June 5, 2006

Mr. Gary Van Middlesworth
Site Vice-President
Duane Arnold Energy Center
3277 DAEC Road
Palo, IA 52324

SUBJECT: DUANE ARNOLD ENERGY CENTER
NRC COMPONENT DESIGN BASES INSPECTION (CDBI)
INSPECTION REPORT 05000331/2006007(DRS)

Dear Mr. Van Middlesworth:

On April 21, 2006, the U.S. Nuclear Regulatory Commission (NRC) completed a baseline inspection at your Duane Arnold Energy Center. The enclosed report documents the inspection findings which were discussed on April 21, 2006, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety, and to compliance with the Commission's rules and regulations, and with the conditions of your license. The team reviewed selected procedures and records, observed activities, and interviewed personnel. Specifically, this inspection focused on the design of components that are risk significant and have low design margin.

Based on the results of this inspection, eight NRC-identified findings of very low safety significance, which involved violations of NRC requirements were identified. However, because these violations were of very low safety significance and because they were entered into your corrective action program, the NRC is treating the issues as Non-Cited Violations in accordance with Section VI.A.1 of the NRC's Enforcement Policy.

If you contest the subject or severity of a Non-Cited Violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Duane Arnold Energy Center.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Ann Marie Stone, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-331
License No. DPR-49

Enclosure: Inspection Report 05000331/2006007(DRS)
w/Attachment: Supplemental Information

cc w/encl: J. Stall, Senior Vice President, Nuclear and Chief Nuclear Officer
R. Helfrich, Senior Attorney
M. Ross, Managing Attorney
W. Webster, Vice President, Nuclear Operations
M. Warner, Vice President, Nuclear Operations Support
R. Kundalkar, Vice President, Nuclear Engineering
J. Bjorseth, Site Director
D. Curtland, Plant Manager
S. Catron, Manager, Regulatory Affairs
Chairman, Linn County Board of Supervisors
D. McGhee, Iowa Department of Public Health

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No:	50-331
License No:	DPR-49
Report No:	05000331/2006007(DRS)
Licensee:	Florida Power & Light Company
Facility:	Duane Arnold Energy Center
Location:	3299 DAEC Road Palo, Iowa 52324-9783
Dates:	March 7, 2006, through April 21, 2006
Inspectors:	Z. Falevits, Senior Engineering Inspector, Lead Inspector J. Jacobson, Senior Engineering Inspector C. Brown, Senior Engineering Inspector M. Munir, Engineering Inspector S. Burgess, Senior Reactor Analyst M. Villaran, Electrical Contractor C. Baron, Mechanical Contractor
Observer:	M. Melnicoff, Engineering Inspector
Approved by:	A. M. Stone, Chief Engineering Branch 2 Division of Reactor Safety (DRS)

Enclosure

SUMMARY OF FINDINGS

IR 05000331/2006007(DRS); 03/07/2006 - 04/21/2006; Duane Arnold Energy Center; Component Design Bases Inspection.

The inspection was a 4-week onsite baseline inspection that focused on the design of components that are risk significant and have low design margin. The inspection was conducted by regional engineering inspectors and two consultants. Eight Green Non-Cited Violations were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process (SDP)." Findings for which the SDP does not apply may be Green, or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. Inspector-Identified and Self-Revealed Findings

Cornerstone: Barrier Integrity

- Green. The team identified a Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," having very low safety significance involving the control logic of reactor core isolation cooling (RCIC) pump suction valves MO-2516 and MO-2517. Design Change Request 1040 modified the control logic and did not retain the remote-manual closure capability of these containment isolation valves. This remote-manual closure capability was specifically addressed in NRC correspondence. As an interim measure, the licensee revised an operating procedure to allow the operators to manually block specific relay contacts in the control room, allowing these valves to be closed if required. The licensee entered the finding into their corrective action program as CAP 041114.

  The finding was more than minor because failure to retain the remote-manual closure capability of these valves was associated with the attribute of design control, which affected the barrier integrity cornerstone objective of ensuring the functionality of the primary containment isolation valves. The finding was of very low safety significance based on the results of the licensee's analysis and screened as Green using the SDP Phase 1 screening worksheet. (Section 1R21.3.b.2)

Cornerstone: Mitigating Systems

- Green. The team identified a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," having very low safety significance involving the calculation of low level setpoints for the CST. Specifically, the licensee did not include a quantitative analysis of the transfer time in the calculation and subsequently, did not fully address the potential for air entrainment in the high pressure injection pump due to vortexing. The licensee determined the high pressure injection system was operable based on available margin in the calculation. The licensee entered the finding into their corrective action program as CAP 040973.

The finding was more than minor because the failure to account for this transfer time reduced the margin available to prevent air entrainment into the high pressure coolant injection (HPCI) system and affected the Mitigating Systems cornerstone attribute of design control. The finding was of very low safety significance based on the results of the licensee's analysis and screened as Green using the SDP Phase 1 screening worksheet. The cause of the finding was related to the cross-cutting element of problem identification and resolution. (Section 1R21.3.b.1)

- Green. The team identified a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," having very low safety significance involving licensee's failure to ensure that the torque values specified in the maintenance procedure for safety related and important to safety 250Vdc, 125Vdc, and 48Vdc batteries, were correctly incorporated from vendor specified design data and from the licensee's design standard into the procedure. Consequently, all 250Vdc, 125Vdc, and 48Vdc battery electrical terminal connections were under-torqued during battery replacement activities, in 2003. The licensee's corrective action included performing a condition evaluation to determine status of the batteries, and entering this performance deficiency into their corrective action program for resolution as CAP041156, CAP041422, and CAP 041734.

  This finding was more than minor because the batteries procedure deficiency affected plant equipment and was associated with the attribute of design control and equipment performance of the Mitigating Systems cornerstone. Specifically, improper torquing could result in unacceptable battery terminal connection resistance and decreased battery capacity, rendering the dc system incapable of performing its required safety function. The finding was of very low safety significance based on the results of the licensee's analysis and screened as Green using the SDP Phase 1 screening worksheet. (Section 1R21.3.b.3)

- Green. The team identified a Non-Cited Violation of 10 CFR 50 Appendix B, Criterion III, "Design Control," having very low safety significance for failure to ensure that proper design control was maintained. Specifically, the licensee failed to perform a comprehensive design review of a 1992 modification that had incorrectly downgraded the quality classification of two level indicating switches. As a result of this team's inquiries, four additional examples of mis-classified equipment were identified. The licensee entered the finding into their corrective action program as CAP041107 and CAP041731.

