The Westinghouse Sigma Reactor Coolant Pump Seal provides reliable performance and costs savings to support safe and long-term plant operation.

What is the Sigma Reactor Coolant Pump Seal?

The Sigma seal was developed from 30-plus years of positive operating experience and lessons learned with original #1 seal design, state-of-the-art design methods, and a complementary full-scale testing facility to create a fit, form and functional replacement seal that meets the demands of today’s PWR fleet.

The seal design integrates seamlessly into the existing plant equipment and is compatible with the Westinghouse SHIELD® Passive Thermal Shutdown Seal resulting in a comprehensive and cost-effective sealing solution that provides unprecedented reliability and service life with integrated passive safety features.

The Sigma seal includes a hydrostatic number 1 double-delta channel seal (DDCS) that offers stable leakage between 2.5 and 3.5 GPM and integrates design features that offer*:

- 400 times reduction in DDCS wear
- 40% improvement in performance predictability
- 60% reduction in thermal sensitivity
- 50% reduction in failure modes
- 20% reduction in sensitivity to particle depositions

Benefits

- Reduces seal maintenance costs
- Decreases refueling outage dose
- Eliminates seal installation issues
- Prevents plant start-up delays attributed to low-pressure operation and seal hang-ups
- Reduces probability of a forced outage due to seal performance
- 20,000 hours of development, functional and qualification testing:
  - Full-scale dynamic endurance (4,000 hours)
  - Station Blackout
  - Fire Scenario (NFPA 805, Appendix R)
  - Safety injection restarts (cold water injection)
  - Tribological sensitivity and wear testing

Availability

The Sigma number 1 seal will be available starting in fall 2018.

*Based on industry statistics of current and previous seal designs