people still at the nuclear reservation. But that does not count workers whose illness was not diagnosed before they left Hanford.

The Department of Energy says it wants to help former Hanford workers learn more about whether their health could be affected by the metal, how to get screened and how to obtain financial compensation available for those who are ill.

A meeting is scheduled for former workers Monday at a Richland hotel.

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Information from: Tri-City Herald, <http://www.tri-cityherald.com>

## **Bannister's Beryllium Threshold Far Exceeds Those At Other Plants (KCS)**

By KAREN DILLON

Kansas City Star, March 14, 2011

Ten years ago, officials at the Bannister Federal Complex said they had cleaned the bomb-parts plant of beryllium contamination and made it safe for workers.

But other plants have been cleaned to much higher standards.

Several other Department of Energy plants are at least five times more stringent than the Bannister plant in removing the dangerous carcinogen from walls, floors and ceilings.

An employee leader at the Energy Department's Hanford Site in Washington state, whose Cold War legacy includes beryllium contamination, was stunned when he learned about Kansas City's beryllium goal.

"That's way too high," said Mark Fisher, who is chairman of the Hanford Beryllium Awareness Group, an employee organization that shares oversight of beryllium standards.

"Somebody should be held liable or responsible. The way we do business at Hanford that would not be allowed at all."

Gayle Fisher, a spokeswoman for the plant, said Kansas City believed its standard was protective of workers and the public.

The plant's "beryllium management program has been developed and maintained with worker protection being the primary consideration," said Gayle Fisher, speaking for the Energy Department's National Nuclear Security Administration and its private contractor, Honeywell FM&T.

But documents obtained by The Kansas City Star also show:

- Another federal agency has been locked in a dispute for almost a decade with the operators of the Kansas City manufacturing plant in an effort to force a better cleanup in one part of the plant.

- Several years ago extremely high levels of beryllium were found in that area — after officials said the plant had been clean.

- Agencies disagree on whether it's been cleaned up.

A spokesman for US Rep. Emanuel Cleaver, a Kansas City Democrat, said it's time the Environmental Protection Agency stepped in.

"This is an example of why we think the EPA needs to be in charge of examining, testing and putting together the cleanup plan for the facility," Danny Rotert said.

The EPA acknowledges, however, that it so far has little legal standing to take charge of a cleanup at the Energy Department facility.

Beryllium has long been a concern among workers.

Last month The Star reported that the medical arm of the Energy Department found that an unusually high number of Kansas City plant workers have become ill from exposure to beryllium for unknown reasons.

Studies have shown that any exposure to beryllium can lead to disease that can scar the lungs, and it also may affect lymph nodes, liver, kidneys and heart. The disease can take as long as 30 years to develop.

More than a decade ago, the Energy Department established several beryllium standards for its about two dozen nuclear arms complexes. Those standards included air and equipment surfaces — but not specifically walls, floors and ceilings.

Gayle Fisher said the Kansas City plant took the initiative and established its own goal of 1 microgram of beryllium per 100 square centimeters for those surfaces.

The plant "has adequate worker protection controls and is in compliance with DOE's beryllium regulations," she said.

But it's not safe, said Mike Van Dyke, one of the nation's leading industrial hygienists in the handling of beryllium.

Most complexes adopted a 0.2-microgram standard years ago, he said.

"These are established ways of doing things," Van Dyke said.

Four other complexes checked by The Star adopted a standard of 0.2 micrograms or less.

The Hanford Site adopted 0.2 micrograms years ago, said Mark Fisher, the Hanford energy worker. In recent years, Hanford has adopted an even more stringent standard of 0.1 micrograms, he said.

Documents show that Oak Ridge Y-12 Plant in Tennessee adopted the 0.2 standard by 2001.

Pantex, located in the Texas Panhandle, and Lawrence Livermore in California, also have adopted at least a 0.2, according to their Chronic Beryllium Disease Prevention Programs.

Gayle Fisher acknowledged that plants may be using different standards.

The Kansas City plant "contacted professionals in the beryllium field to identify best practices for worker protection," she said.

The beryllium cleanups came after the Energy Department announced in 1999 that it had found significant beryllium contamination in 26 of its bomb-making factories around the country. About 26,000 workers were believed to have been exposed.

In Kansas City, beryllium had been found in more than a dozen areas in the plant, and the Energy Department ordered the cleanup to be done by January 2002. A Honeywell spokeswoman said in 2001 that the cleanup would be finished four months early.

Honeywell officials also told The Star in 2000 that plant management had taken significant steps over the past four decades to limit employees' exposure to beryllium.

In fact, a spokeswoman said the plant had never had a confirmed case of chronic beryllium disease.

"This facility from a safety standpoint is at world-class levels," she said.

Within a year, however, about 35 employees were found who were either sick from beryllium or had been exposed to beryllium. Exposure to beryllium can lead to chronic beryllium disease or lung cancer.

Subsequent testing of current and former employees also found more beryllium cases. A 2009 Energy Department health report said the number of beryllium-related illnesses was higher than expected considering the limited amount of beryllium that plant officials said was used over several decades.

Honeywell continues to say there should be little danger for employees.

"With current controls in place, the (plant) is in compliance with applicable regulations to protect worker health and the environment," Tanya Snyder, Honeywell's spokeswoman, wrote in an e-mail this year.

But high beryllium levels were found in the plant even after the 2001 cleanup had been pronounced complete, according to the documents obtained by The Star.

Honeywell and the Energy Department's National Nuclear Security Administration (NNSA) sampled a 300,000-square-foot area from 2002 to 2004. It found some readings as low as "undetectable" and some as high as 50 micrograms of beryllium per 100 square centimeters — 50 times higher than the plant's own standard — according to the documents.

Those high samples come as a surprise to Kansas City Councilman John Sharp, who represents District 6, where the plant is located.

Honeywell and NNSA never announced those findings.

"It's shocking that the public and employees were told this was cleaned up and the government's own inspectors found such horrendous levels of contamination after the entire plant was supposedly cleaned up," he said.

"The Department of Energy and NNSA have to be candid with elected officials, workers and the public."

Gayle Fisher, who would only respond to questions by e-mail, said recently that the areas with high readings had been cleaned up. She said the documents demonstrated that.

"Any suggestion that cleanup has not been performed or there is a lack of worker protection controls in place would be errant and misleading," she wrote.

However, Van Dyke and environmental experts with General Services Administration and the Missouri Department of Natural Resources reviewed the documents and say they saw no evidence that a cleanup was done.

"Some of the areas that (the documents say) have been decontaminated still show high levels of beryllium," said Angela Brees, a spokeswoman for GSA, which has office space at the plant.

Brees said she also asked NNSA recently for a cleanup plan of the area but never got one.

"I said if you guys have a cleanup plan that would sort of be the end of it," Brees said.

Cleanup battle

Aside from the argument over whether those sampled areas with very high levels have been cleaned, another struggle has been going on since 2002.

The documents detail the long debate between GSA and NNSA over a general cleanup of beryllium in the 300,000-square-foot area to at least a 0.2 standard.

Back in the 1970s, GSA, the federal government's property manager, took ownership of a large portion of the main building. It then leased the 300,000-square-foot area to the Energy Department.

In 2001, Honeywell and NNSA decided to give up use of the area — but now, after years of dickering, GSA may not want it back.

The documents belong to GSA and show the agency's unsuccessful attempts to get Honeywell and NNSA to do a general cleanup of the area, which has been converted to non-beryllium manufacturing and storage. Recently, a Honeywell spokesman said about 15 people still work in the area.

The documents include meeting notes, e-mails, letters, sampling results, studies and reports, and cover a period from 2002 to present.

Highlights:

- After years of negotiation, Honeywell and NNSA said in 2009 they did not feel that it was feasible to do a general cleanup of the area to a 0.2 level. Such a cleanup could be expensive and time-consuming because if even one follow-up sample registered high, another cleanup would have to be done.

- Honeywell and NNSA officials finally decided to wait until 2013 or 2014 to do the cleanup. Honeywell expects to move by 2014 to a new plant.

- Not only did GSA want a cleanup — it finally decided it wanted beryllium to be undetectable in the area.

GSA shared a report with Honeywell and NNSA showing that any level of beryllium is dangerous to some people.

NNSA's reaction was unclear in the documents.

"We did share the information with NNSA from the report," said Kevin Santee, a GSA industrial hygienist. "They didn't have a response at that time. They didn't provide a response later."

In fact, GSA officials proposed conducting their own sampling of the property in 2009. But NNSA officials did not give permission, saying there was no rush to give the space back to GSA. NNSA had decided to continue using the property until a new \$1 billion plant was built near the former Richards-Gebaur Airport in south Kansas City.

"At this point NNSA believes additional sampling of the space is premature," wrote Robert Nowak, an NNSA facilities manager, in a letter.

"It is anticipated that this sampling would take place in the 2013 timeframe. This would allow time for the planning and execution of any corrective actions deemed necessary."

Partly because of the beryllium disagreement, GSA now plans to swap properties with NNSA so it will not have to deal with the area, which GSA officials called "contaminated."

GSA took the right stand on a cleanup, said Van Dyke, the industrial hygienist with National Jewish Health, a respiratory disease hospital that treats beryllium cases from the Honeywell plant.

Once the plant realized it had such high levels of beryllium, it should have done more sampling and completed a comprehensive, scientific cleanup, he said.

"GSA is right on the money," he said.

US Sen. Roy Blunt found it all to be alarming.

"The fact that two groups of bureaucrats have been privately fighting for a decade over who is responsible for cleaning up toxic material while employees work nearby is appalling and beyond irresponsible," the Missouri Republican said.

"The employees' safety at the facility must be a priority, and I'm working to make sure this situation is solved immediately."

Read more: <http://www.kansascity.com/2011/03/12/2721475/bannisters-beryllium-threshold.html#ixzz1GZAJq8xj>

## **Beryllium level at KC complex exceeds other sites (SLPD)**

St. Louis Post-Dispatch, March 14, 2011

The level of the dangerous carcinogen beryllium permitted at a Kansas City federal complex where workers have complained of health problems far exceeds the limit at other plants, the Kansas City Star has found.

The newspaper also reported on Sunday that the plant's own threshold was still surpassed in government testing.

The Energy Department previously established beryllium standards that apply to such things as air and equipment surfaces but not specifically walls, floors and ceilings.

The Kansas City plant established its own goal of 1 microgram of beryllium per 100 square centimeters for those surfaces, said Gayle Fisher, speaking for the Energy Department's National Nuclear Security Administration and its private contractor, Honeywell FM&T. She said it offered protection to workers at the Bannister Federal Complex, which has housed a Department of Defense landfill and manufacturing sites for weapons parts and aircraft.

But Mike Van Dyke, one of the nation's leading industrial hygienists in the handling of beryllium, said most complexes adopted a 0.2-microgram standard years ago.

The standard in place at the Kansas City plant stunned Mark Fisher, who is chairman of an employee organization that shares oversight of beryllium standards at the Energy Department's Hanford Site in Washington state.

"That's way too high," Fisher said.

He said the Hanford Site has adopted an even more stringent standard of 0.1 micrograms in recent years after previously adhering to the 0.2 standard.

Plants adhering to the 0.2 standard include the Oak Ridge Y-12 Plant in Tennessee, the Pantex facility in the Texas Panhandle and Lawrence Livermore in California.

Gayle Fisher acknowledged that plants may be using different standards. But she said the Kansas City plant "contacted professionals in the beryllium field to identify best practices for worker protection."

The Kansas City Star also reported that documents it obtained found that several government inspections detected levels of beryllium that far exceeded the plant's own guidelines after officials said it had been cleaned a decade ago. Some readings were as high as 50 micrograms of beryllium per 100 square centimeters.

But Honeywell and the Energy Department's National Nuclear Security Administration never announced those findings.

"It's shocking that the public and employees were told this was cleaned up and the government's own inspectors found such horrendous levels of contamination after the entire plant was supposedly cleaned up," said Kansas City Councilman John Sharp, who represents District 6, where the plant is located.

Gayle Fisher, who only responded to questions by e-mail, said recently that the areas with high readings had been cleaned up. She said the documents demonstrated that.

"Any suggestion that cleanup has not been performed or there is a lack of worker protection controls in place would be errant and misleading," she wrote.

However, Van Dyke and environmental experts with General Services Administration and the Missouri Department of Natural Resources reviewed the documents and say they saw no evidence that a cleanup was done.

"Some of the areas that (the documents say) have been decontaminated still show high levels of beryllium," said Angela Brees, a spokeswoman for GSA, which has office space at the plant.

Brees said she also asked NNSA recently for a cleanup plan of the area but never got one.

"I said if you guys have a cleanup plan that would sort of be the end of it," Brees said.

## **INTERNATIONAL NUCLEAR NEWS:**

### **Japanese Survivors Worry About Dwindling Supplies, Food After Devastating Earthquake, Tsunami (WP)**

By Chico Harlan

Washington Post, March 14, 2011

TOKYO — Overwhelmed by a still-growing catastrophe, Japanese authorities struggled Monday to reach buried survivors and the missing, faced roadblocks in delivering aid and raced to contain an expanding nuclear emergency.

Prime Minister Naoto Kan called the crisis the country's toughest challenge since World War II and said that decimated towns along the northeastern coastline were not yet getting the food and supplies they needed.

A series of unstable nuclear plants across the country threatened to compound the nation's difficulties, which started with Friday's double-barreled disasters: first an 8.9-magnitude earthquake, then a tsunami. At the Fukushima Daiichi nuclear plant, one containment building housing an overheated reactor had already exploded. A top Japanese official feared the same might soon happen at a second unit.

With a government spokesman saying that the units could be in partial meltdown, an alarmed public struggled to understand the safety implications of trace radiation leakage, even as the government said that public safety was not in danger.

The economic toll of the disaster was evident on Monday as Japanese stock markets fell more than 5 percent and the Nikkei index of major Tokyo Stock Exchange companies dropped sharply as trading opened for the first full day since the earthquake and tsunami struck.

People here are frightened by what they can't see and shocked by what they are seeing. Entire towns have been swamped, and the hardest-hit areas still don't have what they need, according to those in shelters and those organizing relief efforts. There's not enough food, not enough water and, in many places, no heat. Tens of thousands remain missing, beyond the reach of rescue workers.

As the official death toll surpassed 1,000, the police chief of Miyagi Prefecture, among the hardest-hit northeastern regions, said Sunday that there is "no question" that at least 10,000 people in the prefecture of 2.3 million are dead. Other prefectures in the northern part of Japan's main Honshu island could face similar tolls.

One Red Cross official said that in the Pacific coast town of Ishinomaki, the local hospital feared it was about to run out of food and milk for babies. Most gas stations along the main roads heading north from Tokyo do still have gas — but lines snake around for several blocks.

Amid all this, Japan has mobilized 100,000 troops — a doubling of the force that had been called into action a day earlier — who are racing to rescue those in towns that were swept away. Kan said the government was exploring the possibility of delivering food by sea or air, given the problems with roads en route to the north.

Because the damaged nuclear plants have left the country with a depleted energy supply, Japan on Monday will begin a series of rolling blackouts across a slice of the country that includes Tokyo, home to about 13 million. Kan approved the measure even though the scheduled outages — a first for modern Japan — will impede business as this economically wounded country returns to work. If the country cannot save energy, officials said, unplanned blackouts could turn much of the country dark and add one more barrier for rescue workers.

Updated Google Earth images showed aerial-view photos of towns where a mosaic of colorful rooftops had been churned into mush. In the coastal town of Rikuzentakata, in hard-hit Iwate Prefecture, only 5,900 of the town's 23,000 residents have taken shelter, according to the Kyodo news service. The rest were unaccounted for.

Youka Ishi, who works at a town office two miles from the Miyagi Prefecture coast, said that roughly 2,700 buildings closer to the water "have been swallowed by the wave, and there is nothing left."

"I know, through my work as a welfare worker, about 40 or 50 elderly people in that area," Ishi said. "Not one of them have I been able to contact, or even see just the face of."

In Sendai city, which was hit hard along its coast, between 400 to 500 people stayed Sunday night at a shelter in the undamaged prefectural office. Those who went outside could still see a fire smoldering somewhere along the coastline.

Cameron Peek, a 23-year-old American who teaches English in Sendai city, was staying at the shelter. "We have enough space and food," he said. "People have been taking cardboard boxes from convenience stores and making beds. Everybody seems pretty spent."

Japan's government on Sunday broadened efforts to cope with the disaster, with its central bank approving more than \$650 million in loans to banks in the hardest-hit areas. Japan's parliament was temporarily suspended as officials deal with the crisis.

Authorities here have received criticism for their handling of the nuclear emergency — particularly their communication to the public. In a Sunday editorial, the Yomiuri Shimbun, Japan's largest newspaper, took aim at the government's response time in explaining, or even acknowledging, the Saturday explosion at the Fukushima Daiichi plant. Only five hours after the explosion did Chief Cabinet Secretary Yukio Edano say that no radioactive substances had been leaked as a result of the blast.

Engineers are now rushing to stabilize at least two overheated reactors by injecting seawater into their cores. Japanese officials say minute quantities of radiation have already been released, and hundreds of people in Fukushima Prefecture are being tested for radiation exposure. Nuclear engineering experts say the evidence points to severe damage to the uranium fuel rods in Fukushima Daiichi unit 1, a situation they classify as a partial meltdown. If the cores cannot be cooled sufficiently, a total meltdown could ensue, exposing the fuel rods to the outside air and further spreading radiation.

The government also said it would distribute potassium iodide pills to those in the vicinity of the plant.

The United States has sent a disaster team to Tokyo that includes both government nuclear experts and rescue squads. The United States has already dispatched troops, and a nuclear-powered aircraft carrier, to assist with efforts in the north of the country.

Meanwhile the State Department said that US citizens, including government workers on nonessential business, "should avoid travel to Japan at this time." In the three days since the offshore earthquake, Honshu island has suffered hundreds of aftershocks, with experts expecting more over the next several weeks.

Along the arteries that connect Tokyo with towns that are most in need of supplies and assistance, travelers encountered mudslides and fuel shortages, even less than 100 miles north of Tokyo.

The shelves of the Family Mart convenience store in Kagamiishi, Fukushima Prefecture, were wiped clean, save for alcohol and condiments.

At the store, Miki Arai packed what few supplies were available into a cardboard box. Arai had scheduled a vacation from his job as an IT engineer in Tokyo when the earthquake hit two days earlier. He left the city Sunday morning hoping to help in Sendai however he could — a one-man rescue team. He took trains as far north as he could, then rented a motorbike. As he latched the box of supplies to the back of his bike, Arai explained that he had given up on Sendai.

"It's too far, there's no gas to get back, and it's easier to reach to evacuated tsunami victims closer to Fukushima," Arai said.

### **3 Injured, 7 Missing In Blast At Japan Nuke Plant (AP)**

Associated Press, March 14, 2011

TOKYO – Tokyo Electric Power Co. says three workers have been injured and seven are missing after an explosion at the stricken Fukushima Dai-ichi nuclear plant.

Japan's chief cabinet secretary says a hydrogen explosion occurred Monday at the facility's Unit 3. The blast was similar to an earlier one at a different unit at the facility.

Yukio Edano says people within a 12-mile (20-kilometer) radius were ordered inside following the blast. AP journalists felt the explosion 25 miles (40 kilometers) away.

Edano says the reactor's inner containment vessel holding nuclear rods is intact, allaying some fears of the risk to the environment and public.

More than 180,000 people have evacuated the area in recent days.

THIS IS A BREAKING NEWS UPDATE. Check back soon for further information. AP's earlier story is below.

TOKYO (AP) — Japan's chief cabinet secretary says a hydrogen explosion has occurred at Unit 3 of Japan's stricken Fukushima Dai-ichi nuclear plant. The blast was similar to an earlier one at a different unit of the facility.

Yukio Edano says people within a 12-mile (20-kilometer) radius were ordered inside following Monday's. AP journalists felt the explosion 30 miles (50 kilometers) away.

Edano says the reactor's inner containment vessel holding nuclear rods is intact, allaying some fears of the risk to the environment and public.

The No. 3 Unit reactor had been under emergency watch for a possible explosion as pressure built up there following a hydrogen blast Saturday in the facility's Unit 1.

More than 180,000 people have evacuated the area.

### **Stricken Reactors Defy Technicians' Best Efforts To Contain The Damage (NYT)**

By Hiroko Tabuchi and Matthew L. Wald

New York Times, March 14, 2011

TOKYO – A second explosion rocked a troubled nuclear power plant Monday, blowing the roof off a containment building but not harming the reactor, Japanese nuclear officials announced on public television.

The explosion underscores the difficulties Japanese authorities are having in bringing several stricken reactors under control three days after a massive earthquake and a tsunami hit Japan's northeast coast and shut down the electricity that runs the crucial cooling systems for reactors.

Operators fear that if they cannot establish control, despite increasingly desperate measures to do so, the reactors could experience full meltdowns, which would release catastrophic amounts of radiation.

It was unclear if radiation was released from the explosion, but a similar explosion at the plant over the weekend did release radioactive material.

Chief Cabinet Secretary Yukio Edano said that the release of large amounts of radiation was unlikely. But traces of radiation could be released into the atmosphere, and 600 people who remained within a 12 mile radius have been ordered to take cover indoors, he said.

The nuclear power watchdog said readings taken soon after the explosion showed no big change in radiation levels around the plant.

"I have received reports that the containment vessel is sound," he said. "I understand that there is little possibility that radioactive materials are being released in large amounts."

Twenty-two people who live near the plant are already showing signs of radiation exposure from earlier radiation releases at the plant, but it is not clear if they received dangerous doses.

Technicians had been scrambling most of Sunday to fix a mechanical failure that left the reactor far more vulnerable to explosions.

The two reactors where the explosions occurred are both presumed to have suffered partial meltdowns. The reactors are both at the Fukushima Daiichi Nuclear Power Station, where another reactor is also having difficulties.

The Fukushima Daiichi plant and the Fukushima Daini power station, about 10 miles away, have been under a state of emergency.

