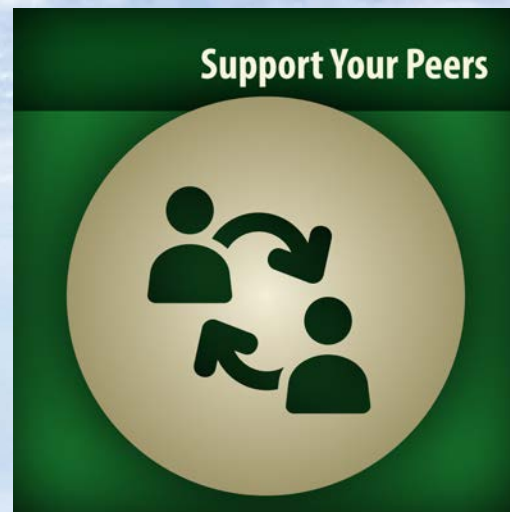


DC Cook Baffle Bolt Inspection and Repair



ISOE Joint Session on NPP Aging ALARA Planning

David W. Miller

DC Cook Radiation Protection Department

American Electric Power

November 8, 2017





Preparations

- Special thanks to the RP staff at Indian Point and Salem for allowing Cook NATC to benchmark and learn from their baffle bolt replacement experience.



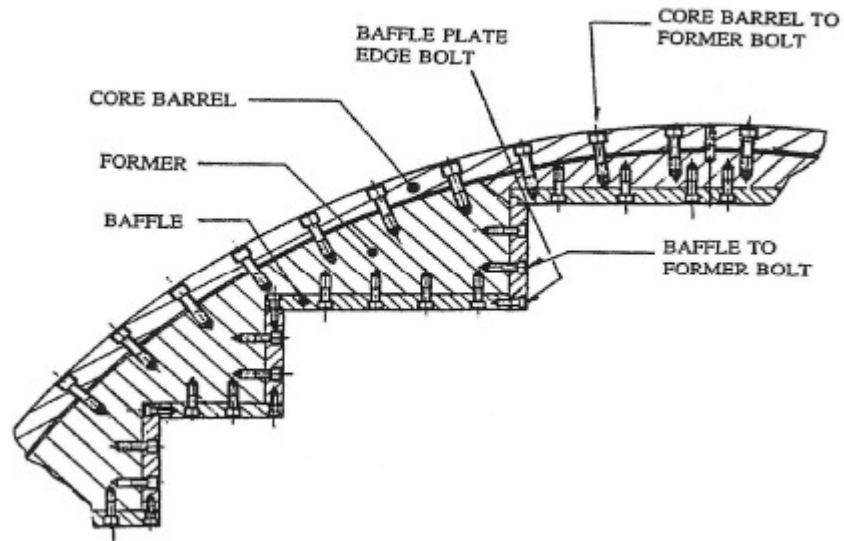


Scope of Issue

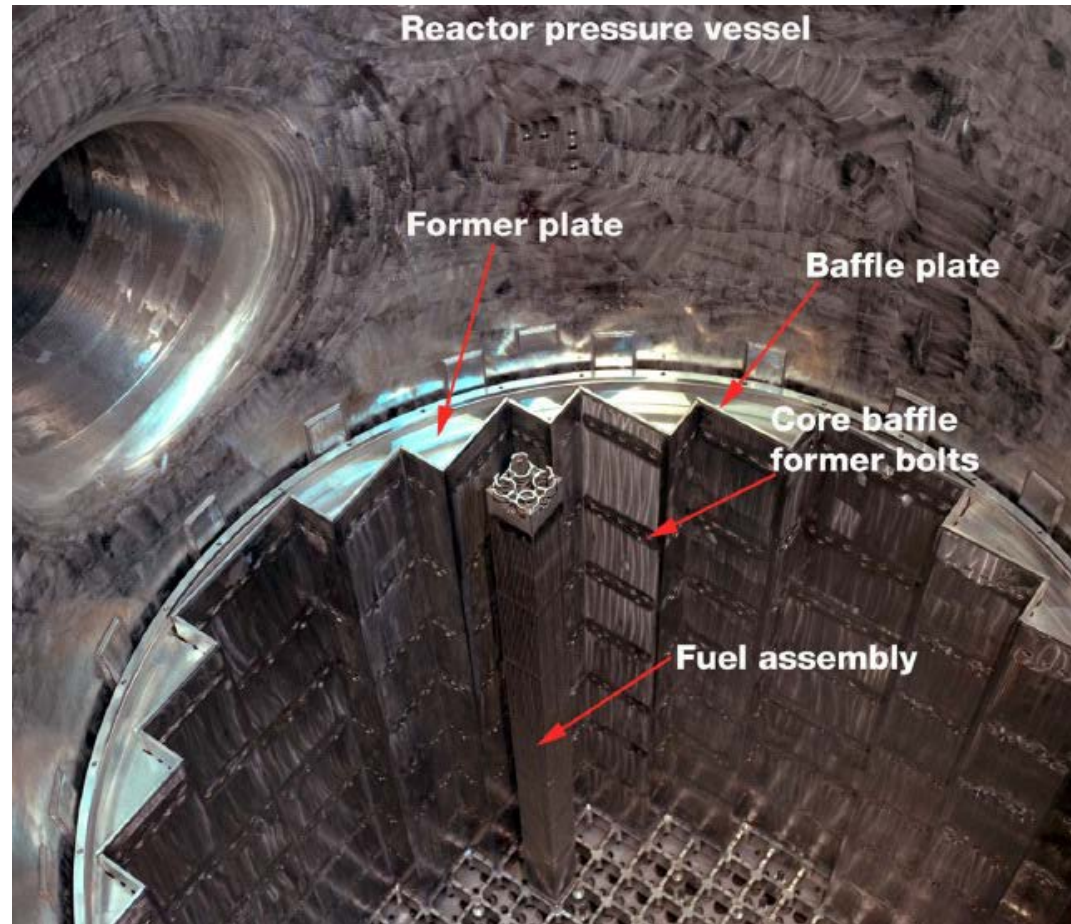
- Baffle bolt degradation was found at the Indian Point and Salem Plants in March and April 2016
