

Quad Cities Nuclear Power Station Annual Assessment Meeting

Reactor Oversight Process – 2011

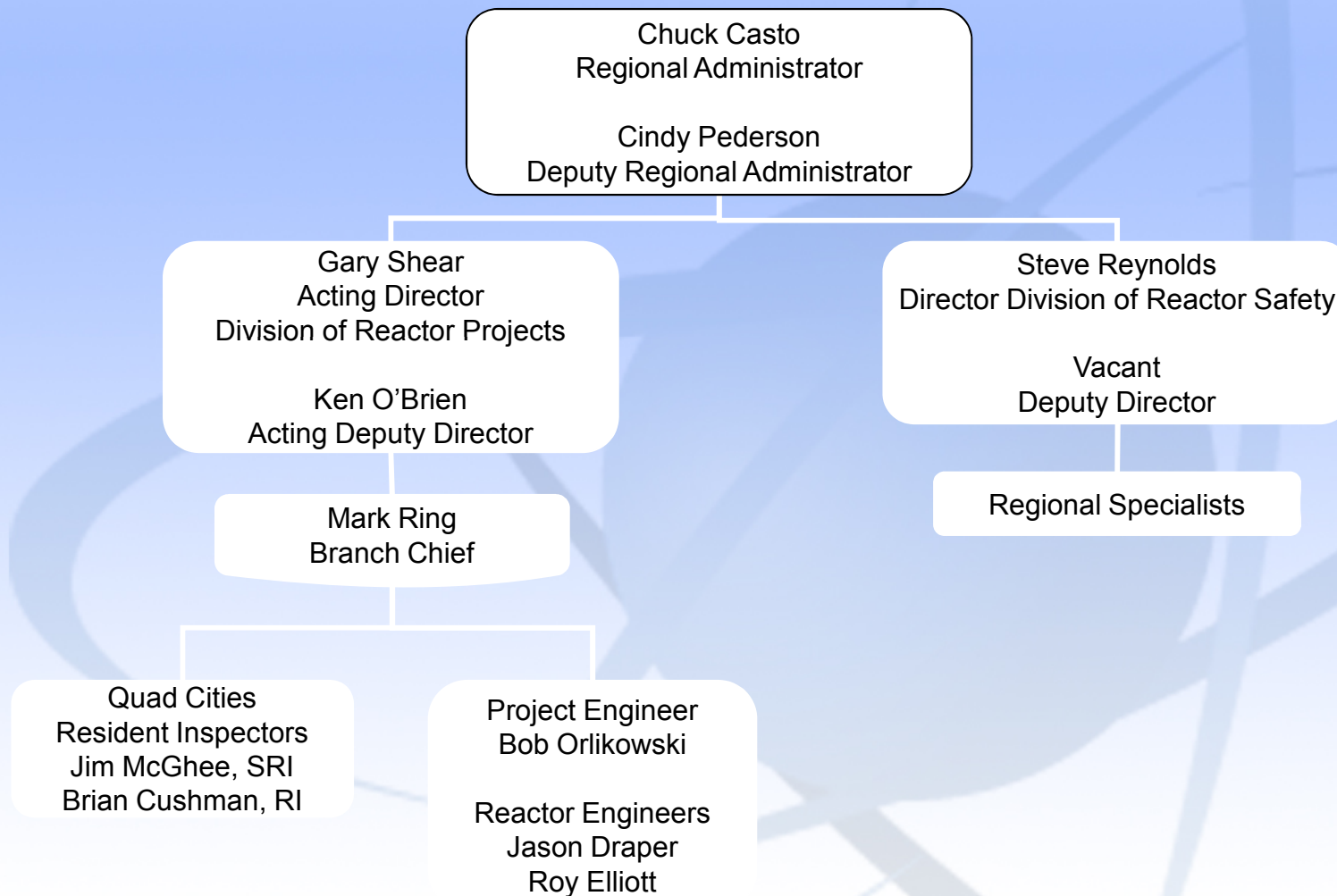
Nuclear Regulatory Commission - Region III

Cordova, IL

June 12, 2012



Region III Organization





Our Mission



- To license and regulate the nation's civilian use of byproduct, source, and special nuclear materials to ensure adequate protection of public health and safety, promote the common defense and security, and protect the environment.



