

A Commissioner's Perspective on Nuclear Safety and NRC's Response to Nuclear Events in Japan

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Nuclear Safety Workshop
Preliminary Lessons Learned From Fukushima Daiichi
U.S. Department of Energy
Arlington, Virginia

Agenda

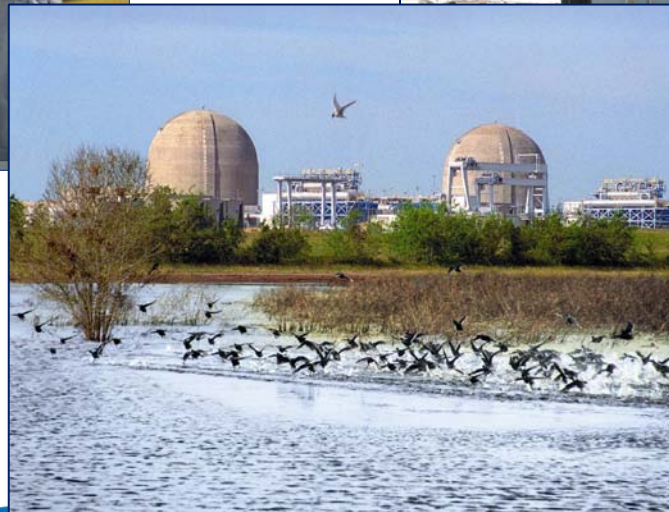
- About the NRC
- Fukushima Event
- NRC Actions
- Conclusion

What we do

Safety



Security



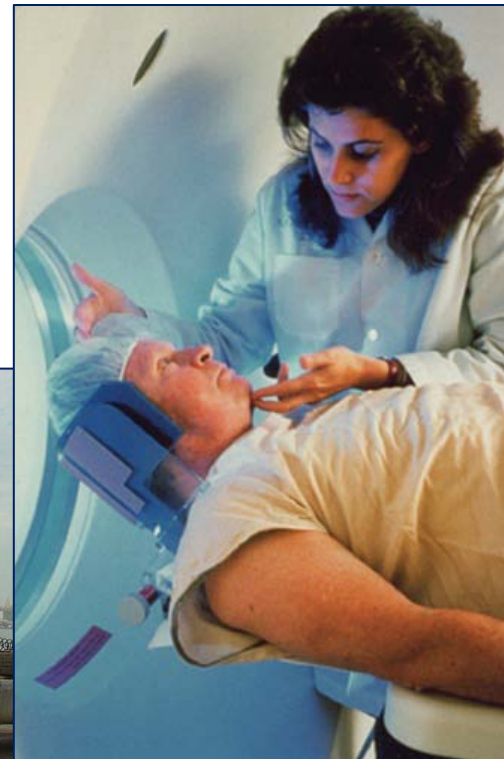
Environment

What we regulate

Reactors



Materials



Waste



How we regulate

- 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

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”