- Industry response guidance, endorsed by the US Nuclear Regulatory Commission, issued in 2016 by Westinghouse Reactor Services Group
- Both units of Cook Units 1,2, along with Indian Point 2&3, Salem 1,2, and Diablo Canyon 1 fall into the most **urgent** category of response
- Cook's current strategy is to replace at least 200 bolts during each of the next two refueling outages on each unit. Total population per reactor is about 800 baffle bolts.



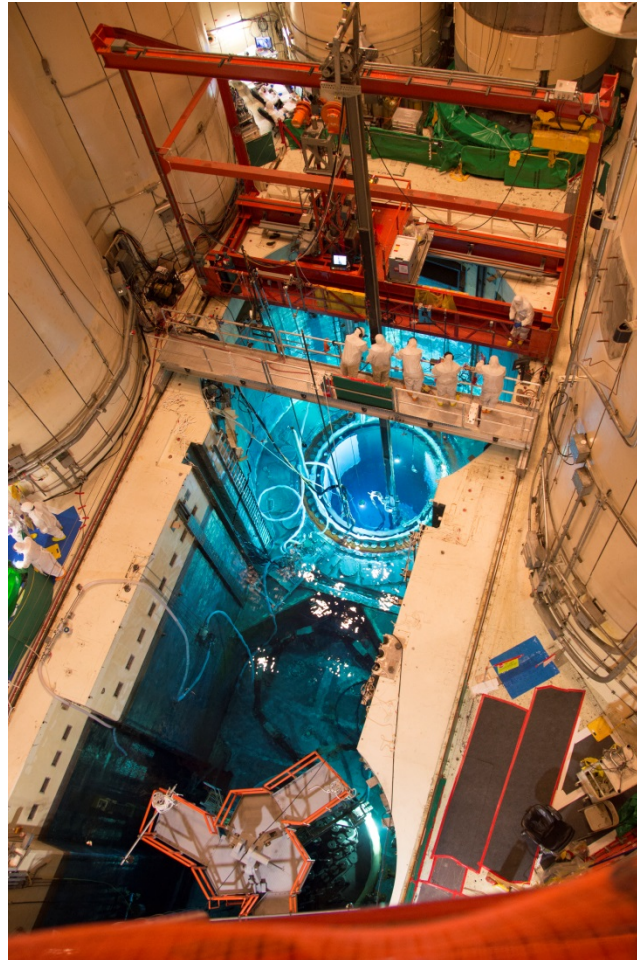
So, What's a Baffle Bolt?



