

# REGULATORY DECISION-MAKING IN THE WAKE OF FUKUSHIMA

Edison Electric Institute  
Spring Legal Conference 2011

NRC Commissioner William C. Ostendorff  
April 29, 2011

# Agenda

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- ▶ Introduction
- ▶ Background on the NRC
- ▶ Adequate Protection of Public Health and Safety:
- ▶ Commission's Plans for Addressing Fukushima at US Nuclear Power Plants
- ▶ Conclusion

# What we do

***Safety***



***Security***

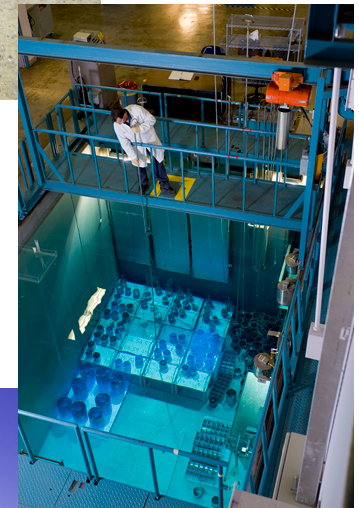


***Environment***



# Nuclear Regulatory Commission Basics

- ▶ **Role of the States**
  - ▶ Majority of materials licensees regulated by States through agreements with the NRC
  - ▶ Agreement State Program
  - ▶ States have no authority to regulate safety of nuclear power plants
    - ▶ States do possess some limited authority with respect to need for power, environmental

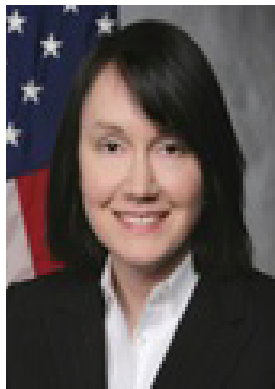


# The Commission

- ▶ Policy-setting component of the agency
- ▶ 5 Commissioners appointed by the President and confirmed by the Senate for staggered 5 year terms
- ▶ Agency action requires majority vote of the Commission
- ▶ Each Commissioner has equal authority and responsibilities, but Chairman serves as Principal Executive Officer and Spokesperson



Chairman  
Gregory Jaczko



Commissioner  
Kristine Svinicki



Commissioner  
George  
Apostolakis



Commissioner  
William  
Magwood



Commissioner  
William  
Ostendorff

# Commission Decision-making Processes

- ▶ Commission Decision Documents
- ▶ Options and recommendations
- ▶ Voting
- ▶ Commission direction
- ▶ SRM/
- ▶ Affirmation meeting



# Regulatory principles



## Principles of Good Regulation

*The NRC adheres to the following Principles of Good Regulation*

**Independence:** Nothing but the highest possible standards of ethical performance and professionalism should influence regulation. However, independence does not imply isolation. All available facts and opinions must be sought openly from licensees and other interested members of the public. The many and possibly conflicting public interests involved must be considered. Final decisions must be based on objective, unbiased assessments of all information, and must be documented with reasons explicitly stated.

**Openness:** Nuclear regulation is the public's business, and it must be transacted publicly and candidly. The public must be informed about and have the opportunity to participate in the regulatory processes as required by law. Open channels of communication must be maintained with Congress, other government agencies, licensees, and the public, as well as with the international nuclear community.

**Efficiency:** The American taxpayer, the rate-paying consumer, and licensees are all entitled to the best possible management and administration of regulatory activities. The highest technical and managerial competence is required, and must be a constant agency goal. NRC must establish means to evaluate and continually upgrade its regulatory capabilities. Regulatory activities should be consistent with the degree of risk reduction they achieve. Where several effective alternatives are available, the option which minimizes the use of resources should be adopted. Regulatory decisions should be made without undue delay.

**Clarity:** Regulations should be coherent, logical, and practical. There should be a clear nexus between regulations and agency goals and objectives whether explicitly or implicitly stated. Agency positions should be readily understood and easily applied.

**Reliability:** Regulations should be based on the best available knowledge from research and operational experience. Systems interactions, technological uncertainties, and the diversity of licensees and regulatory activities must all be taken into account so that risks are maintained at an acceptably low level. Once established, regulation should be perceived to be reliable and not unjustifiably in a state of transition. Regulatory actions should always be fully consistent with written regulations and should be promptly, fairly, and decisively administered so as to lend stability to the nuclear operational and planning processes.