On Monday morning, the company that operates both plants said it had restored the cooling systems at two of three reactors experiencing problems at Daini. That would leave a total of four reactors at the two plants with pumping difficulties.

"I'm not aware that we've ever had more than one reactor troubled at a time," said Frank N. von Hippel, a physicist and professor at Princeton, explaining the difficulties faced by the Japanese.

"The whole country was focused on Three Mile Island," he said, referring to the Pennsylvania nuclear plant accident in 1979. "Here you have Tokyo Electric Power and the Japanese regulators focusing on multiple plants at the same time."

In what was perhaps the clearest sign of the rising anxiety over the nuclear crisis, both the United States Nuclear Regulatory Commission and the Russian authorities issued statements on Sunday trying to allay fears, saying they did not expect harmful levels of radiation to reach their territory.

Late Sunday night, the International Atomic Energy Agency announced that Japan had added a third plant, Onagawa, to the list of those under a state of emergency because a low level of radioactive materials had been detected outside its walls. But on Monday morning, it quoted Japanese authorities as saying that the radioactivity levels at the Onagawa plant had returned to normal levels and that there appeared to be no leak there.

"The increased level may have been due to a release of radioactive material from the Fukushima Daiichi nuclear power plant," the agency said. The Onagawa and Daiichi plants are 75 miles apart. The operator of the Onagawa plant, Tohoku Electric Power, said levels of radiation there were twice the allowed level, but did not pose health risks.

Soon after that announcement, Kyodo News reported that a plant about 75 miles north of Tokyo was having at least some cooling system problems. But a plant spokesman later said a backup pump was working.

The government was scrambling to test people who lived near the Daiichi plant, with local officials saying that about 170 residents had probably been exposed. The government earlier said that three workers had radiation illness, but Tokyo Electric Power, which runs Fukushima Daiichi and Daini, said Monday that only one worker was ill.

The worst problems continued to be at Fukushima Daiichi, and appeared to be the most serious involving a nuclear plant since the Chernobyl disaster. Officials have said they presume that two of the stricken reactors at the plant suffered a partial meltdown of the reactor core – a dangerous situation that, if unchecked, could lead to a full meltdown and the likelihood of a catastrophic release of radiation.

A partial meltdown can occur when radioactive fuel rods, which normally are covered in water, remain partially uncovered for too long. The more the fuel is exposed, the closer the reactor comes to a full meltdown.

Technicians are essentially fighting for time while heat generation in the fuel gradually declines, trying to keep the rods covered despite a breakdown in the normal cooling system, which runs off the electrical grid. Since that was knocked out in the earthquake, and diesel generators later failed – possibly because of the tsunami – the operators have used a makeshift system for keeping cool water on the fuel rods.

Now, they pump in new water, let it boil and then vent it to the atmosphere, releasing some radioactive material. But they are having difficulty even with that, and have sometimes allowed the water levels to drop too low, exposing the fuel to steam and air, with resulting fuel damage.

On Sunday, Japanese nuclear officials said operators at the plant had suffered a setback trying to bring one of the reactors under control when a valve malfunction stopped the flow of water and left fuel rods partially uncovered. The delay raised pressure at the reactor.

At a late-night news conference, officials at Tokyo Electric Power said that the valve had been fixed, but that water levels had not yet begun rising. Chief Cabinet Secretary Yukio Edano said the situation was unchanged Monday morning.

Hiroko Tabuchi reported from Tokyo, and Matthew L. Wald from Washington. Michael Wines contributed reporting from Koriyama, Japan, and Ellen Barry from Moscow.

## **Japanese Nuclear Plants' Operator Scrambles To Avert Meltdowns (WP)**

By Chico Harlan And Steven Mufson

Washington Post, March 14, 2011

TOKYO — Japanese authorities said Sunday that efforts to restart the cooling system at one of the reactors damaged by Friday's earthquake had failed, even as officials struggled to bring several other damaged reactors under control.

Workers at the Fukushima Daiichi nuclear plant have not found a way to stabilize overheated reactors and feared the possibility of partial nuclear meltdown, which could potentially cause a further release of radioactive material, Japan's top government spokesman said Sunday. Engineers were having trouble, in particular, with two units at the nuclear facility — one of which lost its outer containment wall Saturday in an explosion.

Meanwhile, officials declared a state of emergency at a nuclear power plant in Onagawa, where excessive radiation levels were reported.

Chief Cabinet Secretary Yukio Edano said a similar explosion could soon occur at Fukushima Daiichi's unit 3, the result of hydrogen levels that are increasing within the unit's reactor vessel amid last-ditch efforts to keep fuel rods submerged in water. Already, trace amounts of radioactive material have leaked from the No. 3 reactor, Edano said.

"At the risk of raising further public concern, we cannot rule out the possibility of an explosion," Edano said.

But Edano also insisted that an explosion would have no impact on human health. Based on initial findings from the government and from Japan's nuclear agency, the Saturday explosion in unit 1 did not damage the reactor vessel, and the government said that the unit 3 reactor vessel would also withstand an explosion. The reactor vessels of No. 3 and No. 1 are being flooded with seawater and boron in an emergency attempt to keep the units cool after the plant lost its main power supply and a backup system failed.

Though the third unit is being filled with water, its gauge inside does not register the rising levels, Edano said. He did not have an explanation.

"If the cooling system is not maintained, there is a good chance the core could start melting down," said Masahi Gota, a former Toshiba engineer who was involved in the design of the containment vessel for these nuclear reactors.

Richard Lester, co-chair of the Department of Nuclear Science and Engineering at MIT, said: "The most important task that the operators have — and have had for last 36 hours — is to keep the fuel in the reactor covered, submerged in water. If they succeed in doing that, keeping the fuel rods covered in water, the likelihood of significant damage to the fuel is low. If they cannot keep the fuel covered with water, then you have the possibility of melting."

Some 170,000 people have been evacuated around a 12-mile radius of the plant. They join more than 450,000 other evacuees from other quake- and tsunami-affected regions. A spokesman for Japan's nuclear agency said as many as 160 people may have been exposed to radiation and were being tested at a hospital to determine if levels were dangerous.

"Only the gravest danger would justify an evacuation at such a moment," said Peter Bradford, a former commissioner at the US Nuclear Regulatory Commission.

Edano said officials were acting on the assumption that a meltdown could be underway at Fukushima Daiichi's unit 3, and that it was "highly possible" a meltdown was underway at its unit 1 reactor, where an explosion destroyed a building a day earlier.

Authorities made preparations to distribute potassium iodide pills and warned people in the vicinity to stay inside and cover their mouths if they ventured outdoors.

Tokyo Electric Power, owner of the two heavily damaged complexes, took the unprecedented step of pumping seawater mixed with boric acid into Fukushima Daiichi's unit 1 reactor to tame ultra-high temperatures from fuel rods that had been partially exposed. In keeping with the natural as well as mechanical challenges of the week, the company had to delay the plan briefly after another, more mild, earthquake rocked the area and led to another tsunami warning.

Tokyo Electric said it had also vented or planned to vent steam and gas containing small amounts of radioactivity from six of its other reactor units. One worker died after being trapped in an exhaust stack, the company said, and another was hospitalized for radiation exposure.

The explosion inside Fukushima Daiichi unit 1 destroyed a building that housed both the reactor vessel and its containment structure. It was caused by hydrogen, which nuclear experts said could only have been produced from inside the reactor vessel by the exposure of zirconium cladding that surrounds the fuel rods. Those rods are supposed to be covered by water, but at very high temperatures, steam reacts with the zirconium and produces hydrogen.

When pressure rose in the reactor vessel, it vented the gas into the containment structure and then into the outer building. Experts think devices designed to ignite the hydrogen before it reached dangerous levels were not working, because of power failures.

Those power failures helped start the crisis at the nuclear plants. After grid power was knocked out by the quake, the tsunami flooded and disabled backup diesel generators and battery power ran out. Margaret Harding, a US nuclear-safety



consultant in touch with experts in Japan, said the entire complex was blacked out for a period of time before new backup generators arrived.

Another indication that the fuel rods in Fukushima Daiichi unit 1 were exposed is that Japan's Nuclear and Industrial Safety Agency (NISA) said Saturday that the reactor could be nearing a meltdown and that two radioactive substances, cesium and radioactive iodine, had already been detected nearby.

## **Officials Struggle To Prevent Meltdown At Two Reactors (WSJ)**

By Yuka Hayashi

Wall Street Journal, March 14, 2011

Full-text stories from the Wall Street Journal are available to Journal subscribers by clicking the link.

## **Radioactive Releases In Japan Could Last Months, Experts Say (NYT)**

By David E. Sanger and Matthew L. Wald

New York Times, March 14, 2011

WASHINGTON — As the scale of Japan's nuclear crisis begins to come to light, experts in Japan and the United States say the country is now facing a cascade of accumulating problems that suggest that radioactive releases of steam from the crippled plants could go on for weeks or even months.

The emergency flooding of two stricken reactors with seawater and the resulting steam releases are a desperate step intended to avoid a much bigger problem: a full meltdown of the nuclear cores in two reactors at the Fukushima Daiichi Nuclear Power Station. So far, Japanese officials have said the melting of the nuclear cores in the two plants is assumed to be "partial," and the amount of radioactivity measured outside the plants, though twice the level Japan considers safe, has been relatively modest.

But Pentagon officials reported Sunday that helicopters flying 60 miles from the plant picked up small amounts of radioactive particulates — still being analyzed, but presumed to include Cesium-137 and Iodine-121 — suggesting widening environmental contamination. In a country where memories of a nuclear horror of a different sort in the last days of World War II weigh heavily on the national psyche and national politics, the impact of continued venting of long-lasting radioactivity from the plants is hard to overstate.

Japanese reactor operators now have little choice but to periodically release radioactive steam until the radioactive elements in the fuel of the stricken reactors stop generating intense heat, a process that can continue for a year or more even after the fission process has stopped. To control that heat, the plant's operator must constantly try to flood the reactors with seawater, then release the resulting radioactive steam into the atmosphere, several experts familiar with the design of the Daiichi facility said. That suggests that the 200,000 people who have been evacuated may not be able to return to their homes for a considerable period and that shifts in the wind could blow radioactive materials toward Japanese cities rather than out to sea.

Re-establishing normal cooling of the reactors would require restoring electric power — which was cut in the earthquake and tsunami — and now may require plant technicians working in areas that have become highly contaminated with radioactivity.

More steam releases also mean that the plume headed across the Pacific could continue to grow. On Sunday evening, the White House sought to tamp down concerns, saying that modeling done by the Nuclear Regulatory Commission had concluded that "Hawaii, Alaska, the US Territories and the US West Coast are not expected to experience any harmful levels of radioactivity."

But all weekend, after a series of intense interchanges between Tokyo and Washington and the arrival of the first American nuclear experts in Japan, officials said they were beginning to get a clearer picture of what went wrong over the past three days, and as one senior official put it, "under the best scenarios, this isn't going to end anytime soon."

The essential problem is the definition of "off" in a nuclear reactor. When the nuclear chain reaction is shut and the reactor shuts down, the fuel is still producing about 6 percent as much heat as it did when it was running, because of continuing heat generation by the radioactivity, the release of subatomic particles and of gamma rays.

Usually, when a reactor is first shut down, an electrically driven pump pulls heated water from the vessel to a heat exchanger, and cool water from a river or ocean is brought in to draw off that heat.

But at the Japanese reactors, after losing electric power, that system could not be used. Instead the operators are dumping seawater into the vessel, and letting it cool the fuel by boiling. But as it boils, pressure rises too high to pump in more water, so they have to vent the vessel to the atmosphere, and feed in more water, a procedure known as "feed and bleed."

When the fuel was intact, the steam they were releasing had only modest amounts of radioactive material, in a nontroublesome form. With damaged fuel, that steam is getting dirtier.

Re-establishing normal cooling will require electric power and may require workers to function in areas that are now contaminated, American nuclear experts say.

Christopher D. Wilson, a reactor operator and later a manager at Exelon's Oyster Creek plant, near Toms River, N.J., said, "normally you would just re-establish electricity supply, from the on-site diesel generator or a portable one." Portable generators have been brought into Fukushima, he said.

Fukushima was designed by General Electric, just as Oyster Creek was, at about the same time, and the two plants are very similar, he said. The problem, he said, was that the hook-up is done through electric switching equipment that is in a basement room flooded by the tsunami, he said. "Even though you have generators on site, you have to get the water out of the basement," he said.

Another nuclear engineer with long experience in reactors of this type, who now works for a government agency, was emphatic. "To completely stop venting, they're going to have to put some sort of equipment back in service," he said. He asked not to be named because his agency had not authorized him to speak.

The central problem arises from a series of failures that began after the tsunami. It easily overcame the sea walls surrounding the Fukushima plant. It swamped the diesel generators, which were placed in a low-lying area, apparently because of misplaced confidence that the sea walls would protect them. At 3:41 p.m. Friday, roughly an hour after the quake and just around the time the region would have been struck by the giant waves, the generators shut down. According to Tokyo Electric Power Company, the plant switched to an emergency cooling system that operates on batteries, but these were soon depleted.

Inside the plant, according to industry executives and American experts who received briefings over the weekend, there was deep concern that spent nuclear fuel that was kept in a "cooling pond" inside one of the plants had been exposed and begun letting off potentially deadly gamma radiation. Then water levels inside the reactor cores began to fall. While estimates vary, several officials and industry experts said on Sunday that the top four to nine feet of the nuclear fuel in the core and control rods appear to have been exposed to the air – a condition that can quickly lead to melting, and ultimately to a complete meltdown.

At 8 p.m., just as Americans were waking up to news of the earthquake, the government declared an emergency, contradicting its earlier reassurances that there were no major problems. But the chief cabinet secretary, Yukio Edano, stressed that there had been no radiation leak.

But one was coming: Workers inside the reactors saw that levels of coolant water were dropping. They did not know how severely. "The gauges that measure the water level don't appear to be giving accurate readings," one American official said.

What the workers knew by Saturday morning was that cooling systems at a nearby power plant, Fukushima Daini, were also starting to fail, for many of the same reasons. And the pressure in the No. 1 reactor at Fukushima Daiichi was rising so fast that engineers knew they would have to relieve it by letting steam escape, sending the first traces of radiation into the atmosphere.

Shortly before 4 p.m., camera crews near the Daiichi plant captured what appears to have been an explosion at the No. 1 reactor – apparently caused by a buildup of hydrogen. It was dramatic television but not especially dangerous – except to the workers injured by the force of the blast inside.

The explosion was in the outer container, leaving the main reactor vessel unharmed, according to Tokyo Electric's reports to the International Atomic Energy Agency. (The walls of the outer building blew apart, as they are designed to do, rather than allow a buildup of pressure that could damage the reactor vessel.)

But the dramatic blast was also a warning sign of what could happen inside the reactor vessel if the core was not cooled. The International Atomic Energy Agency said that "as a countermeasure to limit damage to the reactor core," Tokyo Electric proposed injecting seawater mixed with boron – which can absorb some of the reactive elements – and it began to do that at 10:20 p.m. Saturday.

It was a desperation move: The corrosive seawater will essentially disable the 40-year-old plant; the decision to flood the core amounted to a decision to abandon the facility. But even that operation has not been easy.

To pump in the water, the Japanese have apparently tried used fire-fighting equipment – hardly the usual procedure. But forcing the seawater inside the containment vessel has been extraordinarily difficult, because the pressure in the vessel has become so great.

One American official likened the process to "trying to pour water into an inflated balloon," and said that on Sunday it was "not clear how much water they are getting in, or whether they are covering the cores."

The problem was compounded because gauges inside the reactor seemed to have been damaged in the earthquake or the tsunami, making it impossible to know just how much water is in the core.

And workers attempting the pumping operation are presumed to be exposed to radiation; several workers, according to Japanese reports, have been treated for radiation poisoning. It is not clear how severe their exposure was.

Keith Bradsher contributed reporting from Hong Kong, Hiroko Tabuchi from Tokyo and Henry Fountain from New York.

## **Japan Battles Nuclear Meltdown (FT)**

By Jonathan Soble, Tokyo

Financial Times, March 14, 2011

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## **In Disasters' Wake, Japan Races To Diffuse Nuclear Threat (USAT)**

By William M. Welch, Usa Today

USA Today, March 14, 2011

Japanese safety officials flooded nuclear-power reactors damaged in the massive earthquake and tsunami with seawater Sunday to prevent the worst-case scenario of a radioactive explosion.

Japan said at least 1,800 people were confirmed killed in the quake and giant wall of water that followed on Friday; about 1,400 people were missing. The death toll is likely to grow.

Even as aid rushed in from around the world, the misery of dislocated survivors grew in the face of freezing temperatures, crumbled cities and the desperate need for food and clean water. Hundreds of thousands of survivors streamed into emergency centers. Rolling blackouts were to begin today to ration power in several cities, including Tokyo.

"I don't know if we'll ever move back," said Onoda Tamotsu, 35, whose Rikuzentakata neighborhood was obliterated. "There's nothing left."

The bodies of hundreds of people washed ashore Sunday. Search crews pulled bodies from mud-caked homes. Helicopters from the USS Ronald Reagan ferried food and water ashore. Other US ships conducted searches and surveyed damage.

Japan's chief cabinet secretary, Yukio Edano, said scientists had been able to prevent uranium fuel from overheating at the reactors of the Fukushima Daiichi nuclear plant. He said a hydrogen explosion was possible at the No. 3 reactor, but it should not result in danger to the surroundings.

A hydrogen explosion ripped apart the building around the No. 1 reactor a day earlier. Edano said any radioactivity released so far was small.

"If there is an explosion, however, there would be no significant impact on human health," he said.

Nearly 200,000 people evacuated the area around two nuclear power plants along Japan's northeastern coast. Naoki Kumagai, an official at Japan's Nuclear and Industrial Safety Agency, said there was no need to be alarmed by a rise in radiation levels at Fukushima Daiichi.

Japan's ambassador to the US, Ichiro Fujisaki, drew a distinction between a partial meltdown of the nuclear fuel rods inside the stricken reactors, and a more catastrophic complete meltdown.

"It is true that part of fuel rod may have been deformed or melting," he told NBC. "But it is not the situation where the whole reactor, substantial part of reactor, is melting down."

A complete meltdown, or the collapse of a power plant's ability to keep temperatures under control, could leak dangerous levels of radioactivity and pose major health risks. Unlike the 1986 nuclear disaster at Chernobyl, the Japanese reactors are housed in a sealed container to prevent such a release of contamination.

Japan raised its estimate Sunday of the quake's magnitude to 9.0, a notch above the US Geological Survey's reading of 8.9.

## **Ravaged Japan Faces Nuke Crisis (WT)**

**Tries to keep 2nd reactor from exploding at power plant**

By Christopher Johnson, The Washington Times

Washington Times, March 14, 2011

TOKYO | Japan grieved Sunday over its losses in the wake of a massive earthquake and tsunami that devastated the country Friday and triggered a nuclear-power crisis officials were still trying to deal with Monday.

The 9.0 magnitude earthquake, the worst to hit Japan, and the tsunami that followed with 30-foot-high waves may have killed as many as 10,000 people and battered a 1,300-mile stretch of coastline, wiping out whole towns and villages.

A volcano on the other side of Japan from the epicenter of the quake resumed eruptions of ash and rocks, after weeks of inactivity, Japan's weather service said Sunday. However, officials added that the fresh eruptions at the Shinmoedake volcano may be unrelated to the earthquake.

Meanwhile, nuclear officials Sunday were scrambling to prevent a second reactor from exploding at the nuclear-power plant in Fukushima province, where a reactor exploded Saturday and neared meltdown.

Japanese Chief Cabinet Secretary Yukio Edano said that a hydrogen explosion could occur at Unit 3 of the Fukushima complex, after a blast at a building housing a reactor the day before at Unit 1.

"At the risk of raising further public concern, we cannot rule out the possibility of an explosion," he said. "If there is an explosion, however, there would be no significant impact on human health."

As Japanese authorities tried to downplay the nuclear crisis in northeastern Japan, nuclear scientists and activists here warned of dangerous scenarios if workers fail to cool the second reactor.

Masashi Goto, an engineer who formerly designed nuclear plants for Toshiba, which built the troubled reactors in Fukushima, called the crisis facing Japan an "extraordinary situation."

"If the cooling process stops, the radiation can't be contained anymore," he told a panel at the Foreign Correspondents Club of Japan on Sunday night in Tokyo. "The government is saying reassuring words to say everything is all right. But the public needs to understand that this is beyond what the reactor was designed to withstand."

Japan's Kyodo News agency quoted a Fukushima government official as saying that 19 evacuees were found exposed to radiation, while 160 people — including 60 elderly hospital patients and staff — may have been contaminated. Ryo Miyake, a spokesman for Japan's nuclear agency, confirmed that 160 people may have been exposed.

Mr. Goto said that attempts to cool nuclear rods with seawater are potentially dangerous, and he warned of a chain reaction of explosions at the 40-year old plant.

"If it's a steam explosion, it's comparable to a volcano erupting and lava flowing into the ocean. It's very, very serious and frightening," he said.

Mr. Goto was cautious not to speculate on potential damage to public health, saying only that radiation could travel beyond a 12-mile zone where the government has ordered an estimated 170,000 residents to evacuate.

"I can't predict how long it will take for this situation to settle because nobody knows exactly what the situation is inside the reactor," he said.

Philip White, international liaison officer of the Citizens' Nuclear Information Center, a group of about 10 activists originally formed by nuclear scientists in Japan, says the plant is in "a state of meltdown."

"You are not safe if you are 21 kilometers [13 miles] away," he said in an interview, when asked if a meltdown could threaten people in Tokyo, about 155 miles southwest of the reactor.

"In a worst-case scenario, radiation could come to Tokyo if the wind was blowing in the right direction," he said.

