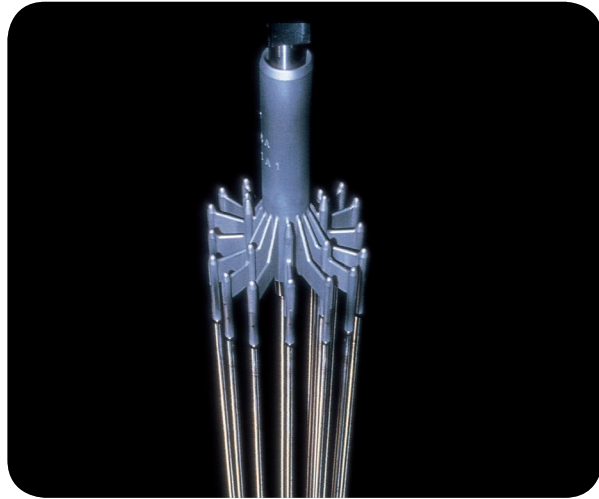


HARMONI™ Rod Cluster Control Assemblies



AREVA's HARMONI™ RCCA has operated in both 15x15 and 17x17 Westinghouse reactors.

AREVA Control Components Deliver Outstanding Performance

For more than 35 years, AREVA has been designing and fabricating control components for pressurized water reactors. Our long-life and wear-resistant designs are well-recognized for their outstanding operating performance in Babcock & Wilcox (B&W), Combustion Engineering (CE) and Westinghouse-type reactors. HARMONI™ replacement rod cluster control assemblies (RCCAs) are fully compatible with Westinghouse fuel and reactor mating components. In addition, AREVA engineering support can help meet utilities' specific requirements.

Ion-Nitride Enhances Resistance to Wear

Laboratory Testing

In the early stages of developing a wear-resistant RCCA, we performed sliding wear tests to determine the best wear treatment. These tests were conducted in the Frotteau Test Loop in France on Ion-Nitride tubes, Chrome Carbide-coated tubes, Armoloy-coated tubes (both 0.3 mils and 0.6 mils thickness) and uncoated stainless steel tubes. The tests confirmed that Ion-Nitride provided the best wear protection for both the RCCA and guide card, extending RCCA life.

Operational Experience

In the United States, AREVA has supplied full complements of HARMONI™ RCCAs to Diablo Canyon Units 1 & 2 (2001–2004), Sequoyah Units 1 & 2 (2002–2004), Turkey Point Units 3 & 4 (2000), Salem Units 1 & 2 (1995 & 1996), McGuire Unit 2, Catawba Units 1 & 2 (1995–1997) and Millstone Unit 3 (2008–2010).

AREVA has supplied over 7,700 HARMONI™ RCCAs operating in 97 reactors in France, Spain, Sweden, the United Kingdom, Belgium, South Korea, China, the United States and South Africa. Over 22,000 RCCA inspections in these reactors have confirmed the superior wear performance of the ion-nitrided cladding when compared to other alternatives.

Innovative Design Prevents Structural Failures

Our basic RCCA for Westinghouse plants features a high-strength, one-piece spider casting and greater clearance between the cladding and absorber in the lower tip region to prevent tip cracking. Proven to operate trouble-free in B&W and Westinghouse reactors, this one-piece design replaces the original brazed spider used in Westinghouse RCCAs.

Easy Transition

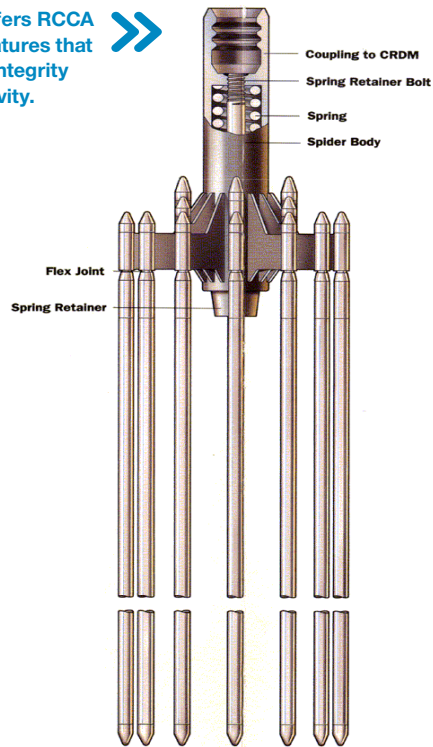
The transition to HARMONI™ RCCAs can be accomplished through a 10CFR50.59 review for which assistance is offered. No interface problems have occurred in the many transitions performed at Westinghouse-type reactors by AREVA.

A majority of the Westinghouse-type reactors around the world are operating with HARMONI™ RCCAs.

Features and Benefits

- The Ion-Nitride surface treatment and longer lower end plugs virtually eliminate wear as the life-limiting phenomenon in RCCAs
- AREVA offers an operational plan with the HARMONI™ RCCAs that will provide extended service life

AREVA offers RCCA design features that increase integrity and longevity. >>



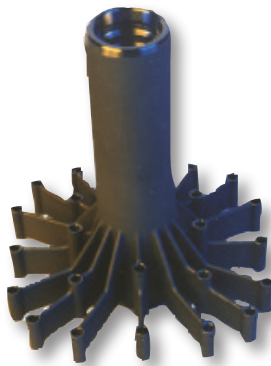
RCCA Technical Improvements

- A flex joint improves rod alignment and reduces drag in guide tubes
- A durable, proven one-piece casting
- An Ion-Nitrided surface treatment provides:
 - Superior wear-resistance
 - Proven performance worldwide
 - The most cost-effective RCCA replacement choice (especially for high-wear plants)
- Longer lower end plugs eliminate cladding wear in the fuel assembly guide tube

AREVA Control Component Manufacturing Experience

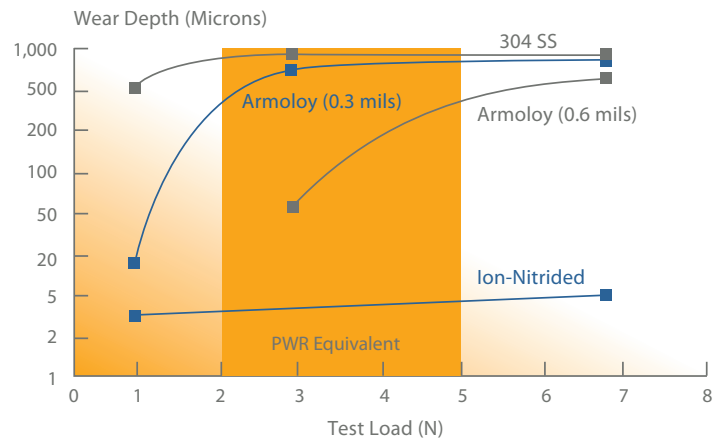
AREVA has built the following designs:

- B&W 15x15 standard
- B&W 15x15 extended life
- CE 14x14 extended life
- Replacement 17x17 hybrid RCCA (Ion-Nitrided)
- Replacement 17x17 Ag-In-Cd RCCA (Ion-Nitrided)
- Replacement 15x15 Ag-In-Cd RCCA (chrome-plated)
- Replacement 15x15 Ag-In-Cd RCCA (Ion-Nitrided)



>> Our casting enables more accurate positioning and elimination of braze failures.

Antiwear Solution Testing Cladding Maximum Wear Depth



>> Wear testing results: Ion-Nitrided cladding shows significantly less wear than Armoloy (Chrome).

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