U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Briefing on the Japan Near Term Task Force Report – Short-Term Actions

R. William Borchardt

Executive Director for Operations

September 14, 2011

Staff Review of Near-Term Task Force (NTTF) Recommendations

Martin Virgilio

Deputy Executive Director for Reactor and Preparedness Programs

Agenda

- **Staff Review of NTTF Recommendations**
- **Staff Recommendations**

NTTF Conclusions

- **No imminent risk from continued operation and licensing activities**
- **NTTF report provided 12 overarching recommendations addressing principles of defense-in-depth, protection, mitigation and emergency preparedness**

Status of SRM-SECY-11-0093

- **Required four Notation Vote Papers on NTTF report:**
  - **Proposed Charter (complete)**
  - **Staff recommendations (complete)**
  - **Prioritization (due October 3)**
  - **Recommendation 1 (due within 18 months)**

Staff Review of NTTF Recommendations

- **Commission paper (SECY-11-0124) contains staff's assessment of the NTTF recommendations that can and, in the staff's judgment, should be initiated, in part or in whole, without delay**

Staff Recommendations

- **Greatest potential for safety improvement**
- **Near-term efforts, which could be started without delay**
- **Measured approach**

Staff Recommendations

- Seismic and flood walkdowns (2.3)
- Seismic and flood hazard reevaluations (2.1)
- Station Blackout (SBO) (4.1)
- 50.54(hh)(2) equipment (4.2)

Staff Recommendations (cont'd)

- Reliable hardened vent for Mark I containments (5.1)
- Strengthening on-site emergency response capabilities (8)
- Emergency preparedness (9.3)

External Stakeholder Feedback

- **August 31, 2011 public meeting discussed six recommendations**
  - **Conceptual agreement**
  - **Stakeholders desire involvement**
  - **Concerns with implementation pace and regulatory vehicle**

Regulatory Vehicles

- **Orders**
  - **New requirements**
  - **Redefine level of protection regarded as adequate**
  - **Stakeholder engagement**

Regulatory Vehicles (cont'd)

- **Requests for Information (RFI) pursuant to 10 CFR 50.54(f)**
  - **Specific information needs from licensees**
  - **Licensees report actions taken**
  - **Informs regulatory action**
- **Rulemaking**

Seismic and Flood Hazard Walkdowns (2.3)

- **RFI pursuant to 50.54(f)**
  - **Methodology and criteria for walkdowns**
  - **Perform walkdowns to identify and address plant-specific vulnerabilities**
  - **Inform the NRC of the results and planned or taken actions**

Seismic and Flood Hazard Reevaluations (2.1)

- Stakeholder interaction to develop the technical basis and acceptance criteria
- RFI pursuant to 50.54(f)
- Determine appropriate regulatory action

SBO (4.1)

- **Engage stakeholders in support of rulemaking activities to enhance the capability to maintain safety through a prolonged SBO**
- **Development of the regulatory basis, a proposed rule and implementing guidance**

50.54(hh)(2) Equipment (4.2)

- **Order**
  - **Reasonable protection of 50.54(hh)(2) equipment from the effects of external events, and to establish and maintain sufficient capacity to mitigate multi-unit events**
  - **Stakeholder interactions to identify acceptance criteria**

Reliable Hardened Vents for Mark I Containments (5.1)

- **Order**
  - **Take action to ensure reliable hardened wetwell vents**
  - **Interactions with stakeholders to develop the technical bases and acceptance criteria**

Strengthening On-site Emergency Response Capabilities (8)

- **Advanced notice of proposed rulemaking**
  - **Methodology to integrate onsite emergency response processes, procedures, training and exercises**
  - **Interact with stakeholders to modify the emergency operating procedure generic technical guidelines**

Emergency Preparedness Regulatory Actions (9.3)

- **RFI pursuant to 10 CFR 50.54(f)**
  - **Perform a staffing study**
  - **Evaluate enhancements for licensee communications during SBO**
  - **Inform the NRC of the results and planned or taken actions**
- **Evaluate licensee responses and take appropriate regulatory action**

Next Steps

- **Notation vote paper due October 3, 2011**
  - **Reflect regulatory actions**
  - **Implementation challenges**
  - **Technical and regulatory basis**
  - **Additional recommendations**
  - **Schedule and milestones for stakeholder engagement and Advisory Committee on Reactor Safeguards review**

Acronyms

- **NTTF – Near-Term Task Force**
- **SBO – Station Blackout**
- **RFI – Request for Information**

Industry Perspective on Near-Term Task Force Recommendation #9 – Enhancing Emergency Preparedness

Susan Perkins-Grew

Director, Emergency Preparedness

NEI

Recommendation #9 - EP

- Existing EP technical basis is valid; effective in protecting public health and safety
- Industry performing reviews; determining actions
- On-shift staffing analysis for multi-unit event
  - Need additional criteria and instructions
  - Must consider progress on other actions
  - Request extension to effective date (or implementation) of staffing analysis rule change

Recommendation #9 - EP

- Upgrading power supplies to communications equipment
  - Staff engagement with stakeholders:
    - Technical bases, acceptance criteria, implementation schedule
- Other proposed actions in Recommendation #9
  - Rulemaking vs. guidance

Summary

- Many EP changes already in process
- Need to consider cumulative impact
- Industry encourages the same stakeholder engagement as used in recent EP Rulemaking
- General agreement on need to move forward
- Priorities and schedules must remain in the context of enhancements and prioritized appropriately

Industry Recommendations on Near-Term Actions in Response to Fukushima

Charles Pardee

Chairman, Industry Fukushima Response Steering Committee

Industry Actions Since March 11

- Verified measures to manage extreme events
- Increased operator awareness and safety margins for spent fuel cooling and makeup
- Evaluating the extension of coping durations for extended loss of AC power
- Developing detailed timeline of Fukushima event
- Developed governance, goals and principles to guide industry response

2. Seismic and Flooding Design Bases

- Walk down seismic and flooding protection against current design basis requirements (2.3)
  - Develop procedures & acceptance criteria
  - Obtain NRC concurrence
  - Report results to NRC
- Use Generic Issue 199 as a model for potential updates to plant design bases (2.1)
  - Establish protocol for evaluating new and significant information on seismic and flooding

4. Extended Loss of AC Power

- Pursue an Advanced Notice of Proposed Rulemaking (ANPR) to revise §50.63 (4.1)
- Assure sufficient equipment is available to meet §50.54 (hh)(2) requirements for a multi-unit event (4.2)
  - Protect portable equipment from external events using appropriate commercial standards

5. Hardened Vents

- Assure adequate accessibility, and the ability to operate, BWR Mk 1 hardened vent valves assuming no AC power
- Report results to NRC and implement any warranted improvements