"A nuclear disaster, which the promoters of nuclear power in Japan said wouldn't happen, is in progress. We warned that Japan's nuclear power plants could be subjected to much stronger earthquakes and much bigger tsunamis than they were designed to withstand."

International officials, experts and activists differed on the potential fallout in Japan.

"This is not a serious public health issue at the moment," said Malcolm Crick, secretary of the U.N. Scientific Committee on the Effects of Atomic Radiation.

"It won't be anything like Chernobyl. There the reactor was operating at full power when it exploded, and it had no containment," he said, referring to the world's worst nuclear-power accident, in Ukraine in 1986.

"Many people thought they'd been exposed after Three Mile Island," he said of the nuclear accident in Pennsylvania in 1979. "The radiation levels were detectable; but in terms of human health, it was nothing."

Authorities in Japan, meanwhile, urged people near the plant to stay inside, shut windows, and wear clothing to protect their skin from potential radiation.

The earthquake and tsunami killed 1,400 people, according to official estimates. Hundreds are missing. However, police in one of the worst-hit areas feared the death toll could reach 10,000.

At least 1.4 million households remained without water Sunday, and 2 million households had no electricity. Officials plan to begin power rationing with rolling blackouts Monday in several cities, including Tokyo.

The government also doubled the number of troops pressed into rescue operations to about 100,000.

Dozens of countries have offered assistance. Two US aircraft carrier groups were off Japan's coast and ready to help. Helicopters were flying from one of the carriers, the USS Ronald Reagan, delivering food and water.

Two other US rescue teams, including one from Fairfax County, Va., and rescue dogs arrived Sunday.

- This article is based in part on wire service reports.

## Japan Nuclear Plant Rocked By Second Blast (AFP)

By Hiroshi Hiyama

AFP, March 14, 2011

SENDAI, Japan (AFP) – An explosion rocked an earthquake-hit nuclear plant Monday, as Japan struggled to avert a catastrophic reactor meltdown caused by a quake and tsunami feared to have killed more than 10,000.

A new tsunami scare triggered evacuations on the devastated northeast coast after a large wave was spotted rolling in to shore, but authorities said they had detected no sign of a tsunami or a quake that would have caused it.

Japan has been battling to control two overheating reactors at the ageing Fukushima plant after the cooling systems were knocked out by Friday's 8.9-magnitude quake and the resulting tsunami that swallowed up whole towns.

Shortly after Prime Minister Naoto Kan said the plant was still in an "alarming" state, a blast at its number-three reactor shook the facility and sent plumes of smoke billowing into the sky.

The plant's operator TEPCO said that nine people were injured in the blast, which authorities said was probably a hydrogen explosion.

The chief government spokesman Yukio Edano said TEPCO reported that the reactor was probably undamaged and there was a low possibility of a major radiation leak at the plant, 250 kilometres (160 miles) northeast of Tokyo.

Another explosion blew apart the building surrounding the plant's number-one reactor on Saturday but the seal around the reactor itself remained intact.

With ports, airports, highways and manufacturing plants shut down, the government has predicted "considerable impact on a wide range of our country's economic activities".

Tokyo's stock market plunged more than six percent in afternoon trade as investors absorbed the impact, including power outages and plant shutdowns, after the biggest quake in Japan's history.

The yen surged to a four-month high after the central bank pumped a record amount of money into financial markets while shares in auto makers were hammered more than 10 percent after they were forced to close factories.

Leading risk analysis firm AIR Worldwide said the quake alone would exact an economic toll estimated at between \$14.5 billion and \$34.6 billion (10 billion to 25 billion euros), without taking into account the effects of the tsunami.

Kan said in a televised national address Sunday that Japan was facing its worst crisis since the end of World War II – which left the defeated country in ruins.

"The current situation of the earthquake, tsunami and the nuclear plants is in a way the most severe crisis in the 65 years since World War II," said the premier, who was dressed in an emergency services suit.

The large wave off Japan's coast which triggered panic Monday had been spotted by a helicopter.

Authorities issued evacuation orders in some parts of the devastated coastline after the initial report and as seawater was seen retreating off Iwate and Aomori prefectures – a phenomenon that occurs before tsunamis.

"When we detect an earthquake, the agency issues either a tsunami warning or an alert, but there was no quake monitored," a meteorological agency official told AFP.

Rolling power outages were due to start later Monday. Millions of people have already been without electricity since the disaster hit Friday, forcing the shutdown of nuclear plants in the affected areas.

Japan relies on nuclear energy for about a third of its power needs.

Edano said Sunday it was likely a partial meltdown had occurred at the Fukushima number-one reactor. A meltdown occurs when a reactor core overheats and causes damage to the facility, potentially unleashing radiation into the environment.

France's Institute of Radiation Protection and Nuclear Safety said "very large" amounts of radioactivity were "produced simultaneously with the explosion" at Fukushima Saturday.

The United Nations said a total of 590,000 people had been evacuated in the quake and tsunami disaster, including 210,000 living near the two Fukushima nuclear plants.

The colossal 8.9 magnitude tremor sent waves of churning mud and debris racing over towns and farmland in Japan's northeast, destroying everything in its path and reducing swathes of countryside to a swampy wasteland.

The police chief in badly hit Miyagi prefecture said the death toll was certain to exceed 10,000 in his region.

In the Miyagi port town of Minamisanriku alone some 10,000 people were unaccounted for – more than half the population.

The national police agency said the confirmed death toll now stood at 1,597, but groups of hundreds of bodies were being found along the shattered coastline.

Many survivors were left without water, electricity, fuel or enough food, as authorities appeared overwhelmed by the monumental scale of the disaster.

Japan committed 100,000 troops – about 40 percent of its armed forces – to help earthquake and tsunami survivors as the world rallied behind the disaster-stricken nation and a US aircraft carrier began ferrying in food.

Japan sits on the "Pacific Ring of Fire", and Tokyo is in one of its most dangerous areas, where three continental plates are slowly grinding against each other, building up enormous seismic pressure.

The immense force of Friday's quake has moved Honshu – the main Japanese island – by 2.4 metres (eight feet), the US Geological Survey said.

## **Japanese Engineers Work To Contain Nuclear Reactor Damage (LAT)**

**They are pumping seawater laced with boron, to absorb radioactive emissions, in an attempt to cool two reactors and prevent a meltdown at the Fukushima No. 1 (Daiichi) plant.**

By Thomas H. Maugh II

Los Angeles Times, March 14, 2011

Engineers are now pumping seawater laced with boron into two nuclear reactors at Japan's Fukushima No. 1 (Daiichi) power plant 150 miles north of Tokyo and are considering doing it at a third reactor in a last-ditch effort to stave off a meltdown that could release dangerous amounts of radioactivity into the environment. Here's a look at why they are doing it and what the potential consequences are, according to various experts.

Why do the reactors have to be cooled?

Nuclear reactors operate through the chain-reaction splitting, or fissioning, of uranium atoms. The process creates heat used to turn water into steam. When an earthquake occurs, a safety mechanism inserts control rods into the core of the reactor to halt the chain reaction. But the fuel rods continue to produce excess amounts of heat for several days and must be cooled. If they are not cooled, they could melt, with potentially disastrous consequences, including the release of massive amounts of radiation into the environment.

What went wrong?

The tsunami disrupted the electrical grid that supplied power to the pumps that circulated cooling water at 11 reactors shut down in the quake area. But at six of those reactors, water from the tsunami also damaged the diesel generators that supplied backup power. The facilities had to rely on batteries, which had a life of only several hours.

What caused the explosion?

The uranium pellets in the fuel rods are sheathed in zirconium cladding. It appears some of the rods may have been exposed to the air and overheated. When the heated rods came into contact again with water, the zirconium would have been oxidized, releasing hydrogen. According to the Union of Concerned Scientists, which promotes nuclear safety, the containment vessel that surrounds the reactor is designed to allow about 1% of the volume of gas within to escape per day. The hydrogen accumulated in the outer building that surrounds the containment vessel. Then an explosion was touched off by a spark. That explosion damaged the outer building and the pumping system, but did not breach the reactor containment vessel.

Videos show nuclear plant explosion

Why wasn't seawater pumped into the containment vessels earlier?

Seawater is very corrosive, particularly at high temperatures, so pumping it into the vessels is an indication that the Tokyo Electric Power Co., which operates the Fukushima No. 1 (Daiichi) facility, has given up on saving the reactors. Normally, reactors use only water that is distilled and free of all contaminants.

Why have officials added boron?

Boron is very good at absorbing neutrons that are released during the fission of uranium. It is one of the primary components of the control rods that are used to shut the reactor down. Adding it to the seawater helps tamp down heat production. It also will control a nuclear reaction should any of the fuel rods melt and fall to the reactor floor.

Japanese authorities say there has been a partial meltdown. What does that mean?

That statement is based on the detection of extremely small quantities of the isotopes cesium-137 and iodine-131 in the environment near the plant. Those two elements are byproducts of uranium fission. During the normal operation of a reactor, cesium-137 and iodine-131 migrate to the gap between the fuel pellets and the zirconium cladding. The fact that some quantities escaped into the environment suggests the cladding heated up and cracked to some degree. That does not mean any fuel has melted, although it is possible that a small amount did. Barring a major catastrophe, no one will know whether fuel has melted until they can get into the containment vessel and examine it.

Could there be a nuclear explosion?

No. The worst that could happen if all cooling stopped is that the fuel would melt and fall to the floor of the containment vessel. The containment vessel is designed to hold the hot fuel in, but the type of nuclear reactor in danger at the Fukushima plant —General Electric Mark One boiling water reactors — has been widely reported to have a vulnerability in its design that would let the fuel burn through the floor of the vessel. If that happened, radiation could spread through the environment, but on a much more limited basis than happened at Chernobyl, where there was no containment vessel and the core contained graphite that burned, dispersing radioactivity widely. A massive plume of radioactive smoke and ash could spread from the site, exposing people for miles away, depending on the wind and weather.

Can the reactors be saved?

No one knows for sure. They are already 40 years old and near the end of their designed lifetime, so it seems unlikely. Experts say it is hard to predict how much damage will be done by the seawater because a reactor has never been exposed to it before. The other key questions are whether the reactor containment vessels have been or will be breached and whether the fuel has or will melt.

What's the best-case scenario for either reactor?

If the containment vessel is not breached and the fuel has not melted, then the fuel assembly could ultimately be replaced and the reactor restarted in a process analogous to refueling the reactor. But that might require complete replacement of all the plumbing in the reactor if pipes have been damaged by the seawater. In that case, it might be cheaper to start over. If the fuel has melted partially, or perhaps even completely, without damaging the containment vessel, the reactor would have to be decommissioned. Most likely, the company would keep pumping seawater through it for several years until it had cooled down sufficiently and many of the radioactive isotopes had decayed enough that engineers could go in and remove the fuel. That, in essence, is what happened in 1979 in the partial core meltdown at the Three Mile Island Generating Station in Pennsylvania. Workmen eventually dug out the partially melted fuel and buried it at a disposal site in Idaho. The empty containment vessel now stands next to functioning reactors at the site.

Photos: Scenes of earthquake destruction

What's the worst-case scenario?

A breach in the containment vessel. If they happens, engineers would most likely have to entomb the reactor in concrete, as was done at Chernobyl, where a breach spread radioactive ash across most of Europe, except the Iberian peninsula.

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## **At Two Reactors, A Race To Contain Meltdowns (WP)**

By Steven Mufson

Washington Post, March 14, 2011

Tokyo Electric Power Co. entered Day 4 of its battle against a cascade of failures at its two Fukushima nuclear complexes, using fire pumps to inject tens of thousands of gallons of seawater into two reactors to contain partial meltdowns of ultra-hot fuel rods.

Japanese officials say they believe a hydrogen explosion occurred at the Fukushima Daiichi nuclear plant, similar to an earlier one at a different facility. TV footage shows a wide plume of white smoke shrouding the base of the entire plant.

Government spokesman Yukio Edano said that based on initial reports, the explosion did not damage the container vessel. Radiation level near the plant will go up, as happened with Saturday's explosion. There are no initial reports of injuries.

Pumping seawater into the plants produced high pressures and vapors that the company vented into its containment structures and then into the air, raising concerns about radioactivity levels in the surrounding area where people have already been evacuated. The utility said that at one of the huge, complicated reactors, a safety relief valve was opened manually to lower the pressure levels in a containment vessel.

But the limited vapor emissions were seen as far less dire than the consequences of failure in the fight against a more far-reaching partial or complete meltdown that would occur if the rods blazed their way through the reactor's layers of steel and concrete walls.

The potential size of the area affected by radioactive emissions could be large. A state of emergency was declared briefly at another nuclear plant called Onagawa after elevated radioactivity levels were detected there. Later Japanese authorities

blamed the measurement on radioactive material that had drifted from the Fukushima plant more than 75 miles away, according to the International Atomic Energy Agency.

The IAEA noted that forecasts said winds would be blowing to the northeast, away from the Japanese coast, over the next three days.

Tokyo Electric said that radioactivity levels both inside the plant and at its nearby monitoring post were higher than normal. The Nuclear Energy Institute, an industry group in the United States, reported that the highest recorded radiation level at the Fukushima Daiichi site was 155.7 millirem at 1:52 p.m. on March 13; radiation levels fell to 4.4 millirem by the evening. The Nuclear Regulatory Commission's radiation dose limit for the public is 100 millirem per year.

In addition to one worker hospitalized for radiation exposure, two others felt ill during stints in the control rooms of Fukushima Daiichi units 1 and 2.

While Tokyo Electric said it also continued to deal with cooling system failures and high pressures at half a dozen of its 10 reactors in the two Fukushima complexes, fears mounted about the threat posed by the pools of water where years of spent fuel rods are stored.

At the 40-year-old Fukushima Daiichi unit 1, where an explosion Saturday destroyed a building housing the reactor, the spent fuel pool, in accordance with General Electric's design, are placed above the reactor. Tokyo Electric said that it was trying to figure out how to maintain water levels in the pools, indicating that the normal safety systems there had failed too. Failure to keep adequate water levels in a pool would lead to a catastrophic fire, said nuclear experts, some of whom believe that unit 1's pool may now be outside.

"That would be like Chernobyl on steroids," said Arnie Gundersen, a nuclear engineer at Fairewinds Associates Inc. and a member of the public oversight panel for the Vermont Yankee nuclear plant, which is identical to the Fukushima Daiichi unit 1.

Gundersen said the unit 1 pool could have as much as 20 years of spent fuel rods, which are still radioactive.

At Fukushima Daiichi unit 3, Tokyo Electric said the government ordered a halt to the pumping of seawater for a time as pressures and hydrogen levels rose in the containment structure, causing fears of an explosion like the one that destroyed the building around unit 1.

Victor Gilinsky, a former commissioner at the Nuclear Regulatory Commission, said that in order to produce hydrogen, temperatures inside the reactor core had to be well over 2,000 degrees and as high as 4,000 degrees Fahrenheit. He said a substantial amount of fuel had to be exposed at least at some point.

The Fukushima Daiichi unit 3, built by Toshiba, is 37 years old. Last year, the unit began using some reprocessed fuel known as "mox," a mixture of plutonium oxide and uranium oxide, produced from recycled material from nuclear weapons as part of a program known as "from megatons to megawatts." Anti-nuclear activists have called mox more unsafe than enriched uranium. If it escapes the reactor, plutonium even in small quantities can have much graver consequences on human health and the local environment for countless years, much longer than other radioactive materials.

Kyodo news agency cited Tokyo Electric as saying that more than three yards of a mox nuclear-fuel rod had been left above the water level, raising concerns that bits of plutonium or its byproducts may already be mixed into vapors or molten material.

The Fukushima Daiichi unit 3, once capable of generating 784 megawatts of power, is substantially bigger than unit 1, which generated about 460 megawatts. As a result, getting temperatures in its reactor core could prove a much tougher task, experts said.

Japanese officials were also trying to figure out whether Friday's earthquake, or the subsequent high pressures and temperatures in the reactors, had caused other cracks or leaks in reactors in the region. So far officials have not said that they have found any, though they have noted still unexplained losses of water in some reactor vessels.

Though Fukushima Daiichi units 1 and 3 posed the gravest dangers for now, Tokyo Electric said it was still working on its other units. At Fukushima Daiichi unit 2, initially thought to be worst affected by the earthquake, cooling water levels were lower than normal but stable, the company said.

Tokyo Electric also said it had released vapors with some radioactive materials at all four of the reactors at its second Fukushima complex — Fukushima Daini — on March 12. After injecting water into the reactors, the company said that water levels were stable, off-site power restored and shutdowns complete or in progress. Nonetheless, Japan's Nuclear and Industrial Safety Agency said Monday that Fukushima Daini units 1, 2 and 4 remained in a nuclear state of emergency.

The crisis at the Japanese nuclear reactors began when the earthquake last Friday disabled the power grid that the reactors use to run cooling systems. Backup diesel generators at the seaside plants were later disabled by the tsunami. Backup batteries lasted only a few hours. For a period of time, the Fukushima Daiichi complex is believed to have been completely blacked out. During that time, the cooling systems failed to prevent a steep rise in temperatures in the reactor core.



## Japanese Scramble To Avert Meltdowns As Nuclear Crisis Deepens After Quake (NYT)

By Hiroko Tabuchi, Matthew L. Wald

New York Times, March 13, 2011

TOKYO — Japanese officials struggled on Sunday to contain a widening nuclear crisis in the aftermath of a devastating earthquake and tsunami, saying they presumed that partial meltdowns had occurred at two crippled reactors and that they were facing serious cooling problems at three more.

The emergency appeared to be the worst involving a nuclear plant since the Chernobyl disaster 25 years ago. The developments at two separate nuclear plants prompted the evacuation of more than 200,000 people. Japanese officials said they had also ordered up the largest mobilization of their Self-Defense Forces since World War II to assist in the relief effort.

On Saturday, Japanese officials took the extraordinary step of flooding the crippled No. 1 reactor at Fukushima Daiichi Nuclear Power Station, 170 miles north of Tokyo, with seawater in a last-ditch effort to avoid a nuclear meltdown.

Then on Sunday, cooling failed at a second reactor — No. 3 — and core melting was presumed at both, said the top government spokesman, Chief Cabinet Secretary Yukio Edano. Cooling had failed at three reactors at a nuclear complex nearby, Fukushima Daini, although he said conditions there were considered less dire for now.

With high pressure inside the reactors at Daiichi hampering efforts to pump in cooling water, plant operators had to release radioactive vapor into the atmosphere. Radiation levels outside the plant, which had retreated overnight, shot up to 1,204 microsieverts per hour, or over twice Japan's legal limit, Mr. Edano said.

NHK, Japan's public broadcaster, flashed instructions to evacuees: close doors and windows; place a wet towel over the nose and mouth; cover up as much as possible. At a news conference, Mr. Edano called for calm. "If measures can be taken, we will be able to ensure the safety of the reactor," he said.

One result of the venting may have been setting off an explosion, caused by either steam or hydrogen, that tore the outer wall and roof off the building housing reactor No. 1, although the steel containment of the reactor remained in place, officials said.

Even before the statement on Sunday by Mr. Edano, it was clear from radioactive materials turning up in trace amounts outside the reactors that fuel damage had occurred. The existence or extent of melting might not be clear until workers can open up the reactors and examine the fuel, which could be months.

A meltdown occurs when there is insufficient cooling of the reactor core, and it is the most dangerous kind of a nuclear power accident because of the risk of radiation releases. The radiation levels reported so far by the Japanese authorities are far above normal but still too small to pose a hazard to human health if the exposure continued for a brief period. The fear was that more core damage would bring bigger releases.

The Japanese Nuclear and Industrial Safety Agency said that as many as 160 people may have been exposed to radiation around the plant, and Japanese news media said that three workers at the facility were suffering from full-on radiation sickness.

Even before the explosion on Saturday, officials said they had detected radioactive cesium, which is created when uranium fuel is split, an indication that some of the nuclear fuel in the reactor was already damaged.

How much damage the fuel suffered remained uncertain, though safety officials insisted repeatedly through the day that radiation leaks outside the plant remained small and did not pose a major health risk.

However, they also told the International Atomic Energy Agency that they were making preparations to distribute iodine, which helps protect the thyroid gland from radiation exposure, to people living near Daiichi and Daini.

Worries about the safety of the two plants worsened on Saturday because executives of the company that runs them, Tokyo Electric Power, and government officials gave confusing accounts of the location and causes of the dramatic midday explosion and the damage it caused.

Late Saturday night, officials said that the explosion at Daiichi occurred in a structure housing turbines near its No. 1 reactor at the plant, rather than inside the reactor itself. But photographs of the damage did not make clear that this was the case.

They said that the blast, which may have been caused by a sharp buildup of hydrogen when the reactor's cooling system failed, destroyed the concrete structure surrounding the reactor but did not collapse the critical steel container inside. This pattern of damage cast doubt on the idea that the explosion was in the turbine building.

"We've confirmed that the reactor container was not damaged," Mr. Edano said in a news conference on Saturday night. "The explosion didn't occur inside the reactor container. As such there was no large amount of radiation leakage outside. At this point, there has been no major change to the level of radiation leakage outside, so we'd like everyone to respond calmly."

Japanese nuclear safety officials and international experts said that because of crucial design differences, the release of radiation at Daiichi would most likely be much smaller than at Chernobyl even if the plant had a complete core meltdown, which they said it had not.

After a full day of worries about the radiation leaking at Daiichi, Tokyo Electric Power said an explosion occurred “near” the No. 1 reactor at Daiichi around 3:40 p.m. Japan time on Saturday. It said four of its workers were injured in the blast.

The decision to flood the reactor core with corrosive seawater, experts said, was an indication that Tokyo Electric Power and Japanese authorities had probably decided to scrap the plant. “This plant is almost 40 years old, and now it’s over for that place,” said Olli Heinonen, the former chief inspector for the I.A.E.A., and now a visiting scholar at Harvard.

Mr. Heinonen lived in Japan in the 1980s, monitoring its nuclear industry, and visited the stricken plant many times. Based on the reports he was seeing, he said he believed that the explosion was caused by a hydrogen formation, which could have begun inside the reactor core. “Now, every hour they gain in keeping the reactor cooling down is crucial,” he said.