# Independence

# Openness

# Efficiency

# Clarity

# Reliability



# Adequate Protection



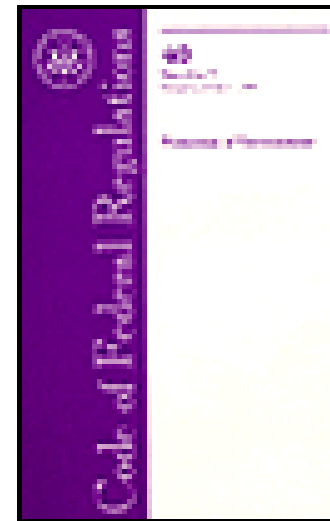
- ▶ Agencies operate only within the bounds of authority granted to them by Congress
- ▶ NRC: Atomic Energy Act
- ▶ Statutory Hallmark: reasonable assurance of adequate protection of public health and safety and common defense and security



# Adequate Protection

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- ▶ Adequate protection in NRC regulation:
  - ▶ “Fleshing out” adequate protection standard
  - ▶ Presumption of adequate protection through compliance with regulations
- ▶ Safety enhancements
  - ▶ “Extra” adequate protection
  - ▶ Backfit analysis: substantial increase in safety and costs are justified



# Adequate Protection

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- ▶ NRC and Courts have historically refused to define “adequate protection”
- ▶ 4 general principles:
  - ▶ Extremely broad grant of authority
  - ▶ Nexus to radiological health and safety
  - ▶ Determined on case-by-case basis
  - ▶ Does not mean “zero risk”



# How adequate protection is factored into decision-making

## ▶ Risk consideration



- ▶ Assessment of probabilities and consequences
- ▶ Concerns based on realistic assumptions; real world safety, security, or legal issues
- ▶ Not looking for “zero risk”
- ▶ Critical function of NRC and Commissioner is to decide how much risk is acceptable

# How adequate protection is factored into decision-making

- ▶ **Contextual Evaluation**
  - ▶ Examination of proposals in totality of circumstances
  - ▶ Maintaining balance
  - ▶ Mitigation of concern through other regulatory measures, voluntary initiatives, guidance, etc.
  - ▶ Adverse impacts?
  - ▶ Checks and balances
  - ▶ Example: Design Basis Threat



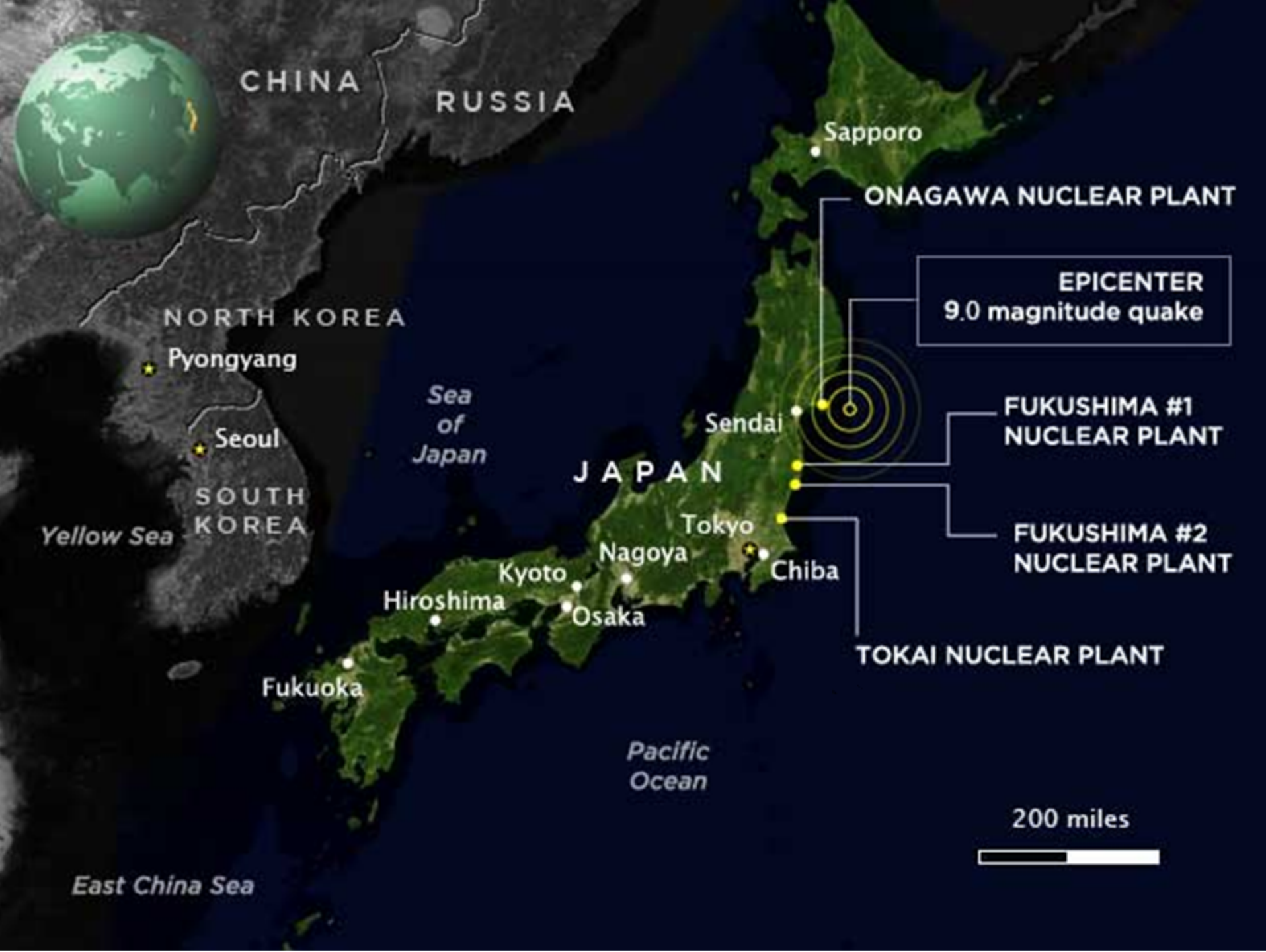
# How adequate protection is factored into decision-making

