



TVA Response to the Fukushima Event and Lessons Learned from Recent Natural Disasters

SOUTHERN LEGISLATIVE CONFERENCE

July 17, 2011



Agenda

- Centralized Response Center
- What We Have Done
- Key Initiatives
- Where We Are Going
- Watts Bar Unit 2 and Bellefonte Nuclear Plants
- Lessons Learned From Recent Natural Disasters
- Key Messages



We Are Safe

TVA nuclear plants are designed, built, maintained, and operated with strong protections against catastrophic events.

TVA emergency response plans and procedures show we are thinking ahead.

TVA continues to review its facilities, equipment, plans, procedures, and industry experience to identify enhancements.



Centralized TVA Response

Establish a TVA-wide centralized support center with satellite site response teams.

Sharing information with the industry to understand events from Japanese reactors.

Assess readiness for design basis and beyond events.

Communicate accurate and timely information.

Evaluate vulnerabilities to 'stacked' events.

Provide recommendations for TVA sites.



What We Have Done

Reviewed design basis events for each TVA plant.

- Floods – including dam failures
- Seismic and tornados
- Electrical
- Fuel integrity, spent fuel pool, and dry cask storage

Verified readiness of equipment and guideline enhancements and severe accident mitigation guidelines.

Postulated response to beyond design basis or ‘stacked’ events.

Responding to industry requests.



Assessing procedures and guidelines in place to respond to these kinds of events.

- Emergency Operating Procedures for preventing plants from exceeding designed operating limits
- Severe Accident Mitigation Guidelines for accidents beyond which the plant has been designed



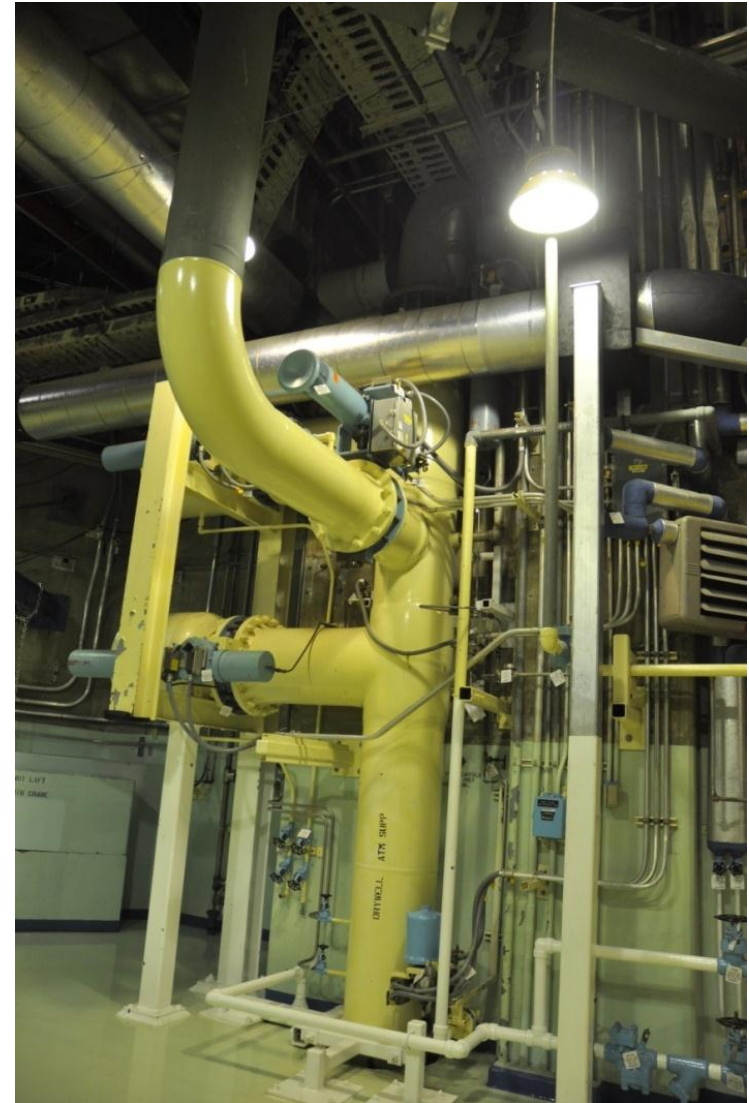
Key Initiatives

Assessing engineering bases to assure we have defense-in-depth.

- Robust plant designs
- Core protection
- Reliable emergency power supplies
- Flood response plans
- Seismic design features based on most credible area history
- Safe used fuel storage

Browns Ferry and all other U.S. boiling water reactors have hardened vent systems.