  The finding was more than minor because, without proper electrical isolation devices, failure of QL4 (non-safety) classified devices could cause a loss of QL1(safety related) classified equipment. This finding was of very low safety significance based on the results of the licensee's analysis and screened as Green using the SDP Phase 1 screening worksheet. The cause of this finding was related to the cross-cutting aspect of problem identification and resolution, in that, the licensee did not fully evaluate the condition adverse to quality in 2004. (Section 1R21.3.b.4)

- Green. The team identified a Non-Cited Violation of 10 CFR 50, Appendix B, Criterion III, Design Control, having a very low safety significance pertaining to lack of design basis for the values listed in Updated Final Safety Analysis Report Table 8.1-2. The licensee could not identify an active calculation that supported the values listed in

the table. In response to this deficiency, the licensee initiated CAP 041395 to develop the basis for the values indicated in the UFSAR table.

The finding was more than minor because control relay settings and design voltage values could be incorrectly set based on these unsupported values. The finding was of very low safety significance based on the results of the licensee's analysis and screened as Green using the SDP Phase 1 screening worksheet. (Section 1R21.3.b.5)

- Green. The team identified a Non-Cited Violation of TS 5.4.1a, "Procedures," having a very low safety significance pertaining to licensee's failure to establish and use an appropriate procedure for charging a single cell of a safety related battery. A portable non-safety related charger was used to charge a single cell of a safety related battery without maintaining the required electrical isolation between the safety related battery and the non-safety related charger. The licensee initiated CAP 041099 to modify existing maintenance procedures.

  This finding was more than minor because failure to maintain electrical isolation could render the safety related battery inoperable. The finding was of very low safety significance based on the results of the licensee's analysis and screened as Green using the SDP Phase 1 screening worksheet. (Section 1R21.3.b.6)

- Green. The team identified a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," having very low safety significance for failure to implement a testing program to ensure that the installed safety related and important-to-safety molded case circuit breakers (MCCBs) will perform satisfactorily in service. This issue was entered into the licensee's corrective action program as CAP041363. The licensee was planning to purchase new test equipment and commence testing a statistical sample of the installed MCCBs to corroborate MCCB operability.

  The finding was more than minor because the installed MCCBs were not adequately exercised or tested and were beyond the manufacturer's design life. This condition could effect breaker coordination, over-current protection, fire prevention, and multiple other safety related and important to safety functions. The finding was of very low safety significance because licensee determined the issue was a qualification deficiency confirmed not to result in loss of operability per "Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment." The cause of the finding was related to the cross-cutting aspect of problem identification and resolution. (Section 1R21.4)

- Green. The team identified a Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," having very low safety significance for failing to maintain adequate procedures to establish alternate ventilation within a minimum time after the onset of a station blackout event. The licensee entered the finding into their corrective action program as CAP 041379 and commenced an extensive root cause investigation.

  The finding was more than minor because failure to establish alternate ventilation within the analyzed time limit could result in excessive temperatures in the rooms and impact the performance of equipment. Although the use of an inadequate procedure increased

the likelihood of undesirable consequences from an SBO event, the finding was of very low safety significance because it did not involve a design or qualification deficiency, did not represent a loss of safety function, and did not involve an external initiating event. The cause of the finding is related to the cross-cutting element of problem identification and resolution. (Section 1R21.6)

B. Licensee-Identified Violations

None

REPORT DETAILS

1. REACTOR SAFETY

Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Component Design Bases Inspection (71111.21)

.1 Introduction

The objective of the component design bases inspection is to verify that design bases have been correctly implemented for the selected risk significant components and that operating procedures and operator actions are consistent with design and licensing bases. As plants age, their design bases may be difficult to determine and an important design feature may be altered or disabled during a modification. The Probabilistic Risk Assessment (PRA) model assumes the capability of safety systems and components to perform their intended safety function successfully. This inspectible area verifies aspects of the Initiating Events, Mitigating Systems and Barrier Integrity cornerstones for which there are no indicators to measure performance. Specific documents reviewed during the inspection are listed in the attachment to the report.

In addition, the team reviewed several licensee audits and self-assessments to assess how effective licensee personnel were at self-identifying problems. The assessment was accomplished by comparing licensee-identified problems with problems that the team identified during this inspection. The sample included a self-assessment in preparation for the CDBI and selected assessments of the Engineering Design Control program.

.2 Inspection Sample Selection Process

The team selected risk significant components and operator actions for review using information contained in the licensee's PRA and the Duane Arnold Standardized Plant Analysis Risk (SPAR) Model, Revision 3.21. In general, the selection was based upon the components and operator actions having a risk achievement worth of greater than 2.0 and/or a risk reduction worth of greater than 1.005. The operator actions selected for review included actions taken by operators both inside and outside of the control room during postulated accident scenarios.

The team performed a margin assessment and detailed review of the selected risk-significant components to verify that the design bases have been correctly implemented and maintained. This design margin assessment considered original design reductions caused by design modification, or power uprates, or reductions due to degraded material condition. Equipment reliability issues were also considered in the selection of components for detailed review. These included items such as failed performance test results, significant corrective action, repeated maintenance activities, maintenance rule (a)(1) status, components requiring an operability evaluation, NRC resident inspector input of problem areas/equipment, and system health reports. Consideration was also given to the uniqueness and complexity of the design, operating experience, and the

available defense in depth margins. In addition, the team performed walkdowns of the selected components to evaluate the as-built design and material condition. A summary of the reviews performed and the specific inspection findings identified are included in the following sections of the report.

.3 Component Design

a. Inspection Scope

The team reviewed the Updated Final Safety Analysis Report (UFSAR), Technical Specifications (TS), component/system design basis documents, drawings, and other available design basis information, to determine the performance requirements of the selected components. The team used applicable industry standards, such as the American Society of Mechanical Engineers (ASME) Code and the Institute of Electrical and Electronics Engineers (IEEE) Standards, to evaluate acceptability of the systems' design. The review was to verify that the selected components would function as designed when required and support proper operation of the associated systems. The attributes that were needed for a component to perform its required function included process medium, energy sources, control systems, operator actions, and heat removal. The attributes to verify that the component condition and tested capability was consistent with the design bases and was appropriate may include installed configuration, system operation, detailed design, system testing, equipment and environmental qualification, equipment protection, component inputs and outputs, operating experience, and component degradation.