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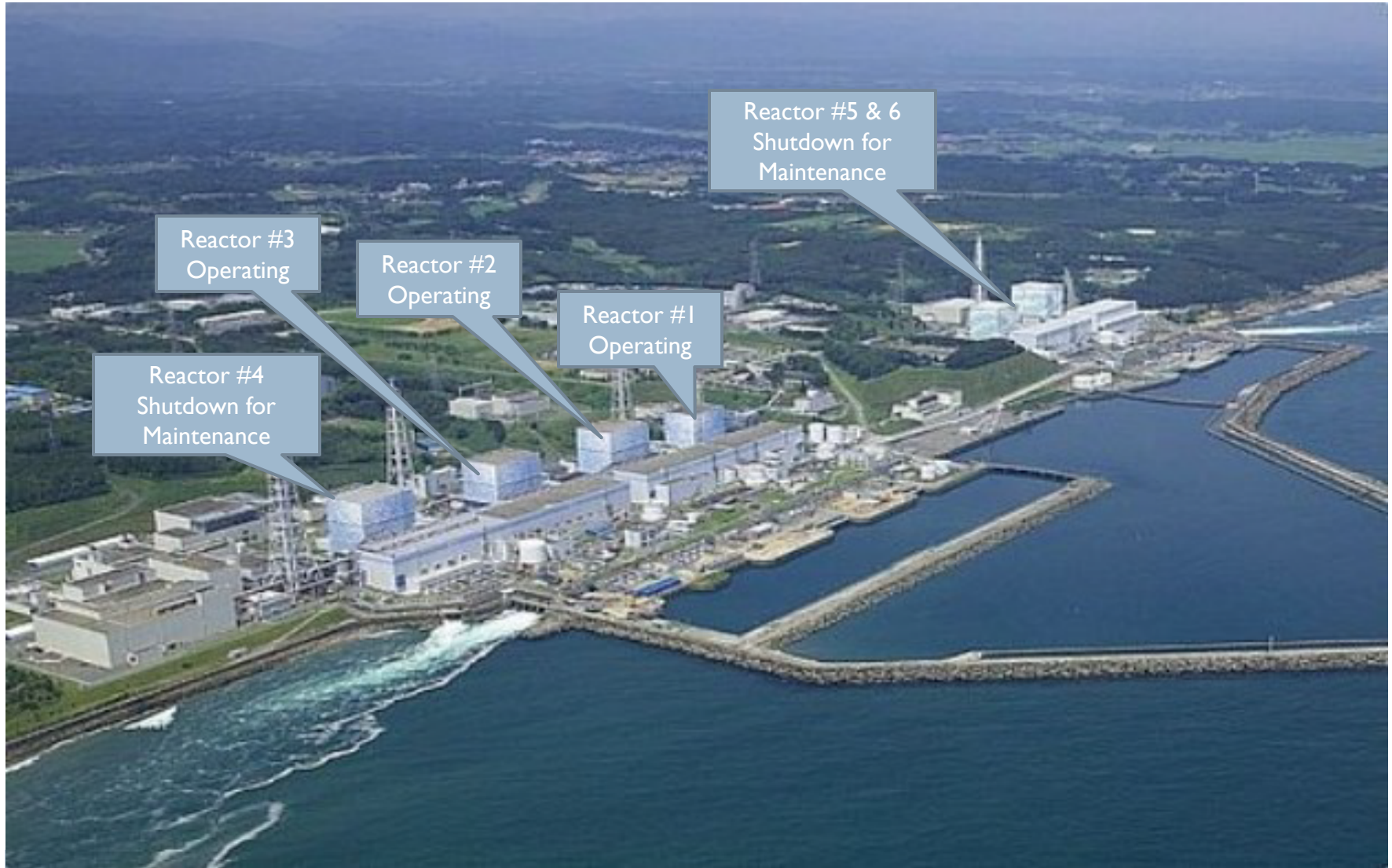