7. Spent Fuel Pools

- Assure ability to monitor spent fuel pool level and temperature remotely assuming extended loss of AC power
  - Provide diverse power supply for monitoring
  - Safety-related power supply would not have changed situation at Fukushima

8. EOPs, SAMGs and EDMGs

- Assure appropriate training on SAMGs and EDMGs
  - Operators and Emergency Response Personnel
- Standard should be one of familiarity, not proficiency, commensurate with the likelihood of events
- Integration of procedures and guidelines is a longer-term activity

General Recommendations Going Forward

- Must maintain current plant focus on safety and reliability
- Post-Fukushima actions must be integrated and prioritized with other important actions
- Given diversity of plant designs, locations and threats, implementation should be flexible, risk-informed and performance-based
- Continue to develop lessons-learned from Fukushima

UCS Perspective on the Japan Task Force Report Short-Term Actions

September 14, 2011
Dr. Edwin S. Lyman
Senior Scientist
Union of Concerned Scientists

General Comments

- ***UCS endorses the need for swift and comprehensive action by the NRC to identify and eliminate safety vulnerabilities that have been highlighted by Fukushima***
- ***Should be part of a larger review of the adequacy of safety margins and other defense-in-depth measures***

Orders

- **Orders are appropriate where swift action is warranted; the process for implementing them should be transparent**
  - **Should be as clear and specific as possible when issued**

How not to issue orders

- **NRC should avoid repeating the experience of the B.5.b order**
  - **Issued February 25, 2002**
  - **Final guidance not endorsed until December 22, 2006**
  - **Inspections not completed until December 2008**
  - **Open issues remained even in 2009**
- **Due in part to NRC-NEI disputes hidden from the public**

Recommendation 2

- ***UCS agrees that near-term action is needed to define the current seismic and flooding risk profile and to address vulnerabilities***
- ***GI-199 data, North Anna, Ft. Calhoun underscore concern***
- ***Draft GL could provide a good evaluation basis, but timelines are too long and SMA/SPRA option could confuse the public***

Recommendation 4

- ***UCS supports general framework for extended SBO mitigation but the ultimate level of protection will depend on resolution of many issues***
  - ***Reliability and availability standards for coping equipment/procedures***
  - ***Asserted seismic margins need to be demonstrated***
- ***Credit should be given for B.5.b measures in severe accident scenarios only if they can be shown to work***

Hydrogen control in SBOs

- ***The NRC should act immediately to require reliable backup power for hydrogen igniters at ice condensers and Mark IIIs to prevent containment rupture under SBO conditions***
- ***In fact, in 2006 the Commission directed the staff to "promptly proceed to require" these measures. It never happened and they remain voluntary commitments. Why?***

Recommendation 5

- ***UCS supports requirements for reliable hardened wetwell vents for Mark I and Mark II BWRs***
  - ***Operability under a range of severe accident conditions must be demonstrated***
- ***No need to wait for final Fukushima vent analyses to proceed***

Recommendation 7

- ***UCS supports prompt action to address the safety issues posed by overstuffed spent fuel pools***
- ***The staff does not provide adequate justification for deferring action on important Task Force recommendations such as requiring reliable pool instrumentation***
- ***Rulemaking to require accelerated transfer of spent fuel to dry casks should be a near-term action***

Recommendation 8

- ***Strengthening and integration of EOPs, SAMGs, EDMGs are overdue***
- ***Proposed requirements that EDMG procedures be developed and integrated into plant procedures were opposed by NEI and omitted in the final §50.54(hh) rule and guidance***
- ***10/2006 letters: staff expectation that licensees would integrate B.5.b into procedures for effective use in nonsecurity-initiated events***

Recommendation 8

- ***"The implementing procedures for B.5.b ... are not linked to the EOPs... B.5.b procedures are similar to fire safe-shutdown procedures in that they are stand alone and if you try to run them concurrently there may be conflicts ..." --- e-mail from Christopher Cahill, RI, 6/11/10***

Recommendation 9

- ***UCS agrees with all Task Force recommendations for emergency planning enhancements but believes the Task Force defense of the 10-mile EPZ is premature***
  - ***Fukushima experience needs to be fully assessed***

Acronyms

- ***EDMGs: Extensive Damage Mitigation Guidelines***
- ***EOPs: Emergency Operating Procedures***
- ***EPZ: Emergency Planning Zone***
- ***GI: Generic Issue***
- ***GL: Generic Letter***
- ***NEI: Nuclear Energy Institute***

Acronyms (cont.)

- ***SAMGs: Severe Accident Mitigation Guidelines***
- ***SBO: Station Blackout***
- ***SMA: Seismic Margin Assessment***
- ***SPRA: Seismic Probabilistic Risk Assessment***
- ***UCS: Union of Concerned Scientists***

Comments on the Japan Near-Term Task Force Report

William Leith

Senior Advisor for Earthquake and Geologic Hazards

U.S. Geological Survey

Reston, Virginia

USGS-NRC Collaboration

- Seismic hazard analyses for new license applications
- ShakeCast alerting for ground motion at U.S. nuclear plants
- Evaluation of seismic monitoring needs in the East
- Research on ground motion
- Tsunami hazard assessment