For each of the components selected, the team reviewed the maintenance history, system health report, and condition reports. Field walkdowns were conducted for all accessible components to assess material condition and to verify the as-built condition was consistent with the design. Other attributes reviewed are included as part of the scope for each individual component.

The following 16 components were reviewed (16 inspection samples):

(1) Torus Suction Motor Operated Valve (MOV) 2321: The team reviewed the MOV calculations, including required thrust, degraded voltage, maximum differential pressure, and valve weak link analysis, to ensure the valve was capable of performing its function under design conditions. Diagnostic and inservice testing (IST) test results were also reviewed to verify acceptance criteria were met and performance degradation would be identified.

The team also reviewed control logic schematic diagrams, the system description, and flow control diagrams to verify the adequacy of valve control logic design and to ensure that the valve was capable of functioning under design conditions. In addition, the team reviewed corrective action documents regarding a valve post-maintenance testing problem to verify the licensee's review, response, and disposition of the problem.

(2) Residual Heat Removal Heat Exchanger A Bypass Valve, MOV 2030: The team reviewed the MOV calculations, including required thrust, degraded voltage, maximum differential pressure, and valve weak link analysis, to ensure the valve was capable of performing its function under design conditions. Diagnostic and IST test results were also reviewed to verify acceptance criteria were met and performance degradation would be identified.

The team also reviewed the control logic schematic diagrams, the system description, and flow control diagrams to verify the adequacy of valve control logic design and to ensure that the valve was capable of functioning under design conditions. In addition, the team reviewed corrective action documents regarding valve overhaul schedule and periodic test frequency problems to verify the licensee's review, response, and disposition of the problems.

(3) Automatic Depressurization Valve PSV4400: The team reviewed control logic schematic diagrams, system description, and flow control diagrams to verify the adequacy of valve control logic design and to ensure that the valve was capable of functioning under design conditions. In addition, the team reviewed the analyses addressing the design and the capacity of the nitrogen supplies associated with this valve, to ensure that there was sufficient capacity to operate the valve. This nitrogen capacity included an allowance for leakage. The team also reviewed the procedures for leak testing the nitrogen system.

(4) 125 Vdc Division 1 Safety Related Battery 1D1: The team reviewed various electrical documents including battery load and margin calculations, battery float and equalizing voltages, overall battery capacity, performance discharge test (initial acceptance test), weekly battery surveillance tests, quarterly battery surveillance tests, short circuit calculation for distribution panel 1D10, breaker interrupting ratings and electrical coordination. The team also reviewed electrical schematics for selected Appendix R circuits to ensure that coordination existed between the downstream and the upstream fuses. The team performed a walkdown of the battery, chargers, distribution panels, and verified as-built configuration and the rating of the circuit breakers

(5) Division II 480Vac Essential Load Center 1B04: The team reviewed electrical diagrams, system health and status reports, system descriptions, the UFSAR , circuit breaker vendors' manuals and a technical bulletin, thermography program condition reports, recent preventive maintenance, surveillance testing and the electrical distribution system calculations to assess the status and maintenance condition of the equipment and to verify the adequacy of bus and circuit breaker load capacity, short circuit ratings, and bus voltage. The team interviewed plant engineers concerning the electrical distribution system calculations, power system analysis software, and electrical coordination. A walkdown of the load center was conducted to observe general material condition of the selected components.

The team also reviewed system operating and surveillance procedures to verify the adequacy of the low pressure coolant injection (LPCI) loop select

instrumentation control logic design. Corrective action reports were reviewed regarding the failure of a LPCI swing bus circuit breaker.

(6) 480 V Safety Related Load Center 1B03: The team reviewed the short circuit calculation, load flow and voltage drop calculation under various scenarios, and interrupting ratings of the circuit breakers, to ensure that the bus bracing and the circuit breakers can withstand the short circuit current. The team performed a walkdown of the load center to verify the as-built condition.

(7) 4160Vac Division II Essential Switchgear 1A4: The team reviewed electrical diagrams, the system health and status report, the system description, the UFSAR, Technical Specifications, circuit breaker vendors' manuals, thermography program reports, protective relay settings, and the electrical distribution system calculations to assess the status and maintenance condition of the equipment and to verify the adequacy of bus and circuit breaker load capacity, short circuit ratings, protective device coordination, transient performance, and bus voltage.

The team interviewed plant electrical engineers concerning the electrical distribution system calculations, power system analysis software, and electrical coordination. Walkdown inspections of the essential switchgear buses were conducted to observe its general material condition. An interview was conducted with electrical maintenance personnel regarding switchgear, electrical bus bar, and circuit breaker maintenance and inspection.

(8) Division 1 Emergency Diesel Generator 1G031: The team reviewed the diesel generator loading calculation including the one that depicts the loading sequence during loss of offsite power (LOOP) and loss of coolant accident (LOCA). The team reviewed electrical diagrams, system descriptions, system operating instructions, protective relay settings, and the electrical distribution system calculations to verify the adequacy of protective relaying scheme and verify that operator actions were consistent with the UFSAR and Technical Specifications. A walkdown of the diesel generator was conducted to observe its general material condition.

The team also reviewed calculations and test results associated with the air, fuel oil, cooling water, and ventilation systems for the emergency diesel generator. This review specifically included the capacity of the air start system, leak testing of the air start system, the capacity of the fuel oil storage tanks, and the performance of the cooling water system heat exchangers. Various condition reports associated with the air start system and the governor were also reviewed by the team.

(9) RPV Low Pressure Permissive for LPCI/Containment Spray (CS) (PS4529): The team reviewed the basis for the low pressure permissive setpoint associated with the LPCI and CS injection valves opening under accident conditions. This included a review of the setpoint calculation to verify that opening these valves would not result in over-pressurization of the LPCI and/or CS systems. The team also verified that the setpoint would allow injection flow when required.

(10) Emergency Service Water Pump (ESW) 1P099B: The team reviewed electrical diagrams, ESW and river water system (RWS) system descriptions, and corrective action documentation regarding an underground cable failure in a 125Vdc control power cable supplying the 'A' RWS pump at the intake structure. The team interviewed plant engineers regarding submergence of the safety related cables in a manhole in the underground duct bank supplying the intake structure, qualification of the cables for submerged operation, cable aging, cable condition monitoring tests, the licensee's corrective action implementation, and functional testing for manhole sump pumps. In addition, the team reviewed design and corrective action documentation and interviewed plant engineers regarding the licensee's corrective actions for a plant modification that downgraded the safety qualification of level indicating switches.