But he was also concerned about the presence of spent nuclear fuel in a pool inside the same reactor building. The pool, too, needs to remain full of water to suppress gamma radiation and prevent the old fuel from melting. If the spent fuel is also exposed — and so far there are only sketchy reports about the condition of that building — it could also pose a significant risk to the workers trying to prevent a meltdown.

Both Daiichi and Daini were shut down by Friday’s earthquake, but the loss of power in the area and damage to the plants’ generators from the ensuing tsunami crippled the cooling systems. Those are crucial after a shutdown to cool down the nuclear fuel rods.

The malfunctions allowed pressure to build up beyond the design capacity of the reactors. Early Saturday, officials had said that small amounts of radioactive vapor were expected to be released into the atmosphere to prevent damage to the containment systems and that they were evacuating people in the area as a precaution.

Those releases apparently did not prevent the buildup of hydrogen inside the plant, which ignited and exploded Saturday afternoon, government officials said. They said the explosion itself did not increase the amount of radioactive material being released into the atmosphere. However, safety officials urged people who were not evacuating but still lived relatively nearby to cover their mouths and stay indoors.

David Lochbaum, who worked at three reactors in the United States with designs similar to Daiichi, and who was later hired by the Nuclear Regulatory Commission to teach its personnel about that technology, said that judging by photographs of the stricken plant, the explosion appeared to have occurred in the turbine hall, not the reactor vessel or the containment that surrounds the vessel.

The Daiichi reactor is a boiling-water reactor. Inside the containment, the reactor sends its steam out to a turbine. The turbine converts the steam’s energy into rotary motion, which turns a generator and makes electricity.

But as the water goes through the reactor, some water molecules break up into hydrogen and oxygen. A system in the turbine hall usually scrubs out those gases. Hydrogen is also used in the turbine hall to cool the electric generator. Hydrogen from both sources has sometimes escaped and exploded, Mr. Lochbaum said, but in this case, there is an additional source of hydrogen: interaction of steam with the metal of the fuel rods. Operators may have vented that hydrogen into the turbine hall.

Earlier Saturday, before the explosion, a Japanese nuclear safety panel said the radiation levels were 1,000 times above normal in a reactor control room at Daiichi. Some radioactive material had also seeped outside, with radiation levels near the main gate measured at eight times normal levels, NHK quoted nuclear safety officials as saying.

The emergency at Daiichi began shortly after the earthquake struck Friday afternoon. Emergency diesel generators, which kicked in to run the cooling system after the electrical power grid failed, shut down about an hour after the earthquake. There was speculation that the tsunami had flooded the generators, knocking them out of service.

For some time, the plant was able to operate in a battery-controlled cooling mode. Tokyo Electric Power said that by Saturday morning it had also installed a mobile generator to ensure that the cooling system would continue operating even after reserve battery power was depleted. Even so, the company said it needed to conduct “controlled containment venting” in order to avoid an “uncontrolled rupture and damage” to the containment unit.

Why the controlled release of pressure did not succeed in addressing the problem was not immediately explained. Tokyo Electric Power and government nuclear safety officials also did not explain the precise sequence of failures at the plant.

Daiichi and other nuclear facilities are designed with extensive backup systems that are supposed to function in emergencies to ensure the plants can be shut down safely.

## **Nuclear Emergency Is Worst In Decades (NYT)**

By Anahad O’Connor

New York Times, March 13, 2011

The earthquake and tsunami that battered northern Japan on Friday set in motion one of the worst nuclear accidents in over two decades.

The International Atomic Energy Agency rates the severity of radiological events, with a scale starting at one, an “anomaly,” and rising to seven, a “major” accident. Six and seven designate full meltdown, where the nuclear fuel or core of a reactor overheats and melts. The scale of the ensuing uncontrolled release of radiation that follows differentiates the two. Partial meltdowns, in which the fuel is damaged, are rated a four or a five.

The accident at Chernobyl in the former Soviet Union in 1986 — which killed 56 people directly and thousands of others through cancer and other diseases — was the only nuclear accident so far to have been designated a seven. Just one other accident has surpassed five on the scale: an explosion of dried radioactive waste at the Mayak Nuclear Power Plant near the Soviet city of Kyshtym in 1957. The blast produced a radioactive cloud that spread for hundreds of miles over what is now Russia, forcing the evacuation of 10,000 people and causing the deaths of at least 200.

The Mayak blast was rated a six on the atomic agency’s scale.

The full extent of the damage at the Fukushima Daiichi Nuclear Power Station in Japan is yet to be determined. On Saturday, before emergency measures were announced at a second reactor at that plant, Japanese nuclear safety experts rated the accident a four, putting it just behind the Three Mile Island accident in 1979 near Harrisburg, Pa. That accident, the worst in United States history, was designated a five.

That accident was caused by what began as a seemingly minor plumbing glitch. A valve that opened to reduce pressure in the reactor failed to close, letting cooling water escape and leading the core to overheat. That set in motion a series of missteps by the machines and plant operators monitoring the reactor, a crisis that almost led to a full meltdown.

Officials monitoring the Daiichi (or No. 1) plant in Fukushima have said they detected a radioactive byproduct, cesium, that could indicate that some of the nuclear fuel in Reactor No. 1 was damaged and a partial meltdown had occurred. Officials at the plant filled the reactor with seawater to prevent a full meltdown. But early Sunday, they were struggling to inject water into another reactor. The government issued evacuation orders for about 200,000 people in the surrounding area.

Even as the accident continued to unfold, it was already considered worse than the most severe nuclear accident in Japanese history. In 1999, at a plant just outside Tokyo, a team of operators put a batch of highly enriched uranium in a precipitation tank that was not designed to handle it, setting off a critical reaction. Two operators died from radiation poisoning, and dozens of workers and people living nearby were hospitalized.

## **Several Plant Workers Are Ill, But Radiation Risk In Japan Is Seen As Low For Now (NYT)**

By Denise Grady

New York Times, March 14, 2011

Although several plant workers are ill from radioactive exposure in Japan, the radiation risk to the public appears low so far, experts said.

“At least as of now, what we’re looking at is rather more like Three Mile Island than Chernobyl,” said Dr. David J. Brenner, director of the Center for Radiological Research at Columbia University.

The radiation release from the 1986 Chernobyl disaster, where the entire reactor blew up and vaporized its radioactive fuel, was about a million times the amount released from the partial core meltdown at Three Mile Island in 1979, he said. The Chernobyl accident led to an epidemic of thyroid cancer and increases in leukemia, he said.

But from Three Mile Island, Dr. Brenner said, “There is no evidence that anybody at all got sick, even decades later.”

At the exposure rate now being reported at the boundary of the Fukushima Daiichi plant, it would take many weeks before people exposed would notice any symptoms.

“The sorts of numbers I’m seeing are not the sort that could be linked with radiological symptoms,” Dr. Brenner said.

Inside the plant, however, the three workers with radiation sickness were presumably exposed to much more radiation.

“The medical consequences depend entirely on how much radioactive material is released,” Dr. Brenner said.

The duration of exposure also matters.

High levels of exposure can cause severe radiation sickness and death. Symptoms can include nausea, fatigue, vomiting, hair loss, diarrhea and hemorrhaging.

Even high doses generally take several weeks to cause death.

“It’s normally due to what we call ‘gut death,’ ” Dr. Brenner said. “The lining of the gut gets depleted.”

Radiation interferes with the cells’ ability to divide and reproduce, and cells in the intestine are usually replaced frequently. For the same reason, the blood-forming cells in bone marrow are also sensitive to radiation. “What you really die of in the end is infection,” Dr. Brenner said.

The more likely risk for the public is that of low-level exposures, which can increase the risk of cancer many years later. Again, the danger depends on the length of exposure and what types of radioactive materials to which one is exposed.

Some radioactive materials are readily absorbed by the body and linger there. Iodine, for example, goes to the thyroid gland, and strontium to bone, and they emit radiation inside the body that over time can lead to cancer or leukemia. Other radioactive materials, like tritium, pass quickly through the body.

The Japanese government is handing out iodine pills to flood the thyroid gland with ordinary iodine in hopes of preventing it from taking up the radioactive form.

Dr. Brenner said the iodine pills were protective, but were “a bit of a myth” because their use is based on the belief that the risk is from inhaling radioactive iodine. Actually, he said, 98 percent of people’s exposure comes from milk and other dairy products.

“The way radioactive iodine gets into human beings is an indirect route,” he said. “It falls to the ground, cows eat it and make milk with radioactive iodine, and you get it from drinking the milk. You get very little from inhaling it. The way to prevent it is just to stop people from drinking the milk.” He said that the epidemic of thyroid cancer around Chernobyl could have been prevented if the government had immediately stopped people from drinking milk.

Crops can also be contaminated. “I wouldn’t be eating an apple from a tree close to the plant,” Dr. Brenner said.

Children, and fetuses, are more vulnerable to radiation than are adults. Scientists estimate that about 5 percent of the population is genetically more susceptible to radiation than the rest.

The radioactive elements released from the reactor form clouds that are carried off by the prevailing winds. Again, the risk depends on how much is released. “As it’s being blown away, to some extent it’s being dispersed,” Dr. Brenner said. “And some of it falls on the ground.”

One way of measuring radiation exposure is in a unit called the rem. According to the Environmental Protection Agency, most people in the United States receive 0.3 rem per year just from normal, background radiation. Flying for 12 hours at 39,000 feet exposes a person to 0.006 rem. At 5 to 10 rem, lab tests can pick up changes in blood chemistry. Nausea starts after 50 rem, hemorrhaging at 100 rem. At 500 rem, half of people exposed will die within 30 days. At 2,000 rem, a person can die within hours or days. So far, one employee at a nuclear plant in Japan has been reported to have had an exposure of 10 rem, not enough to produce obvious symptoms. The annual dose limit for workers at nuclear plants in the United States is 5 rem.

People are so afraid of radiation that any threat of exposure can cause what Dr. Brenner called psychophysical consequences. He cited an incident in 1987 in Goiania, Brazil, in which people were exposed to radioactive material stolen from a hospital. Fearing contamination, about 125,000 sought medical exams. Thousands reported symptoms of radiation sickness, like vomiting and rashes. Ultimately, only 249 turned out to have any signs of contamination.

## **Japan Power Supply, Industrial Damage Key To Assessing Economic Impact (WP)**

By Howard Schneider

Washington Post, March 14, 2011

Japanese stock markets fell more than 5 percent Monday as the country’s manufacturers shuttered plants to assess damage and deal with power shortages, and the nation’s economy wrestled with the impact of not only a natural disaster but lingering concerns about nuclear safety.

The Nikkei index of major Tokyo Stock Exchange companies fell sharply as trading opened for the first full day since the earthquake and tsunami struck Friday. The impact around the world will be watched closely for signs of how a new round of economic uncertainty is received by markets balancing a US economic recovery with rising oil prices and other emerging risks.

The world’s third-largest economy was hobbled by a crisis that will challenge its financial system and energy infrastructure, as well as its capacity for dealing with a humanitarian disaster.

The first working day since the quake struck will dawn to rolling blackouts and hoarding, despite the Bank of Japan’s vow to keep the economy on track. Central bank Governor Masaaki Shirakawa said over the weekend that the bank was prepared to inject “massive” amounts of money into the economy to keep the country’s financial system stable and its trading system functioning.

Markets worldwide showed a measured response in early trading. Futures in the United States and Europe pointed to a lower market opening, and the ASX 200 index in Australia lost more than a percentage point in the first minutes of trading. Analysts warned that extended power disruptions or larger-than-expected damage to manufacturers could undercut a global economic recovery that was beginning to gain momentum.

The insured property losses from the quake could amount to between \$14 billion and \$35 billion, according to Air Worldwide, a risk consulting company.

Japan is already groaning under government debt equal to twice its yearly economic output, proportionally the world’s largest load, but analysts said the country should have the financial muscle to deal with the reconstruction.

"Japan has the immediate fiscal space to respond to this tragedy," said Mohamed El-Erian, chief executive officer of investment fund Pimco.

Although the cost of reconstruction may prove challenging, analysts said Japan retains enough room to borrow what it will need to bounce back from the devastation without, for example, using nontraditional methods such as spending down its trillion-dollar stockpile of international currency reserves. Money is likely to also flow from Japanese investments overseas back to the country, a phenomenon that may have been behind the jump in the value of the yen Friday, following the disaster.

The Tokyo exchange was open only half an hour longer after the earthquake struck, but in those closing minutes dropped 1.7 percent. Analysts expect further declines Monday, and the weekend's events are likely to shape trading worldwide amid expectations that problems at the country's nuclear facilities may prompt countries to rethink the use of nuclear power and boost demand — and prices — for oil and other fuels.

The country has lost about 6,800 megawatts of power generating capacity as a result of the damage to its nuclear plants, perhaps 7 percent or more of its total supply, analysts with Barclays Capital said in a research note. But the effect on industry and economic activity won't be clear until it is known how long the plants will be off line, how the lost power can be replaced, and whether potential radiation leaks at the nuclear facilities have been contained.

Japanese companies are just beginning to assess the damage. The twin natural disasters spared some of the country's most important economic zones, but have forced at least a temporary shut down of plants and businesses in the more heavily industrialized Tohoku region.

Toyota said many of its Japanese plants had been able to open Friday, but that four facilities, in Hokkaido, Tohoku, Miyagi and Iwate, would be at least temporarily shuttered while they were evaluated. Companies such as Honda and Canon released similar statements, with handfuls of facilities shut but no clear sense yet of the extent of the damage and how long it will take to repair, or estimates of the impact on their operations or the ability to ship products because of damages to local roads and railways.

Those details will be important in determining whether the impact of what happened in Japan follows the typical course of other natural disasters — with an immediate drop in economic activity followed by a more-than-offsetting gain as funds and investment flow to reconstruction — or whether this one poses larger risks to the Japanese and global economies.

Japan's top corporations include major global brands that have moved production overseas, a fact that led some companies such as Honda to already project that its operations in the critical North American market would not be greatly affected.

But the global impact could be unpredictable in an era when markets, investors and policymakers have become increasingly concerned about the way shocks in one country can ripple through the world in unexpected ways.

In its most recent detailed analysis of Japan, the IMF said it was concerned that any disruption to Japan's tentative return to economic growth could send the country into a deep deflationary spiral, with wages, prices and investment falling, and households and businesses reluctant to spend on the expectation that they will fall even more. Although Japan's economy, with its aging population and stagnant incomes, is not a driving source of world demand for goods and services, it does play an important role in world trade, and a renewed recession there could deal a broader blow to confidence in the recovery.

"A slow recovery carries risk that deflation could become more entrenched," the IMF concluded, and noted that public opinion in Japan, since 2007, had quickly been turning towards an expectation that prices would fall in the future.

At the same time, the IMF has been pressuring Japan on its government debt, and arguing that large and rising deficits — something that may now be unavoidable — were also a risk to growth.

At least in the short-run, "Japan's tragedy will also impact other countries via temporary headwinds in the form of lower global demand and interrupted supply chains," El-Erian said.

## **Economic Setback Joins The List Of Growing Troubles In Japan (NYT)**

By Steve Lohr

New York Times, March 14, 2011

As the humanitarian and nuclear crises in Japan escalated after the devastating earthquake and tsunami, the impact on the country's economy appeared to be rising steadily as well.

While the nation's industrial clusters in the south and west seemed to be spared the worst, the crisis at damaged nuclear plants north of Tokyo was threatening to cause an energy squeeze that could set back all sectors of Japan's economy.

To help bring electricity back to the devastated areas, utilities across Japan are cutting back and sharing power, imposing rolling blackouts that will affect factories, stores and homes throughout the nation. The emergency effort is expected to last up to two weeks, but could take longer.

"The big question is whether this will seriously affect Japan's ability to produce goods for any extended period of time," said Edward Yardeni, an independent economist and investment strategist.

Assembly plants for Japan's big three automakers — Toyota, Honda and Nissan — were closed on Sunday and planned to remain closed on Monday. Automakers said some plants experienced damage that was not extensive, but damage to suppliers and to the nation's transport system and infrastructure were expected to affect their ability to make and move their products.

Japan's economic outlook, already problematic, is now even more uncertain, economists and analysts say, because the dimensions of the disaster remain unclear, especially at the damaged nuclear plants.

"The Japanese economy threatens to suffer another bout of recession," said Mark Zandi, chief economist of Moody's Analytics.

Economic activity in Japan contracted in the fourth quarter of 2010, and the country was overtaken by China as the world's second-largest economy, after the United States. Activity may well shrink for the first half of this year, Mr. Zandi said, though he predicted that the rebuilding efforts in the aftermath of the quake would help provide a rebound in the second half.

The Tokyo Stock Exchange, Japan's biggest, opened as usual on Monday, with the Nikkei 225 in Tokyo down 5.5 percent, or 564.55 points, at 9689.88 in early trading.

To try to stabilize the markets and prop up the economy, the head of Japan's central bank said on Sunday that the bank would pour money into the financial system on Monday. Analysts estimated that the bank could add \$25 billion to \$40 billion in liquidity.

Masaaki Shirakawa, governor of the Bank of Japan, did not mention an amount, but emphasized the bank's resolve. "We will monitor market conditions and plan to provide markets with a lot of liquidity first thing tomorrow morning," Mr. Shirakawa said, after attending a meeting of cabinet ministers.

Rebuilding costs that could run in the tens of billions of dollars may require Japan to make tough decisions about government spending, economists say. Its ratio of government debt to the economy's annual output is already at 200 percent, the highest among industrialized nations and far higher than in the United States, for example. So reconstruction, economists say, may make cuts in government spending elsewhere a necessity.

The yen is expected to strengthen against the dollar, as Japanese investors bring money back from overseas to shore up their savings and provide money for the rebuilding campaign. Those financial flows back into Japan will drive up demand for the yen, increasing its value. After the Kobe earthquake in 1995, the yen rose about 20 percent against the dollar over a few months.

On Monday, the yen was stronger, with the dollar trading at 81.35 yen. A ripple effect could be to reduce the demand for United States treasury bonds, adding pressure to American interest rates, according to Byron R. Wien, vice chairman of Blackstone Advisory Partners. The Japanese have been large purchasers of United States bonds, but, Mr. Wien said, "they are going to be using their money to rebuild, so they will be smaller buyers of our debt securities."

If energy curbs and infrastructure damage hinder production in a significant way, it could harm Japanese companies and affect consumers abroad. Japanese automakers have shifted much of their manufacturing overseas in recent years. But some popular models are still made in Japan for export, including fuel-efficient cars like the Toyota Prius and the Honda Fit. Disruptions in exports could hurt sales at a time when rising gasoline prices have increased demand for those cars in the United States.

Japan is also a crucial global supplier of electronics goods and parts used in an array of industrial and consumer goods. The country produces an estimated 40 percent of the lightweight chips used to store data in smartphones and tablet computers, and it is also a leading maker of liquid crystal displays used in consumer electronics products.

Most high-tech goods these days are produced through carefully orchestrated procurement and manufacturing networks that combine parts from around the globe, often shipped on tight daily production schedules. Even temporary shortages can drive up prices sharply for a while.

The daily spot market for certain kinds of semiconductor chips will likely feel the impact soonest. "There will be a lot of nervousness," said Jim Handy, an analyst at Objective Analysis, a semiconductor research firm. "This may cause phenomenal shortages in the spot market."

Sony's six factories in the region affected by the earthquake were all damaged, and the company said it had no clear idea when they would reopen. All the facilities have halted operations.

The destruction was most severe at a plant in Miyagi Prefecture that makes Blu-ray disks and magnetic tapes. The tsunami flooded the first floor and the surrounding area, forcing nearly 1,150 workers and 110 neighbors to seek safety upstairs. On Saturday, Sony chartered a helicopter to deliver supplies to those trapped.

By Sunday afternoon, all but 20 had left the plant to check on their families and homes. Some may return to the factory overnight, depending on whether their homes are still intact.

Freescale Semiconductor's plant in Sendai, which makes chips for the automotive and consumer electronics industries, is also shut down. All employees were safely evacuated, the company said.

The overall effect on the technology market, Mr. Handy said, would be serious.

"It looks like it's going to be pretty awful — the electricity, the water, the railroads — there could be plants that shut down," he said. "All those things are going to cause problems. Just pile all that together and it's all bad."

In the global energy market, there are already signs of a reaction to Japan's troubles, with the expectation the country will turn to liquefied natural gas to replace electricity output lost at the damaged nuclear plants. Two tankers at sea, carrying liquefied natural gas from Russia, have been diverted to Japan, according to industry reports.

"Liquefied natural gas will be the default fuel to replace the electricity generation Japan has lost," said Daniel Yergin, chairman of IHS Cambridge Energy Research Associates. "Liquefied natural gas tankers will be diverted to Japan, the market that needs it the most, and desperately so."

Nick Bunkley and Verne G. Kopytoff contributed reporting.

## **Bank Of Japan Plans Emergency Action To Sooth Markets (FT)**

By Michiyo Nakamoto In Tokyo And Agencies

Financial Times, March 13, 2011

Full-text stories from the Financial Times are available to FT subscribers by clicking the link.

## **In Japan Plant, Partial Meltdown "Highly Possible" (AP)**

By Eric Talmadge And Mari Yamaguchi, Associated Press

Associated Press, March 14, 2011

KORIYAMA, Japan — Japanese officials were struggling Sunday with a growing nuclear crisis and the threat of multiple meltdowns, as more than 170,000 people were evacuated from the quake- and tsunami-savaged northeastern coast where police fear more than 10,000 people may have already died.

A partial meltdown was already likely under way at one nuclear reactor, a top official said, and operators were frantically trying to keep temperatures down at the power plant's other units and prevent the disaster from growing even worse.