Some Nuclear Facts



- 104 nuclear power plants supply about 20 percent of the electricity in the U.S.
- Nuclear materials are used in medicine for diagnosis and cancer treatment.
- Nuclear materials are widely used in industry, such as in density gauges, flow measurement devices, radiography devices, and irradiators.



The NRC Regulates

- **Nuclear reactors** - commercial power reactors, research and test reactors, new reactor designs
- **Nuclear materials** - nuclear reactor fuel, radioactive materials for medical, industrial, and academic use
- **Nuclear waste** – transportation, storage and disposal of nuclear material and waste, decommissioning of nuclear facilities
- **Nuclear security** – physical security of nuclear facilities and materials from sabotage or attacks



What We Don't Do

- **Regulate nuclear weapons, military reactors, or space vehicle reactors**
- **Own or operate nuclear power plants**
- **Regulate some radioactive materials, such as X-rays and naturally occurring radon**



How We Regulate

- **Establish rules and regulations**
- **Issue licenses**
- **Provide oversight through inspection, enforcement, and evaluation of operational experience**
- **Conduct research to provide support for regulatory decisions**
- **Respond to events and emergencies**

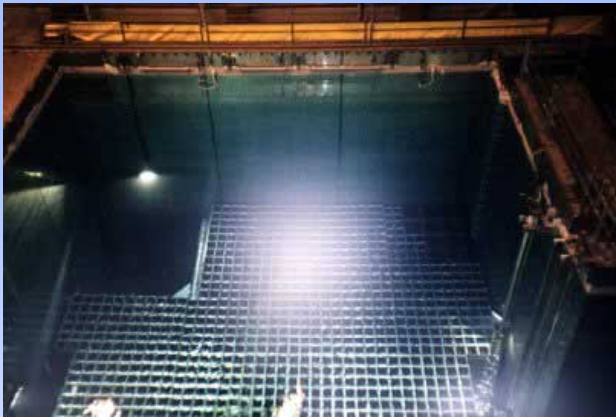


Assurance of Plant Safety

- **Require “defense-in-depth”**
- **Require long-term maintenance of equipment**
- **Require continual training of operators**
- **Verify compliance with regulations**



What We Do – Nuclear Waste



- **The NRC regulates:**
 - Storage of spent reactor fuel in fuel pools or dry storage casks, and
 - Any national spent fuel storage site, such as the proposed Yucca Mountain site.



What We Do – Nuclear Security



- **NRC Requires:**
 - Well-armed and well-trained security forces,
 - Surveillance and perimeter patrols,
 - State-of-the-art site access equipment and controls,
 - Physical barriers and detection zones, and
 - Intrusion detection systems and alarm stations.