U.S.NRC ShakeCast Report

Magnitude 5.8 - VIRGINIA

Version 7

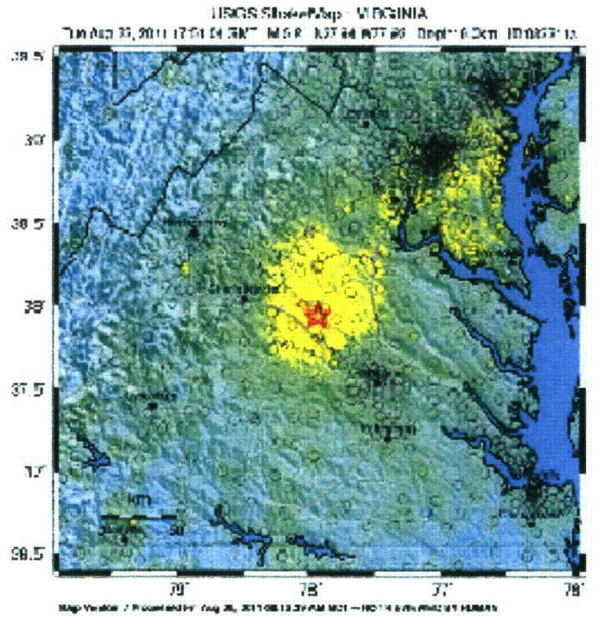
Origin Time: 2011-08-23 17:51:04 GMT

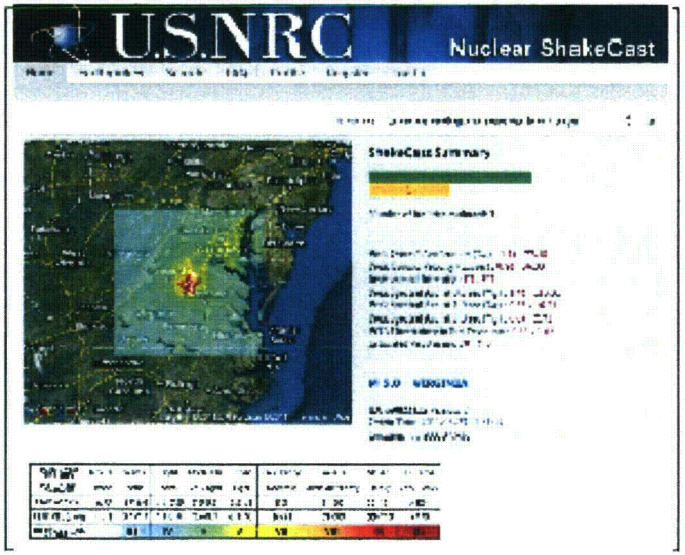
Created: 2011-08-26 14:50:40 GMT

Latitude: 37.9360 Longitude: -77.9330

Depth: 6.0 km

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



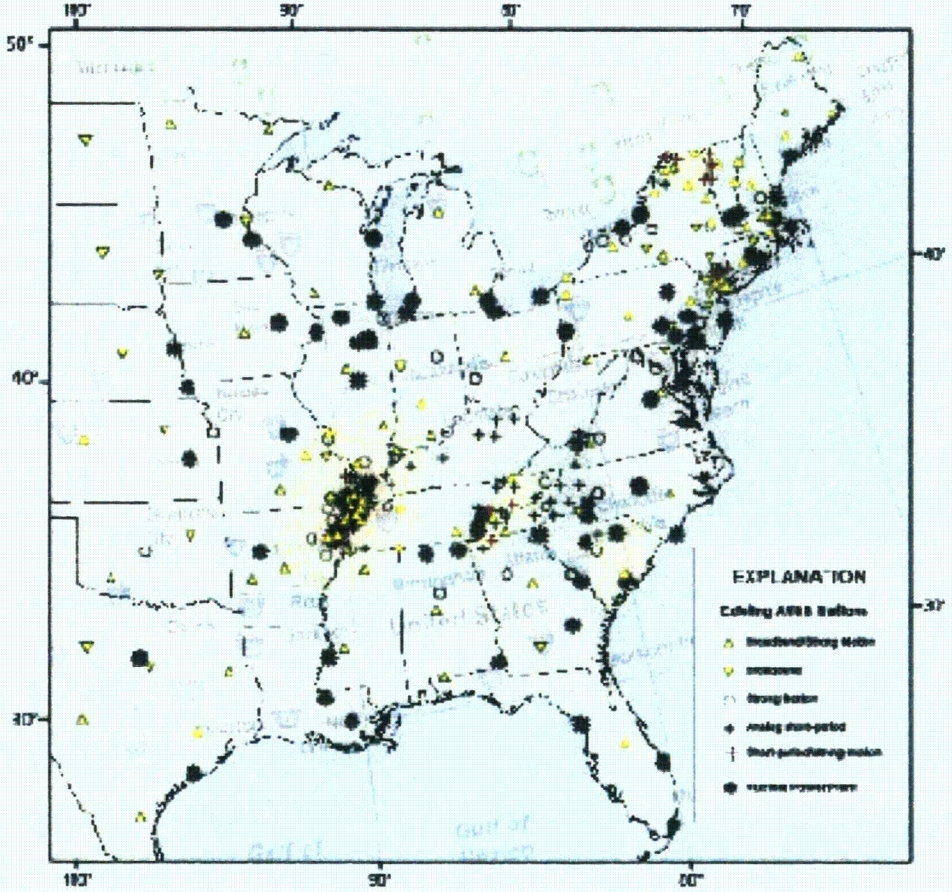


Recent significant earthquakes in the region

- M4.5 VIRGINIA at 12/9/2003 20:59

Prepared under United States Nuclear Regulatory Commission-United States Geological Survey Interagency Agreement JCN-N6184—Assessment of the Current State of the Advanced National Seismic System

Improved Earthquake Monitoring in the Central and Eastern United States in Support of Seismic Assessments for Critical Facilities



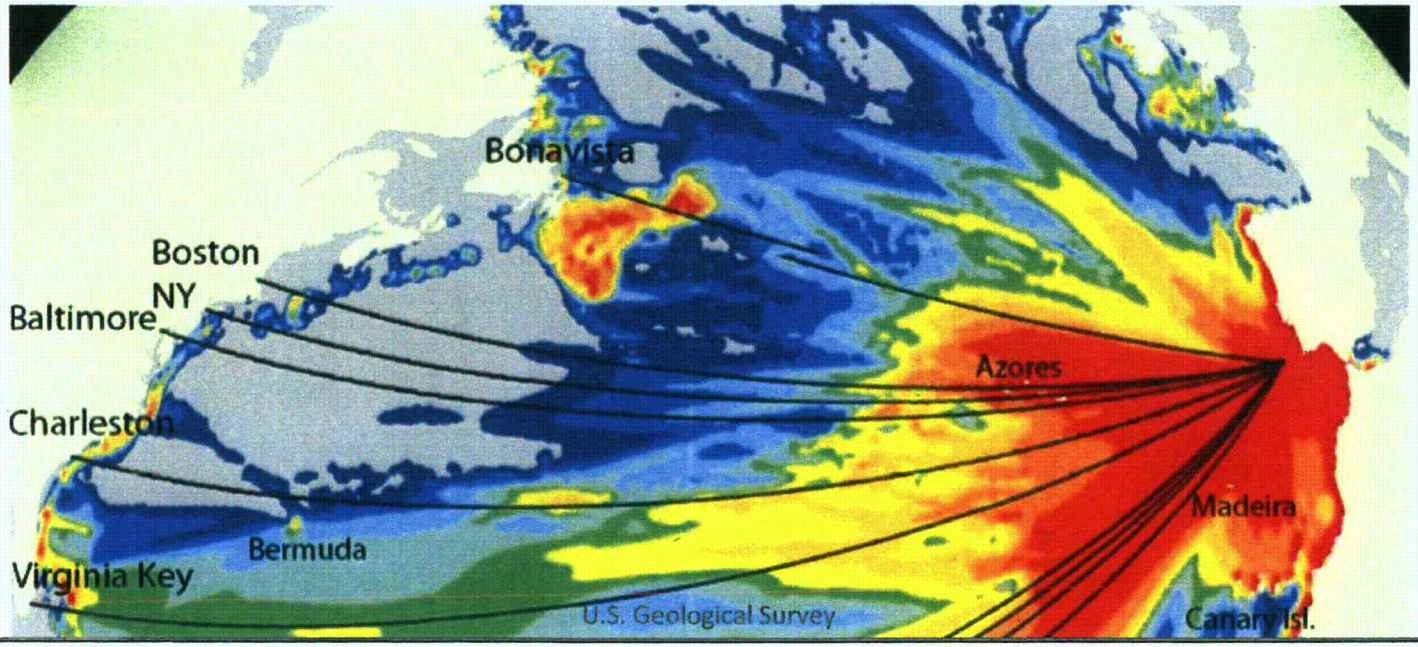
Open-File Report 2011–1101 U.S. Geological Survey