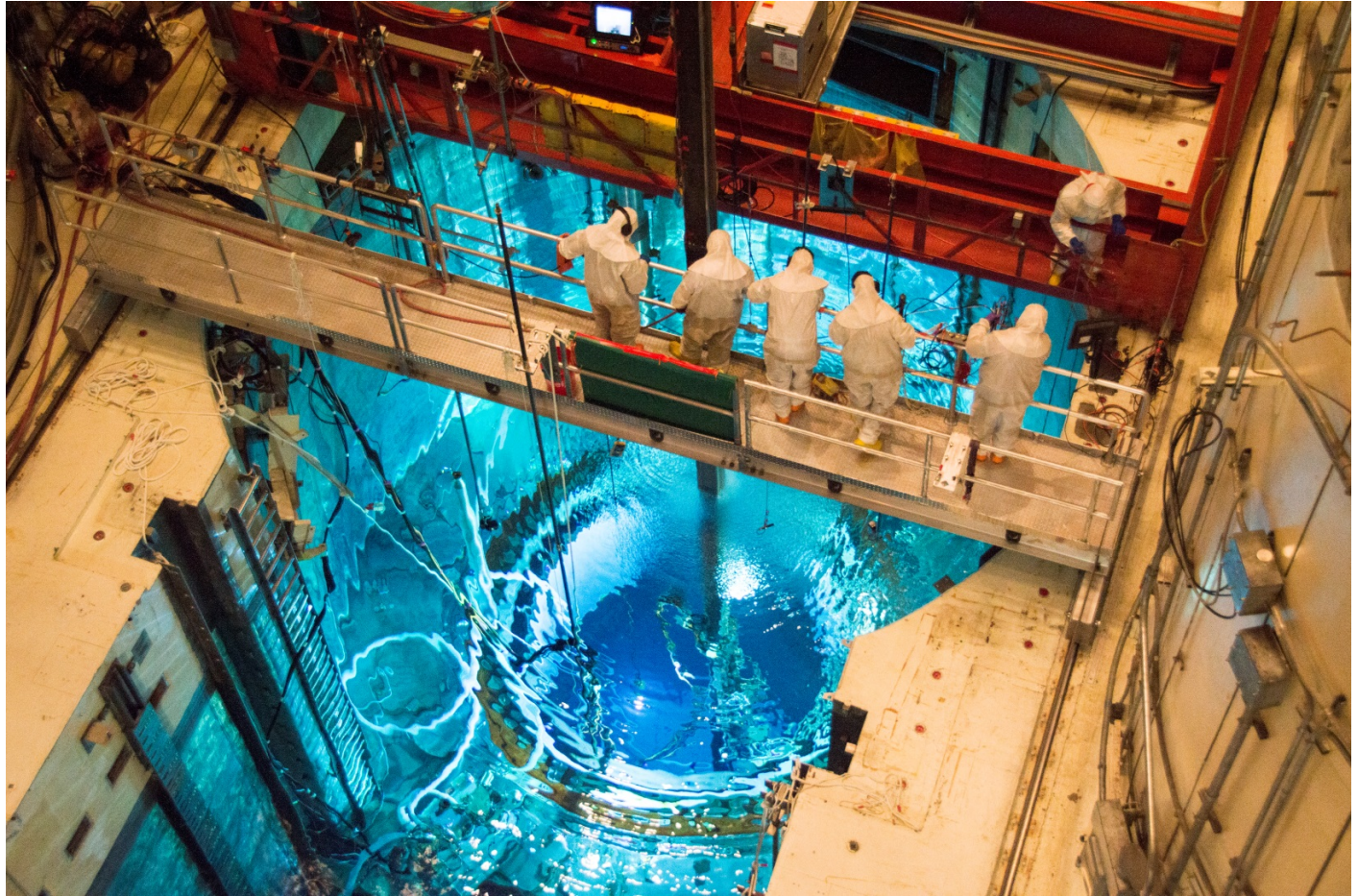
How to put a Square Peg in a Round Hole



Bird's Eye View of Set Up



Männer bei der Arbeit (Men at Work)