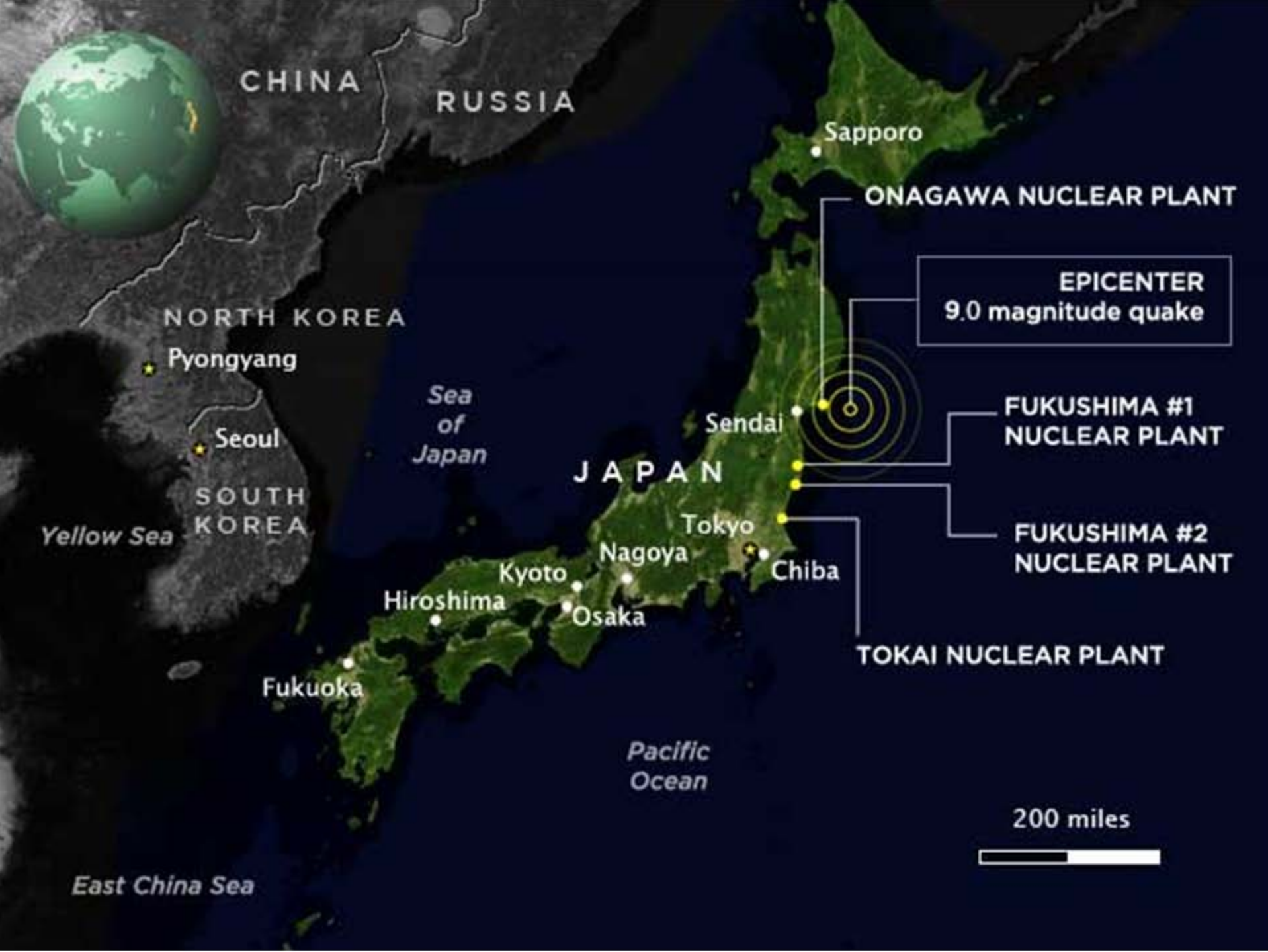


Extreme External Events

- Defense-in-depth philosophy
- Risk is not a static concept
 - Climate change (potential increase in magnitude of floods)
 - Improved state-of-knowledge of hazards (e.g., seismology, hydrology)
 - Aging infrastructure (e.g., nexus between flood control and nuclear sites)
- Maintain strong operating experience programs
- Vigilant periodic review of hazards and risks

Fukushima Daiichi

- Event background
- NRC actions
- Next steps



Fukushima Daiichi NPP



Sequence of Events

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
 - Much higher in other locations in northern Japan

Sequence – continued

- Three operating units shutdown at time of earthquake
- Offsite power lost; emergency diesels supply power
- 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

Tsunami exceeded the design assumption that led to extensive plant damage and extended station blackout



Reactor #3

Reactor #4

Water Spray Boom to Spent Fuel Pool

NRC Task Force

- Senior level agency task force
- Methodical and systematic review
- Near term and long term objectives
- Recommendations to be provided to Commission
- Publicly available report

Near Term Review

- Evaluate Fukushima Daiichi accident
- US 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 July)

Longer Term Review

- 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

Actions to Date

- Information notice to NRC licensees
- Temporary inspections
 - Extensive damage and severe accident mitigation guidelines
 - Station blackout
 - Seismic and flooding
- Bulletin on mitigating strategy information
 - Maintenance and testing of equipment
 - Strategy implementation

EP Rulemaking

- Rulemaking initiated pre-Fukushima
 - Revisions to existing regulations
- Lessons learned over the last 30 years
- Some key elements:
 - Evacuation Time Estimate updating
 - Emergency Action Levels for hostile actions
 - Emergency Response Organization augmentation at alternate facility
 - Challenging drills and exercises
- Final rule before Commission for approval
- NRC Task Force also looking at EP

Other Key Areas

- **Emergency Command and Control**
 - Executing emergency procedures and actions under challenging plant conditions
- **External communication and outreach**
 - Shared responsibility of regulator and industry
 - Promote understanding of risks and the bases for regulatory activities
 - Proactive engagement



Conclusion

Maintaining a systematic and methodical review in response to Fukushima:

- 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

Questions

Comments

Discussion