Evaluation of Tsunami Sources with the Potential to Impact the U.S. Atlantic and Gulf Coasts

An Updated Report to the Nuclear Regulatory Commission

By Atlantic and Gulf of Mexico Tsunami Hazard Assessment Group

Rev. Aug. 2008



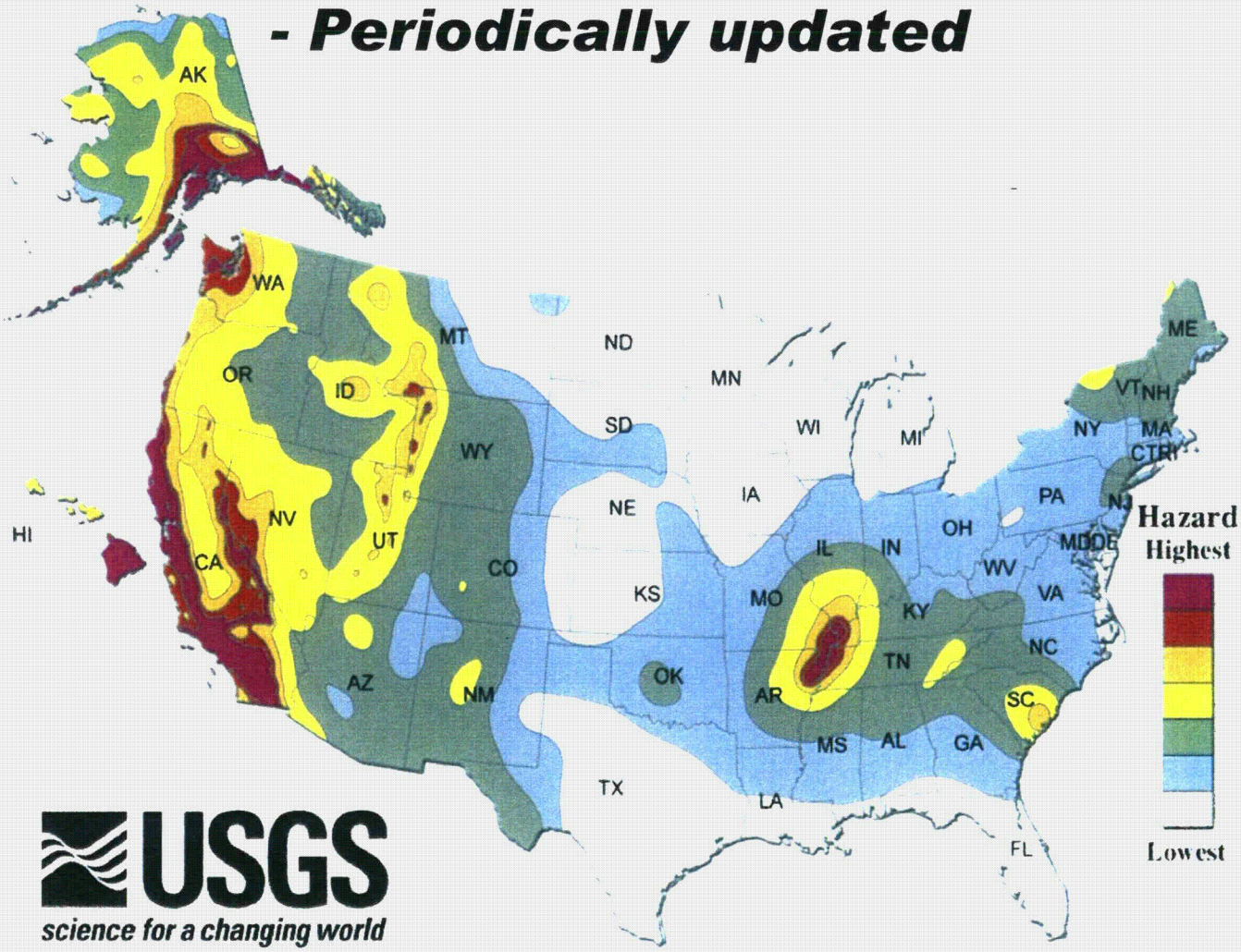
USGS Approach to Earthquake Hazards

- ***Earthquake hazards are periodically reevaluated as new data become available and new research improves ground motion models***
- ***National Seismic Hazard Maps are updated every 6 years***

National Seismic Hazard Maps

- Basis for U.S. Building Codes

- Periodically updated

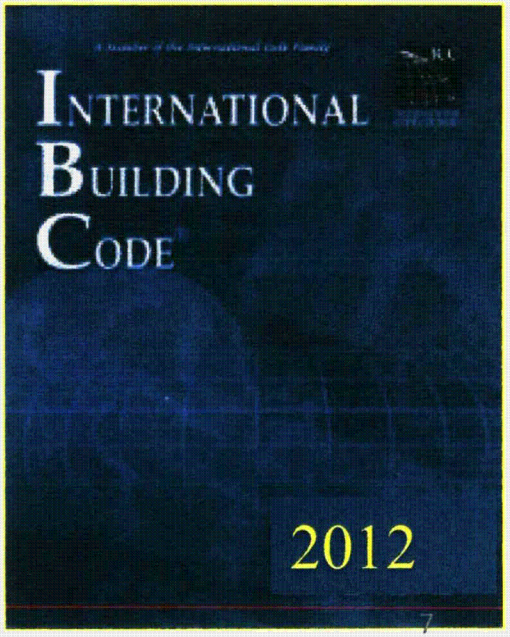


USGS
science for a changing world

U.S. Geological Survey

NEHRP Recommended Seismic Provisions
for New Buildings and Other Structures
FEMA P-750 / 2009 Edition

FEMA



Comments on NTTF Rec. 2.1

Much has been learned since the plants were licensed and the hazard estimates have changed significantly in some places (including the Virginia seismic zone)

