

# Engineered Leak Rate No. 1 Seal for Reactor Coolant Pumps

## Background

Reactor coolant pump (RCP) control leak-off seal performance is heavily influenced by a variety of plant and environmental conditions that can directly impact the RCP seal leak-off rate, the dominant variable used to evaluate seal performance. Unplanned forced outages or an extension of an outage can result if leak-off rates approach their lower or higher operating limits.

As a result, Westinghouse has introduced the engineered leak rate (ELR™) No. 1 seal for RCPs. The ELR™ No. 1 seal provides a customized seal leak-off rate to compensate for the variety of uncontrolled parameters that can impact seal leak-off performance.

## Description

The ELR™ No. 1 seal for RCPs is designed to provide Westinghouse customers with No. 1 RCP seal leak rates tailored to the current plant-specific design conditions, or seal response data to customer-specific transient conditions.

The ELR™ No. 1 seal program utilizes the Westinghouse No. 1 RCP seal test loop, which is designed to simulate customer-specified plant conditions. This enables Westinghouse to monitor that the ELR™ No. 1 seals provided are meeting customer expectations.

Parameters such as temperature, pressure and shaft rotation can be manipulated to simulate a wide variety of plant-specific conditions. The ELR™ No. 1 seal response is monitored and recorded while the inlet conditions are changed during the test.

Based on the customer-supplied plant-specific criteria, Westinghouse can design and manufacture a new seal ring and runner set. This custom seal set will be tested in accordance with Westinghouse specifications for production seals.

The following is a list of the standard tests that would be completed:

- Static and dynamic cold low pressure
- Dynamic cold high pressure
- Thermal performance response
- Pressure hysteresis performance response
- Cooldown and cold testing

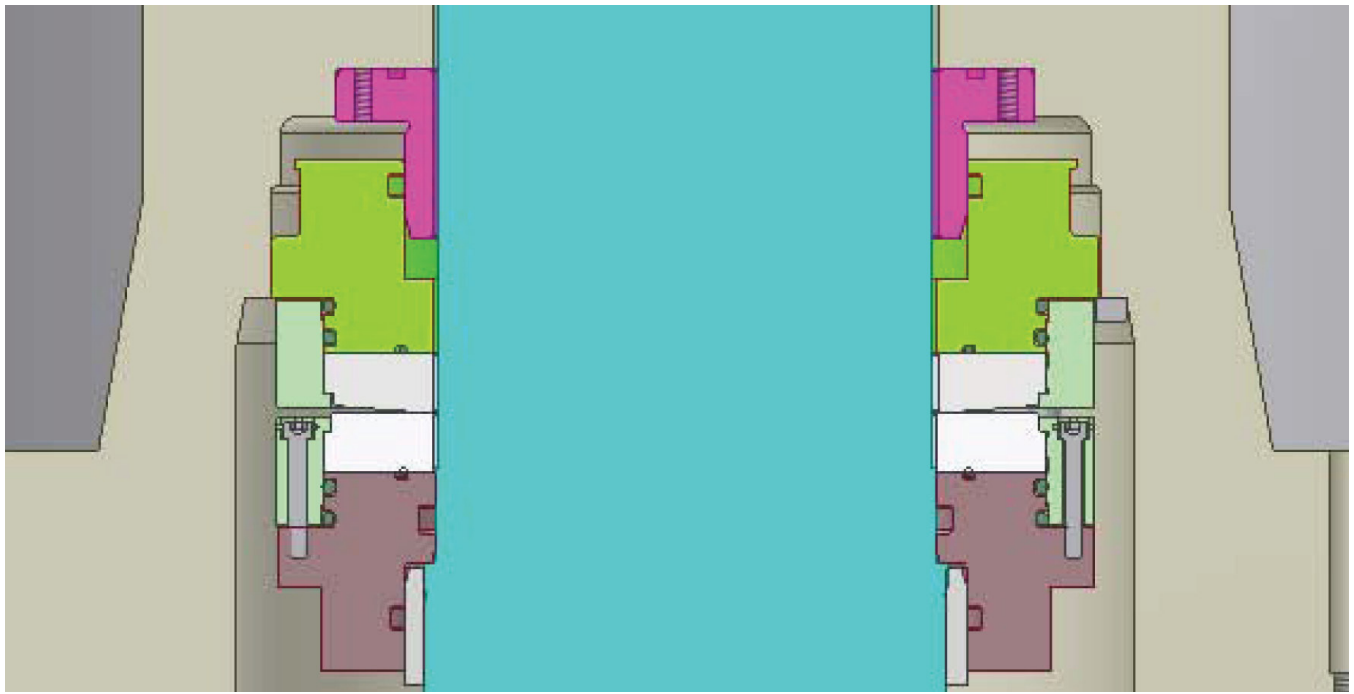
In addition, customer-specified tests can be performed as mutually agreed upon.

Westinghouse can also test existing clean (non-contaminated) spare No. 1 RCP seals. The spare ring and runner set can be returned to Westinghouse and modified to meet customer-specified engineered leak rate and testing parameters.

## Benefits

The ELR™ No. 1 seal program provides significant benefits in a number of areas by addressing current plant-specific conditions, including the following:

- Changes to plant configurations that result in temperature changes to seals
- Operator response times based on No. 1 seal leakage
- Long-term effects of particle deposition
- Reduced number of forced unplanned outages, SCRAM and extended outages



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