- ▶ **Other factors:**
  - ▶ Application of common sense/real world experiences
  - ▶ Engagement with stakeholders
    - ▶ Trips to the field/site visits
    - ▶ Doing our homework
    - ▶ Avoid making decisions in a vacuum
  - ▶ Binding requirements vs. other solutions
    - ▶ Voluntary initiatives, agency guidance, industry peer review
  - ▶ Inspection/enforcement

# Fukushima Daiichi



# Overview of Fukushima Daiichi Nuclear Power Station





# Earthquake & Tsunami Sequence of Events

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Friday March 11<sup>th</sup> at 2:36 pm local time

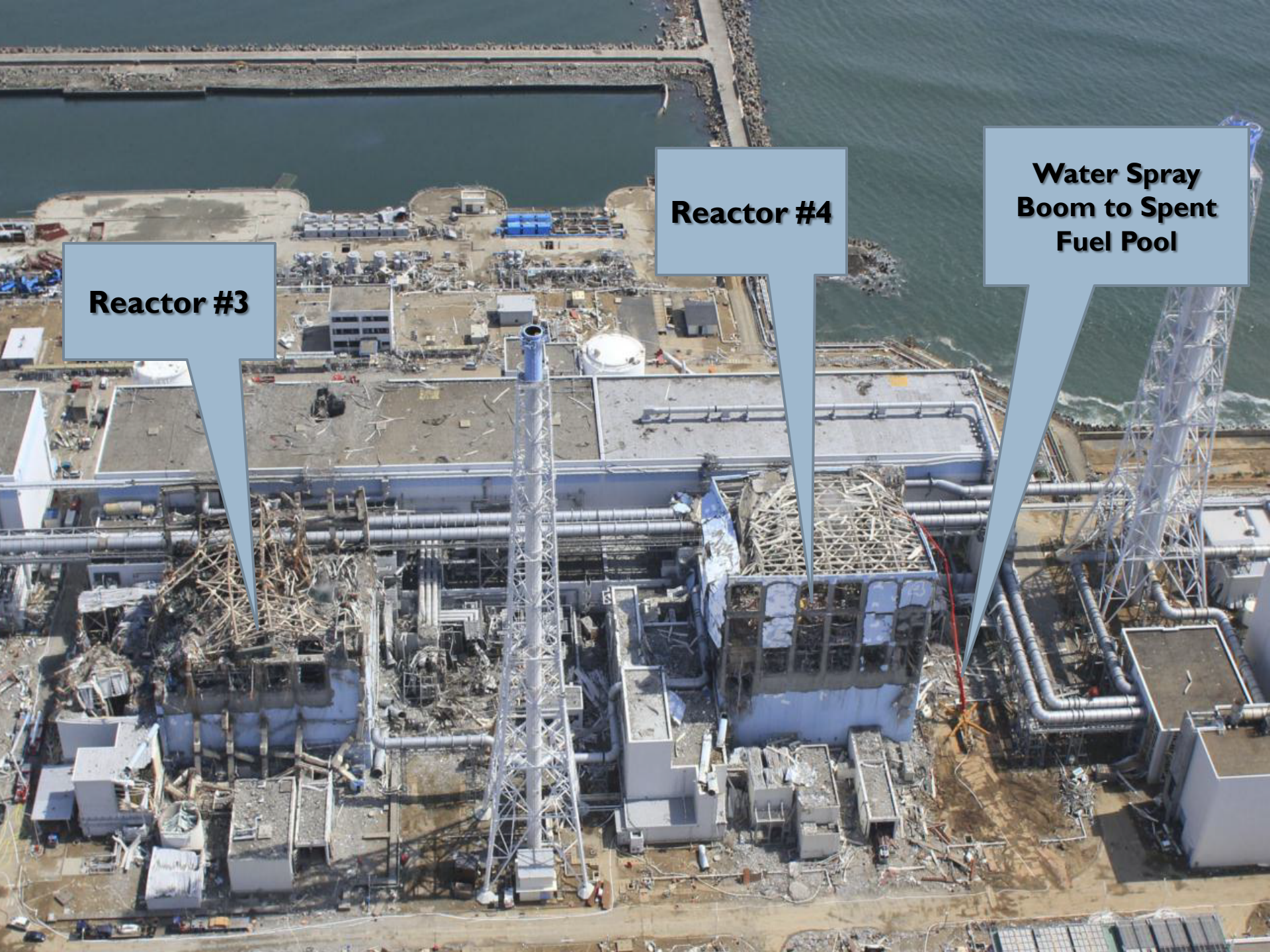
- ▶ Magnitude 9.0 earthquake 231 miles northeast of Tokyo
- ▶ Quake is fifth largest in the world (since 1900)
- ▶ Earthquake generated a 15 meter tsunami at plant (much higher in other locations in northern Japan)