Comments on NTTF Rec. 2.1

- ***The approach used in the original hazard assessments at nuclear plants was deterministic***
- ***Both the USGS and NRC now use similar probabilistic methods***

Comments on NTTF Rec. 2.1

NRC and USGS have worked together on:

- **implementing the USGS model in the NRC (used for the GI-199 screening) and**
- **the new CEUS SSC model, now being finalized**

Comments on NTTF Rec. 2.2

- Can be achieved and makes sense. It would bring NRC in-line with other agencies
- USGS and NRC/RES staff have already talked about how to coordinate assessment efforts

Comments on NTTF Rec. 2.2

By comparison:

- ***USGS updates the US hazard maps every 6 years to support the building code (via NIST)***
- ***DOE has a 10 year review cycle***

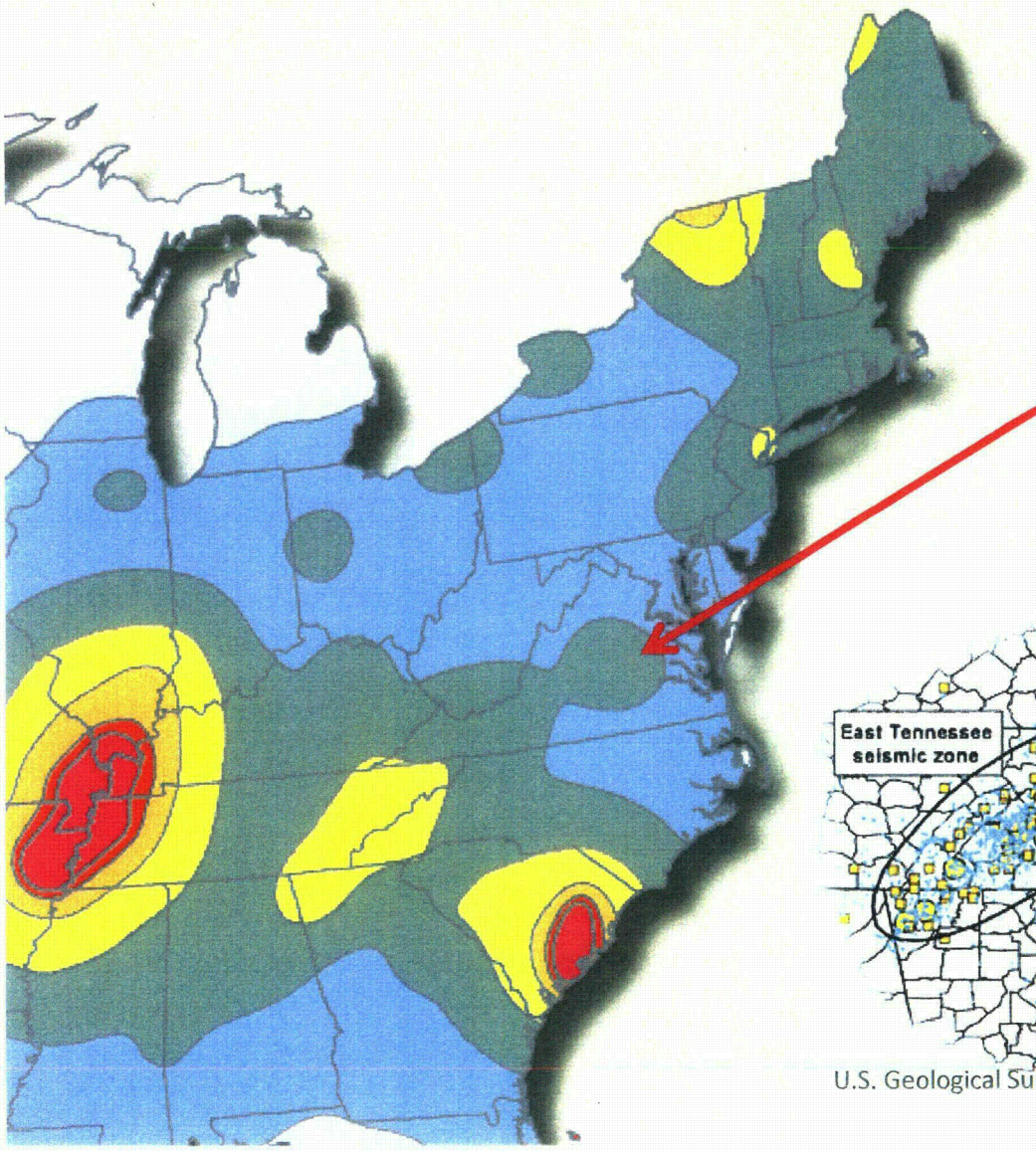
Outdated Instrumentation

- ***Virginia quake is your alert***
- ***Modern instrumentation in the plants could provide both NPP operators and NRC staff with the data they need to rapidly determine appropriate post-earthquake actions***

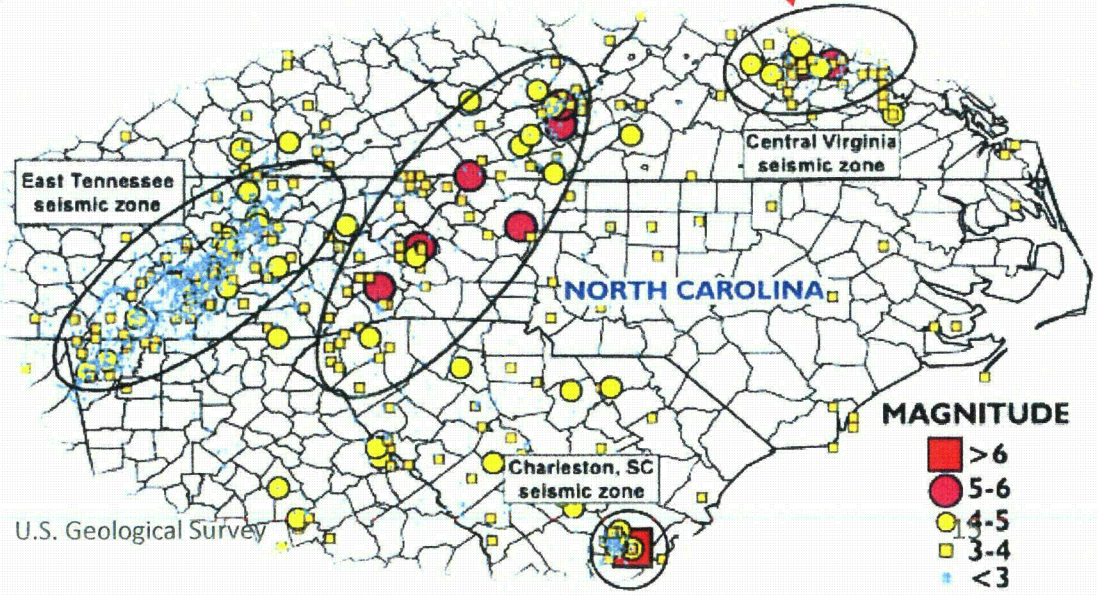
The Virginia Earthquake

- Largest in Virginia in 114 yr.
- Occurred in mapped zone of moderate seismic hazard
- No USGS-supported regional seismic network
- Estimated acceleration at North Anna NPP of 0.26g

