Review of Responses to NRC Bulletin 2003-02-Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity

Cracking in pressurized water reactor (PWR) bottom mounted instrumentation (BMI) fabricated from Alloy 600 base material was first identified at the South Texas Project, (STP) Unit 1 plant in the United States (US). Based on the failure analysis of the BMI, the licensee concluded that the cracking was due to primary water stress corrosion cracking (PWSCC). PWSCC has been identified as the primary degradation mechanism affecting PWR high nickel alloy nozzles and welds (e.g., Alloy 600 tubing, piping, or forging material, and Alloy 82/182 weld material) in the reactor coolant system. To address these concerns, the Nuclear Regulatory Commission (NRC) issued NRC Bulletin 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity, on August 21, 2003, to all holders of operating licenses for PWRs. The purpose of the bulletin was to request information from the industry related to the structural integrity of the reactor pressure vessel BMI nozzles at PWR facilities. This report summarizes the NRC staffs review of licensee responses to the Bulletin, licensees BMI inspection results, industry activities related to BMI inspections, and the staffs conclusions regarding the need for additional regulatory action in this area. A brief summary regarding the inspection results of the BMI penetrations and the associated aging monitoring programs for the foreign reactors is included in this report.

Source Edition

Catawba, Unit 1, Response to Nuclear Regulatory - NRC LOWER HEAD PENETRATIONS AND REACTOR COOLANT PRESSURE Bulletin 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and. Reactor Coolant Pressure Boundary Integrity, to the industry. Based on its review of TVAs responses to NRC Bulletin 2003-02, the NRC **4/8/05, Braidwood Station, Unit 1 - Response to Nuclear - NRC** Bulletin 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and. Reactor Coolant Pressure Boundary Integrity, to the industry. integrity of the RPV lower head penetrations. Based on its review of I&Ms responses to NRC Bulletin 2003-02, the NRC staff finds that I&M has met **Review of Responses to NRC Bulletin 2003-02-Leakage from** LOWER HEAD PENETRATIONS AND REACTOR COOLANT PRESSURE Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant. Pressure Boundary Integrity, to the industry. Based on its review of TVAs responses to NRC Bulletin 2003-02, the NRC staff finds that TVA. **09/30/05 - NRC Leakage from Reactor Pressure Vessel Lower Head - NRC** 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor. Coolant Pressure Boundary Integrity, to the industry. that will be performed to verify the integrity of the RPV lower head penetrations. Based on its review of NMCs reponses to NRC Bulletin 2003-02, the NRC **Salem Nuclear Units 1 and 2-Response to Nuclear - NRC** 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity, on August 21, 2003, to all **Catawba, Unit 1, Response to Nuclear Regulatory - NRC** Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant. Pressure Boundary Integrity, to the industry. supplemented with bare-metal visual inspections in order to detect reactor coolant pressure Based on its review of Entergys responses to NRC Bulletin 2003-02, the **none** 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor. Coolant Pressure Boundary Integrity, to the industry. that will be performed to verify the integrity of the RPV lower head penetrations. Based on its review of NMCs reponses to NRC Bulletin 2003-02, the NRC **Review of Responses to Nrc Bulletin 2003-02-leakage from Reactor** Responses to NRC Bulletin 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Reactor Coolant Pressure Boundary Integrity: Nureg-1863 book reviews & author details **Donald C. Cook, Unit 2 - Response to NRC Bulletin 2003-02** REACTOR COOLANT PRESSURE BOUNDARY INTERGRITY. (TAC NO. Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant. Pressure Boundary Integrity, to the industry. Based on its review of Dukes responses to NRC Bulletin 2003-02, the NRC staff finds that. **Leakage from Reactor Pressure Vessel Lower Head - NRC** Bulletin 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and. Reactor Coolant Pressure Boundary Integrity, to the industry. examination on all 58 RPV lower head penetrations. Based on its review of PSEGs responses to NRC Bulletin 2003-02, the NRC staff finds that. **Response to NRC Bulletin 2003-02, Leakage from Reactor** Reactor pressure vessels are thick steel containers that hold nuclear fuel when the reactors . The NRC reviewed the industrys responses On August 21, 2003, the NRC issued NRC Bulletin 2003-02, Leakage from Reactor Pressure. Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity, in **Sequoyah, Unit 1, Response to NRC Bulletin 2003-02, Leakage** Bulletin 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and. Reactor Coolant Pressure Boundary Integrity, to the industry. This Bulletin informed lower head wastage observed. Based on its review of AmerGens responses to NRC Bulletin 2003-02, the NRC staff finds that. **Review of Responses to NRC Bulletin 2003-02-Leakage from** Bulletin 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and. Reactor Coolant Pressure Boundary Integrity, to the industry. RPV lower head during the next refueling outage (Unit 1 twelfth refueling Based on its review of PG&Es responses to NRC Bulletin 2003-02, the NRC **Initial Response - NRC** Bulletin 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and. Reactor Coolant Pressure Boundary Integrity, to the industry. examination of all 50 RPV lower head penetrations during the Fall 2003 The NRC staff has completed its review of VEPCOs responses to NRC **Watts Bar, Unit 1, Response to NRC Bulletin 2003-02, Leakage** Review of Responses to NRC Bulletin 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary and Reactor Coolant Pressure Boundary Integrity, on August 21, 2003, to all **Surry, Unit 2 - Response to NRC Bulletin 2003-02, Leakage from** Review of Responses to NRC Bulletin 2003-02-Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary **NRC: Backgrounder on Reactor Pressure Vessel Issues** AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY Reactor Pressure Vessel (RPV) lower head penetration inspection Read Review of Responses to Nrc Bulletin 2003-02-leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure

Boundary **Sequoyah, Unit 2 - Response to NRC Bulletin 2003-02, Leakage** AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY Reactor Pressure Vessel (RPV) lower head penetration inspection **Buy Review of Responses to NRC Bulletin 2003-02, Leakage from** SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION - RESPONSE TO NRC Bulletin 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and. Reactor Coolant Pressure Boundary Integrity, to the industry. bare-metal visual examination of each RPV lower head penetration **N. Anna, Unit 2 - Bulletin 2003-02 Response. - NRC Diablo Canyon, Unit 1 - Response to NRC Bulletin 2003-02** Bulletin 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and. Reactor Coolant Pressure Boundary Integrity, to the industry. developing criteria for RPV lower head penetration inspections. Based on its review of Dukes responses to NRC Bulletin 2003-02, the NRC staff finds **Leakage from Reactor Pressure Vessel Lower Head - NRC** Boundary Integrity. On August 21, 2003, the NRC issued NRC Bulletin 2003-02, Leakage from Reactor Pressure. Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity. This bulletin requires the **Prairie Island, Unit 2 - Response to NRC Bulletin 2003-02, Leakage** LOWER HEAD PENETRATIONS AND REACTOR COOLANT PRESSURE Bulletin 2003-02, Leakage from Reactor Pressure Vessel Lower Head Penetrations and. Reactor Coolant Pressure Boundary Integrity, to the industry. The NRC staff has completed its review of TVAs responses to NRC Bulletin