

# Flux Thimble Thermocouple Assemblies

U.S. nuclear utilities with moveable in-core monitoring systems need leak-free core temperature monitoring for safe and reliable operations. AREVA's Flux Thimble Thermocouple Assemblies feature proven seal and connector design improvements that translate into improved safety and lower costs for plant operators.

## High Reliability and Less Maintenance

The high reliability of the redesigned Hi/Lo seals:

- Reduces the time required to establish low pressure sealing during refueling
- Reduces radiation exposure
- Reduces potential for leaks at the seal

Other improvements include reducing the potential for thermocouple failure by:

- Firmly connecting the inner and outer tubes together in the upper seal structural body. This connection protects the thermocouples from shear forces between the tubes, which are generated during insertion and withdrawal.
- Encasing the thermocouple leads in tough, overlapping, environmentally-qualified, shrink-wrap tubing. This tubing provides protection against damage due to small radius bending.

## Flux Thimble Thermocouple Assembly

The Flux Thimble Thermocouple Assembly integrates core exit thermocouples with the thimble tubes used in the moveable in-core monitoring system. The Type-K thermocouples are located between two Inconel 600 tubes.

While the outer tube is designed to withstand system pressure and provides the first pressure boundary to the reactor coolant, the thicker inner tube provides the pressure boundary of record, meeting ASME over-pressure design margin requirements.



## High Quality Manufacturing

AREVA is a global leader in the design and manufacturing of high technology systems. AREVA manufactures the Flux Thimble Thermocouple assemblies at AREVA's Solution Complex, located at Mt. Athos Road in Lynchburg, Va. The Flux Thimble Thermocouple assemblies are similar in design and require similar fabrication techniques to AREVA's Incore Detector Assemblies (ICDA). Since its initial supply of ICDA's in 1972, AREVA has fabricated and delivered more than 3,000 incore detector assemblies.

## Features and Benefits

- Proven connector and seal redesign to improve reliability and reduce maintenance
- Lower costs and reduced radiation exposure for maintenance personnel
- High quality manufacturing in the AREVA Solutions Complex in Lynchburg, Va.
- Meets ASME over-pressure design margin requirements



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