framatome

Baffle Bolt Replacement

Framatome's bolt replacement solution, coupled with our extensive experience, provides proven schedule savings and eliminates inherent foreign material risk associated with traditional machining operations.

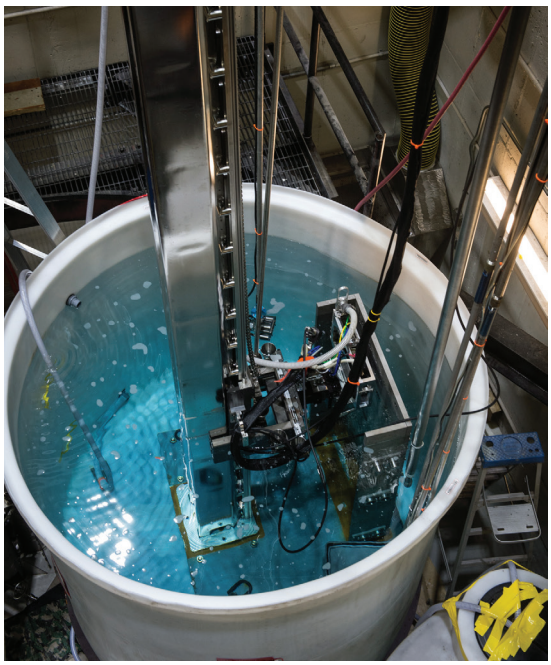
Challenge

As part of the nuclear industry's rigorous attention to safety, nuclear plant equipment is continuously monitored and inspected, and repaired or upgraded where necessary. Among the safety-related components regularly inspected are stainless steel baffle bolts that secure removable liner plates around pressurized water reactor vessels.

Inspections can reveal reactor internals degradation and baffle bolt indications. Recent industry events have shown emergent issues with baffle bolt indications/failed bolts in Westinghouse plants — missing heads, cracked lock bar welds, missing lock bars, etc. Potential impacts include foreign material from loose bolt heads resulting in fuel damage, baffle plate wear on fuel assembly, and extended outage duration, possibly resulting in an uninspected reactor vessel (RV) and a LOCA event risk.

Solution

Framatome offers nuclear plant operators a roadmap for baffle-to-former bolt evaluation that includes risk-based modeling, award-winning inspection capabilities and extensive replacement experience. This allows plant operators to proactively plan examination intervals, replacement patterns and outage duration — all to control costs. Our solution addresses normal bolt removal and installation, broken bolt/shank removal and installation, and broken bolt/oversize threading and bolt installation. Our schedule savings are proven and our electrical discharge machining (EDM) technique eliminates inherent foreign material risk associated with traditional machining operations.



Customer benefits

- Increase production rates from ~12 bolts per day with single mast to 15-20 bolts per day with dual masts
- Optimized bolt design for lower stress concentrations
- Crimp cup locking mechanism — eliminates welding for install
- Mast extension allows replacement with core barrel in vessel
- Compact tool heads do not require hoists for removal
- Improved EDM filter system designed for lower dose and higher water clarity
- Framatome's EDM technology — best approach to eliminate FME concerns and machine highly irradiated baffle bolt material

Our Technology

- Contingency oversized bolt design
- Quick assembly mast system
- Modified EDM tools remove lock bar and machine counterbore for lock cup - all in one operation
- Impact driver reduces number of stuck bolts and decreases removal time
- Custom-designed and fabricated EDM swarf filtration systems
- Modified tool for bolt installation and lock crimping

Replaced Over 8,900 RV Internals Bolts in the U.S. and Europe

Replacement of Baffle & Barrel Bolts in the U.S.

Nuclear Power Plant	Years	Number of Bolts Replaced
Oconee 1,2,3	1980s	288
ANO-1	1980s	216
Rancho Seco	1980s	216
Crystal River	1980s	348
Davis Besse	1980s	348
DC Cook	1990	1
Point Beach 2	1999	176
Ginna	1999	56
Ginna	2011	25
DC Cook	2013	28 Clevis Bolts

Your performance
is **our** everyday **commitment**

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