The team also reviewed various calculations associated with the performance requirements of the ESW pump to verify the capability of the pump to provide required cooling water to components under transient and accident conditions. This included a review of the thermal performance analyses for various heat exchangers and the hydraulic analysis of the ESW system. The design of the associated RWS supply to the ESW pumphouse was also reviewed to verify the adequacy of the water supply to the ESW system.

(11) Feeder Breaker 1A311 from Emergency Diesel Generator 1G031 to Bus 1A3: The team reviewed the short circuit calculation for bus 1A3, interrupting ratings of the circuit breakers, selected coordination calculations and electrical schematics to ensure that the switchgear bus bracing and the circuit breakers can withstand the short circuit current. The team performed a walkdown of the switchgear to verify the as-built condition.

(12) Reactor Core Isolation Cooling (RCIC) Pump 1P226: The team reviewed various analyses associated with both the water side and the steam side of the RCIC pump. This included system hydraulic, steam pressure, and net positive suction head analyses for the pump. In addition, the team reviewed the RCIC room heat-up analyses to verify that the ambient conditions in the room would be adequate in the event of a station blackout (SBO) or other transient. The team also reviewed the qualification documents for the electrical components in the RCIC pump room.

(13) RCIC Injection Header Isolation Valve MO2512: The team reviewed the MOV calculations, including required thrust, degraded voltage, maximum differential pressure, and valve weak link analysis, to ensure the valve was capable of performing its function under design conditions. Diagnostic and IST test results were also reviewed to verify acceptance criteria were met and performance degradation would be identified. The team also reviewed the control logic associated with this valve to verify that it would function as required to provide injection flow under transient conditions. The team reviewed limited power circuit current calculations, the MOV specification data sheet, and interviewed plant engineers to verify the capability of the valve to operate as required under degraded voltage conditions.

(14) 161kV / 4.16kV Startup Transformer 1X003: The team reviewed electrical diagrams, the system description, the UFSAR, thermography program reports, recent preventive maintenance and surveillance testing and the electrical distribution system calculations to assess the status and maintenance condition of the transformer and to verify the adequacy of the grid voltage, protective device settings, and transformer load capacity. Several interviews were conducted with the electrical maintenance engineer regarding preventive maintenance of the transformer and condition monitoring tests. A walkdown of the Startup Transformer and bus duct was conducted to observe its general material condition. A minor modification to the transformer's sudden pressure seal-in relay was also reviewed.

(15) 34.5kV / 4.16kV Standby Transformer 1X004: The team reviewed electrical one line diagrams, single line meter and relay diagrams, the system description, the UFSAR, thermography program reports, recent preventive maintenance and surveillance testing, and the electrical distribution system calculations to assess the status and maintenance condition of the transformer and to verify the adequacy of the grid voltage, protective device settings, and transformer load capacity. Several interviews were conducted with the electrical maintenance engineer regarding preventive maintenance, condition monitoring tests, and data trending. A walkdown of the standby transformer, connections, and cable trays was conducted to observe the general material condition.

(16) 125 Vdc Division 1 Battery 1D1 Replacement Modification EMA A50996: The team reviewed the modification package that replaced the 125 Vdc battery 1D1 to ensure that the modification and the installation was done in accordance with the design requirements. The team also performed a walkdown of the battery and associated distribution panels to assess the as-built condition and interviewed the dc system engineer.

b. Findings

The team identified six findings of very low safety significance associated with Non-Cited Violations and one unresolved item.

.1 Calculation Deficiency for Potential Vortexing in CST

Introduction: The team identified a Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," having very low safety significance (Green) involving the calculation of low level setpoints for the condensate storage tank (CST). The calculation did not fully address the potential for air entrainment due to vortexing in the CST. Specifically, the licensee failed to account for the time required for the system valves to change position after the low level setpoint was reached. This omission reduced the margin available to prevent entrained air from entering the HPCI system. In addition, the team determined that this issue had been previously identified and had not been effectively resolved.

Description: The team reviewed calculation CAL-E93-027, "Condensate Storage Tank Low Level LS5218 and LS5219," Revision 3. This calculation provided the basis for CST low level setpoint, which was designed to automatically transfer the suctions of the RCIC and HPCI pumps from the CST to the torus when the useable water in the CST was depleted. This setpoint value was included in Technical Specifications 3.3.5.1 and 3.3.5.2. The team noted that this calculation did include an allowance for vortexing within the CST, but it did not include a quantitative analysis of the time required for the valves to change position after the low level setpoint was reached. (The level in the tank would continue to decrease as the valves changed positions.) Instead, the calculation included an assumption which stated, in part, "In the event that air entrainment occurs in the CST, it will be for less than one minute, which is judged to have insignificant effect on HPCI performance." The basis for this assumption was not included in the calculation.

The team also determined that NRC Inspection Report 05000331/2004006, dated March 9, 2004, included an NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action" related to the same concern. The 2004 inspection report stated that this issue had been identified by the licensee during a December 2003 self-assessment but had not been appropriately addressed in the corrective action program. On February 12, 2004, the licensee initiated CAP030703 to address the issue. This CAP and the related corrective action documents had been closed based on the statement placed in Revision 3 of CAL-E93-027 (dated November 19, 2004). The team determined that the addition of this assumption to the calculation had not effectively resolved the concern.

On March 16, 2006, the licensee initiated CAP040973 and planned to include a quantitative analysis of the transfer time in the calculation. The licensee determined that the calculation contained some conservative assumptions which should compensate for the loss of margin due to the failure to account for the valves' repositioning. Therefore, the licensee concluded that the HPCI system was operable.

Analysis: The team determined that the failure to include a quantitative analysis of the transfer time in the setpoint calculation was a performance deficiency and a finding. The team determined that the finding was more than minor in accordance with Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Dispositioning Screening," because it was associated with the attribute of design control, which affected the Mitigating Systems cornerstone objective of ensuring the availability and reliability of the HPCI system to respond to accident conditions. Specifically, the failure to account for this transfer time reduced the margin available to prevent air entrainment into the HPCI system.

The team evaluated the finding using IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," Phase 1 screening, and determined that the finding screened as Green because it was not a design issue resulting in loss of function per Part 9900, Technical Guidance, did not represent an actual loss of a system's safety function, did not result in exceeding a TS allowed outage time, and did not affect external event mitigation. The basis for this conclusion was that despite the loss of design margin, the HPCI system would have performed its safety function in the event of an accident.

