

CALVERT CLIFFS

SG replacement complete; RV head changeout next

A refueling outage and steam generator changeout at Calvert Cliffs-2 was completed on April 22 after 66 days, 32 days ahead of schedule. The effort set a world record for quickest steam generator replacement, according to plant operator Constellation Nuclear. In addition, the outage was completed in 58 fewer days than a similar outage completed at Calvert Cliffs-1 in 2002.

Constellation spokeswoman Elleen Kane said her research indicated that the previous record for the replacement of two steam generators, using the two-piece replacement process, was 68 days, shared by Dominion Generation's North Anna-2, in Mineral, Va., and Almaraz-Trillo NPP AIE's Almaraz-2, in Spain.

The two-piece process consisted of refurbishment of the steam generator's upper portion and replacement of the lower portion. The two portions are then welded back together. (For an in-depth look at the use of steam generator modeling during the Calvert Cliffs-2 outage, see *NV*, Apr. 2003, p. 36.)

Kane said that Calvert Cliffs was believed to be the only nuclear power plant in the world to complete welding with zero rejectable indications shown in radiography testing (RT) on the steam generator girth and on the reactor coolant system's hot and cold legs. With zero rejectable RT indications, there were no weld repairs required in these locations, cutting outage duration time.

The most significant welds, done on the steam generator girths in just slightly more than eight days, covered 52 feet in circumference per steam generator. Each girth weld required 2200 lb of weld material.

During the outage, Calvert Cliffs-2 also inspected the reactor vessel head, including all nozzles. A bare metal visual inspection and ultrasonic testing showed the head to be in good condition, with no indication of cracking or boric acid damage. Kane said that Calvert Cliffs was one of the first nuclear plants to inspect its reactor vessel head after the Nuclear Regulatory Commission issued an inspection order February 11.

In addition to normal refueling activities, Calvert Cliffs employees and more than 1000 contractor personnel replaced Unit 2's two main step-up transformers, modified fuel assemblies, and conducted routine maintenance work on the unit's secondary systems, including the turbine and intake structure.

The Calvert Cliffs plant, in Lusby, Md., has a pair of 825-MWe (net) Combustion Engineering pressurized water reactors. Unit 1



The Calvert Cliffs-2 reactor vessel head was inspected using bare metal visual inspection and ultrasonic testing as required by the Nuclear Regulatory Commission. Inspection results indicated the head to be in "excellent condition," according to Constellation.



Contract welder Errol Corbin, one of dozens of welders working on the project, practices welding techniques on a girth weld mock-up.



Calvert Cliffs-2's original steam generator lower assembly moves to a secure onsite location for storage.

started commercial operation in May 1975 and Unit 2 in April 1977.

■ Constellation will be spending \$93 million to replace the reactor vessel heads at Calvert Cliffs, even though both units had issue-free inspections during their most recent outages, according to Kane. Unit 1's replacement will occur in 2006 and Unit 2's a year later.

The cost for the project will include the improved design of the new heads plus head internals and other components, Kane said.

The existing vessel heads are the original ones from the mid-1970s, when both units at Calvert Cliffs started commercial operation. Kane said both Calvert Cliffs units are currently ranked in the Nuclear Regulatory Commission's high-susceptibility category for reactor heads with regard to head degradation. (The NRC has created a grading chart to rank each U.S. PWR vessel head's susceptibility to degradation. The units are placed into one of three categories—low, medium, or high—as determined by a combination of factors, including operating time and temperature.)

Kane called the planned head replacements a "prudent business decision," in that Constellation received license-renewal approval from the NRC in March 2000 to extend the operating lives of the two Calvert Cliffs units by another 20 years. ■