UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, DC 20555-0001

October 25, 2010

NRC INFORMATION NOTICE 2010-22: FUEL ASSEMBLIES DAMAGED DURING REFUELING OPERATIONS DUE TO MISALIGNMENT

ADDRESSEES

All holders of an operating license or construction permit for a pressurized-water nuclear power reactor issued under Title 10 of the *Code of Federal Regulations,* Part 50, "Domestic Licensing of Production and Utilization Facilities," except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

PURPOSE

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice (IN) to inform addressees of an event at a domestic pressurized-water reactor plant that resulted in damage to fuel assemblies during a refueling outage because of inadequate verification of core alignment. The NRC expects recipients to review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. The suggestions that appear in this IN are not NRC requirements; therefore, no specific action or written response is required.

DESCRIPTION OF CIRCUMSTANCES

On November 2, 2009, the Oconee Nuclear Station, Unit 1 (a Babcock & Wilcox Co. pressurized-water reactor), was unable to couple a control rod drive mechanism to its associated control rod assembly during reactor vessel reassembly. The licensee subsequently disassembled the reactor vessel head and upper internals and discovered that multiple fuel assemblies were damaged during reactor vessel reassembly and that these damaged fuel assemblies were interfering with proper control rod coupling. The damage to one fuel assembly resulted in bowed fuel pins and the detachment of pieces of multiple grid straps. The licensee had to use a specially constructed tool to remove this fuel assembly from the reactor and place it in the spent fuel pool. Other assemblies had minor damage mostly limited to the upper end fittings.

A post event examination of the fuel alignment video revealed that the gap between the inner wall of the baffle and an adjacent fuel assembly was larger than that allowed by the vendor specifications. The licensee's fuel alignment verification procedure was not in accordance with current vendor guidance; specifically, it did not include the maximum allowed gap value. The procedure called solely for a qualitative evaluation to determine the existence of gaps and provided a maximum number of gaps allowed. In accordance with this procedure, the licensee determined that it met the acceptance criteria for fuel alignment and continued with vessel reassembly. Because the licensee proceeded with a larger than allowed gap, the fuel assembly

upper end fitting and reactor vessel plenum grid pads could not properly align. The weight of the plenum rested on the upper end fitting tabs and deformed the fuel assemblies.

Additional information is available in the NRC inspection report, "Oconee Nuclear Station—Integrated Inspection Report 05000269/2009005, 05000270/2009005, 05000287/2009005," dated January 28, 2010 (Agencywide Documents Access and Management System, Accession No. ML100280909).

DISCUSSION

Deformations in fuel assembly geometry can undermine the integrity of the fuel cladding, which is one of the primary barriers to fission product release. Also, deformed fuel assemblies could affect reactivity control if they cause control rods to become stuck during reactor operations. Furthermore, industry operating experience has shown that deformed fuel assemblies can become stuck within the reactor upper internals without the licensee's knowledge. Unknowingly lifting fuel assemblies that have become stuck to upper internals or upper guide structures presents a risk of dropping the fuel assembly and the associated risk of fission product release should a fuel rod be breached.

The importance of verifying adequate core alignment and avoiding misalignments between fuel and reactor internals is evident and necessitates special preparation and consideration on behalf of licensees. Before verifying core alignment, licensees should consider reviewing and applying related operating experience and verifying that their procedures and methods are in agreement with the latest fuel vendor guidance.

CONTACT

This IN requires no specific action or written response. Please direct any questions about this matter to the technical contacts listed below or to the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

/RA/

Timothy J. McGinty, Director
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