The cause of this finding was related to the cross-cutting aspect of problem identification and resolution. The team determined that this condition was previously identified by the licensee's 2003 self-assessment and by the NRC in 2004; however, in each case, corrective actions had been initiated to address the issue, but were closed without fully resolving the concern.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," required, in part, that measures be established to assure that the design basis, namely the specific values (requirements) derived from analysis (based on calculation and/or experiments) of the effects of a postulated accident for which a structure, system, or component must meet its functional goals are correctly translated into specifications, drawings, procedures, and instructions.

Contrary to the above, as of March 16, 2006, the licensee failed to assure that the low level CST setpoint was adequate to perform it's design function. Specifically, calculation CAL-E93-027, Revision 3, did not assure that the setpoint would preclude HPCI pump failure due to air entrainment under accident conditions. Because this violation was of very low safety significance and it was entered into the licensee's corrective action program, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy (NCV 05000331/2006007-01(DRS)). The licensee entered the finding into their corrective action program as CAP040973 to revise the affected calculation.

.2 RCIC Pump Suction Valves Automatic Control Logic

Introduction: The team identified an NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," having very low safety significance (Green) involving the control logic of RCIC pump suction valves MO-2516 and MO-2517. These valves, in the suction piping from the torus to the RCIC pump, were designed to automatically open during a low level condition in the CST. This design, which was implemented by Design Change Request (DCR) 1040, failed to retain the remote-manual closure capability of these containment isolation valves. This remote-manual closure capability was specifically addressed in NRC correspondence.

Description: The team reviewed DCR 1040, "RCIC Auto-Suction Switchover from the CST to the Suppression Pool" during the inspection. This design change was implemented in response to NUREG-0737, Item II.K.3.22, "Automatic Switchover of Reactor Core Isolation Cooling System Suction." The acceptance criteria associated with this NUREG item stated, in part, "...the capability of remote manual containment isolation shall be retained." The team noted that the design change, as implemented, failed to retain this remote manual isolation capability when a low CST level signal was present.

In response to this finding, the licensee initiated CAP041114 on March 22, 2006. The licensee determined that the as-installed design was a deviation from an NRC commitment and that the condition did not result in an operability concern. As an interim measure, the licensee revised an operating procedure to allow the operators to manually block specific relay contacts in the control room, allowing these valves to be closed if

required until plans to modify the valves control logic could be evaluated and implemented.

Analysis: The team determined that the failure to retain the capability of remote manual containment isolation was a performance deficiency and a finding. The team determined that the finding was more than minor in accordance with Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Dispositioning Screening," because it was associated with the barrier integrity attribute of design control, which affected the barrier integrity cornerstone objective of providing reasonable assurance that physical barriers protect the public from radionuclide releases by ensuring the functionality of the primary containment. Specifically, under certain circumstances, the design change prevented the automatic and remote-manual closure of two containment isolation valves.

The team reviewed IMC 0609, "Significance Determination Process (SDP)," dated May 19, 2005, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," dated December 1, 2004. The team determined that the barrier integrity cornerstone was affected because the licensee incorrectly modified the control logic of RCIC suction isolation valves MO-2516 and MO-2517 and consequently failed to implement the design basis requirement to maintain remote manual containment isolation capability under all conditions. Because the finding did not represent an actual open pathway in the physical integrity of the reactor containment or involve an actual reduction in defense-in-depth for the atmospheric pressure control or hydrogen control functions of the reactor containment, the team determined the finding to be of very low safety significance. The basis for this conclusion was that the RCIC system and containment would have performed their safety functions in the event of an accident.

The team concluded this finding did not have a cross-cutting aspect.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," required, in part, that measures be established to assure that specific functions to be performed by a structure, system, or component of a facility are correctly translated into specifications, drawings, procedures, and instructions. The RCIC suction isolation valves MO-2516 and MO-2517 are containment isolation valves.

Contrary to the above, as of March 22, 2006, Design Change Request 1040, "RCIC Auto-Suction Switchover from the CST to the Suppression Pool" modified the control logic of MO-2516 and MO-2517 and prevented remote manual containment isolation capability from the control room under some conditions. However, because this violation was of very low safety significance and it was entered into the licensee's corrective action program, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy (NCV 05000331/2006007-02(DRS)). The licensee entered the finding into their corrective action program as CAP041114.

.3 Inadequate Torquing of Electrical Battery Connections Due to Inadequate Maintenance Procedure for 250Vdc, 125Vdc, and 48Vdc Battery Terminations

Introduction: The team identified an NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," having very low safety significance (Green) for failure to implement

adequate design control of vendor and licensee's design inputs. Specifically, the licensee failed to incorporate correct vendor and licensee specified design torquing values into the batteries' maintenance procedure used for electrical terminations. Consequently, lower torquing values have been used to torque the battery terminal connections during the installation of the new safety related 250Vdc and 125Vdc, and important to safety 48Vdc batteries, in 2003.

Description: During field walkdown and design review of selected dc system components, the team identified that incorrect electrical termination torque values were specified in maintenance procedure BATTRY-C173-01, Revision 21, for the 250Vdc and 125Vdc, (1D1, 1D2 and 1D4) safety related batteries and for the 48Vdc (1D93) important to safety batteries. Specifically, the procedure specified incorrect initial torque values (new batteries) and subsequent (maintenance) torque values required for torquing battery electrical connections.

The licensee used the battery vendor manual RS-1476 (C&D Technologies) as the source document for determining the cell-to-cell (intercell) connection torque values for the batteries. The C&D vendor manual specified for initial installation of cell to cell connections (using 5/16-18 brass stud) 110 to 120 in-lb. However, maintenance procedure BATTRY-C173-01 specified required torque values of 100 to 110 in-lb.

The licensee used Maintenance Directive MD-042, "Bolting Practices," Revision 6, as the source document for determining the required initial torquing values for bolt connections at the terminal end plate to battery cable lugs. Maintenance Directive MD-042 specified (using 5/16-18 bolts) 120 in-lb for lubricated bolts and 160 in-lb for unlubricated bolts. However, procedure BATTRY-C173-01 showed required torque values of 150 to 160 in-lb for initial torque for the bolts provided. The team noted that for this application, the licensee used stainless steel bolts, washers and nuts. The C&D vendor manual specified 160 to 170 in-lb for similar stainless steel bolts, washers and nuts applications (C&D Table 3, bolt assembly C). The licensee informed the team that the procedures will be revised to use the vendor recommended values.