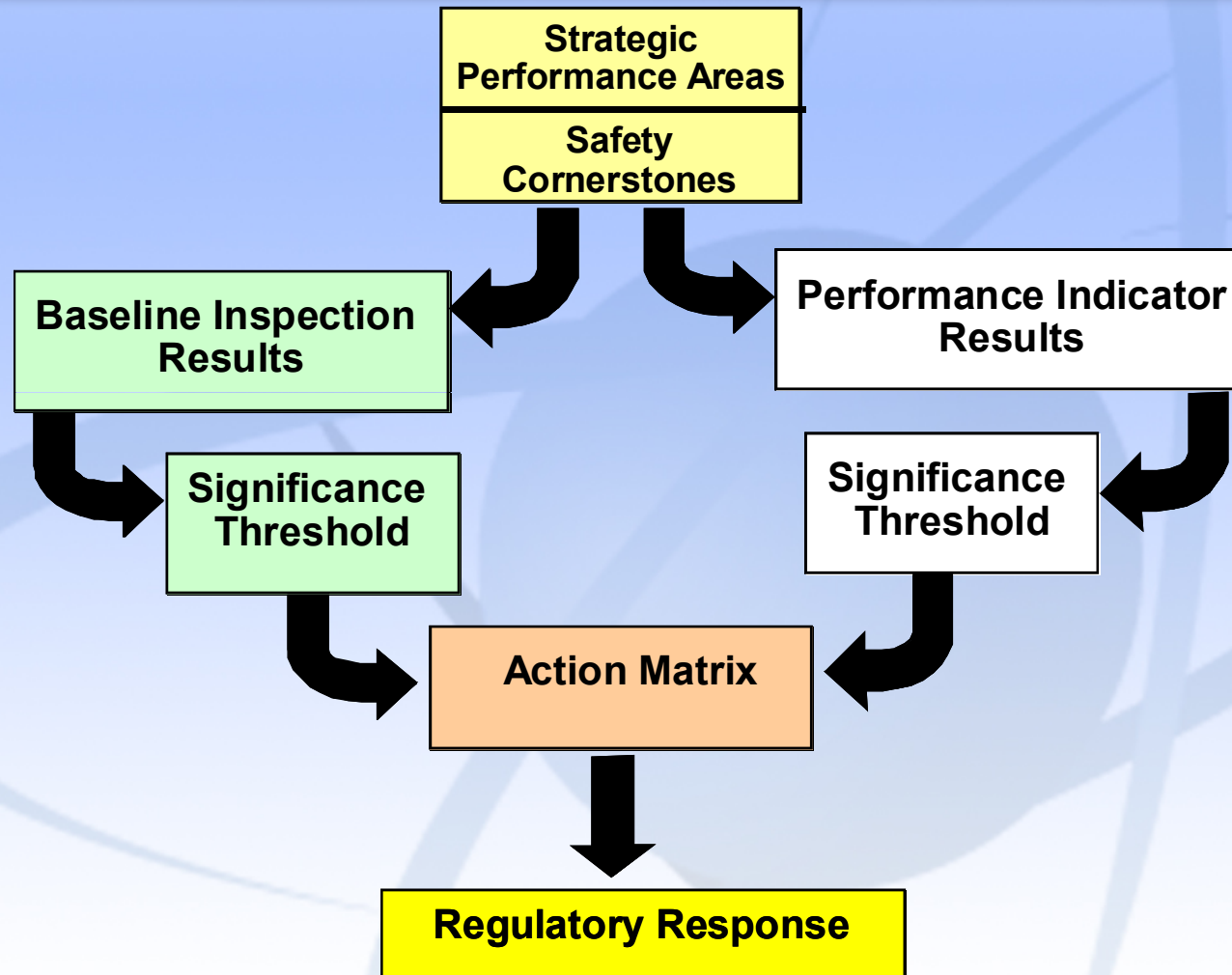


NRC Performance Goals

- **Safety:** Ensure adequate protection of public health and safety and the environment.
- **Security:** Ensure adequate protection in the secure use and management of radioactive materials.



Reactor Oversight Process





Examples of Baseline Inspections

- **Equipment Alignment** ~80 hrs/yr
- **Triennial Fire Protection** ~250 hrs
every 3 yrs
- **Operator Response** ~125 hrs/yr
- **Emergency Preparedness** ~80 hrs/yr
- **Rad Release Controls** ~110 hrs
every 2 yrs
- **Worker Radiation Protection** ~95 hrs/yr
- **Corrective Action Program** ~250 hrs
every 2 yrs
- **Corrective Action Case Reviews** ~60 hrs/yr



Significance Threshold

Performance Indicators

- Green:** Only Baseline Inspection
- White:** Increases NRC oversight
- Yellow:** Increases NRC oversight
- Red:** Increases NRC oversight

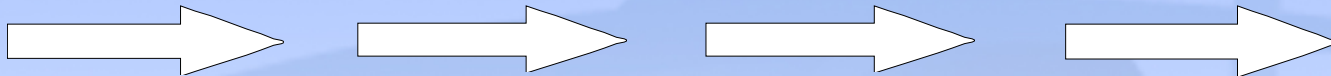
Inspection Findings

- Green:** Very low safety issue
- White:** Low to moderate safety issue
- Yellow:** Substantial safety issue
- Red:** High safety issue