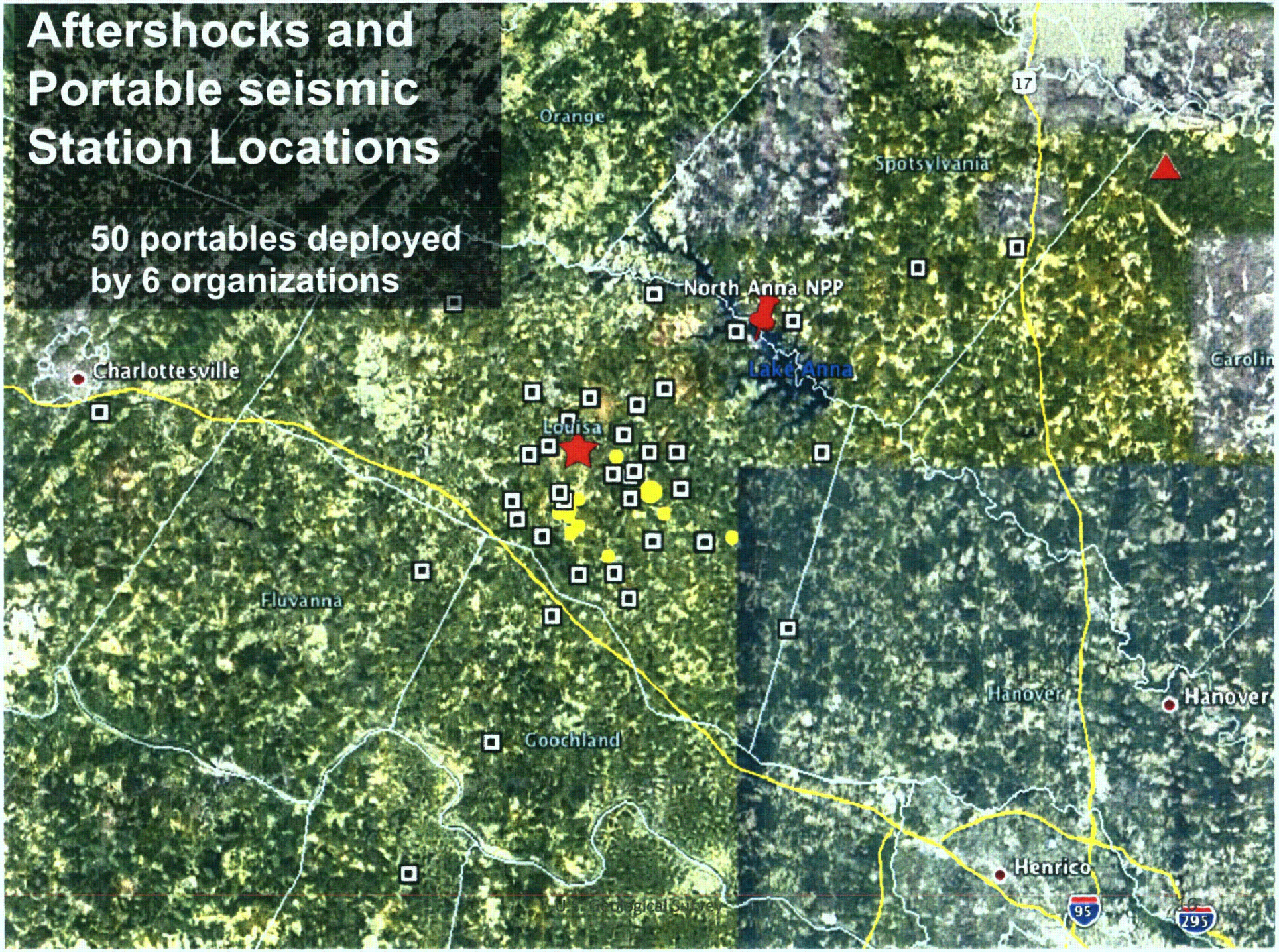
USGS National Seismic Hazard Map



Central Virginia Seismic Zone



U.S. Geological Survey

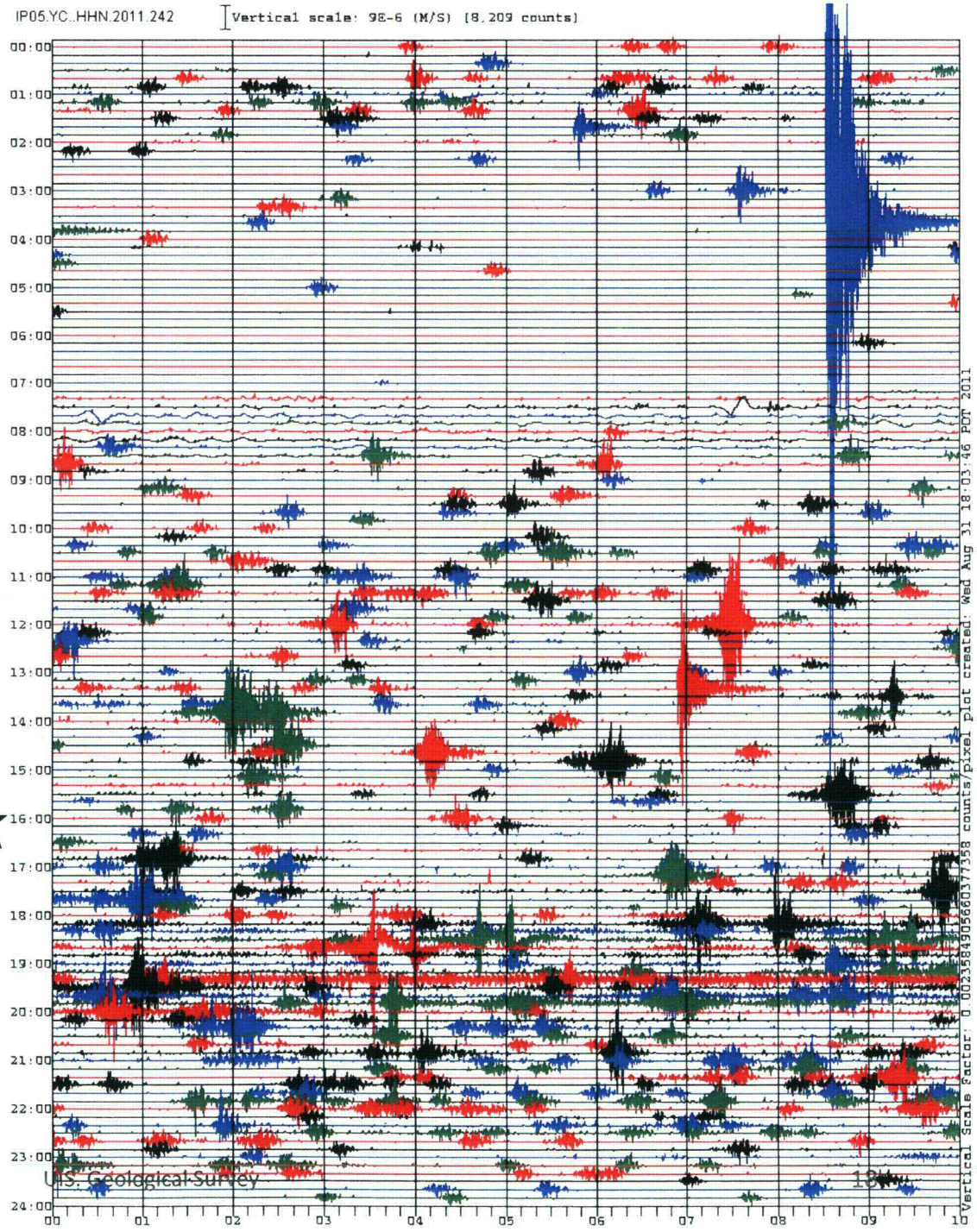

Aftershocks and Portable seismic Station Locations
50 portables deployed by 6 organizations
Orange
Spotsylvania
17
North Anna NPP
Lake Anna
Charlottesville
Louisa
Fluvanna
Goochland
Hanover
Hanover
Henrico
95
295

Damage in Epicentral Area

Aftershocks will continue for many months

Record is from August 30, 2011

M3.4 aftershock produced 0.25g at its epicenter



Large central and eastern U.S. quakes are rare... ...but their impacts can be large

- ***Active faults largely hidden***
- ***Radiated energies are high***
- ***Seismic waves travel long distances***
- ***Thick soils can amplify ground motions***
- ***Soils are prone to liquefaction***
- ***Structures and lifelines older, less seismically resistant***
- ***Communities are relatively unprepared***

Sources of more information

- **USGS earthquake information:**
  - **http://earthquake.usgs.gov**
- **Key documents:**
  - **Fact Sheet: Earthquakes In and Near the Northeastern United States, 1638-1998.**
  - **Handbook: Putting Down Roots in Earthquake Country**

Acronyms

COL	Combined operating license
DBE	Design basis earthquake (a.k.a SSE)
GI-199	Generic Issue 199
GMPE	Ground motion prediction equation
NPP	nuclear power plant
NRO	Office of New Reactors (cliff's group)
NTTF	Japan Near Term Task Force
OBE	Operating Basis Earthquake ground motion
RES	Office of Research
RG	Regulatory guide (RG 1.208 = guide on PSHA)
SSCs	Structures, systems, and components
SSC	Seismic Source Characterization
SSE	Safe shutdown earthquake ground motion

RESPONSE TO TASK FORCE RECOMMENDATIONS

September 14, 2011

Thomas B. Cochran, Ph.D.

Consulting Senior Scientist

Nuclear Program

Natural Resources Defense Council (NRDC)

Recommendations 2.1 and 2.3 – Seismic/Flooding

NTTF's recommended reevaluation:

- is limited to seismic and floods, but should include all significant contributors to core damage frequency (from PSAs/SAMAs/PRAs), e.g., including:
  - internal and external fires
  - high winds and tornados
  - ice and storms
  - nearby facility and transportation accidents
- should address adequacy of existing siting criteria
- is overly reliant on licensee self-assessment
  - fails to insure that NRC establish/approve the inspection/evaluation criteria and methods for the reevaluations and walkdowns
- is overly reliant on existing design basis:
  - will have limited value until gap in seismic protections for new vs. existing plants is resolved (GI-199)

Recommendation 2 (cont.)

- The NRC Staff recommendations attempt to resolve some 2.1 and 2.3 issues related to the evaluation process and criteria.