Chief Cabinet Secretary Yukio Edano said Sunday that a hydrogen explosion could occur at Unit 3 of the Fukushima Dai-ichi nuclear complex, the reactor that could be melting down. That would follow a blast the day before in the power plant's Unit 1, as operators attempted to prevent a meltdown by injecting sea water into it.

"At the risk of raising further public concern, we cannot rule out the possibility of an explosion," Edano said. "If there is an explosion, however, there would be no significant impact on human health."

More than 170,000 people had been evacuated as a precaution, though Edano said the radioactivity released into the environment so far was so small it didn't pose any health threats.

A complete meltdown — the collapse of a power plant's systems and its ability to keep temperatures under control — could release uranium and dangerous contaminants into the environment and pose major, widespread health risks.

Up to 160 people, including 60 elderly patients and medical staff who had been waiting for evacuation in the nearby town of Futaba, and 100 others evacuating by bus, might have been exposed to radiation, said Ryo Miyake, a spokesman from Japan's nuclear agency. The severity of their exposure, or if it had reached dangerous levels, was not clear. They were being taken to hospitals.

Edano told reporters that a partial meltdown in Unit 3 of the Fukushima Dai-ichi power plant was "highly possible."

Asked whether a partial meltdown had occurred, Edano said that "because it's inside the reactor, we cannot directly check it but we are taking measures on the assumption" that it had.

Japan struggled with the nuclear crisis as it tried to determine the scale of the Friday disasters, when an 8.9-magnitude earthquake, the most powerful in the country's recorded history, was followed by a tsunami that savaged its northeastern coast with breathtaking speed and power.

At least 1,000 people were killed — including some 200 bodies discovered Sunday along the coast — and 678 were missing, according to officials, but police in one of the worst-hit areas estimated the toll there alone could eventually top 10,000.

The scale of the multiple disasters appeared to be outpacing the efforts of Japanese authorities to bring the situation under control more than two days after the initial quake.

Rescue teams were struggling to search hundreds of miles (kilometers) of devastated coastline, and thousands of hungry survivors huddled in darkened emergency centers cut off from rescuers and aid. At least a million households had gone without

water since the quake, and food and gasoline were quickly running out across the region. Large areas of the countryside were surrounded by water and unreachable. Some 2.5 million households were without electricity.

Japanese Trade Minister Banri Kaeda warned that the region was likely to face further blackouts, and power would be rationed to ensure supplies to essential facilities.

The government doubled the number of troops pressed into rescue and recovery operations to about 100,000 from 51,000, as powerful aftershocks continued to rock the country. Hundreds have hit since the initial temblor.

Unit 3 at the Fukushima plant is one of the three reactors that had automatically shut down and lost cooling functions necessary to keep fuel rods working properly due to power outage from the quake. The facility's Unit 1 is also in trouble, but Unit 2 has been less affected.

On Saturday, an explosion destroyed the walls of Unit 1 as operators desperately tried to prevent it from overheating and melting down.

Without power, and with its pipes and pumps destroyed, authorities resorted to drawing seawater mixed with boron in an attempt to cool the unit's overheated uranium fuel rods. Boron disrupts nuclear chain reactions.

The move likely renders the 40-year-old reactor unusable, said a foreign ministry official briefing reporters. Officials said the seawater will remain inside the unit, possibly for several months.

Robert Alvarez, senior scholar at the Institute for Policy Studies and former senior policy adviser to the US secretary of energy, told reporters that the seawater was a desperate measure.

"It's a Hail Mary pass," he said.

He said that the success of using seawater and boron to cool the reactor will depend on the volume and rate of their distribution. He said the dousing would need to continue nonstop for days.

Another key, he said, was the restoration of electrical power, so that normal cooling systems can operate.

Edano said the cooling operation at Unit 1 was going smoothly after the sea water was pumped in.

Operators released slightly radioactive air from Unit 3 on Sunday, while injecting water into it hoping to reduce pressure and temperature to prevent a possible meltdown, Edano said.

He said radiation levels just outside the plant briefly rose above legal limits, but since had declined significantly. Also, fuel rods were exposed briefly, he said, indicating that coolant water didn't cover the rods for some time. That would have contributed further to raising the temperature in the reactor vessel.

At an evacuation center in Koriyama, about 40 miles (60 kilometers) from the troubled reactors and 125 miles (190 kilometers) north of Tokyo, medical experts had checked about 1,500 people for radiation exposure in an emergency testing center, an official said.

On Sunday, a few dozen people waited to be checked in a collection of blue tents set up in a parking lot outside a local gymnasium. Fire engines surrounded the scene, with their lights flashing.

Many of the gym's windows were shattered by the quake, and glass shards littered the ground.

"The situation there is very bad," said Takehito Akimoto, a 39-year-old high school teacher. "We are still trying to confirm the safety of our children, many of them scattered with their families or friends, so we don't know where they are or if they are OK."

A steady flow of people — the elderly, schoolchildren and families with babies — arrived at the center, where they were checked by officials wearing helmets, surgical masks and goggles.

Officials placed Dai-ichi Unit 1, and four other reactors, under states of emergency Friday after operators lost the ability to cool the reactors using usual procedures.

An additional reactor was added to the list early Sunday, for a total of six — three at the Dai-ichi complex and three at another nearby complex. Local evacuations have been ordered at each location. Japan has a total of 55 reactors spread across 17 complexes nationwide.

Officials began venting radioactive steam at Fukushima Dai-ichi's Unit 1 to relieve pressure inside the reactor vessel, which houses the overheated uranium fuel.

Concerns escalated dramatically Saturday when that unit's containment building exploded.

Officials were aware that the steam contained hydrogen and were risking an explosion by venting it, acknowledged Shinji Kinjo, spokesman for the government's Nuclear and Industrial Safety Agency, but chose to do so because they needed to keep circulating cool water on the fuel rods to prevent a meltdown.

To cool the reactor fuel, operators needed to keep circulating more and more cool water on the fuel rods. But the temperature in the reactor vessel apparently kept rising, heating the zirconium cladding that makes up the fuel rod casings.



If the temperature inside the Fukushima reactor vessel rose further, to roughly 4,000 degrees Fahrenheit (2,200 Celsius), then the uranium fuel pellets would start to melt. But once the zirconium reached 2,200 degrees Fahrenheit (1,200 Celsius), it reacted with the water, becoming zirconium oxide and hydrogen.

When the hydrogen-filled steam was vented from the reactor vessel, the hydrogen reacted with oxygen, either in the air or water outside the vessel, and exploded.

A similar "hydrogen bubble" problem concerned officials at the 1979 Three Mile Island nuclear disaster in Pennsylvania, until it dissipated.

According to experts interviewed by The Associated Press, any melted fuel would eat through the bottom of the reactor vessel. Next, it would eat through the floor of the already-damaged containment building. At that point, the uranium and dangerous byproducts would start escaping into the environment.

At some point in the process, the walls of the reactor vessel — 6 inches (15 centimeters) of stainless steel — would melt into a lava-like pile, slump into any remaining water on the floor, and potentially cause an explosion much bigger than the one caused by the hydrogen. Such an explosion would enhance the spread of radioactive contaminants.

If the reactor core became exposed to the external environment, officials would likely began pouring cement and sand over the entire facility, as was done at the 1986 Chernobyl nuclear accident in the Ukraine, Peter Bradford, a former commissioner of the US Nuclear Regulatory Commission, said in a briefing for reporters.

At that point, Bradford added, "many first responders would die."

## **Japan Pushes To Rescue Survivors As Quake Toll Rises (NYT)**

By Martin Fackler, Mark McDonald

New York Times, March 13, 2011

NAKAMINATO, Japan — Japan mobilized a nationwide rescue effort on Saturday to pluck survivors from collapsed buildings and rush food and water to thousands in an earthquake and tsunami zone under siege, without water, electricity, heat or telephone service.

Entire villages in parts of Japan's northern Pacific coast have vanished under a wall of water, many communities are cut off, and a nuclear emergency was unfolding at two stricken reactors at one plant as the country tried to absorb the scale of the destruction after Friday's powerful earthquake and devastating tsunami.

Japanese news media estimates of the death toll ranged from 1,300 to 1,700, but the total could rise. Many communities were scrambling to find the missing; in the port town of Minamisanriku, nearly 10,000 people were unaccounted for, according to the public broadcaster NHK. Much of the northeast was impassable, and by late Saturday rescuers had not arrived in the worst-hit areas.

More than 300,000 people have been evacuated, including tens of thousands fleeing the zone around the nuclear plants in Fukushima Prefecture even before news that problems at one plant appeared to be escalating quickly.

Most of the deaths were from drowning, but Japan's Self-Defense Forces and firefighters were working to prevent a higher toll, rushing up the coast in helicopters and struggling to put out fires burning in industrial complexes or sweeping through Japan's many vulnerable wooden homes. Japan had clearly learned the lessons of the devastating Kobe earthquake of 1995, when the government refused to accept offers of international help early enough, leading to criticism that some of the 6,000 deaths could have been avoided.

The United States, which has several military bases in Japan, is sending in helicopters, destroyers and an aircraft carrier, the Ronald Reagan, which has the ability to act as a hospital as well as to convert seawater into drinking water, said a spokesman for the Navy's Seventh Fleet in Japan. Severe aftershocks continued to rock a traumatized country. The United States Geological Survey recorded 90 quakes off the eastern coast on Saturday alone, five of them with magnitudes larger than 6.0. Kyodo News reported more than 125 aftershocks since Friday afternoon's earthquake.

The continual swaying and rolling of the ground deepened the disorientation of a nation accustomed to disaster, but which has not experienced anything on this scale for generations.

Compounding those fears was uncertainty about the scale of the crisis at one of the nuclear plants in Fukushima, in the earthquake zone, and a growing sense on Sunday that the situation was worsening. The Japanese authorities were handing out iodine to residents in the area. Some experts believe iodine can help head off long-term effects of radiation exposure, including thyroid cancer.

The breadth of the disaster poses new challenges for a fragile government struggling with political scandals, continued economic woes and public frustration over its inability to weaken entrenched bureaucrats.

Aerial photographs of ravaged coastal areas showed a string of cities and villages leveled by the power of the tsunami. Plumes of black smoke rose from burning industrial plants. Stranded ships bobbed in the water. Town after town reported that parts of their population were unaccounted for. Survivors gathered on rooftops, frantically shouting or signaling for help.

With phone service cut throughout the area, some radio and television stations broadcast pleas from people trying desperately to find their family members or at least to assure them that they were alive. "This is Kimura Ayako in Sapporo, looking for the Tanakas in Soma," one caller said. "We are O.K. Please tell us your location."

Hatsue Takahashi of Onagawa in Miyagi Prefecture sent out a message on NHK Education TV to Rina Takahashi in the same town: "Hang on," she said. "I'll go there to meet you." And Sachiko Atara of Iwaki city called out across the airwaves in hopes of reaching Hideharu Komatsu in Sendai: "We are all O.K., waiting for your contact."

In Oarai, a port about 150 miles south of hard-hit Sendai, fishing boats, truck and cars lay 100 yards back from the water's edge, deposited in a jagged line like seashells left behind by the farthest reach of powerful waves. Some fishing boats had capsized; those swept into town by the tsunami teetered on their sides, or were tossed upside down.

JR, the railway company, reported that three passenger trains had not been accounted for as of Saturday night, amid fears that they were swept away by the tsunami. There were reports of as many as 3,400 buildings destroyed and 200 fires raging. Analysts estimated that total insured losses from the quake could hit \$15 billion, Reuters reported.

Even as estimates of the death toll from Friday's quake rose, Japan's prime minister, Naoto Kan, said 50,000 troops would be mobilized for the increasingly desperate rescue recovery effort, according to The Associated Press. Meanwhile, several ships from the United States Navy joined the rescue effort. The McCampbell and the Curtis Wilbur, both destroyers, prepared to move into position off Miyagi Prefecture.

In addition, the Ronald Reagan Carrier Strike Group was expected to arrive Sunday. Besides serving as a hospital, it can also be used as a platform for refueling helicopters from the Japanese Self-Defense Forces. Japan was also accepting offers of help from other countries.

Convoys of Japanese military helicopters could be seen flying over the earthquake zone on Saturday, and trucks filled with soldiers were moving into the area.

While aftershocks from the earthquake continued, the tsunami wreaked the most damage. Tsunami experts estimated that despite Japan's extensive warning systems and drills, there would only have been between 15 and 30 minutes after the earthquake struck before the tsunami washed in, leaving those in coastal areas precious little time to flee.

One-third of Kesennuma, a city of 74,000, was reported to be submerged, the BBC said, and photographs showed fires continued to rage there. Iwate, a coastal city of 23,000 people, was reported to be almost completely destroyed, the BBC said.

Local television here reported that the authorities had found 300 to 400 bodies in the town of Rikuzentakata, in Iwate Prefecture. In Minamisoma, in Fukushima Prefecture, 97 residents of a retirement home were found dead. And an additional 100 bodies were found Saturday in Miyagi Prefecture, near the quake's epicenter, bringing the total in those places to more than 500.

Although aftershocks were continuing to rattle Tokyo, signs of normality were appearing. Flight schedules were resuming at Tokyo's principal airports, Narita and Haneda, and most of Tokyo's trains and subways were operating.

Farther north, aerial photos showed floodwaters receding from the runways at the airport in Sendai, perhaps the hardest hit of the coastal cities.

Military units were in Sendai on Saturday, working at evacuation shelters or helping search-and-rescue teams. Sendai's Web site, posted in Tokyo because much of the north was still without electricity, recorded a grim list of the toll: 1.4 million homes in the city without electricity, and 500,000 homes without water. At a school turned refugee center, Nakano Elementary School, 350 people were lifted out by a Self-Defense Forces helicopter, and 400 people in Arahama Elementary School were in the process of being plucked out by helicopters.

"The rescue is going on through the night, of course," Michael Tonge, a teacher from Britain, said early Sunday morning from his home in Sendai.

Mr. Tonge said many people in Sendai were still without power, although his home had not lost electricity. "The government is telling people not to use it too much as they need the power to help bring the nuclear reactor under control," he said.

No buildings had collapsed in his neighborhood, Mr. Tonge said, and people were not panicking — typical of a nation accustomed to order and schooled to stay calm and constructive.

"The few shops open have people queuing nicely," he said, "with no pushing or fighting or anything." He said he hoped the earthquake would not come to be known as the "Sendai quake."

"I haven't heard it being called the Sendai quake here, but if that's what people are calling it, then that is unfortunate," said Mr. Tonge, who lives there with his wife, Yuka, and their 3-year-old daughter, Aoi. "This is a beautiful city with nice people. A great place to live."

## Japan Orders Evacuation Near 2nd Nuclear Plant (NYT)

By Matthew L. Wald

New York Times, March 12, 2011

Japanese officials issued broad evacuation orders on Saturday for people living near two nuclear power plants whose cooling systems broke down as a result of the earthquake. The officials warned that small amounts of radioactive material were likely to leak from the plants.

The power plants, known as Daiichi and Daini and operated by Tokyo Electric Power, experienced critical failures of the cooling systems after the plants were shut down, as they were during the quake.

About 45,000 people were affected by the evacuation order at the Daiichi plant, where those living within a six-mile radius were told to leave. The evacuation of the second plant was for a one-mile radius because "there is no sign that radiation has been emitted outside," an official said.

Failure of the cooling systems allowed pressure to build up beyond the design capacity of the reactors. Small amounts of radioactive vapor were expected to be released into the atmosphere to prevent damage to the containment systems, safety officials said. They said that the levels of radiation were not large enough to threaten the health of people outside the plants, and that the evacuations had been ordered as a precaution.

Nuclear safety officials focused initially on the Daiichi plant. But by Saturday morning Japan had declared states of emergency for five reactors at the two plants, an escalation that added to worries about the safety of nuclear facilities in the quake-prone Japanese islands.

The Daiichi and Daini plants are 10 miles apart in Fukushima Prefecture, about 150 miles north of Tokyo and close to the quake's epicenter off the coast.

The plants' problems were described as serious but were far short of a catastrophic emergency like the partial core meltdown that occurred at the Three Mile Island plant near Harrisburg, Pa., in 1979.

A Japanese nuclear safety panel said the radiation levels were 1,000 times above normal in a reactor control room at the Daiichi plant. Some radioactive material had also seeped outside, with radiation levels near the main gate measured at eight times normal, NHK, Japan's public broadcaster, quoted nuclear safety officials as saying.

The safety officials said there was "no immediate health hazard" to residents from the leaks, which they described as "minute," and people were urged to stay calm.

The emergency at the Daiichi plant began shortly after the earthquake struck on Friday afternoon. Emergency diesel generators, which had kicked in to run the reactor's cooling system after the electrical power grid failed, shut down about an hour after the earthquake. There was speculation that the tsunami knocked the generators out of service.

Twenty hours later, the plant was operating in a battery-controlled cooling mode. Tokyo Electric said that by Saturday morning it had installed a mobile generator at Daiichi to ensure that the cooling system would continue operating even after reserve battery power was depleted. Even so, the company said it was considering a "controlled containment venting" in order to avoid an "uncontrolled rupture and damage" to the containment unit.

"With evacuation in place and the oceanbound wind, we can ensure the safety," a nuclear safety official, Yukio Edano, said at a news conference early Saturday.

It was not clear, however, how long the cooling systems could continue to function in emergency mode or when normal power supplies could be restored.

Two workers were reported missing at the Daiichi plant, but the company did not explain what might have happened to them.

A pump run by steam, designed to function in the absence of electricity, was adding water to the reactor vessel, and as that water boiled off, it was being released. Such water is usually only slightly radioactive, according to nuclear experts. As long as the fuel stays covered by water, it will remain intact, and the bulk of the radioactive material will stay inside. If the fuel is exposed, it can result in a meltdown.

The reactors at the two plants shut down when the earthquake began at 2:46 p.m. Friday. At the Daiichi plant's Reactor Unit 1, when the emergency generators shut down, pressure began to rise in the reactor, leading operators to vent it.

During much of the early morning on Saturday, safety officials focused on getting emergency power supplies to the Daiichi plant to restore the normal cooling function.

Secretary of State Hillary Rodham Clinton, speaking in Washington, said that American military planes had already delivered "coolant." But American military officials indicated that while they were prepared to help Japan grapple with any problems related to its nuclear facilities, they had not been asked to do so.

Japan relies heavily on nuclear power, which generates just over one-third of the country's electricity. Its plants are designed to withstand earthquakes, which are common, but experts have long expressed concerns about safety standards, particularly if a major quake hit close to a reactor.

One major concern is that while plant operators can quickly shut down a nuclear reactor, they cannot allow the cooling systems to stop working. Even after the plant's chain reaction is stopped, its fuel rods produce about six percent as much heat as they do when the plant is running. The production of heat drops off sharply in the following hours, but continued cooling is needed or the water will boil away and the fuel will melt, releasing the uranium fragments inside.

Heat from the nuclear fuel rods must be removed by water in a cooling system, but that requires power to run the pumps, align the valves in the pipes and run the instruments. The plant requires a continuous supply of electricity even after the reactor stops generating power.

With the steam-driven pump in operation, pressure valves on the reactor vessel would open automatically as pressure rose too high, or could be opened by operators. "It's not like they have a breach; there's no broken pipe venting steam," said Margaret E. Harding, a nuclear safety consultant who managed a team at General Electric, the reactors' designer, that analyzed pressure buildup in reactor containments. "You're getting pops of release valves for minutes, not hours, that take pressure back down."

Civilian power reactors are designed with emergency diesel generators to assure the ability to continue cooling even during a blackout. Many reactors have two, assuring redundancy; some have three, so that if one must be taken out of service for maintenance, the plant can still keep running.

It was not immediately clear how many diesel generators there are at Daiichi, but the operators reported earlier in the day that they were not working, prompting the evacuation.

Daiichi, which is formally known as Fukushima Daiichi Nuclear Power Station, was designed by General Electric and entered commercial service in 1971. It was probably equipped to function for some hours without emergency diesel generators, said David Lochbaum, who worked at three American reactor complexes that use G.E. technology.

Mr. Lochbaum, who also worked as an instructor for the Nuclear Regulatory Commission on G.E. reactors, said that such reactors were equipped to ride out interruptions in electrical power by using pumps that could be powered by steam, which would still be available in case of electric power failure. Valves can be opened by motors that run off batteries, he said. Plants as old as Fukushima Daiichi 1 generally have batteries that are large enough to operate for four hours, he said.

After that, he said, the heat production in the core is still substantial but has been reduced. The heat would boil away the cooling water, raising pressure in the reactor vessel, until automatic relief valves opened to let out some of the steam. Then the valves would close and the pressure would start building again.

If the cooling system remains inoperative for many hours, the water will eventually boil away, he said, and the fuel will begin to melt. That is what happened at Three Mile Island. In that case, the causes were mechanical failure, operator error and poor design, according to government investigators.

## **New Quakes Rock Tsunami-devastated Japan (AP)**

By Jay Alabaster

Associated Press, March 12, 2011

Huge earthquakes rocked northeastern Japan on Saturday, a day after a giant temblor set off a powerful tsunami that killed hundreds of people, turned the coast into a swampy wasteland and left two nuclear reactors dangerously close to meltdown.

The United States Geological Survey said a strong earthquake struck just before noon in the sea in virtually the same place where the magnitude 8.9 quake on Friday unleashed one of the greatest disasters Japan has witnessed — a 23-foot (7-meter) tsunami that washed far inland over fields and smashed towns.

Saturday's magnitude 6.8 quake was followed by a series of temblors originating from the same area, the USGS said. It was not immediately known whether the new quakes caused any more damage. All were part of the more than 125 aftershocks since Friday's massive quake, the strongest to hit Japan since officials began keeping records in the late 1800s.

It ranked as the fifth-largest earthquake in the world since 1900 and was nearly 8,000 times stronger than one that devastated Christchurch, New Zealand, last month, scientists said.

The official death toll stood at 413, while 784 people were missing and 1,128 injured. In addition, police said between 200 and 300 bodies were found along the coast in Sendai, the biggest city in the area of the quake's epicenter. An untold number of bodies were also believed to be lying in the rubble and debris. Rescue workers had yet to reach the hardest-hit areas.