# Fukushima accident - continued

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- ▶ Three operating units shutdown at time of earthquake
- ▶ Offsite power lost; emergency diesels supply power
- ▶ Tsunami arrives at site and wipes-out emergency power
  - ▶ Extended station blackout
  - ▶ Batteries deplete and subsequent loss of all reactor cooling
  - ▶ Late injection of seawater using fire trucks
  - ▶ Core damage estimated at 75, 30, and 25 percent for Units 1, 2, 3 respectively
  - ▶ Hydrogen generated from metal water reaction in cores and possibly in Unit 4 spent fuel pool
  - ▶ Hydrogen explosions in units 1, 3, and 4 reactor buildings





**Reactor #3**

**Reactor #4**

**Water Spray  
Boom to Spent  
Fuel Pool**

# NRC Near Term Actions

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- ▶ Evaluate Fukushima Daiichi accident
- ▶ Domestic operating reactors and spent fuel pools
  - ▶ External Events
  - ▶ Station Blackout
  - ▶ Severe Accident Mitigation
  - ▶ Combustible Gas Control
  - ▶ Emergency Preparedness
- Near term review due in 90 days (mid June)

# NRC Longer Term Actions

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- ▶ Based on near term review and additional insights from Fukushima accident
- ▶ Identify potential technical and policy issues
  - Research Activities
  - Generic Issues
  - Reactor Oversight Process
  - Regulatory Framework
  - Interagency Emergency Preparedness

# Risk Communication

## **External communication and outreach**



- Shared responsibility of regulator and industry
- Promote understanding of risks and the bases for regulatory activities
- Proactive engagement

“I fully support his [Chairman Jaczko’s] call for a systematic and methodical review. We must also do this in a way that clearly communicates to the American people what this review means and what it implies for the safety of our existing nuclear power plants. “

William C. Ostendorff

March 21, 2011 Commission Briefing on NRC response to Recent Events in Japan

# Addressing the Events at Fukushima

- ▶ Review will be systematic and methodical
- ▶ NRC must conduct the review and make decisions within the bounds of its legal framework – Adequate protection
- ▶ NRC must understand and constantly reflect on this as we move forward
- ▶ Adequate protection level could change as a result of the review, but NRC should be disciplined in developing and explaining its bases for changes or status quo

# Addressing the Events at Fukushima

- ▶ How will we maintain a “systematic” and “methodical” review?
  - ▶ Risk consideration
  - ▶ Keeping concerns in context
  - ▶ Follow regulatory processes for new requirements
  - ▶ Supporting changes with solid analyses, and engagement with stakeholders
  - ▶ Consideration of all regulatory tools



Thank You

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**Questions**  
**Comments**  
**Discussion**