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Docket Number 99902037
Project 694

May 25, 2022

OG-22-99

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: **Successful Post-Operational Test of the Generation III[®] Passive Thermal Shutdown Seal**

References:

1. PWROG-14001-P-A, Revision 1, "PRA Model for the Generation III Westinghouse Shutdown Seal," November 5, 2017.
2. LTR-NRC-15-78, Revision 0, Submittal of "Successful Post-Operational Testing of the Generation III SHIELD[®] Passive Thermal Shutdown Seal," October 13, 2015.

This letter discusses the successful post-operational Shutdown Seal (SDS) actuation test that was performed on a Reactor Coolant Pump (RCP) Model 93A SDS that was removed from D.C. Cook after 5 fuel cycles (approximately 7.5 years) of operation.

This test satisfies the first post-operational test that is discussed in Limitation and Condition Number 7 in the NRC Final Safety Evaluation contained in Reference 1, which states:

"The PWROG shall perform a minimum of two additional post-operational tests in which one of the post-operational tests shall be performed no later than 2020 for a Generation III[®] SDS assembly that has experienced approximately four years of operation..."

The test and test acceptance criteria for a post-operational SDS actuation test is discussed in Reference 2, which states:

- (1) "The testing shall be performed in the static tester at the Westinghouse Science and Technology Center in a configuration comparable to what was used for the qualification testing, and

- (2) The test shall have the following acceptance criteria:
- a. Actuation shall be passively initiated by rising seal leak-off temperature,
 - b. Actuation shall occur between 260°F and 320°F,
 - c. After actuation, leakage shall be reduced to below 1 gallon per minute.”

This post-operational test was completed at the Westinghouse Science and Technology Center in Churchill, Pennsylvania on April 13, 2022. The SDS was removed from a reactor coolant pump in D.C. Cook Unit 1 after operating from October 2014 to April 2022. The SDS was installed in a special test machine designed to replicate the configuration and operating conditions inside the seal package of the reactor coolant pump.

During the test, the temperature was programmed to increase until actuation of the SDS was achieved. When the water temperature reached 275°F, the SDS successfully actuated, and the leakage rate dropped to less than 0.04 gallons per minute, when the inlet pressure increased to approximately 2250 psig. After actuation, the sealed condition was maintained for 10 minutes to demonstrate that a consistent, stable, and low level of leakage was maintained. The test was then terminated. The temperature and leak rate profiles obtained during the test are provided in Figure 1.

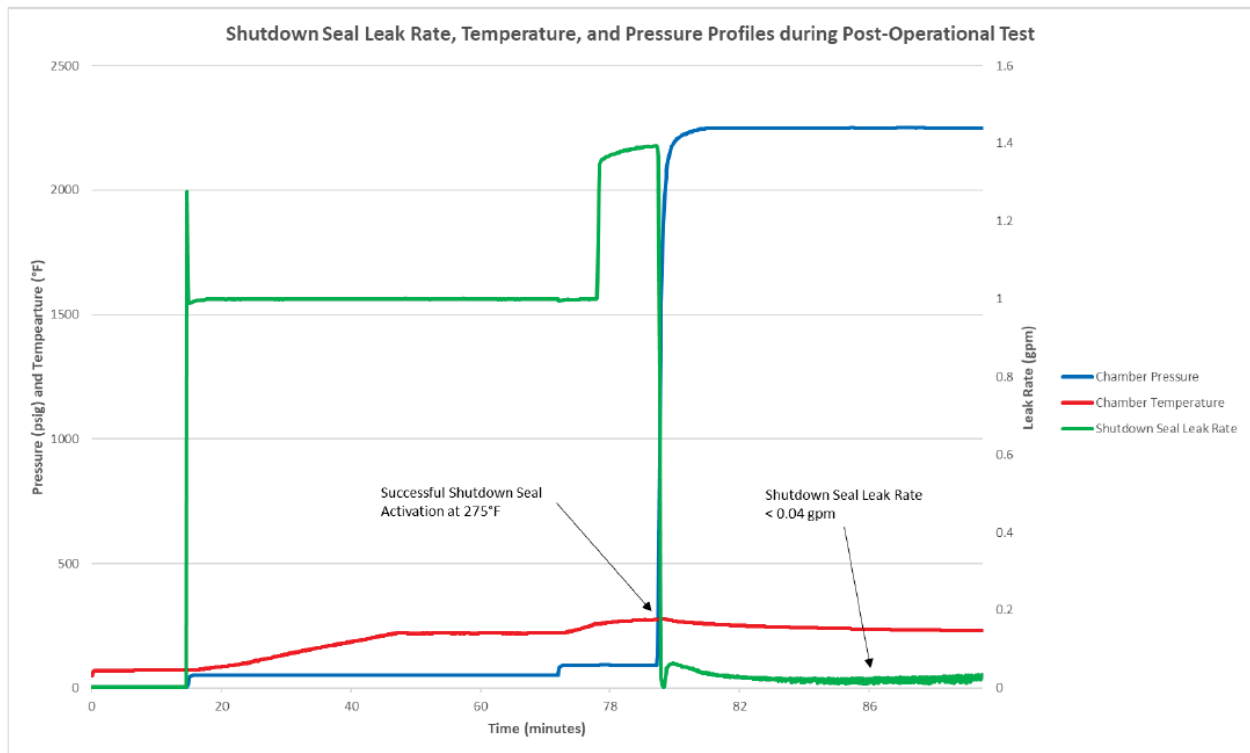


Figure 1: Shutdown Seal Leak Rate and Temperature, and Pressure Profiles during Post-Operational Test

The SDS performance during the post-operational test was consistent with its design function and met all of the applicable acceptance criteria, which are:

- (1) the actuation was passively initiated by the increasing water temperature,
- (2) the actuation temperature of 275°F is within the acceptable design temperature range of 260°F to 320°F, and
- (3) the post-actuation leakage of <0.04 gallons per minute is significantly less than the maximum allowable leakage of 1 gallon per minute.

Therefore, the post-operational test was successful.

If you have any questions, please do not hesitate to contact me at (602) 999-2080 or Mr. Thomas Laubham, Acting Executive Director of the PWR Owners Group, Program Management Office at (412) 374-6788.

Sincerely yours,



Michael Powell
Chairman and COO
PWR Owners Group

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