- It would be preferable had the Staff recommended that once the above clarifications are addressed that the licensee be ordered to conduct the necessary walkdowns and appropriate reevaluations.

Recommendation 4 – SBO Coping

- Should include immediate extension of SBO coping capability to 8 hours given the 4.1 rulemaking will eventually require it.
  - Current regulations leave gap allowing a possible 2-hour coping time!
- Commission action should also ensure that both emergency on-site and off-site equipment be subject to the same maintenance, availability, training and inspection rules as apply to SSCs.

Recommendation 5 – Hardened Vents

- NRDC supports the NTTF recommendation, with the clear caveat that we do not believe that inclusion of "reliable" hardened venting of older BWR Mark I and II reactors *alone* is sufficient to render these obsolete designs adequately safe given the risk they pose to dense surrounding urban populations numbering, in some cases, in the several millions.
- The NRC Staff delay in addressing BWR Mark II reactors is unnecessary.
  - NTTF: "because Mark II containment designs are only slightly larger in volume… it can be reasonably concluded that a Mark II under similar circumstances would have similar consequences"

Recommendation 7 – Spent Fuel Safety

- The staff's omission of all SFP-related recommendations is objectionable.
- While heat load varies with time, we disagree with Task Force's claim that increased pool loads do not contribute to cooling issues:
  - The ability of the water in the pool to dissipate heat and resist boiling is proportional to its volume relative to the volume of spent fuel; these are adversely affected by the amount of spent fuel packed into the pool

Recommendation 7 (cont.)

- In the event of an accident or sabotage the source term for the spread of radioactive material is directly related to the amount of spent fuel in the pool.
  - Attention needs to be given to pool unloading and ways to reduce the hazards associated with spent fuel pools through accelerated dry cask storage.

Recommendation 8 – Emergency Response

- While agreeing with the NTTF recommended orders, NRDC believes that its primary orientation toward rationalizing paperwork and "guidance" does not go nearly far enough in ensuring that the NRC actually *accomplishes* its mission of *ensuring* that on-site emergency response capabilities *are adequate* to the task of protecting plant staff and the public and remain so on any given day decades into the future. We would prefer to see a much more hands on role by the NRC in establishing hard and fast performance criteria for emergency response capabilities and realistic methods for verifying on a recurring basis that licensees are able to meet them.

Recommendation 8 (cont.)