Action Matrix Concept

Licensee Response	Regulatory Response	Degraded Cornerstone	Multiple/Rep. Degraded Cornerstone	Unacceptable Performance
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Increasing Safety Significance

Increasing NRC Inspection Efforts

Increasing NRC/Licensee Management Involvement

Increasing Regulatory Actions



National Summary of Plant Performance

Status as of 12/31/2011

Licensee Response (Quad is here)	88
Regulatory Response	11
Degraded Cornerstone	3
Multiple/Repetitive Deg. Cornerstone	1
Unacceptable	0
IMC 0350 Oversight	1
Total	104



National Summary

- **Performance Indicator Results for 2011***

– Green	6585
– White	9
– Yellow	0
– Red	0

*PIs are counted per plant per quarter

- **Total Inspection Findings in 2011#**

– Green	846
– White	13
– Yellow	2
– Red	0

Finding data current as of 2/24/2012 and does not include security findings



Quad Cities Assessment Results

January 1 - December 31, 2011

- **Quad Cities remains in the Licensee Response Column of the ROP Action Matrix**
- **All findings and performance indicators were green**
- **15 Green findings and 2 SL-IV NCVs**



Quad Cities Inspection Activities

January 1 – December 31, 2011

- **Inspectors spent over 2100 hours on direct inspection effort at Quad Cities during calendar year 2011, which included both baseline inspection activities as well as inspections following the March earthquake and tsunami in Japan.**
- **From May 8 to June 10, 2011, the licensee performed an outage on Quad Cities Unit 1 for refueling and routine maintenance.**



Quad Cities Inspection Activities

January 1 - December 31, 2011

- In addition to the inspections performed by the Resident Inspectors, several other inspections were performed during this assessment period, including:
 - License Renewal Inspection
 - Component Design Bases Inspection
 - Independent Spent Fuel Storage Installation Inspection
 - Inspections during the Unit 1 refueling outage



Quad Cities Annual Assessment Summary

January 1 - December 31, 2011

- **Exelon operated Quad Cities Nuclear Power Station in a manner that preserved public health and safety**
- **All cornerstone objectives were met**



Quad Cities Annual Assessment Summary

January 1 - December 31, 2011

- **No substantive cross-cutting issues were identified**
- **NRC plans baseline inspections at Quad Cities for 2012**



Open to the Public

- **The NRC places a high priority on keeping the public and stakeholders informed of its activities.**
- **At www.nrc.gov, you can:**
 - Find public meeting dates and transcripts;
 - Read NRC testimony, speeches, press releases, and policy decisions; and
 - Access the agency's Electronic Reading Room to find NRC publications and documents.



Contacting the NRC

- **Report an emergency**
 - (301) 816-5100 (call collect)
- **Report a safety concern**
 - (800) 695-7403
 - Allegation@nrc.gov
- **General information or questions**
 - www.nrc.gov
 - Select “What We Do” for Public Affairs



Actions in Response to the Japan Nuclear Accident

- Actions in response to Japan Nuclear Accident
Website: <http://www.nrc.gov/japan/japan-info.html>
- Mailbox for comments on staff actions:
JLD_Public.Resource@nrc.gov
- Office of Public Affairs Point of Contact:
OPA.resource@nrc.gov or 301-415-8200



NRC Representatives

- **Jim McGhee, Senior Resident Inspector**
 - (309) 654-2227
- **Brian Cushman, Resident Inspector**
 - (309) 654-2227
- **Mark Ring, Branch Chief**
 - (630) 829-9703
- **Viktoria Mitlyng, Public Affairs Officer**
 - (630) 829-9662
- **Prema Chandrathil, Public Affairs Officer**
 - (630) 829-9663
- **NRC Region III Office Switchboard**
 - (630) 829-9500 (800) 522-3025