"The flood came in from behind the store and swept around both sides. Cars were flowing right by," said Wakio Fukushima, who owns a convenience store in this northern coastal city of 1.02 million people, 80 miles (125 kilometers) from the quake's epicenter.

Smashed cars and small airplanes were jumbled up against buildings near the local airport, several miles (kilometers) from the shore. Felled trees and wooden debris lay everywhere as rescue workers coasted on boats through murky waters around flooded structures, nosing their way through a sea of detritus.

"The tsunami was unbelievably fast. Smaller cars were being swept around me and all I could do was sit in my truck," said truck driver Koichi Takairin, 34, who was pinned in his four-ton vehicle and later escaped to a community center.

His rig ruined, he joined the steady flow of mud-spattered survivors who walked along the road away from the sea and back into city. Smoke from at least one large fire could be seen in the distance.

But basic commodities were at a premium. Hundreds lined up outside of supermarkets, and gas stations were swamped with cars. The situation was similar in scores of other towns and cities along the 1,300-mile-long (2,100-kilometer-long) eastern coastline hit by the tsunami.

Japan also declared its first-ever states of emergency for five nuclear reactors at two power plants after the units lost cooling ability in the aftermath of the earthquake, and workers struggled to prevent meltdowns.

Two of the reactors at the Fukushima Daiichi plant in Futaba town were in danger and could face a meltdown if all possible safety procedures fail.

Authorities said the breakdown happened after the quake knocked out power, turning off the water supply needed to cool the system. Although a backup cooling system was being used, Japan's nuclear safety agency said pressure inside the reactor had risen to 1 1/2 times the level considered normal.

Authorities said radiation levels had jumped 1,000 times normal inside Unit 1 and were measured at eight times normal outside the plant.

They expanded an earlier evacuation zone more than threefold, from 3 kilometers to 10 kilometers (2 miles to 6.2 miles). About 3,000 people were urged to leave their homes in the first announcement.

Japan gets about 30 percent of its electricity from nuclear power plants. Authorities warned citizens to be prepared for severe power cuts. More than 1 million households across Japan, mostly in the northeast, still didn't have access to water.

In Sendai, as in many areas of the northeast, cell phone service was down, making it difficult for people to communicate with loved ones.

"I'm waiting for my son to come here. But I cannot tell him he should come over here because mobile phones aren't working," a woman in her 70s at a shelter told Japanese TV in the town of Rikuzentakada, which appeared to be largely destroyed by the tsunami.

"My husband is missing," she said. "Tsunami water was rising to my knees, and I told him I would go first. He is not here yet."

The tsunami swept inland about 6 miles (10 kilometers), and beyond that most buildings appeared undamaged from the outside.

TV footage showed several people standing on the roof of a three-story building in Miyagi prefecture (state), surrounded by mud. A man waved a big white flag, and a woman was lifting two pink umbrellas, signaling for help.

Elsewhere, aerial footage showed military helicopters lifting people on rescue tethers from rooftops and partially submerged buildings surrounded by water and debris. At one school, a large white "SOS" had been spelled out in English.

"The energy radiated by this quake is nearly equal to one month's worth of energy consumption" in the United States, USGS scientist Brian Atwater told The Associated Press.

The entire Pacific had been put on alert — including coastal areas of South America, Canada and Alaska — but waves were not as bad as expected.

President Barack Obama pledged US assistance following what he called a potentially "catastrophic" disaster. He said one US aircraft carrier is already in Japan and a second was on its way. A US ship was also heading to the Marianas Islands to assist as needed, he said.

Most trains in Tokyo started running again Saturday after the city had been brought to a near standstill the day before. Tens of thousands of people had been stranded with the rail network down, jamming the streets with cars, buses and trucks trying to get out of the city.

The city set up 33 shelters in city hall, on university campuses and in government offices, but many spent Friday night at 24-hour cafes, hotels and offices.

Japan's worst previous quake was a magnitude 8.3 temblor in Kanto that killed 143,000 people in 1923, according to the USGS. A magnitude 7.2 quake in Kobe killed 6,400 people in 1995.

Japan lies on the "Ring of Fire" — an arc of earthquake and volcanic zones stretching around the Pacific where about 90 percent of the world's quakes occur, including the one that triggered the Dec. 26, 2004, Indian Ocean tsunami that killed an

estimated 230,000 people in 12 countries. A magnitude-8.8 quake that shook central Chile in February 2010 also generated a tsunami and killed 524 people.

## **Japan Quake Causes Emergencies At 5 Nuke Reactors (AP)**

By Mari Yamaguchi And Jeff Donn

Associated Press, March 12, 2011

Japan declared states of emergency for five nuclear reactors at two power plants after the units lost cooling ability in the aftermath of Friday's powerful earthquake. Thousands of residents were evacuated as workers struggled to get the reactors under control to prevent meltdowns.

Operators at the Fukushima Daiichi plant's Unit 1 scrambled ferociously to tamp down heat and pressure inside the reactor after the 8.9 magnitude quake and the tsunami that followed cut off electricity to the site and disabled emergency generators, knocking out the main cooling system.

Some 3,000 people within two miles (three kilometers) of the plant were urged to leave their homes, but the evacuation zone was more than tripled to 6.2 miles (10 kilometers) after authorities detected eight times the normal radiation levels outside the facility and 1,000 times normal inside Unit 1's control room.

The government declared a state of emergency at the Daiichi unit — the first at a nuclear plant in Japan's history. But hours later, the Tokyo Electric Power Co., which operates the six-reactor Daiichi site in northeastern Japan, announced that it had lost cooling ability at a second reactor there and three units at its nearby Fukushima Daini site.

The government quickly declared states of emergency for those units, too. Nearly 14,000 people living near the two power plants were ordered to evacuate.

Japan's nuclear safety agency said the situation was most dire at Fukushima Daiichi's Unit 1, where pressure had risen to twice what is considered the normal level. The International Atomic Energy Agency said in a statement that diesel generators that normally would have kept cooling systems running at Fukushima Daiichi had been disabled by tsunami flooding.

Officials at the Daiichi facility began venting radioactive vapors from the unit to relieve pressure inside the reactor case. The loss of electricity had delayed that effort for several hours.

Plant workers there labored to cool down the reactor core, but there was no prospect for immediate success. They were temporarily cooling the reactor with a secondary system, but it wasn't working as well as the primary one, according to Yuji Kakizaki, an official at the Japanese nuclear safety agency.

Even once a reactor is shut down, radioactive byproducts give off heat that can ultimately produce volatile hydrogen gas, melt radioactive fuel, or even breach the containment building in a full meltdown belching radioactivity into the surroundings, according to technical and government authorities.

Despite plans for the intentional release of radioactivity, Chief Cabinet Secretary Yukio Edano said the 40-year-old plant was not leaking radiation.

"With evacuation in place and the ocean-bound wind, we can ensure the safety," Edano said at a televised news conference early Saturday.

It was unclear if the elevation of radioactivity around the reactor was known at the time he spoke.

The outside measurement of radiation at Daiichi was far below the allowed limit for a year, other officials said, reporting that it would take 70 days standing at the gate to reach the yearly limit.

Dr. Irwin Redlener, a pediatrician who runs a disaster preparedness institute at Columbia University, said the reported level of radiation outside the plant would not pose an immediate danger, though it could lift the rate of thyroid cancer in a population over time.

However, he called the reported level inside the plant extraordinarily high, raising a concern about acute health effects. "I would personally absolutely not want to be inside," he said.

While the condition of the reactor cores was of utmost concern, Tokyo Electric Power Co. also warned of power shortages and an "extremely challenging situation in power supply for a while."

The Daiichi site is located in Onahama city, about 170 miles (270 kilometers) northeast of Tokyo. The 460-megawatt Unit 1 began operating in 1971 and is the oldest at the site. It is a boiling water reactor that drives the turbine with radioactive water, unlike pressurized water reactors usually found in the United States. Japanese regulators decided in February to allow it to run another 10 years.

The temperature inside the reactor wasn't reported, but Japanese regulators said it wasn't dropping as quickly as they wanted.

Kakizaki, the safety agency official, said the emergency cooling system is intact and could kick in as a last line of defense. "That's as a last resort, and we have not reached that stage yet," he added.

Defense Ministry official Ippo Maeyama said dozens of troops trained for chemical disasters had been dispatched to the plant in case of a radiation leak, along with four vehicles designed for use in atomic, biological and chemical warfare.

Technical experts said the plant would presumably have hours, but probably not days, to try to stabilize things.

Leonard S. Spector, director of the Washington office of the James Martin Center for Nonproliferation Studies, said loss of coolant is the most serious type of accident at a nuclear power plant.

"They are busy trying to get coolant to the core area," said Neil Sheehan, a spokesman for the US Nuclear Regulatory Commission. "The big thing is trying to get power to the cooling systems."

High-pressure pumps can temporarily cool a reactor in this state with battery power, even when electricity is down, according to Arnold Gundersen, a nuclear engineer who used to work in the US nuclear industry. They can open and close relief valves needed to control pressure. Batteries would go dead within hours but could be replaced.

The IAEA said "mobile electricity supplies" had arrived at the Daiichi plant. It wasn't clear if they were generators or batteries.

It also was not immediately clear how closely the reactor had moved toward dangerous pressure or temperature levels. If temperatures were to keep rising to more than 2,000 degrees Fahrenheit, it could set off a chemical reaction that begins to embrittle the metallic zirconium that sheathes the radioactive uranium fuel.

That reaction releases hydrogen, which can explode when cooling water finally floods back into the reactor. That was also concern for a time during the 1979 Three Mile Island accident in Pennsylvania.

If the reactor temperature keeps reaches around 4,000 degrees, the fuel could melt outright, and the reactor could slump right into the bottom of the containment building in a partial meltdown. Then the crucial question would be whether the building would stay intact.

"The last line of defense is that containment — and that's got to hold," Gundersen said. If it doesn't, the radioactive load inside the reactor can pour out into the surroundings.

The plant is just south of the Miyagi prefecture, which was the region hardest hit by the quake. A fire broke out at another nuclear plant in that area in a turbine building at one of the Onagawa power reactors. Smoke poured from the building, but the fire was put out. Turbine buildings of such boiling water reactors, though separate from the reactor, do contain radioactive water, but at much lower levels than inside the reactor. A water leak was reported in another Onagawa reactor.

No radioactive releases were reported in any of the other affected plants.

As Japan is one of the most seismically active nations in the world, it has strict sets of regulations designed to limit the impact of quakes on nuclear power plants. These standards call for constructing plants on solid bedrock to reduce shaking.

As one of the most seismically active countries in the world, Japan has strict sets of regulations designed to limit the impact of quakes on nuclear power plants. These standards call for building plants on solid bedrock to reduce shaking.

Even so, 10 of Japan's 54 commercial reactors were shut down because of the quake, and Tokyo Electric Power said it had to reduce power generation. Japan gets about 30 percent of its electricity from nuclear power.

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**Date:** Monday, March 14, 2011 6:59:44 PM  
**Attachments:** 11-048.docx

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# NRC NEWS

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No. 11-048

March 14, 2011

### NRC SENDS ADDITIONAL EXPERTS TO ASSIST JAPAN

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

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

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

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

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

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# NRC NEWS

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**Subject:** Real Event: NRC Press Release #6 - Japan Event Earthquake/Tsunami  
**Date:** Monday, March 14, 2011 9:32:13 PM  
**Attachments:** Press Release 6.pdf

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

The NRC is responding to an event.

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

cccl 85



# NRC NEWS

## U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Telephone: 301/415-8200

Washington, D.C. 20555-0001

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

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

No. 11-047

March 14, 2011

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

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

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

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

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

###

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**From:** Harrington, Holly  
**To:** OPA Resource; Ash, Darren; Barkley, Richard; Batkin, Joshua; Bell, Hubert; Belmore, Nancy; Bergman, Thomas; Bollwerk, Paul; Bonaccorso, Amy; Borchardt, Bill; Bozin, Sunny; Brenner, Eliot; Brock, Terry; Brown, Boris; Bubar, Patrice; Burnell, Scott; Burns, Stephen; Carpenter, Cynthia; Chandrathil, Prema; Clark, Theresa; Collins, Elmo; Couret, Ivonne; Crawford, Carrie; Cutler, Iris; Dacus, Eugene; Dapas, Marc; Davis, Roger; Dean, Bill; Decker, David; Dricks, Victor; Droggitis, Spiros; Flory, Shirley; Franovich, Mike; Gibbs, Catina; Haney, Catherine; Hannah, Roger; Harbuck, Craig; Hasan, Nasreen; Hayden, Elizabeth; Holahan, Gary; Holahan, Patricia; Holian, Brian; Jacobssen, Patricia; Jaczko, Gregory; Jasinski, Robert; Jenkins, Verlyn; Johnson, Michael; Jones, Andrea; Kock, Andrea; Kotzalas, Margie; Ledford, Joey; Lee, Samson; Leeds, Eric; Lepre, Janet; Lew, David; Lewis, Antoinette; Loyd, Susan; Magwood, William; McCrary, Cheryl; McGrady-Finneran, Patricia; McIntyre, David; Mensah, Tanya; Mityng, Viktoria; Monninger, John; Montes, David; Nieh, Ho; Ordaz, Vonna; Ostendorff, William; Owen, Lucy; Powell, Amy; Quesenberry, Jeannette; Reddick, Darani; Regan, Christopher; Reyes, Luis; Riddick, Nicole; RidsSecyMailCenter Resource; Riley (OCA), Timothy; Rohrer, Shirley; Samuel, Olive; Satorius, Mark; Schaaf, Robert; Schmidt, Rebecca; Scott, Catherine; Screnci, Diane; Shaffer, Vered; Shane, Raeann; Sharkey, Jeffry; Sheehan, Neil; Sheron, Brian; Siurano-Perez, Osiris; Steger (Tucci), Christine; Svinicki, Kristine; Tabatabai, Omid; Tannenbaum, Anita; Taylor, Renee; Temp, WDM; Thomas, Ann; Uhle, Jennifer; Uselding, Lara; Vietti-Cook, Annette; Virgilio, Martin; Virgilio, Rosetta; Walker-Smith, Antoinette; Weaver, Doug; Weber, Michael; Weil, Jenny; Werner, Greg; Wiggins, Jim; Williams, Evelyn; Zimmerman, Roy; Zorn, Jason  
**Subject:** RE: Press Release: NRC Sends Additional Experts to Assist Japan  
**Date:** Monday, March 14, 2011 8:48:06 PM  
**Attachments:** 11-048.docx

---

This press release has gone out with slight change. See attached.

**From:** OPA Resource  
**Sent:** Monday, March 14, 2011 6:59 PM  
**To:** Ash, Darren; Barkley, Richard; Batkin, Joshua; Bell, Hubert; Belmore, Nancy; Bergman, Thomas; Bollwerk, Paul; Bonaccorso, Amy; Borchardt, Bill; Bozin, Sunny; Brenner, Eliot; Brock, Terry; Brown, Boris; Bubar, Patrice; Burnell, Scott; Burns, Stephen; Carpenter, Cynthia; Chandrathil, Prema; Clark, Theresa; Collins, Elmo; Couret, Ivonne; Crawford, Carrie; Cutler, Iris; Dacus, Eugene; Dapas, Marc; Davis, Roger; Dean, Bill; Decker, David; Dricks, Victor; Droggitis, Spiros; Flory, Shirley; Franovich, Mike; Gibbs, Catina; Haney, Catherine; Hannah, Roger; Harbuck, Craig; Harrington, Holly; Hasan, Nasreen; Hayden, Elizabeth; Holahan, Gary; Holahan, Patricia; Holian, Brian; Jacobssen, Patricia; Jaczko, Gregory; Jasinski, Robert; Jenkins, Verlyn; Johnson, Michael; Jones, Andrea; Kock, Andrea; Kotzalas, Margie; Ledford, Joey; Lee, Samson; Leeds, Eric; Lepre, Janet; Lew, David; Lewis, Antoinette; Loyd, Susan; Magwood, William; McCrary, Cheryl; McGrady-Finneran, Patricia; McIntyre, David; Mensah, Tanya; Mityng, Viktoria; Monninger, John; Montes, David; Nieh, Ho; Ordaz, Vonna; Ostendorff, William; Owen, Lucy; Powell, Amy; Quesenberry, Jeannette; Reddick, Darani; Regan, Christopher; Reyes, Luis; Riddick, Nicole; RidsSecyMailCenter Resource; Riley (OCA), Timothy; Rohrer, Shirley; Samuel, Olive; Satorius, Mark; Schaaf, Robert; Schmidt, Rebecca; Scott, Catherine; Screnci, Diane; Shaffer, Vered; Shane, Raeann; Sharkey, Jeffry; Sheehan, Neil; Sheron, Brian; Siurano-Perez, Osiris; Steger (Tucci), Christine; Svinicki, Kristine; Tabatabai, Omid; Tannenbaum, Anita; Taylor, Renee; Temp, WDM; Thomas, Ann; Uhle, Jennifer; Uselding, Lara; Vietti-Cook, Annette; Virgilio, Martin; Virgilio, Rosetta; Walker-Smith, Antoinette; Weaver, Doug; Weber, Michael; Weil, Jenny; Werner, Greg; Wiggins, Jim; Williams, Evelyn; Zimmerman, Roy; Zorn, Jason  
**Subject:** Press Release: NRC Sends Additional Experts to Assist Japan

For immediate release.

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

ccc/86



# NRC NEWS

## U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs

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

No. 11-048

March 14, 2011

### NRC SENDS ADDITIONAL EXPERTS TO ASSIST JAPAN

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

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

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

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

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

###

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**From:** Akstulewicz, Brenda  
**To:** Brenner, Eliot; Burnell, Scott; Chandrathil, Prema; Couret, Ivonne; Dricks, Victor; Hannah, Roger; Harrington, Holly; Hayden, Elizabeth; Janbergs, Holly; Ledford, Joey; McIntyre, David; Mitlyng, Viktoria; Screnci, Diane; Shannon, Valerie; Sheehan, Neil; Uselding, Lara  
**Subject:** FW: NRC press release  
**Date:** Monday, March 14, 2011 11:30:59 AM  
**Attachments:** 11-047.docx

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Please see attached.

---

**From:** Brenner, Eliot  
**Sent:** Monday, March 14, 2011 11:23 AM  
**To:** Akstulewicz, Brenda  
**Subject:** NRC press release

Brenda .. please send the attached around to all NRC staff then put the release out. Send it internally with a 15 minute delay before release.

ccc/87





# NRC NEWS

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No. 11-047

March 14, 2011

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**From:** OPA Resource

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

**Subject:** Press Release: Japanese Government Asks for Assistance with Reactor Events; U.S. Government and NRC Preparing Response

**Date:** Monday, March 14, 2011 12:02:10 PM

**Attachments:** 11-047.docx

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For release and posting in approximately 15 minutes.

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

ccc/88



# NRC NEWS

## U.S. NUCLEAR REGULATORY COMMISSION

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Washington, D.C. 20555-0001

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No. 11-047

March 14, 2011

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**From:**OPA Resource**To:**

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

**Subject:**

Press Release: NRC Sends Special Inspection Team to Global Nuclear Fuel Plant

**Date:**

Monday, March 14, 2011 5:38:20 PM

**Attachments:**11-007.ii.docx**Office of Public Affairs**

US Nuclear Regulatory Commission

301-415-8200

opa.resource@nrc.gov

ccc/89



# NRC NEWS

## U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs, Region II  
245 Peachtree Center Ave. NE, Suite 1200  
Atlanta, GA 30303-1257  
Web Site: [www.nrc.gov](http://www.nrc.gov)

No. II-11-007

CONTACT: Roger Hannah (404) 997-4417  
Joey Ledford (404) 997-4416

March 14, 2011

E-mail: [OPA2@nrc.gov](mailto:OPA2@nrc.gov)

### NRC SENDS SPECIAL INSPECTION TEAM TO GLOBAL NUCLEAR FUEL PLANT

The Nuclear Regulatory Commission has sent a Special Inspection Team to Global Nuclear Fuel-Americas, LLC, to examine the circumstances associated with an event in which the licensee failed to maintain required process control over a small quantity of enriched uranium. The nuclear fuel manufacturing facility is located in Wilmington, N.C.

The event, reported to the NRC on March 2, occurred in a grinding station in one of the facility's process lines. A quantity of uranium dioxide beyond prescribed limits was found to have accumulated in a filter in the grinding station.

Upon discovery of the condition, all of the facility's grinding stations were shut down to assess their conditions. No other examples of powder accumulation were discovered. Other process controls and systems ensured that event posed no danger to plant employees or the public.

The three-member NRC special inspection team, which is expected to begin its work at the facility today, will determine the safety implications of the event and the adequacy of the licensee's corrective actions.

The NRC will issue a publicly available inspection report documenting the findings within 30 days after the inspection is completed.

###

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**From:** Couret, Ivonne  
**To:** Hayden, Elizabeth  
**Subject:** WEB STUFF Today  
**Date:** Monday, March 14, 2011 11:25:37 AM  
**Attachments:** MG\_2649.jpg  
MG\_2654.jpg  
MG\_2659.jpg  
MG\_2661.jpg

---

Here are some images today

Last caption suggestion reads

Here at the NRC's headquarters Operations Center, operating on a 24-hour basis, staff are examining available information to analyze the earthquake and tsunami event and understand their implications both for Japan and the United States. The NRC has sent two boiling-water reactor experts to Japan as part of a U.S. Agency for International Development team. The NRC will not comment on hour-to-hour developments at the Japanese reactors. This is an ongoing crisis for the Japanese who have primary responsibility.

Ivonne L. Couret  
Public Affairs Officer  
Office of Public Affairs

O (301) 415-8205  
[ivonne.couret@nrc.gov](mailto:ivonne.couret@nrc.gov)

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

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

NRC Employees can read interesting insight on the OPA Blog  
<http://portal.nrc.gov/OCM/opa/blog/default.aspx>

Please consider the environmental impact before printing this email.

