

# BWR Activities to complete Fukushima Lessons Learned

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# Topics



Status of FLEX Strategies

Status of Severe Accident Hardened Containment Vent System (HCVS) Hardware and Strategy

Status of Emergency Operating Procedures, Severe Accident Mitigation Guidelines and Technical Support Guidelines (EOP/SAMG/TSG)

Planned Actions for Mitigating Strategies Proposed Rule Summary

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# BWR Status of FLEX Strategies



- Industry-wide, the US BWR fleet is expected to be materially complete on implementing FLEX Strategies by the end of 2016.
- The Mark I and II plants will enhance their FLEX capability with upgraded hardened wet well vents between 2016 and summer of 2018 per order EA-13-109 requirements.
- Approximately 1/3 of the BWR fleet will issue FLEX Final Integrated Plans (FIP) by the end of 2016. The remainder of the BWR fleet will submit following the completion of the NRC order EA-13-109 wet well vent enhancements at their site.
- 2 BWR plants are expecting FLEX inspections in Spring - Summer 2016. The remainder of plant inspections are expected to extend into 2018.
- BWR plants are working to the established timelines for Mitigating Strategy Assessments (MSA) of Flooding and Seismic using NEI 12-06, revision 2 guidance.
  - Flood MSA: most to complete in 2016 and remainder in 2017.
  - Seismic MSA: most to complete in 2017.

# Severe Accident Hardened Vent



- US BWR Mark I and II applicable sites are implementing both hardware (phase 1) and strategy (phase 2) elements of the NRC order EA-13-109.
- The impacted BWRs will install wet well (hardware) enhancements by mid-2018.
- The impacted BWRs will implement the strategy for Severe Accident Water Addition and Management by the June of 2019 to comply with NRC order EA-13-109 phase 2.
  - The impacted BWR Units expect Staff Evaluations on the phase 2 Overall Integrated Plan (OIP) by summer 2016.
- The fleet expects order closure inspections to occur in 2018-2020.
  - OIPs, audits, staff evaluations and inspections are expected to be the durable record for closure of the order.



# Status of EOP/SAMG/TSG

## EOPs:

- BWR fleet has incorporated FLEX required actions concurrent with FLEX material completion by end of 2016.
- Full EOP upgrade to revision 3 is expected concurrent with SAMG commitment of June 2017, but majority of units are at revision 3 levels.

## SAMGs:

- BWR owners committed to the NRC via letters in late 2015 to have SAMG revision 3 incorporated by June 2017.
- BWR units impacted by NRC order EA-13-109 require incorporation of the required items from revision 3 for phase 1 and severe accident water addition/management for phase 2.

## TSGs:

- BWROG is hosting US workshops in 2016 and 2017 on use of TSG calculation aids. International workshops held in 2015 and more are planned for 2016.
- Latest TSG, with Fukushima lessons learned insights, was issued with revision 3 and is considered part of implementation of SAMG.



# Planned Actions for MS Proposed Rule

- Expect BWR fleet will be implementing the MS Rule within the approved timeline consistent with the rest of the US nuclear fleet.
- Anticipated actions are as follows:
  - Anticipate documentation enhancements needed for the change of Extreme Mitigation Actions from 50.54(hh) to 50.155.
  - Develop and perform demonstrations on FLEX and procedure interactions in Emergency Preparedness arena.
  - Complete documentation on MS Rule elements based on previously completed Fukushima Task Force Items.

# Summary



The BWR fleet will be materially complete with FLEX such that sites can mitigate Beyond Design Basis External Events by the end of 2016.

The BWR Mk I and II units are enhancing the capability to vent the wet well and manage water addition to protect containment in a beyond design basis or a severe accident event beginning in 2016.

The BWR fleet is expecting to respond to the ongoing efforts on the proposed MS Rule requirements and changes to the ROP for oversight of SAMGs consistent with the NEI and industry response.