The team determined that lower torquing values were inadvertently used in the field to torque the electrical connections on the 250Vdc,125Vdc and 48Vdc batteries. Maintenance work orders (WOs) A50996, A53415, and A53416, were used in 2003 by the licensee to torque the battery connections on the new batteries. The WOs referred the technicians to procedure BATTRY-C173-01 for torquing values to be used. The WOs had one sign off step for the torquing activity and no specific as left torque values were recorded for the batteries. The exact as-left torquing values could not be determined from the work orders.

In response to this concern, the licensee promptly contacted the vendor for technical advice and performed a condition evaluation to determine status of the batteries. The vendor informed the licensee that the as-left torque values "are acceptable for the time being" but that they should be re-torqued to the vendor specified values at the next maintenance interval. The licensee concluded that since the last battery connection resistance measurements were acceptable, the batteries were operable but nonconforming. At the end of the inspection, the licensee initiated WOs A71501,

A71502, A71503, and A71797 to re-torque the battery connections for the 250Vdc, 125Vdc, and 48Vdc to the vendor specified torque values.

Analysis: The team determined that the use of an inadequate maintenance procedure to perform torquing on electrical terminations of safety related batteries was a performance deficiency and a finding. The team determined that the finding was more than minor in accordance with IMC 0612, Appendix B, "Issue Disposition Screening," in that the finding was associated with the attribute of procedure quality and equipment performance and affected the Mitigating Systems cornerstone objective of ensuring the availability and reliability of the dc power system to respond to initiating events to prevent undesirable consequences. Specifically, incorrect torquing requirements specified in the batteries maintenance procedure, which were subsequently translated into field installations of safety related dc batteries, could potentially result in unacceptable battery terminal connection resistance and decreased battery capacity, rendering the dc system incapable of performing its required safety function.

The team evaluated the finding using IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," Phase 1 screening, and determined that the finding screened as Green because the licensee determined the issue was a qualification deficiency confirmed not to result in loss of operability per "Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment." The basis for this conclusion was that despite the use of lower than the vendor specified torque values, the dc system would have performed its design function as determined by the licensee's condition evaluation.

The team concluded this finding did not have a cross-cutting aspect.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," required, in part, that measures shall be established to assure that applicable design basis are correctly translated into specifications, drawings, procedures and instructions.

Contrary to the above, as of March 24, 2006, the licensee failed to ensure that the torque values specified in safety related and important to safety batteries maintenance procedure BATTRY-C173-01, for 250Vdc, 125Vdc, and 48Vdc batteries, were correctly translated from vendor specified design data and from the licensee's design standard into the procedure. Consequently, all 250Vdc, 125Vdc, and 48Vdc battery terminal connections were under-torqued during battery replacement activities, in 2003. Because the violation was of very low safety significance, this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy (NCV 05000331/2006007-03 (DRS)). The licensee entered the finding into their corrective action program as CAP041156, CAP041422, and CAP 041734.

.4 Electrical Components Downgraded from Safety related to Non-Safety Related Without the Required Isolation Devices

Introduction: The team identified an NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," having very low safety significance (Green) for failure to ensure that proper design control was maintained. Specifically, the licensee failed to perform a comprehensive design review to determine whether a modification that incorrectly

downgraded the quality classification of two level indicating switches, also incorrectly classified other equipment or components associated with that modification. In response to the team's concern, the licensee conducted a brief review of the modification package, as described in CAP041107, and identified additional examples of mis-classified components.

Description: In 1992, while implementing a design modification package DCP 1411 (installation of inverters), level indicating switches LIS4935A and LIS4935B at the residual heat removal service water (RHRSW)/emergency service water (ESW) pit were downgraded from safety related (quality classification level QL1) to non-safety related (quality classification level QL4) without providing the required electrical isolation devices. The LISs cause solenoid valves SV4934 and SV4935 in the river water system (RWS) to de-energize when the level in the RHRSW / ESW pits drops to approximately 20 feet. When the solenoid valves de-energize, the RWS make-up control valves CV4914 and CV4915 go to the fail-safe open position, thereby providing a full make-up water flow path from the RWS to the RHRSW/ESW pit. The two RWS make-up control valves are safety-related components.

Electrical design requirements in the Institute of Electrical and Electronic Engineers (IEEE) Std. 308 require electrical isolation points between safety related and non-safety related circuits. The electrical isolation point was provided to maintain the independence of Class 1E circuits and equipment so that the safety functions required during and following any design basis event can be accomplished. This is especially important during a failure in the non-safety related circuit so that the integrity of the safety related circuit is maintained.

In February 2004, the licensee initiated a corrective action item (CAP030637) titled "River Water Supply Emergency Makeup Solenoids Installed on Wrong Division" to document several problems affecting the RWS, including the discovery that modification package DCP1411 (installation of inverters) had incorrectly changed the safety qualification level for the RHRSW/ESW pit level indicating switches LIS4935A and LIS4935B from quality classification level QL1 to QL4 (in 1992). As part of the corrective action, the licensee performed an apparent cause evaluation (ACE001348, February 2004,) and identified a deficiency in the modification package DCP1411 which incorrectly stated that the inverters would not affect the operation of any of the connected safety systems. The licensee also upgraded the safety qualification of the level indicating switches LIS4935A and LIS4935B from QL4 back to QL1, 12 years after the inverter installation modification was originally implemented.

In February, 2004, the NRC resident inspectors issued a 10 CFR Part 50, Appendix B, Criterion III, "Design Control." NCV in inspection report 05000331/2004002. The violation stated that the licensee had failed to ensure that proper design control was maintained when the level indicating switches LIS4935A and LIS4935B at the RHRSW/ ESW pit were downgraded to non-safety related without providing appropriate isolation devices.

During this inspection, the team noted that the licensee had not reviewed the modification package to determine whether other equipment or components had been incorrectly classified. The licensee indicated that focus of the corrective action item

(CAP030637) and the associated apparent cause evaluation (ACE001348) in February 2004, was on the divisional cross-tie issue. The error in the quality classification level was considered to be a secondary issue, with minimal impact on the plant, that could be addressed by correcting and documenting the quality level classification. The licensee issued a corrective action document (CAP041107) on March 22, 2006, to perform a comprehensive review of modification package DCP1411 to determine whether any other equipment or components might also have been incorrectly classified.