NRC Social Media Channels



- Blog: <http://public-blog.nrc-gateway.gov/>
- Flickr: <http://www.flickr.com/photos/nrcgov/>
- Twitter: <https://twitter.com/#!/nrcgov>
- YouTube: <http://www.youtube.com/user/NRCgov>
- RSS: <http://www.nrc.gov/public-involve/listserver.html#rss>



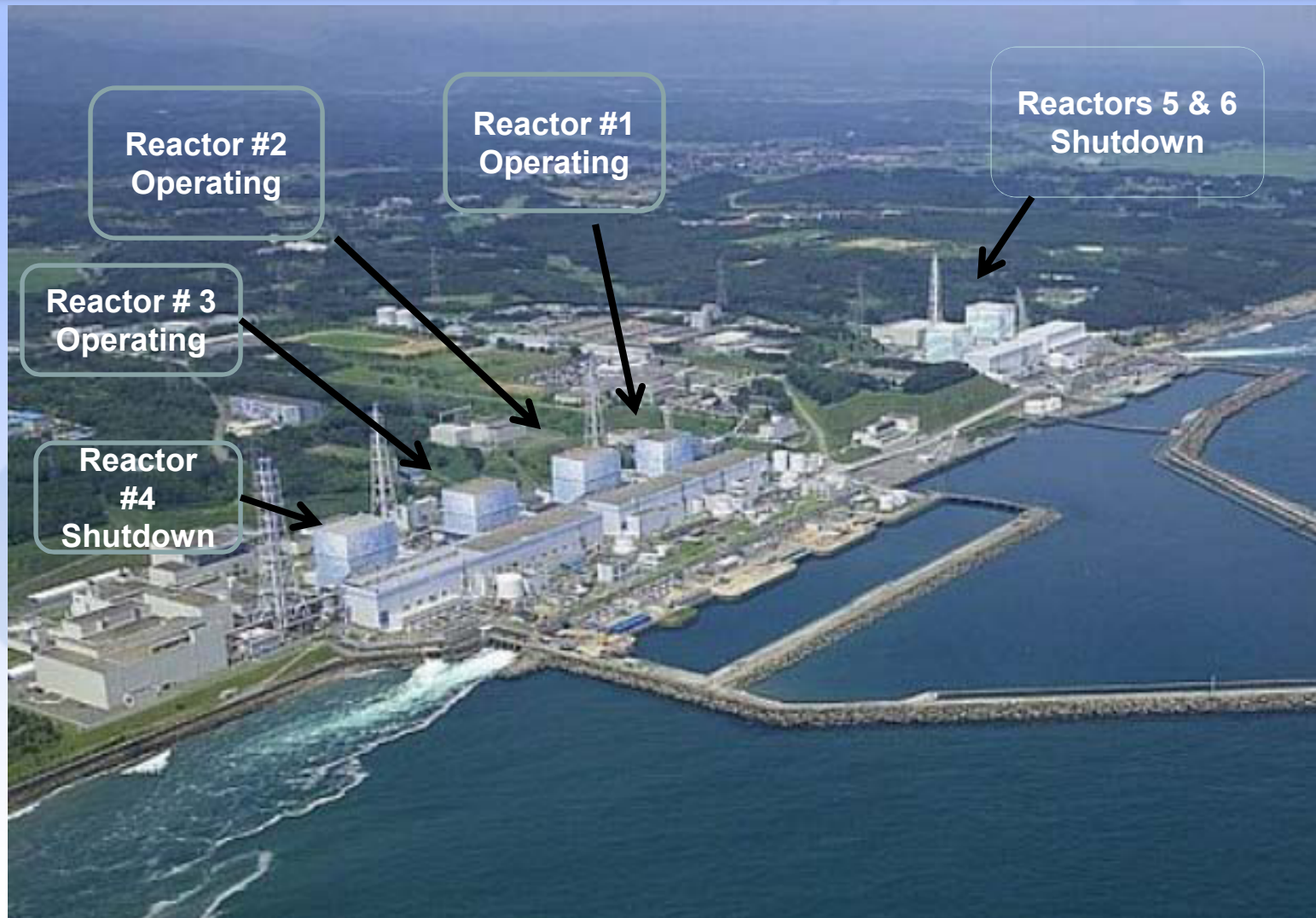
Reference Sources

- **Reactor Oversight Process**
 - <http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/>
- **Public Electronic Reading Room**
 - <http://www.nrc.gov/reading-rm.html>
- **Public Document Room**
 - 1-800-397-4209 (Toll Free)