- NRDC disagrees with the NRC Staff recommendation to discard the orders and issue an advanced notice of proposed rulemaking.
- NRDC has already initiated a rulemaking for NTTF Recommendation 8.4
- The Staff recommendation makes the NTTF recommendation more vague.

Recommendation 9 – EP Enhancements

- NRDC agrees with NTTF recommendation
  - These regulatory gaps are obvious in their importance following Fukushima and never should have been allowed to evolve in the first place
- NRDC disagrees with NRC Staff recommendation to issue a request for information. The licensees can handle the NTTF's recommended order.

Recommendation 9 (cont.)

- Our concern with the treatment of emergency planning issues in the NTTF Report, and by NRC generally, is that risk reduction assessments are based on a cost–benefit analysis whereby the cost of a mitigation alternative is compared to the discounted mean of the collective dose (assessed at $2,000/person-rem) and economic damage consequences after being weighted by core damage (and wind direction) frequency. No further consideration is given to limiting collective dose and economic impacts of lower-frequency high-consequence events, such as that which occurred at Fukushima, by requiring that reactors not be located in areas of high population density and high economic activity.

Patrick Mulligan, Manager
NJ DEP Bureau of Nuclear Engineering

and

CRCPD's Committee on Emergency Response Planning, Chair (HS/ER-5)

Communication

- DHS National Emergency Communications Plan (NECP)
- Statewide Communications Interoperability Plans (SCIP)
- Army National Guard agreements

Communication

- NRC rulemaking enhancements on emergency preparedness

- DHS REP Program Manual Revision

- Licensee and State have sufficient redundant and diverse communications to communicate

Near-Term Task Force EP Recommendations

- Determine and Implement the required staff to fill all necessary positions for response to a multi-unit event.

- Provide a means to power communications equipment needed to communicate onsite and offsite during a prolonged SBO.

- Order licensees to complete the ERDS modernization initiative by June 2012 to ensure multi-unit site monitoring capability.

Additional Comments

- Dose Assessment: RASCAL cannot model multiple unit/multiple spent fuel pool accidents
- Information Sharing: NRC/State Memorandum of Understanding under the Regional State Liaison Program
- Public Inquiries to State Programs during Fukushima

Information Sharing

- Timely, accurate, and consistent information
- Coordinated clear key messages put an event and any associated impacts into perspective for the public.
- Dispels rumors and misperceptions and helps reassure the public

NRC Near Term task Force
Commission Meeting
September 14, 2011

Chairman Jaczko, Commissioners. Good Morning. Let me first take the opportunity to thank you for the invitation to participate in this panel discussion and for the work you and your staff have done on this very important topic.

Today, I will provide comments on NRC staff recommendations pertaining to Emergency Preparedness and more specifically about offsite resources and communication.

The DHS in cooperation with state government have been working diligently on the National Emergency Communications Plan for some time. All fifty States and six U.S. territories have developed Statewide Communication Interoperability Plans (SCIP) that identify near and long-term initiatives for improving communications interoperability and for enhancing communication networks. These initiatives provide a mechanism to evaluate new technologies and their applicability to state and local response organizations. Further, many state governments have agreements in place to tap into the resources of the National Guard who can provide portable and easily deployable satellite communications if necessary.

NRC rulemaking enhancements to emergency preparedness and DHS/FEMA guidance updates will require additional investigation into backup alert and notification systems for nuclear power plant accidents. These requirements will provide another means to enhance effective communication with the public under adverse conditions. In light of the ongoing efforts at the federal and state level to evaluate communication strategies and implement new technologies, I agree with the assessment of NRC staff that there are sufficient redundant and diverse methods to communicate with the NRC and State and local governments.

The document, "Staff Assessment of Near-Term Task Force Recommendations" identifies three areas within emergency preparedness for immediate action:

- Determine and implement the required staff to fill all necessary positions for response to a multi-unit event
- Provide a means to power communications equipment needed to communicate onsite (e.g., radios for response teams and between facilities) and offsite (e.g., cellular telephones and satellite telephones) during a prolonged Station Black-Out.
- Order licensees to complete the ERDS [Emergency Response Data System] modernization initiative by June 2012 to ensure multi-unit site monitoring capability.

Each of the identified areas for immediate action are critical to enhancing response capabilities in light of the recent events in Japan. I agree with the

recommendations of the staff to move forward with these initiatives in order to identify gaps that could impede effective response efforts and take immediate actions to close the gaps.

I do want to take a few minutes to highlight some of the issues identified in the task force report that were not recommended by the staff for short-term action and perhaps raise some additional concerns that were not included in the report but certainly need more attention in the near term.

First, the task force highlighted the shortcomings of dose assessment models to evaluate accident sequences for multiple reactor sites and or multiple spent fuel pools. While this is not identified in the near term recommendations for immediate actions, it is certainly a critical component for the evaluation and assessment of a catastrophic accident involving multiple source term contributors. I believe it is critical for NRC to move forward quickly to address the dose assessment shortfalls identified during this event. This is particularly important in light of the fact that public protective actions in Japan were issued based on results from a dose assessment model that cannot evaluate multiple reactor/spent fuel pool accidents with any degree of accuracy. I would recommend that work on developing appropriate dose assessment tools begin immediately.

I would be remiss if I did not speak about major shortcomings in coordination and information sharing between the federal government and the states during the Fukushima incident. The NRC task force has focused on the hardware and infrastructure necessary for effective communication. What is equally, if not more, important is the timeliness, frequency, content and targeted recipients of the communication. To my knowledge, the only federal agency that engaged constructively and responsively to state concerns and questions was CDC/HHS and that avenue still took some time to establish. As I am sure you are aware, the NRC has a formal Memorandum of Understanding with the States to provide information on incidents involving radiological incidents through the Regional State Liaison Officer program. The NRC did not honor that agreement during this event.

At the state level, there were hundreds of public inquiries as to what effect the accident would have on the state residents from a public health perspective related to; water resources, agricultural resources, tourism, milk etc. Lacking any real data points, source term or modeling projections, it was difficult to speak with any certainty and answer the public's questions and concerns. Granted, from a technical perspective we all could agree that based upon historical information, the release of radiation would have no impact on public health and safety within the U.S. borders. At the same time, from a purely scientific and technical perspective, we had no hard data to support our statements, which places us in a very vulnerable position.

The need for timely, accurate, and consistent information with clear key messages about the significance or non-significance of unintended radioactive releases can help NRC and the States put an event and any associated impacts into perspective for the

public. Timely, accurate, and clear communications dispels rumors and misperceptions and helps reassure the public that the event is being handled appropriately.

Once again, I thank you all for the opportunity to participate today and I would be happy to answer any questions at the conclusion of the presentations.