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

From: Greenwood, Krystal On Behalf Of AV-PHOTO Resource  
Sent: Monday, March 14, 2011 10:24 AM  
To: Couret, Ivonne; AV-PHOTO Resource  
Subject: RE: Photographer needed at Ops center now

Good Morning:

Please find attached images.

Thank you,

Krystal Greenwood  
3 Links Technologies  
AudioVisual Support Contractor  
U.S. Nuclear Regulatory Commission  
Location: T6E8  
Mailstop: T6E20  
Tel. 301-415-6851  
[Krystal.Greenwood@nrc.gov](mailto:Krystal.Greenwood@nrc.gov)

ccc/90

**From:** Brenner, Eliot  
**To:** Hayden, Elizabeth; Burnell, Scott; LIA04 Hoc  
**Cc:** Harrington, Holly; hollymharrington@aol.com  
**Subject:** RE: Questions  
**Date:** Monday, March 14, 2011 11:17:46 AM

---

That is why I want a conference call.

---

**From:** Hayden, Elizabeth  
**Sent:** Monday, March 14, 2011 11:04 AM  
**To:** Burnell, Scott; LIA04 Hoc  
**Cc:** Brenner, Eliot; Harrington, Holly; hollymharrington@aol.com  
**Subject:** RE: Questions

More good questions. We need a well-understood strategy and process for handling these questions and guidance on what OPA staff can/cannot say. This ties into the questions that will be asked at the EOC meetings coming up. After Eliot talks to the Chairman, perhaps we can spend a few minutes getting resolution to this issue.

*Beth*

---

**From:** Burnell, Scott  
**Sent:** Monday, March 14, 2011 10:48 AM  
**To:** LIA04 Hoc  
**Cc:** Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; hollymharrington@aol.com  
**Subject:** RE: Questions

We're working on that, please stand by.

---

**From:** LIA04 Hoc  
**Sent:** Monday, March 14, 2011 10:47 AM  
**To:** Burnell, Scott  
**Subject:** FW: Questions

Scott, I just left you a voicemail. We are getting many of these types of questions and would like guidance from OPA on how to handle.

---

**From:** Tift, Doug  
**Sent:** Monday, March 14, 2011 10:36 AM  
**To:** LIA04 Hoc  
**Cc:** McNamara, Nancy  
**Subject:** FW: Questions

Additional questions for our Q&A.

-Doug

---

**From:** Giarrusso, John (CDA) [mailto:John.Giarrusso@state.ma.us]  
**Sent:** Monday, March 14, 2011 9:30 AM  
**To:** 'Wilson, Mary Ann'; 'Currier, David'; McKenney, Mike

ccc/91

**From:** Brenner, Eliot  
**To:** Hayden, Elizabeth  
**Subject:** RE: In the office. Let me know if you want me in the Ops Ctr.  
**Date:** Monday, March 14, 2011 11:07:51 AM

---

Stay there for the moment. I have a press release to get out, then I want to do a conference call with all the staff. Say noon. Please ask Brenda to set one up. Thanks.

---

**From:** Hayden, Elizabeth  
**Sent:** Monday, March 14, 2011 11:06 AM  
**To:** Brenner, Eliot  
**Cc:** Harrington, Holly  
**Subject:** In the office. Let me know if you want me in the Ops Ctr.

Beth

ccc/92



**From:** Hayden, Elizabeth  
**To:** Brenner, Eliot  
**Cc:** Harrington, Holly  
**Subject:** In the office. Let me know if you want me in the Ops Ctr.  
**Date:** Monday, March 14, 2011 11:05:00 AM

---

Beth

ccc/93

**From:** Burnell, Scott  
**To:** Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; hollymharrington@aol.com  
**Subject:** Need another body here, preferably senior  
**Date:** Monday, March 14, 2011 10:50:30 AM  
**Importance:** High

---

I'm comfortable with the guidance I gave Sartorius to spread Qs around, but there's way too much going on for just me to handle right now between QAs, media calls, ET support, etc

ccc 1/94

**From:** Burnell, Scott  
**To:** Brenner, Eliot; Harrington, Holly; Hayden, Elizabeth; Sheehan, Neil; hollymharrington@aol.com  
**Subject:** Trying to find "Sen. Boxer Q&A" for distribution  
**Date:** Monday, March 14, 2011 10:28:43 AM  
**Importance:** High

---

Can't find in G drive or WebEOC

ccc/95

**From:** Akstulewicz, Brenda  
**To:** Brenner, Eliot; Burnell, Scott; Chandrathil, Prema; Couret, Ivonne; Dricks, Victor; Hannah, Roger; Harrington, Holly; Hayden, Elizabeth; Janbergs, Holly; Ledford, Joey; McIntyre, David; Mitlyng, Viktoria; Screnci, Diane; Shannon, Valerie; Sheehan, Neil; Uselding, Lara  
**Subject:** IMPORTANT!!!  
**Date:** Monday, March 14, 2011 10:00:11 AM

---

Hi Everyone,

If you worked any overtime Friday – Saturday, please amend your T&L **ASAP**.

Thanks

Brenda

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



ccc/96

**From:** Jones, Cynthia  
**To:** Hayden, Elizabeth; McIntyre, David; Harrington, Holly; HOO Hoc  
**Cc:** Evans, Michele  
**Subject:** ANS Talking Points on Implications of Fukushima Accident to U.S. Nuclear Plants  
**Date:** Monday, March 14, 2011 9:00:16 AM  
**Attachments:** ANS Talking Points - 2011-03-13 R1 2.pdf

---

Attached please find talking point developed by ANS (American Nuclear Society) for your information/use.

Cyndi

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

From: Joe Colvin [<mailto:president@ans.org>]

Sent: Monday, March 14, 2011 12:55 AM

To: Jones, Cynthia

Subject: Talking Points on Implications of Fukushima Accident to U.S. Nuclear Plants

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

ccc/97

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

**From:** Hayden, Elizabeth  
**To:** Brenner, Eliot  
**Subject:** Fw: AW: NEA/CNRA - WGPC-12 meeting will be held as scheduled but with flexibility  
**Date:** Monday, March 14, 2011 8:47:17 AM

---

We may have limited attendance at the Paris meeting.

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

From: Treier Anton <Anton.Treier@ensi.ch>  
To: Jean.GAUVAIN@oecd.org <Jean.GAUVAIN@oecd.org>; amcgarry@rpil.ie <amcgarry@rpil.ie>; besenyei@haea.gov.hu <besenyei@haea.gov.hu>; vc@aerb.gov.in <vc@aerb.gov.in>; valentina.ionescu@cncan.ro <valentina.ionescu@cncan.ro>; david.tredinnick@arpana.gov.au <david.tredinnick@arpana.gov.au>; roberto.ranieri@isprambiente.it <roberto.ranieri@isprambiente.it>; marli.vogels@minvrom.nl <marli.vogels@minvrom.nl>; fgrande@cnsns.gob.mx <fgrande@cnsns.gob.mx>; moisiibogdan@cncan.ro <moisiibogdan@cncan.ro>; miyake-ryo@meti.go.jp <miyake-ryo@meti.go.jp>; risto.isaksson@stuf.fi <risto.isaksson@stuf.fi>; sunni.locatelli@cncs-ccsn.gc.ca <sunni.locatelli@cncs-ccsn.gc.ca>; kees.jansen@minvrom.nl <kees.jansen@minvrom.nl>; dagmar.zemanova@ujd.gov.sk <dagmar.zemanova@ujd.gov.sk>; anneli.hallgren@ssm.se <anneli.hallgren@ssm.se>; deniz.yueksel@bmu.bund.de <deniz.yueksel@bmu.bund.de>; watanabe-makoto@meti.go.jp <watanabe-makoto@meti.go.jp>; mkelly@rpil.ie <mkelly@rpil.ie>; schwang@kins.re.kr <schwang@kins.re.kr>; mcle@csn.es <mcle@csn.es>; emmanuel.bouchot@asn.fr <emmanuel.bouchot@asn.fr>; i.sokolova@gosnadzor.ru <i.sokolova@gosnadzor.ru>; otake-fumie@jnes.go.jp <otake-fumie@jnes.go.jp>; stanislaw.janikowski@paa.gov.pl <stanislaw.janikowski@paa.gov.pl>; brafferty@rpil.ie <brafferty@rpil.ie>; anne.marit.ostreng@nrpa.no <anne.marit.ostreng@nrpa.no>; wolfgang.hilden@ec.europa.eu <wolfgang.hilden@ec.europa.eu>; niina.yliknuussi@ec.europa.eu <niina.yliknuussi@ec.europa.eu>; yhhah@kins.re.kr <yhhah@kins.re.kr>; karina.debeule@fanc.fgov.be <karina.debeule@fanc.fgov.be>; r.spiegelberg-planer@iaea.org <r.spiegelberg-planer@iaea.org>; soaresjc@cii.fc.ul.pt <soaresjc@cii.fc.ul.pt>; camelia.liutiev@cncan.ro <camelia.liutiev@cncan.ro>; Hayden, Elizabeth; aurele.gervais@cncs-ccsn.gc.ca <aurele.gervais@cncs-ccsn.gc.ca>; marek.bozenhard@sujb.cz <marek.bozenhard@sujb.cz>; gerard.westerhof@minvrom.nl <gerard.westerhof@minvrom.nl>; lise.roberts@hse.gsi.gov.uk <lise.roberts@hse.gsi.gov.uk>; ddawson@rpil.ie <ddawson@rpil.ie>  
Sent: Mon Mar 14 04:00:36 2011  
Subject: AW: NEA/CNRA - WGPC-12 meeting will be held as scheduled but with flexibility

Dear WGPC members,

in Switzerland, we have a very big media interest concerning the earthquakes and accidents in Japan und the safety of NPPs.

My workload for the media is enormous. That is the reason that I cannot participate at the WGPC-meeting of this week in Paris. I am very sorry about this, and I hope you understand our decision.

I think, we have to talk about these events in Japan at a later workshop of the WGPC.

All the best for you and specially for the japeese people.

Best regards,  
Anton Treier

Swiss Federal Nuclear Safety Inspectorate ENSI  
Industriestrasse 19  
CH-5200 Brugg  
Phone +41 56 460 85 70  
anton.treier@ensi.ch  
www.ensi.ch

-----Ursprüngliche Nachricht-----

cec/98



Von: Jean.GAUVAIN@oecd.org [mailto:Jean.GAUVAIN@oecd.org]

Gesendet: Samstag, 12. März 2011 15:42

An: amcgarry@rpil.ie; besenyi@haea.gov.hu; vc@aerb.gov.in; valentina.ionescu@cncan.ro; david.tredinnick@arpana.gov.au; roberto.ranieri@isprambiente.it; marli.vogels@minvrom.nl; fgrande@cnsns.gob.mx; moisiibogdan@cncan.ro; miyake-ryo@meti.go.jp; risto.isaksson@stuk.fi; Treier Anton; sunni.locatelli@cnscccsn.gc.ca; kees.jansen@minvrom.nl; dagmar.zemanova@ujd.gov.sk; anneli.hallgren@ssm.se; deniz.yueksel@bmu.bund.de; watanabe-makoto@meti.go.jp; mkelly@rpil.ie; schwang@kins.re.kr; mcle@csn.es; emmanuel.bouchot@asn.fr; i.sokolova@gosnadzor.ru; otake-fumie@jnes.go.jp; stanislaw.janikowski@paa.gov.pl; jean.gauvain@oecd.org; brafferty@rpil.ie; anne.marit.ostreng@nrpa.no; wolfgang.hilden@ec.europa.eu; niina.yliknuussi@ec.europa.eu; yhhah@kins.re.kr; karina.debeule@fanc.fgov.be; r.spiegelberg-planer@iaea.org; soaresjc@cii.fc.ul.pt; camelia.liutiev@cncan.ro; elizabeth.hayden@nrc.gov; aurele.gervais@cnscccsn.gc.ca; marek.bozenhard@sujb.cz; gerard.westerhof@minvrom.nl; lise.roberts@hse.gsi.gov.uk; ddawson@rpil.ie  
Betreff: NEA/CNRA - WGPC-12 meeting will be held as scheduled but with flexibility

Dear WGPC Members,

Probably most of you are exceptionally on duty during this week-end. All our thoughts are with our Japanese colleagues severely affected by the Tohoku Pacific Ocean earthquake and the subsequent Tsunami.

With the Chair we have considered the possibility to postpone our annual WGPC meeting.

However, after considering advantages (unique opportunity to discuss NRO real-life issues) and disadvantage (problem should be only in countries with a single staff in charge of public communication), and also considering that it would be strange not to use the situation to discuss "Crisis communication" it was decided to maintain the meeting as scheduled, taking into account the necessary flexibility in case one member could not attend the whole meeting.

At the NEA you will have Internet Connexion and we can also facilitate telephone access to your Capital during the meeting if needed.

Tuesday Afternoon there will be a preparatory meeting with the Chair and the Team Leaders.  
The Regular meeting will be from Wednesday to Friday.

In case you cannot be replaced in your organisation we will fully understand, but we would appreciate that you let us know.

Best Regards

Jean Gauvain  
NEA/NSD

---

From: [k195hyh@kins.re.kr]  
Sent: 12 March 2011 15:28  
To: REIG Javier, NEA/SURN  
Cc: GAUVAIN Jean, NEA/SURN; yhhah@kins.re.kr  
Subject: Re: WGPC meeting will be held as scheduled?

Thank you, Javier and Jean,

I've just come back home from the office where key KINS staff members including President are still working at the KINS Emergency Response Center.

Fortunately, Korea will not be impacted from Japan accident because their wind direction is working the opposite way toward the Pacific Ocean.

On my side, no change with my travel plan is expected. So Jean, no problem to meet you at the NEA office around 12:00 next Tuesday as originally scheduled.

Enjoy your weekend and see you soon.

Best regards,  
Yeonhee

**From:** Hayden, Elizabeth  
**To:** Sheehan, Neil; Brenner, Eliot; Harrington, Holly; Burnell, Scott  
**Subject:** Re: Japanese request for assistance  
**Date:** Monday, March 14, 2011 8:15:37 AM

---

Suggest weSay we are sending a team in response to Japan request.

---

**From:** Sheehan, Neil  
**To:** Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; Burnell, Scott  
**Sent:** Mon Mar 14 06:41:56 2011  
**Subject:** Japanese request for assistance

Eliot,

The Japanese government has formally asked for assistance from the U.S., via the Ambassador. The Chairman has been notified, and he seemed inclined (at least initially) to support the request.

The request includes technical experts who would be "embedded" in two Emergency Operations Centers on a 24-hour basis. That would mean perhaps six NRC staffers. They want guidance on how to get water from the sea to a pond and from there into the reactor.

I drafted a very brief press release on it that is attached.

Neil

ccc/99

**From:** Hayden, Elizabeth  
**To:** Brenner, Eliot; Harrington, Holly; Brenner, Eliot  
**Subject:** Delayed arrival  
**Date:** Monday, March 14, 2011 8:09:55 AM

---

I am waiting for the delayed Ops Center briefing before leaving for the office. ETA 9:30.

ccc/100

**From:** [Bulletin News](#)  
**To:** [NRC-editors@bulletinnews.com](mailto:NRC-editors@bulletinnews.com)  
**Subject:** NRC News Summary for Monday, March 14, 2011  
**Date:** Monday, March 14, 2011 6:59:46 AM  
**Attachments:** [NRCSummary110314.doc](#)  
[NRCSummary110314.pdf](#)  
[NRCClips110314.doc](#)  
[NRCClips110314.pdf](#)

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This morning's Nuclear Regulatory Commission News Summary and Clips are attached.

**Website:** You can also read today's briefing, including searchable archive of past editions, at <http://www.BulletinNews.com/nrc>.

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ccc/101

**From:** Sheehan, Neil  
**To:** Brenner, Eliot; Hayden, Elizabeth; Harrington, Holly; Burnell, Scott  
**Subject:** Japanese request for assistance  
**Date:** Monday, March 14, 2011 6:42:06 AM  
**Attachments:** JapanAssistanceRequest.3-14-2011.docx

---

Eliot,

The Japanese government has formally asked for assistance from the U.S., via the Ambassador. The Chairman has been notified, and he seemed inclined (at least initially) to support the request.

The request includes technical experts who would be "embedded" in two Emergency Operations Centers on a 24-hour basis. That would mean perhaps six NRC staffers. They want guidance on how to get water from the sea to a pond and from there into the reactor.

I drafted a very brief press release on it that is attached.

Neil

ccc/102

**From:** [HRMSBulletin Resource](#)  
**To:** [HRMSBulletin Resource](#)  
**Subject:** REMINDER: Closeout Today for PP 06/11 at 3 P.M.  
**Date:** Monday, March 14, 2011 6:12:41 AM

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Please make sure all Time and Labor input and approval for pay period 06/11 is completed by 3:00pm (EDT) today, March 14, 2011. Edit time and apply rules were run for the entire Agency. Only run these processes for employees who had errors or made changes to their time today.

Thank you for your cooperation.

ccc/103

**From:** Helton, Donald  
**To:** Coyne, Kevin; Kuritzky, Alan  
**Subject:** RE: Self Assessment of Expertise  
**Date:** Monday, March 14, 2011 3:59:17 PM

---

Kevin / Alan

Just some additional info, as if you didn't have enough to keep in mind...

It is a 7-hour drive (which is actually about the same amount of time it takes to fly b/c you have to connect). Not to complicate things further, but since I can not drive at night, I would need to drive part way if I left after noon. Obviously once I got there, working a 12-hour shift would not be preferable without some time to rest (if I had driven the entire way that day).

As you know, my presentation is on Wednesday morning. If it is warranted to leave sooner than that, I wouldn't begrudge the decision. People can always read the paper...

Also, my normal (and qualified) position in the OpCenter is Protective Measures Team Interface with the Reactor Safety Team, if that comes up for any reason.

Anyway, I'll continue to be on standby...

Don

---

From: Coyne, Kevin  
Sent: Monday, March 14, 2011 3:03 PM  
To: Helton, Donald; Kuritzky, Alan  
Subject: RE: Self Assessment of Expertise

Don -

Thanks for the update. I think we're good so far and I informed Jennifer about your availability. I think at this point you're good to continue at the PSA conference, but I'll let you and Alan know if anything should change. For what it's worth, Jason Schaperow was down at the ops center today working on Q and A's as part of the 'partial' reactor safety team and indicated that it was not a fulfilling assignment....

Hope the conference is going well!

Kevin

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

From: Helton, Donald  
Sent: Monday, March 14, 2011 1:10 PM  
To: Coyne, Kevin; Kuritzky, Alan  
Subject: Self Assessment of Expertise

Kevin / Alan:

In the interest of striking a balance between wanting to be responsive but also not wanting to engender false expectations of how I can contribute, the following is my self assessment of my expertise in relevant technical areas:

BWR design and EOPs: minimal  
BWR accident phenomenology and accident management: minimal  
PWR design and EOPs: moderate  
PWR accident phenomenology and accident management: moderate to extensive  
SFP phenomenology: moderate to extensive

ccc/104



Consequence analysis: minimal to moderate

Health effects of ionizing radiation and radiological assessment: minimal

Referring back to an earlier discussion with Kevin, I think that folks like Charlie/Jason (internal) and Mark/KC/Mohsen (external) bring a lot more to the table than I do. Folks like John Parillo (internal) and John Lehner/Trevor/Vinod bring more to the table in specific areas.

Having said all that, I'm here to help in whatever way I can...be it not at all, remotely from Wilmington, returning to DC to help out in the OpCenter, or elsewhere...

Best,  
Don

**From:** Coyne, Kevin  
**To:** Correia, Richard  
**Cc:** Coe, Doug  
**Subject:** RE: ACTION: Assistance to Japanese  
**Date:** Monday, March 14, 2011 5:04:47 PM  
**Attachments:** FW Confirmation of names for Japan.msg

---

Rich –

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

-Kevin

---

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

Doug, Kevin,

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

---

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

Folks –

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

Thanks for your help!

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

cce/105

Attachment FW Confirmation of names for Japan.msg (2560 Bytes) cannot be converted to PDF format.

**From:** Coe, Doug  
**To:** Sheron, Brian; Coyne, Kevin; Correia, Richard; Uhle, Jennifer  
**Subject:** RE: IRC Staffing  
**Date:** Tuesday, March 15, 2011 8:09:59 PM

---

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

---

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

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

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

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

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

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

I will forward the list of desired disciplines as soon as I receive them from Michele. Michele

ccc/106

said she will be looking for the list of potential IRC replacements by COB tomorrow (3/16/11), thus, I will need your candidates by mid-afternoon.

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

cccl 107

**From:** Champ, Billie  
**To:** Commission E-Reader Distribution; E-Reader Distribution  
**Subject:** COMMISSION E-READER....MONDAY, MARCH 14, 2011  
**Date:** Monday, March 14, 2011 11:41:54 AM  
**Attachments:** Tab A 03-11-11 Markey 11-0110.pdf  
Tab B 03-10-11 Mull-DOS 11-0114.pdf  
Tab C 03-04-11 Obama 11-0112.pdf  
Tab D 03-04-11 Berry 11-0111 .pdf  
dailymemos.doc

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**~~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 14, 2011**

**INCOMING CORRESPONDENCE**

- Tab "A" 03/11/11 -- Letter from Congressman Markey, requests information related to the potential impacts of the earthquake in Japan and their nuclear facilities, as well as on the implications for U.S. domestic industry.
- Tab "B" 03/10/11 -- Memorandum from Stephen Mull, DOS, concerns Protection of Data, Captions and Removable Media.
- Tab "C" 03/04/11 -- Memorandum from President Obama, concerns Enhanced Collection of Relevant Data and Statistics Relating to Women.
- Tab "D" 03/04/11 -- Letter from John Berry, concerns the working group to examine veteran's preference in the Federal government.

ccc/108

## DISTRICT OFFICES:

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(508) 875-2900<http://markey.house.gov>**Congress of the United States**  
**House of Representatives**  
**Washington, DC 20515-2107**

March 11, 2011

The Honorable Greg Jaczko  
Chairman  
Nuclear Regulatory Commission  
11555 Rockville Pike  
Rockville, MD 20852

Dear Chairman Jaczko:

I write to request information related to the potential impacts of the devastating earthquake in Japan on that country's nuclear facilities, as well as on the implications for our own domestic industry.