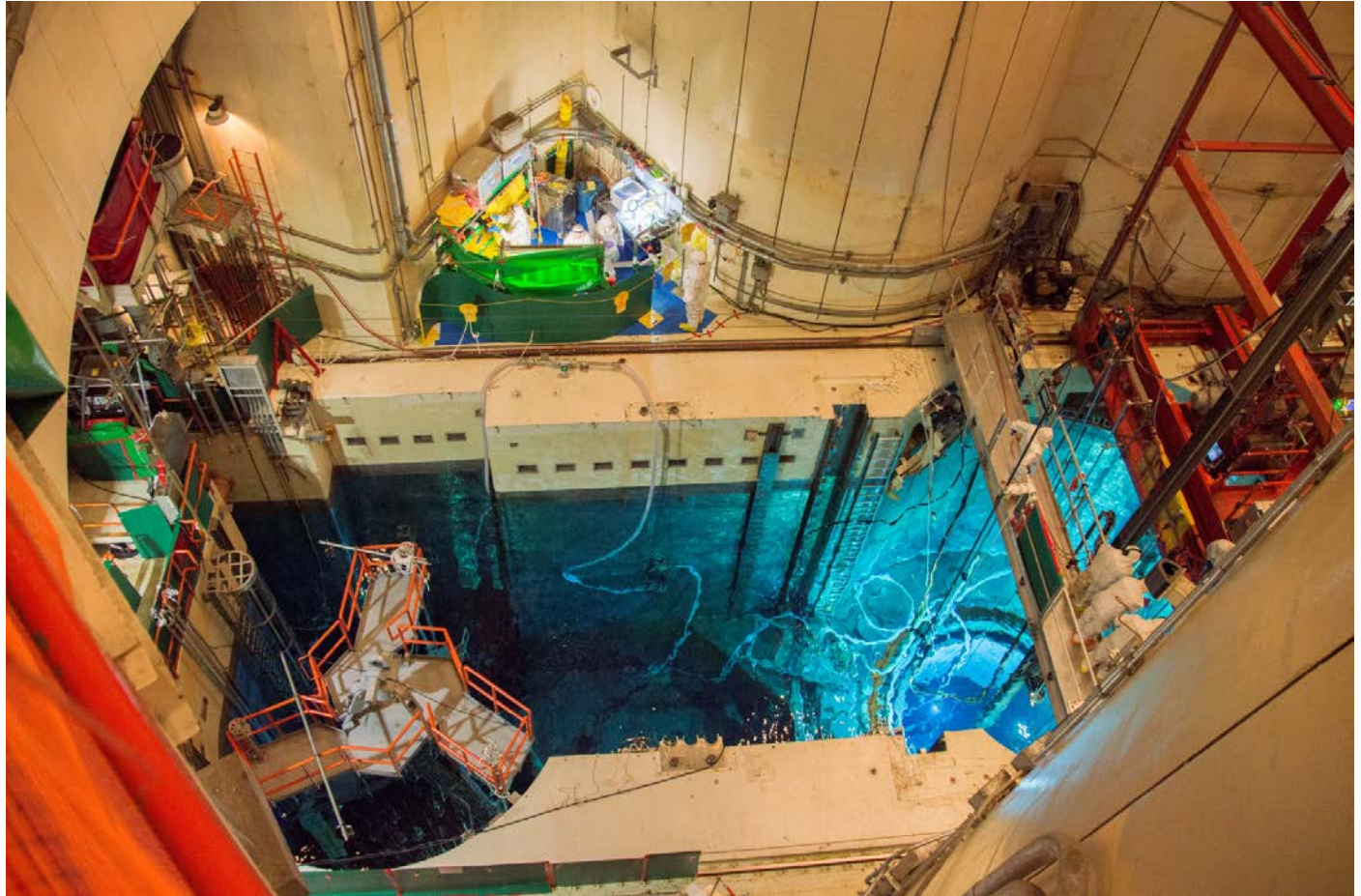
Tool Head Repair Area





EXCELLENCE - by choice

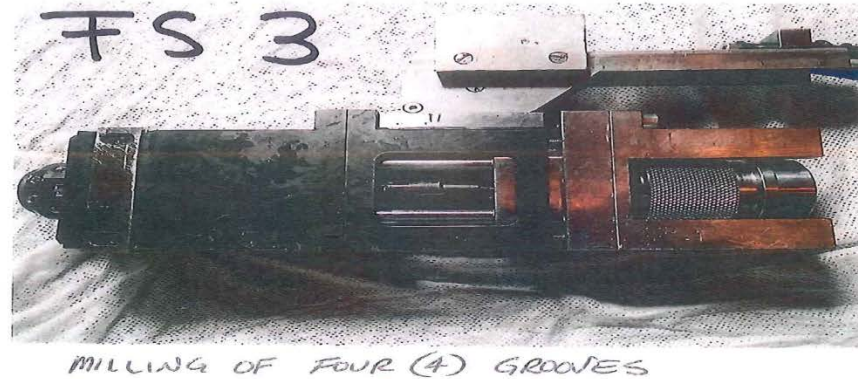
Overhead View of Tool Head Repair Area



Tool Repair



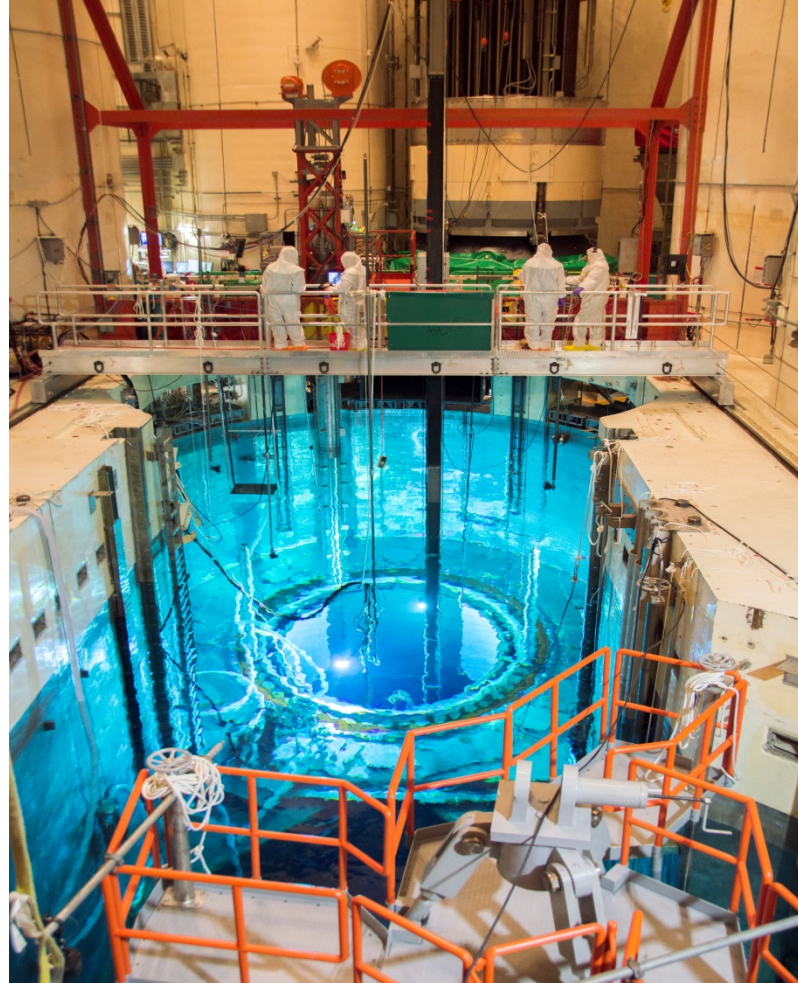
The Usual Suspects



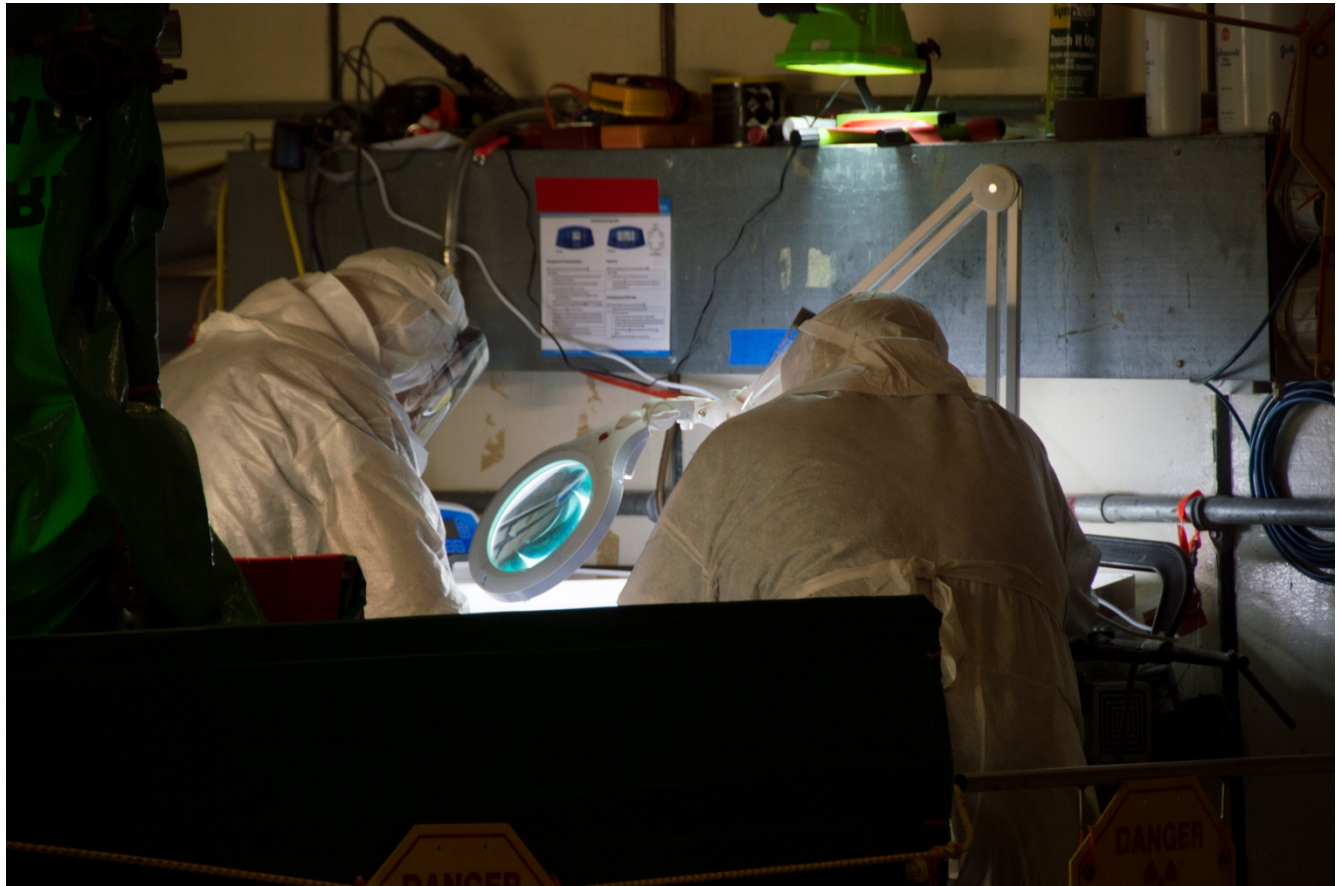
FME Controls



View Looking South



RP Technician Engagement/Innovation





Overall Performance

- 100 percent ECT inspection, 201 bolts replaced
- 12.7 rem vs. 15 rem goal
- One PCE > Level 1
- Zero dose/dose rate alarms
- Extensive planning (to the extent practical)
- Rigorous tool handling/removal process
- JIT training developed (by RPT) and delivered to all personnel supporting baffle bolts





Cook ALARA Experience, con't.