In response to the team's immediate concern, the licensee conducted a brief review of modification package DCP1411 and identified four additional examples where the licensee mistakenly downgraded components from QL1 to QL4. These included input voltage and current meters EI1D15A, EI1D25A, II1D15A, and II1D25A which were tied directly into electrical power inputs for inverters 1D15 and 1D25 with no required isolation provided. Failure of these quality classification QL4 devices could adversely affect the performance of quality classification QL1 equipment. The inspectors were concerned that because of this mis-classification, the licensee could have replaced these components with non-safety related components.

Analysis: The team determined that licensee's failure to perform a comprehensive review of a modification with known deficiencies was a performance deficiency and a finding. The team determined that the finding was more than minor in accordance with IMC 0612, Appendix B, "Issue Dispositioning Screening," because it was associated with the attribute of design control, which affected the Mitigating Systems cornerstone objective of ensuring the availability and reliability of the River Water System pumps to respond to initiating events to prevent undesirable consequences. Specifically, without proper electrical isolation devices, failure of QL4 (non-safety) classified devices could cause a loss of QL1(safety related) classified equipment.

The team evaluated the finding using IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," Phase 1 screening, and determined that the finding screened as Green because it was not a design issue resulting in loss of function per Part 9900, Technical Guidance, did not represent an actual loss of a system's safety function, did not result in exceeding a TS allowed outage time, and did not affect external event mitigation.

The cause of this finding was related to the cross-cutting aspect of problem identification and resolution. Specifically, the licensee did not fully evaluate the condition adverse to quality in 2004. The licensee had an opportunity to identify additional problems with the modification package but had not conducted an extent of condition review on the modification package.

Enforcement: 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that design changes, including field changes, are subject to the design control measures commensurate with those applied to the original design. Electrical design requirements in the Institute of Electrical and Electronic Engineers (IEEE) Std. 308 require electrical isolation points between safety related and non-safety related circuits.

Contrary to the above, during the original design review in 1992 and a subsequent review in 2004, the licensee failed to perform an adequate design review of modification package DCP1411 which had incorrectly downgraded input voltage and current meters EI1D15A, EI1D25A, II1D15A, and II1D25A from safety related to non-safety related. As a result, these non-safety related components were electrically connected to safety related components without the required electrical isolation. However, because this violation was of very low safety significance and it was entered into the licensee's corrective action program, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy (NCV 05000331/2006007-04 (DRS)). The licensee entered the finding into their corrective action program as CAP041107, CAP041731, CAP 042872, and condition evaluation CE003650.

.5 Required Voltages and Rated Amps on 4.16kV, and 480V Buses, UFSAR Table 8.2-1, Had No Documented Design Basis

Introduction: The team identified an NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," having a very low safety significance (Green). This finding pertains to lack of design basis for the values listed on UFSAR Table 8.2-1. The licensee could not identify an active calculation that supported the values listed in the UFSAR.

Description: Table 8.2-1 in the UFSAR, "Bus Voltages for Minimum and Maximum Offsite Grid Voltage Variance," listed the: (1) required, minimum, and maximum voltages and (2) continuous and rated amps for the 4160V switchgears, 480V load centers, and the 480V motor control centers. The team identified that there was no design basis for the numbers given in the table and an active calculation that supported these values was not available for review.

The licensee determined that the values in the table were obtained from a calculation that was superseded by a new calculation and that the table was supposed to have been removed in Revision 14 of the UFSAR. The team noted that this new calculation did not support the values in this table; therefore, the basis for the values in the table could not be established.

The team determined that not having a design basis for the values listed in the UFSAR has led and could lead to erroneous conclusions if these numbers were to be used. For example:

- During the licensee's self-assessment in December 2005, the licensee initiated CAP 039366 when a discrepancy with minimum grid voltage and the setpoints for the emergency diesel generator transfer was discovered. The actual setpoints were at 92.2 percent bus voltage; however, Table 8.2-1 reflected 84.8 percent to 89.1 percent bus voltages. Therefore, it appeared that the transfer would occur at a different grid voltage. The licensee later determined that the values in the table were valid only when all of the 4.16kV buses, safety and non-safety, were connected to the startup transformer and were fully loaded with the grid voltage at 95 percent. These values were not valid for routine, normal power operation. The licensee made an erroneous conclusion using the values from Table 8.2-1.

- During the power uprate activities, a licensee individual obtained a copy of the UFSAR which contained Table 8.2-1. The individual revised the table to remove a "note" and submitted it with the other UFSAR changes for Revision 17. (Therefore, Table 8.2-1 which had been removed in Revision 14 was apparently reintroduced into Revision 17.) The licensee did not believe these values were used in conjunction with the power uprate but nonetheless, its inclusion in the UFSAR did not prevent use of the values.

At the time of the inspection, the team could not determine if the values were used in any other design application; however, concluded that the table could be referenced in various calculations and design changes. The licensee acknowledged this deficiency and entered it into the corrective action program as CAP 041395 to evaluate removing the table or establishing the basis for the values.

Analysis: The team determined that the failure to have a design basis for the voltage values listed in the UFSAR table was a performance deficiency and a finding. The team determined that the finding was more than minor in accordance with IMC 0612, Appendix B, "Issue Dispositioning Screening," because it was associated with the attribute of design control, which affected the Mitigating Systems cornerstone objective of ensuring the availability of the preferred power source. Specifically, the non-supported values contained in the UFSAR table could have resulted in incorrect control relay settings and design voltage values.

The team evaluated the finding using IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," Phase 1 screening, and determined that the finding screened as Green because it was not a design issue resulting in loss of function per Part 9900, Technical Guidance, did not represent an actual loss of a system's safety function, did not result in exceeding a TS allowed outage time, and did not affect external event mitigation.

The team concluded this finding did not have a cross-cutting aspect.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control", requires, in part, that design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. Table 8.2-1 in the UFSAR, "Bus Voltages for Minimum and Maximum Offsite Grid Voltage Variance," listed the: (1) required, minimum, and maximum voltages and (2) continuous and rated amps for the 4160V switchgears, 480V load centers, and the 480V motor control centers.

Contrary to the above, the licensee failed to maintain adequate design control with respect to UFSAR Table 8.2-1. Specifically, the values listed in the table were not supported by an active calculation or other means to verify the design basis. However, because this violation was of very low safety significance and because the issue was entered into the licensee's corrective action program, this violation is being treated as an NCV, consistent with Section VI.A.1 of the Enforcement Policy (NCV 05000331/2006007-05(DRS)). This issue was entered into the licensee's corrective action program as CAP041395.

