

Baffle-Former Bolt NSAL-16-1

John McFadden

Westinghouse

Baffle Bolt Degradation Engineering Issue Manager

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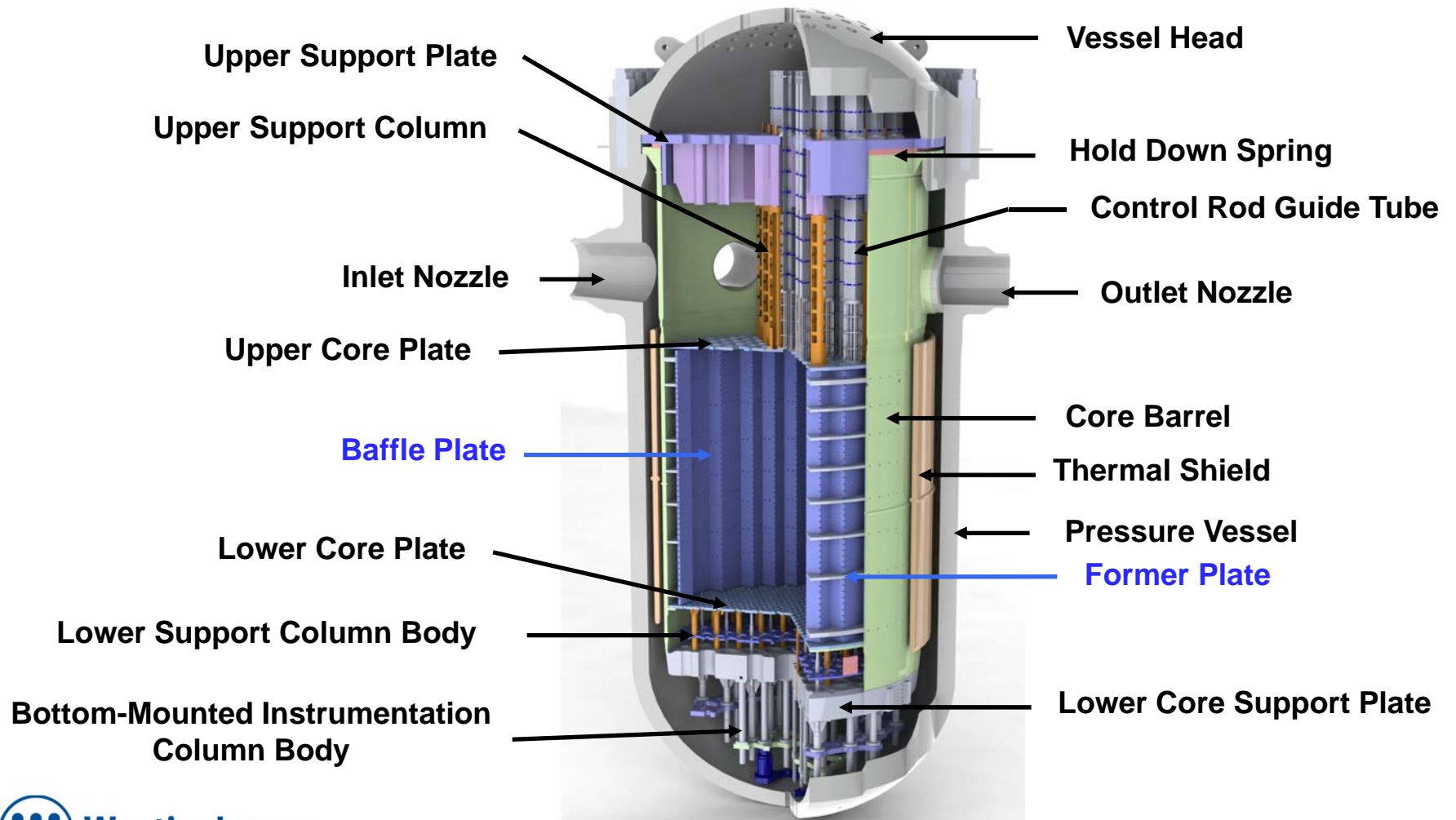