- Primary function to safely remove hydrogen from the containment structures
- Elevated release point
- Operations guidance vents containment prior to exceeding design pressure





- Flood levels are categorized as a near impossible flood due to rainfall/dam failures event (substantially greater than a 10,000 year probable flood).

- Sequoyah and Watts Bar are designed to have the structures and systems capable for cooling the fuel during this event.



Safety Features – Watertight Doors



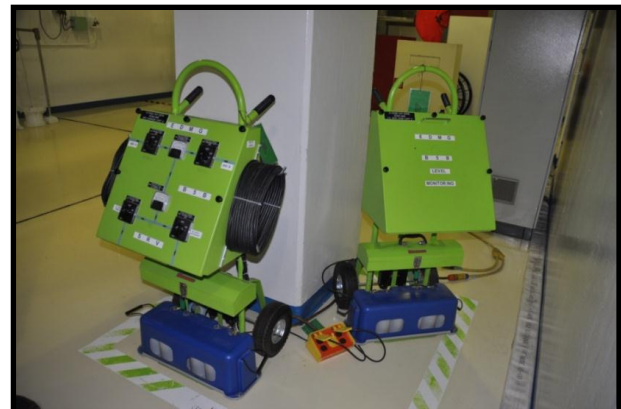
- Watertight doors are used in various areas of the plant to prevent intrusion of water from flooding events.
- Doors operate with a series of airlocks - only one door can be opened at a time.





Backup Power & Safety Features

- Emergency diesel generators are installed to supply electric power if all electric power supplied by the electric grid is lost.
- Battery-mounted carts can be used to re-open valves that otherwise might remain closed.
- Carts can be moved where needed.





Seismic Design

Every U.S. nuclear power plant designed to regional earthquakes.

- Based on past recorded and historical events
- Engineered to withstand an earthquake equal to the plant's maximum projected seismic event and to maintain vital safety systems

Comparing existing emergency plans, equipment, and facilities to experiences in Japan.

Evaluating training opportunities.





Where We Are Going

- Making recommendations – short, intermediate, long-term.
- Making preparations for additional follow up.
- Staying connected with industry groups and nuclear utilities.
- Meeting with stakeholders to review TVA actions.

Proactively communicating with internal and external stakeholders.

- Employee meetings
- Discussions with federal, state, and local officials
- Presentations to Tennessee, Alabama EMAs.
- Media interviews
- Media event at Browns Ferry





Watts Bar 2 and Bellefonte

Actions from Nuclear Power Group response will be incorporated into Watts Bar 2 project.

Evaluating events in Japan to determine their impacts to engineering and licensing for the Bellefonte project.



April 27, 2011 Storms

- More than 160 tornados occurred throughout the day on April 27, 2011.
- Browns Ferry lost offsite power at ~2130.
- All 500kw outgoing transmission lines were lost as a result of the tornados in the area.
- No damage to switchyard
- Activated Emergency Control Centers
- All emergency diesel generators started and supplied AC to the safety related loads.



April 27, 2011 Storms

- One offsite 161kv line remained functional into the station supplying power to BOP loads and other house loads.
- All units placed in cold shutdown on RHR cooling
- Transmission lines repaired and restored
- Browns Ferry shutdown as designed and remained safe throughout the event.
- All 3 units have been returned to full power following the 500kv transmission lines being restored.



Recent Natural Disasters Lessons Learned

April 27 Storms – Loss of offsite power to Browns Ferry

- Communication needs upgrading.
- Chattanooga Emergency Center needs hardening to tornado events.
- Multi-unit events need to be part of standard emergency drills.
- Emergency warning sirens need to have alternate power source.
- Reliability of emergency generators from offsite vendors not known.



Recent Natural Disasters Lessons Learned

Flooding at Fort Calhoun and Cooper Stations

- Missouri River flooding lasting weeks – not days
- Reassessment of our ability to keep flood waters out of the buildings
- Revise our strategy of installing flood mode equipment versus pre-engineered solutions



Key Messages

TVA's nuclear units are designed to safely shut down and maintain safe conditions in the event of natural disasters.

TVA remains engaged with industry groups and nuclear utilities to continually learn and improve.

TVA and other nuclear utilities continue to conduct comprehensive reviews in order to make changes to further ensure safety in the face of severe adverse events.



Key Messages

Nuclear energy remains a vital element of America's electricity portfolio and TVA's power system.

TVA'S NUCLEAR PLANTS REMAIN SAFE