Fukushima Dai-ichi Before Earthquake



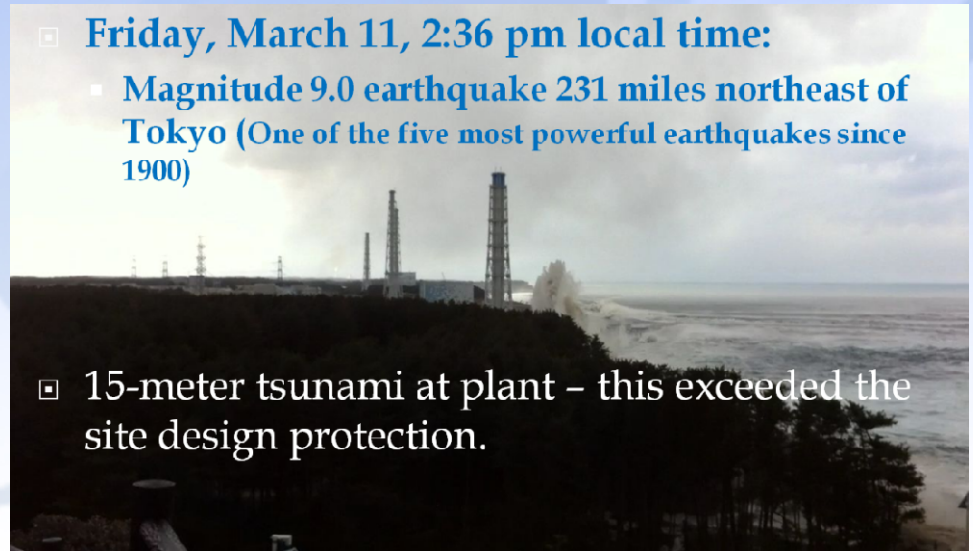


Japan Earthquake and Tsunami March 11, 2011



- ▣ **Friday, March 11, 2:36 pm local time:**
 - **Magnitude 9.0 earthquake 231 miles northeast of Tokyo (One of the five most powerful earthquakes since 1900)**