The 8.9 magnitude earthquake has caused some serious damage at two nuclear facilities in Japan. The Japanese government declared an "atomic power emergency."<sup>1</sup> Fukushima Daiichi nuclear power plant has experienced a failure associated with its emergency diesel generators, preventing the flow of water into its cooling system. To reduce rising pressure inside the Fukushima reactor, slightly radioactive vapor is being released.<sup>2</sup> Residents within a 3 km radius of Fukushima have been evacuated.<sup>3</sup> The United States Air Force also reportedly delivered equipment that could be used to cool the reactor.<sup>4</sup> The International Atomic Energy Agency (IAEA) is seeking information about whether the flow of cooling water has been restored, and about other nuclear power plants and research reactors in Japan.<sup>5</sup> Nuclear fuel requires continued cooling even after a plant has shut down. Failure of the cooling system for many hours is what resulted in a partial core melt at Three Mile Island in 1979.<sup>6</sup> There was also a fire in a turbine building at the Onagawa nuclear facility; Japanese authorities reported to the IAEA that it had been extinguished.<sup>7</sup>

The earthquake and tsunami pose threats to nuclear facilities in the United States. Your staff has informed mine that the Diablo Canyon nuclear power plant in San Luis Obispo, California has declared an 'unusual event' because of the tsunami warnings that have been issued. Taiwan, which has six nuclear reactors, issued a tsunami alert.

<sup>1</sup> <http://www.nytimes.com/2011/03/12/world/asia/12nuclear.html>

<sup>2</sup> [http://www.msnbc.msn.com/id/42025882/ns/world\\_news-asia-pacific/](http://www.msnbc.msn.com/id/42025882/ns/world_news-asia-pacific/)

<sup>3</sup> <http://www.reuters.com/article/2011/03/11/us-quake-japan-iaea-statement-idUSTRE72A2F820110311>

<sup>4</sup> <http://www.reuters.com/article/2011/03/11/japan-quake-reactor-idUSL3E7EB2AH20110311>

<sup>5</sup> <http://www.iaea.org/newscenter/news/2011/tsunamiupdate.html>

<sup>6</sup> <http://www.nytimes.com/2011/03/12/world/asia/12nuclear.html>

<sup>7</sup> <http://www.reuters.com/article/2011/03/11/us-quake-japan-iaea-statement-idUSTRE72A2F820110311>

This disaster serves to highlight both the fragility of nuclear power plants and the potential consequences associated with a radiological release caused by earthquake-related damage. We must ensure that America's nuclear power plants can withstand a catastrophic event and abide by the absolute highest standards for safety. Last year, I requested a GAO investigation<sup>8</sup> into the adequacy of Commission regulations associated with seismic safety. Earlier this week, I wrote<sup>9</sup> you regarding the Commission's pending approval of the design for the AP1000 nuclear reactor, in light of concerns raised by one of the Commission's most long-serving staff that there is a risk that an earthquake at the AP1000 could result in a catastrophic core meltdown. According to this individual:

- The AP1000 shield building failed tests because it is brittle, and could shatter "like a glass cup". About 60 percent of the shield building would consist of a building material that "failed miserably" in a physical test of its ability to withstand out-of-plane shear, one of the forces caused by an earthquake.
- Weak and inadequate computer simulations were used to "prove" the reactor shield is "strong enough".
- Earthquake forces may have been underestimated by Westinghouse.

My concerns about the vulnerabilities of the AP1000 reactor design are only heightened by the reports of the effect of the Japanese quake on their reactors.

I request your prompt attention to the questions raised in my earlier letter. In addition, I request that you provide me with responses to the following questions:

- 1) Please provide me with a detailed description of the earthquake and tsunami-related damage experienced by the nuclear facilities in Japan. If earthquake and tsunami-related damages are reported at other nuclear facilities, please also provide me with a detailed description of these damages. Please ensure that your response includes:
  - a. a description of each specific failure that occurred
  - b. the cause of each specific failure
  - c. whether any radiological release occurred because of the failure
  - d. whether each specific failure could have caused a radiological release if not promptly mitigated and
  - e. how long each specific failure will take to fully repair
- 2) Please also indicate in your response whether you believe each nuclear power plant design a) that is currently in operation in this country, or b) a license for which has been submitted for approval to the Commission for eventual construction and operation in this country can withstand an earthquake or tsunami that is comparable in strength to the one experienced in Japan.
- 3) Please inform me whether you believe that what happened at the Japanese reactors as a result of the earthquake suggests any need for safety improvements at any U.S. reactor, and if so, what actions the Commission is taking to ensure such improvements are made.

---

<sup>8</sup> <http://markey.house.gov/docs/gaoinspection.pdf>

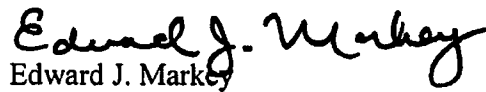
<sup>9</sup> [http://markey.house.gov/docs/3-7-11\\_ejmtotrc.pdf](http://markey.house.gov/docs/3-7-11_ejmtotrc.pdf)



- 4) Please inform me whether the events in Japan indicate any need for changes to the emergency response plans of U.S. nuclear power plants. Would these plans be adequate in a situation where emergency responders and other resources are needed to deal with many problems simultaneously?
- 5) Please indicate whether NRC regulations require nuclear reactor operators to have emergency backup power for long enough to maintain safe conditions through a crisis such as that occurring in Japan, where power may not come back online for days?<sup>10</sup>

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 or Dr. Ilya Fischhoff of my staff at 202-225-2836.

Sincerely,

  
Edward J. Markey

---

<sup>10</sup> <http://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0063.html>

**From:** Coyne, Kevin  
**To:** Correia, Richard  
**Cc:** Coe, Doug  
**Subject:** RE: ACTION: Assistance to Japanese  
**Date:** Monday, March 14, 2011 5:04:00 PM  
**Attachments:** FW Confirmation of names for Japan.msg

---

Rich –

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

-Kevin

---

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

Doug, Kevin,

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

---

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

Folks –

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

Thanks for your help!

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

ccc/109

Attachment FW Confirmation of names for Japan.msg (2560 Bytes) cannot be converted to PDF format.

**Hergenroder, Dan**

---

**From:** Satorius, Mark  
**Sent:** Tuesday, March 15, 2011 9:09 AM  
**To:** All R3 Users  
**Subject:** Update on Japan  
**Attachments:** USNRC Earthquake-Tsunami Update.031511.0730EDT.DOCX

Folks – attached is the latest update from the Incident Response Team that is monitoring the Japanese reactor events. Note the 'Official Use Only' – please follow agency rules on handling this information, which includes, but not limited to, refraining from sharing this outside of the agency. Also note the disclaimer that the information may be dated and subject to constant change. More during the All-Staff meeting today at 10 am.  
Mark

ccc/nd

**Ross, Robin**

---

**From:** Nguyen, Quynh  
**Sent:** Tuesday, March 15, 2011 1:15 PM  
**To:** Burnell, Scott; Stone, Rebecca  
**Cc:** Meighan, Sean  
**Subject:** FW: Update on Japan  
**Attachments:** USNRC Earthquake-Tsunami Update.031511.0730EDT.DOCX

**Hey, from RA of Region III... are we starting to populate SharePoint site?**

---

**From:** Satorius, Mark  
**Sent:** Tuesday, March 15, 2011 9:09 AM  
**To:** All R3 Users  
**Subject:** Update on Japan

Folks – attached is the latest update from the Incident Response Team that is monitoring the Japanese reactor events. Note the 'Official Use Only' – please follow agency rules on handling this information, which includes, but not limited to, refraining from sharing this outside of the agency. Also note the disclaimer that the information may be dated and subject to constant change. More during the All-Staff meeting today at 10 am.  
Mark

**Titus, Brett**

---

**From:** Guzzetta, Ashley  
**Sent:** Tuesday, March 15, 2011 1:13 PM  
**To:** Davidson, Evan; Gall, Jennifer; Audrain, Margaret; Nguyen, Quynh; Titus, Brett; Sanders, Carleen; Vaaler, Marlayna  
**Subject:** FW: Update on Japan  
**Attachments:** USNRC Earthquake-Tsunami Update.031511.0730EDT.DOCX

Some details in here I had not heard about.

---

**From:** Green, Brian  
**Sent:** Tuesday, March 15, 2011 1:03 PM  
**To:** Gran, Zachary; Guzzetta, Ashley; Stutzcage, Edward; Purdie, Michael  
**Subject:** FW: Update on Japan

---

**From:** Scarbeary, April  
**Sent:** Tuesday, March 15, 2011 12:22 PM  
**To:** Green, Brian  
**Subject:** FW: Update on Japan

Fyi in case you didn't already get this...

*April Scarbeary*

Acting Resident Inspector - LaSalle County Station  
Division of Reactor Projects - B2  
United States Nuclear Regulatory Commission  
Region III  
[april.scarbeary@nrc.gov](mailto:april.scarbeary@nrc.gov)



---

**From:** Satorius, Mark  
**Sent:** Tuesday, March 15, 2011 9:09 AM  
**To:** All R3 Users  
**Subject:** Update on Japan

ccc/112

Folks – attached is the latest update from the Incident Response Team that is monitoring the Japanese reactor events. Note the 'Official Use Only' – please follow agency rules on handling this information, which includes, but not limited to, refraining from sharing this outside of the agency. Also note the disclaimer that the information may be dated and subject to constant change. More during the All-Staff meeting today at 10 am.  
Mark

## Hergenroder, Dan

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**From:** Satorius, Mark  
**Sent:** Tuesday, March 15, 2011 10:00 AM  
**To:** McCree, Victor; Collins, Elmo; Dean, Bill  
**Subject:** RE: Response to Japan Earthquake/Tsunami  
**Attachments:** Update on Japan

I'm headed into a 'routine' all-staff meeting in 5 minutes and have decided to hijack the agenda and pretty much turn the meeting into an informational update by myself and going into taking all questions from the staff (knowing that I will probably not be able to answer all comers). In addition, I decided this morning to send out the attached email w/ the OOU status as of 730. Not sure the last was kosher, but decided to move forward and beg for forgiveness later rather than ask permission...

---

**From:** McCree, Victor  
**Sent:** Tuesday, March 15, 2011 9:11 AM  
**To:** Collins, Elmo; Satorius, Mark; Dean, Bill  
**Subject:** FW: Response to Japan Earthquake/Tsunami

FYI

---

**From:** McCree, Victor  
**Sent:** Tuesday, March 15, 2011 10:08 AM  
**To:** R2MAIL; R2RESIDENTS; R2\_RESIDENT SITES  
**Subject:** Response to Japan Earthquake/Tsunami

Good Morning.

I'm sure that all of you are aware of the ongoing events in Japan following last Friday's massive earthquake and tsunami. The loss of life and property due to these catastrophic events is truly devastating, and the U.S., along with a host of other countries are extending support to the Japanese government.

Shortly after the event, the NRC entered the Monitoring Mode and staffed the Headquarters Operations (Ops) Center. Our colleagues in the Ops Center have continued to gather information from media sources and the International Atomic Energy Agency which indicate that the condition of the Unit 1, 2 and 3 reactors at the Fukushima Daiichi nuclear station remains dynamic and represents a continuing safety concern. The Japanese government has implemented protective measures for persons within the emergency planning zone of the Fukushima station, including evacuation, sheltering, and issuance of potassium iodide. The NRC does not expect the U.S. to experience any harmful levels of radioactivity.

On yesterday, the NRC dispatched additional experts to Japan to better understand the status of efforts to safely shut down the damaged reactors at the Fukushima Daiichi site. They will provide technical advice to the U.S. Ambassador in Japan and contribute to the communications among stakeholders (see <http://www.nrc.gov/reading-rm/doc-collections/news/2011/11-048.pdf>). Chuck Casto has been designated to lead the NRC team and will serve as the single point of contact for the U.S. Ambassador on nuclear reactor issues. We wish Chuck and his team the best as they take on this challenging and important assignment. Please note that others in Region II also volunteered to support the response to the events in Japan and they may be asked in the coming weeks and months to supplement and/or replace the current U.S. team members.



The extraordinary events in Japan and their impact on that nation's nuclear infrastructure highlight some of the known risks involved in the technology we regulate. The events have also prompted widespread media and public interest in the safe use of nuclear power in this country. In addition, media commentary on the NRC's role in assuring safety of U.S. plants underscores the vital role that we play in ensuring that nuclear facilities are constructed, maintained, and operated in accordance with the requirements of their design and license. Despite these potential distractions, I echo the Chairman's message today in encouraging you to remain focused on carrying out the NRC mission, as well as Region II's vision.

Once again, I truly appreciate your professional, safety-focused, and high quality work.

Thank you, Vic

**Hergenroder, Dan**

---

**From:** Satorius, Mark  
**Sent:** Tuesday, March 15, 2011 9:09 AM  
**To:** All R3 Users  
**Subject:** Update on Japan  
**Attachments:** USNRC Earthquake-Tsunami Update.031511.0730EDT.DOCX

Folks – attached is the latest update from the Incident Response Team that is monitoring the Japanese reactor events. Note the 'Official Use Only' – please follow agency rules on handling this information, which includes, but not limited to, refraining from sharing this outside of the agency. Also note the disclaimer that the information may be dated and subject to constant change. More during the All-Staff meeting today at 10 am.  
Mark

ccc/114

**From:** Hayden, Elizabeth  
**To:** "Jean.GAUVAIN@oecd.org"  
**Subject:** Re: NEA/CNRA - WGPC-12 meeting will be held as scheduled but with flexibility  
**Date:** Tuesday, March 15, 2011 1:26:10 AM

---

Is the prep mtg w/team members on Tues. at 12 noon or later?

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

From: Jean.GAUVAIN@oecd.org <Jean.GAUVAIN@oecd.org>  
To: amcgarry@rpil.ie <amcgarry@rpil.ie>; besenyei@haea.gov.hu <besenyei@haea.gov.hu>;  
vc@aerb.gov.in <vc@aerb.gov.in>; valentina.ionescu@cncan.ro <valentina.ionescu@cncan.ro>;  
david.tredinnick@arpansa.gov.au <david.tredinnick@arpansa.gov.au>; roberto.ranieri@isprambiente.it  
<roberto.ranieri@isprambiente.it>; marli.vogels@minvrom.nl <marli.vogels@minvrom.nl>;  
fgrande@cnsns.gob.mx <fgrande@cnsns.gob.mx>; moisiibogdan@cncan.ro <moisiibogdan@cncan.ro>;  
miyake-ryo@meti.go.jp <miyake-ryo@meti.go.jp>; risto.isaksson@stuk.fi <risto.isaksson@stuk.fi>;  
anton.treier@ensi.ch <anton.treier@ensi.ch>; sunni.locatelli@cncs-ccsn.gc.ca <sunni.locatelli@cncs-  
ccsn.gc.ca>; kees.jansen@minvrom.nl <kees.jansen@minvrom.nl>; dagmar.zemanova@ujd.gov.sk  
<dagmar.zemanova@ujd.gov.sk>; anneli.hallgren@ssm.se <anneli.hallgren@ssm.se>;  
deniz.yueksel@bmu.bund.de <deniz.yueksel@bmu.bund.de>; watanabe-makoto@meti.go.jp  
<watanabe-makoto@meti.go.jp>; mkelly@rpil.ie <mkelly@rpil.ie>; schwang@kins.re.kr  
<schwang@kins.re.kr>; mcle@csn.es <mcle@csn.es>; emmanuel.bouchot@asn.fr  
<emmanuel.bouchot@asn.fr>; i.sokolova@gosnadzor.ru <i.sokolova@gosnadzor.ru>; otake-  
fumie@jnes.go.jp <otake-fumie@jnes.go.jp>; stanislaw.janikowski@paa.gov.pl  
<stanislaw.janikowski@paa.gov.pl>; jean.gauvain@oecd.org <jean.gauvain@oecd.org>;  
brafferty@rpil.ie <brafferty@rpil.ie>; anne.marit.ostreng@nrpa.no <anne.marit.ostreng@nrpa.no>;  
wolfgang.hilden@ec.europa.eu <wolfgang.hilden@ec.europa.eu>; niina.yliknuussi@ec.europa.eu  
<niina.yliknuussi@ec.europa.eu>; yhhah@kins.re.kr <yhhah@kins.re.kr>; karina.debeule@fanc.fgov.be  
<karina.debeule@fanc.fgov.be>; r.spiegelberg-planer@iaea.org <r.spiegelberg-planer@iaea.org>;  
soaresjc@cii.fc.ul.pt <soaresjc@cii.fc.ul.pt>; camelia.liutiev@cncan.ro <camelia.liutiev@cncan.ro>;  
Hayden, Elizabeth; aurele.gervais@cncs-ccsn.gc.ca <aurele.gervais@cncs-ccsn.gc.ca>;  
marek.bozenhard@subj.cz <marek.bozenhard@subj.cz>; gerard.westerhof@minvrom.nl  
<gerard.westerhof@minvrom.nl>; lise.roberts@hse.gsi.gov.uk <lise.roberts@hse.gsi.gov.uk>;  
ddawson@rpil.ie <ddawson@rpil.ie>  
Sent: Sat Mar 12 10:41:47 2011  
Subject: NEA/CNRA - WGPC-12 meeting will be held as scheduled but with flexibility

Dear WGPC Members,

Probably most of you are exceptionally on duty during this week-end. All our thoughts are with our Japanese colleagues severely affected by the Tohoku Pacific Ocean earthquake and the subsequent Tsunami.

With the Chair we have considered the possibility to postpone our annual WGPC meeting.

However, after considering advantages (unique opportunity to discuss NRO real-life issues) and disadvantage (problem should be only in countries with a single staff in charge of public communication), and also considering that it would be strange not to use the situation to discuss "Crisis communication" it was decided to maintain the meeting as scheduled, taking into account the necessary flexibility in case one member could not attend the whole meeting.

At the NEA you will have Internet Connexion and we can also facilitate telephone access to your Capital during the meeting if needed.

Tuesday Afternoon there will be a preparatory meeting with the Chair and the Team Leaders. The Regular meeting will be from Wednesday to Friday.

In case you cannot be replaced in your organisation we will fully understand, but we would appreciate that you let us know.

ccc/115

Best Regards

Jean Gauvain  
NEA/NSD

---

From: [k195hyh@kins.re.kr]  
Sent: 12 March 2011 15:28  
To: REIG Javier, NEA/SURN  
Cc: GAUVAIN Jean, NEA/SURN; yhhah@kins.re.kr  
Subject: Re: WGPC meeting will be held as scheduled?

Thank you, Javier and Jean,

I've just came back home from the office where key KINS staff members including President are still working at the KINS Emergency Response Center.

Fortunately, Korea will not be impacted from Japan accident because their wind direction is working the opposite way toward the Pacific Ocean.

On my side, no change with my travel plan is expected. So Jean, no problem to meet you at the NEA office around 12:00 next Tuesday as originally scheduled.

Enjoy your weekend and see you soon.

Best regards,  
Yeonhee

**From:** Hayden, Elizabeth  
**To:** Brenner, Eliot  
**Cc:** Harrington, Holly; Burnell, Scott; McIntyre, David  
**Subject:** Calls on press release  
**Date:** Monday, March 14, 2011 11:36:00 AM

---

I've fielded a number of calls (I believe we've had some e-mails also) asking about the basis for our statement in the last press release re no harm to U.S. from radiation and questions on plume dispersal. Other than what we say in the press release about hundreds of miles out over the ocean diluting the radiation, is there anything else we can say? Source of information? We should probably add this to our Qs and As.

*Beth*

ccc/116

**From:** Hayden, Elizabeth  
**To:** Burnell, Scott; Taylor, Robert  
**Cc:** Harrington, Holly  
**Subject:** Talking Points  
**Date:** Monday, March 14, 2011 12:02:00 PM

---

Can one of you update the Talking Points on WEB EOC with the latest press release and blog information? We would like to provide an update to all of OPA.

Also, there is a list of phone numbers for ANS, DOE, NEI on a yellow sticky that I left on the desk there to the left of the computer, could you send me that information so that I can send reporters there.

*Beth*

ccc/117

**From:** FAIMISHelp Resource  
**Cc:** Dolinka, Carl; Liu, Leslie; Vishal Ranjan; Curtis, Michelle  
**Subject:** RE: FAIMIS System Availability 3/14 at 1PM (PLEASE READ)  
**Date:** Monday, March 14, 2011 2:03:39 PM

---

FAIMIS is available again for use. Thank you for your patience.

-FAIMIS Help Desk  
(301)415-1234 Option #7

---

**From:** FAIMISHelp Resource  
**Sent:** Monday, March 14, 2011 12:51 PM  
**Cc:** Dolinka, Carl; Liu, Leslie; 'Vishal Ranjan'; Curtis, Michelle  
**Subject:** FAIMIS System Availability 3/14 at 1PM (PLEASE READ)  
**Importance:** High

FAIMIS Users,

Due to scheduled system activities, the FAIMIS system and FAIMIS Help Desk will be temporarily unavailable after 1PM (EST) today, Monday, March 14, 2011. The system is scheduled to be back up within the hour and we will notify you when it is available again. We appreciate your patience regarding this matter.

Thank you,

FAIMIS Help Desk  
(301)415-1234 Option #7

ccc/118

**From:** [PR News](#)  
**To:** [Hayden, Elizabeth](#)  
**Subject:** Tweet Twice, Post a Status and E-Mail Me In the Morning  
**Date:** Monday, March 14, 2011 12:06:24 PM

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