- **Solid ALARA plan with clear hold points and stop work criteria**
- **Five bolts shipped to off-site vendor for failure analysis**
- **Pre-job meeting with vendor to understand potential cultural differences (German vs US NPP work behaviors)**
- **Shiftly pre-job briefs/vendor engagement/teamwork**
- **Dedicated RP support, strong AEP ownership, strong technician ownership and engagement**



Lessons Learned

- **Receipt of material – anticipate potentially higher dose rates and contamination levels**
- **Additional cavity cleanup through SFP demin not necessary**
- **Ensure accountability for tethered tools**
- **Monitor downdraft table and ultrasonic sink to maintain dose rates low**
- **Complete overhaul of FS 3 tool was very beneficial**



ALARA Lessons Learned

- **Demobilization plan needs to be thorough and must be adhered to**
- **If EDM (bolt vaporization) is necessary, ensure capture of all debris and anticipate much higher dose rates on vacuum hoses during demobilization (2010 40 R/hr vs. 2016 200-400 mR/hr)**
- **Utilize a “tool pool” to hydrolaze tools underwater in parallel with other activities**
- **Lifting hook bent when demobilizing core plate FME cover**





Current Status of Cook Unit1

- Unit 1 outage commenced on September 13, 2017
- 95 days planned to accommodate baffle bolt replacement
- 48 batches of baffle bolts to be completed by Westinghouse Services Group
- Westinghouse specialized tooling is key to the projects success
- 100 Cook baffle bolts have been replaced as of November 3
- Expect to be completed in early December



ISOE Initiatives

- Conference Calls monthly on plant life extension and new technology ALARA information exchange
- US HPs are reviewing NATC suggested standardized RWP job titles and subtasks titles for baffle bolts (8th RWP category being standardized)
- Allows better comparison of RWP job dose, manhours, crew size and pre-job ALARA briefings effectiveness
- Goal is to not repeat ALARA lessons learned at another site or another baffle bolt episode at the same site
- Cook 1,2 plant life extension program is funded at \$1 billion dollars over a 5 - 7 year period including Radiation Monitoring System completed replacement with French manufactured system.





Thank You

Merci !

Questions?