- ▣ **15-meter tsunami at plant – this exceeded the site design protection.**



Protecting People and the Environment

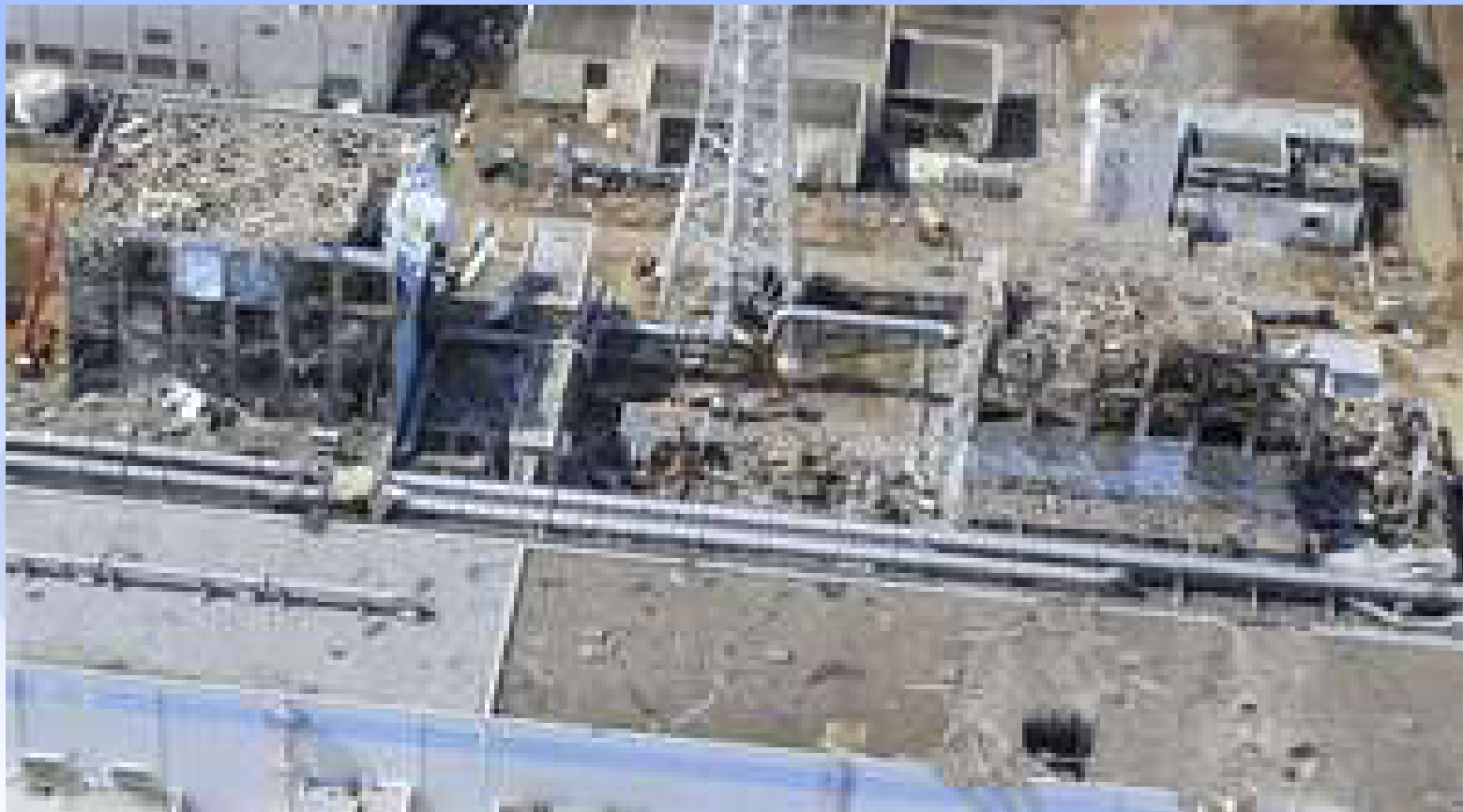


Sequence of Events

- Three operating units shutdown at time of earthquake
- Offsite power lost; emergency diesels supply power
- 1 hour later Tsunami strikes site and wipes-out emergency power.
- Extended station blackout –loss of all AC power
- DC batteries deplete and subsequent loss of reactor cooling
- Late injection of seawater using fire trucks
- Significant core damage at units 1, 2, and 3
- Hydrogen generated from metal water reaction in cores
- Hydrogen explosions in Units 1, 3, and 4 reactor buildings
- Spent Fuel Pool status indications lost –distracted attention from damaged reactors
- Tsunami exceeded the design assumption that led to extensive plant damage and extended station blackout



Reactors 3 & 4 Post-Event



Protecting People and the Environment



NRC Actions Post Fukushima

- Immediate response measures including NRC assist team to Japan
- Industry (EPRI, INPO, NEI) Initiatives
- Prompt (April & May) inspections of capability of US nuclear plants
- Near Term Task Force Conclusions:
 - US nuclear plants are safe
 - Use Fukushima Lessons Learned to enhance safety at US nuclear plants



NRC Orders and Information Requests

- **Strategies and equipment for beyond-design-basis phenomena**
- **Reliable hardened vents**
- **Spent fuel pool instrumentation**
- **Reevaluation of seismic & flood hazards**
- **Design basis check for seismic & flood**
- **Prolonged blackout communications**
- **Staffing for multi-unit and prolonged blackout events**