WAAP-9962

Topics

- Westinghouse Tech Bulletin TB-12-5
- Nuclear Safety Advisory Letter NSAL-16-1

Overview of Internals (Westinghouse NSSS)



Westinghouse Technical Bulletin

TB-12-5



Westinghouse Technical Bulletin TB-12-5

- Tech Bulletin TB-12-5 was issued in March 2012 after the Fall 2010 Cook Unit 2 visual findings of damaged baffle-former bolts
- Identified 7 susceptible 4-loop downflow plants being most affected (Cook 1,2; Salem 1,2; Indian Point 2,3; and Diablo Canyon 1)
- Also identified twelve 2- and 3-loop plants with susceptible designs similar to Cook Unit 2 (i.e., downflow design, bolt design, bolt loading)



Conclusions of TB still valid

Nuclear Safety Advisory Letter NSAL-16-1



Nuclear Safety Advisory Letter (NSAL)

- NSAL-16-1 released on July 5
 - Westinghouse 4-loop downflow plants are most susceptible
 - Impact on other CE and Westinghouse plants has been evaluated
- Information in TB-12-5, “Baffle Bolt Degradation in a Westinghouse NSSS Plant with Downflow Reactor Internal Design” remains applicable

Extent of Condition Evaluation

- Affected plants:
 - All Westinghouse designed NSSS plants with baffle-former bolts and CE designed plants with bolted core shrouds are potentially affected by this issue
 - The Westinghouse **AP1000**[®] plant design does not utilize baffle-former bolts and is not affected by this issue
- Factors contributing to degradation:
 - reactor coolant design configuration (upflow vs. downflow)
 - plant internals design and flowrates
 - bolt design
- Affected plants broken down into 4 Tiers



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NSAL Recommendations

- **General Recommendations for all Tiers:**
 - If visually damaged baffle-former bolts or lock bars are detected, it is recommended that the fuel assemblies that were adjacent to the baffle in the previous cycle, and are scheduled for use in the next cycle, be inspected for fretting wear on the face that was adjacent to the baffle
 - It is recommended that the plant continues to follow the current MRP-227 guidelines and implement any revisions to the MRP-227 recommendations

NSAL Recommendations (cont'd.)

- **Tier 1a (4-loop downflow plants with Type 347 bolt design):**
Complete a UT volumetric inspection of the baffle-former bolts at the next scheduled refueling outage
 - In preparation for this inspection, the plant should consider developing an ABPA and be prepared to replace any baffle-former bolts with visible damage or UT indications
 - Long-term mitigation strategies to consider include upflow conversion and preemptive bolt replacements
- **Tier 1b (4-loop downflow plants with Type 316 bolt design):**
Complete a VT3 (visual) inspection of the baffle-former bolts at the next scheduled refueling outage
 - If any visual indications are found, it is recommended that the plant completes a UT volumetric inspection of the baffle-former bolts
 - If no visual indications are found, it is recommended that the plant completes a UT volumetric inspection of the baffle-former bolts prior to the completion of the second refueling outage after the issuance of this NSAL

NSAL Recommendations (cont'd.)

- **Tier 2a, 2b, and 2c (2- and 3-loop downflow plants):**
 - Plants that have previously completed UT inspections should review the inspection records to identify any indication of the onset of clustering before the next scheduled refueling outage
 - Clustering is defined as 3 or more adjacent bolts or a total number of failures in a single baffle plate > 40% of the total number of bolts on that baffle plate
 - Any indication of clustering should result in the consideration of an accelerated re-inspection schedule
- **Tier 3 (Converted upflow plants):**
 - 4-loop plants that have operated in a downflow configuration for more than 20 years should evaluate the need to perform a UT volumetric inspection of baffle-former bolts on an accelerated schedule
 - All other plants should follow the General Recommendations for all Tiers provided on Slide 9
- **Tier 4 (Designed upflow plants):**
 - Follow the General Recommendations for all Tiers provided on Slide 9