.6 A Portable Non-Safety Related Charger Used to Charge a Single Cell of a 125 Vdc Safety related Battery Without Electrical Isolation.

Introduction: The team identified an NCV of Technical Specification 5.4.1a, "Procedures," having a very low safety significance (Green) involving licensee's failure to establish and use an appropriate procedure when charging a single cell of a safety related battery. A portable non-safety related charger was used to charge a single cell of a safety related battery without maintaining electrical isolation between the safety related battery and the non-safety related charger.

Description: Section 8.3.1.1.2 of UFSAR, "Safety Design Bases," indicated that the electric power systems were designed to meet the intent of IEEE Standard 308, "Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations." The IEEE Standard states that non Class 1E circuits shall be independent and shall have proper isolation from Class 1E systems and components. The team identified that the licensee used a portable non-safety related charger to charge a single cell of a safety related battery and did not maintain electrical isolation between the safety related battery and the non-safety related charger. Without proper isolation capability, an electrical fault on the non-safety related battery charger could have propagated to the safety related battery.

Analysis: The team determined that failure to establish an appropriate procedure, to ensure proper electrical isolation when charging a single cell on the safety related batteries was a performance deficiency and a finding. The team determined that the finding was more than minor in accordance with IMC 0612, Appendix B, "Issue Disposition Screening," in that the finding was associated with the attribute of procedure quality, which affected the Mitigating Systems cornerstone objective of ensuring the availability and reliability of the dc power system to respond to initiating events to prevent undesirable consequences. Specifically, lack of electrical isolation protective devices between the non-Class 1E single cell battery charger and safety related battery could potentially result in not interrupting a fault on the non-Class 1E charger and render the safety related battery incapable of performing its required safety function.

The team evaluated the finding using IMC 0609, Appendix A,"Significance Determination of Reactor Inspection Findings for At-Power Situations," Phase 1 screening, and determined that the finding screened as Green because it was not a design issue resulting in loss of function per GL 91-18, did not represent an actual loss of a system's safety function, did not result in exceeding a TS allowed outage time, and did not affect external event mitigation. In addition, there was no actual fault on the non-Class 1E charger that resulted in rendering any of the station batteries incapable of performing their required safety function.

The team concluded this finding did not have a cross-cutting aspect.

Enforcement: Technical Specification 5.4.1a required, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33. Appendix A, Item 9.a., stated that maintenance that can affect the performance of safety related equipment should be performed in accordance with written procedures appropriate to the circumstances.

Contrary to this requirement, the licensee failed to establish an adequate procedure to be used when charging a single cell battery. Specifically, work orders which provided instructions for using a portable non-safety related charger to charge a single cell of a safety related battery did not ensure electrical isolation between the safety related battery and the non-safety related charger as required. However, because this violation was of very low safety significance and because the issue was entered into the licensee's corrective action program, this violation is being treated as an NCV, consistent with Section VI.A.1 of the Enforcement Policy (NCV 05000331/2006007-06 (DRS)). The licensee's initial corrective action included not performing single cell charging on the station batteries until the procedure was revised. The licensee initiated CAP 041099 to revise Battery Maintenance Procedure BATTRY C173-01 to include information on single cell charging to require Class 1E fuses for isolation between the single cell battery charger and the safety related station batteries.

.7 Potential Design Deficiency Concerning Cable Separation

Introduction: The team identified an unresolved item concerning a potential design issue with respect to flooding of structures housing Division 1 and 2 cables.

Description: Following a 125Vdc underground control cable failure in the station switchyard in April of 2003, the licensee initiated an action plan to develop and establish a program to evaluate potential degraded underground cables. In May 2004, before the licensee had implemented corrective actions from the April 2003 cable failure, an additional 125Vdc control cable failure occurred in an underground duct supplying the intake structure. At that time, the NRC resident inspector issued an NCV 05000331/ 2004003-03 for failure to take prompt corrective actions for potential degraded underground cable after the April 2003 switchyard cable failure.

During this inspection, the team identified that some of the corrective actions initiated after the May 2004 event had been closed or dropped without action. For example, condition evaluation CE001704 included a plan to replace all the safety related ac and dc cables to the intake structure. However, the team noted that the corrective action program did not contain an action to track the implementation of the cable replacement project and determined that the original corrective action item (CAP031811) had been incorrectly closed out prior to completion of all corrective action activities. In addition, corrective action OTH038404 had been initiated in July 2004 to develop a systematic approach to electrical cable aging. The team identified that no action had been taken to develop the cable evaluation program.

The team also identified a concern with respect to the licensee's corrective actions to NCV 5000331/2004003-03. Specifically, in June 2004, the licensee found about 4 feet of water in a manhole (1MH111/2MH209) along the cable run to the intake structure. The manhole configuration consisted of a concrete compartment with a central masonry block fire barrier wall (not impervious to water) separating the cable trays of Division I and Division II. The safety related cables routed through the manhole included:

Division I
4.16kV power to 1X91 transformer for essential 480Vac load center 1B09
125Vdc control power for River Water System pumps motor control

125Vdc control power for essential 480Vac load center 1B09
120Vac annunciator (pump trip)

Division II
4.16kV power to 1X20 transformer for essential 480Vac load center 1B20
125Vdc control power for River Water System pumps motor control
125Vdc control power for essential 480Vac load center 1B20
120Vac annunciator power (pump trip)

The water had covered all of the Division 1 and 2 cables. At that time, the licensee determined that a dead snake prevented the level switch from activating the sump pump. The team determined that none of the safety related cables in these cable ducts/trays were qualified for continuous submerged operation and that the annual-frequency preventive maintenance to verify the functionality of manhole sump pumps had not yet been approved for use; therefore, it had not yet been performed. On April 19, 2006, the licensee initiated preventive maintenance procedures to test the functionality of manhole sump pumps and found a non-functioning sump pump in one of the manholes (MH209).

The team was concerned that a common mode failure could occur between divisions due to non-functioning manhole sump pumps. Although the central masonry block fire barrier wall separated the Divisional cables, it was not designed to prevent flooding of both compartments. In addition, as observed in May 2004 and April 2006, it was possible to have a non-functioning sump pump without notice. The team considered this potential design issue an Unresolved Item (URI 05000331/2006007-07(DRS)) pending further NRC review of design and separation requirements.

Because the manhole was currently free of water, the team was not concerned with current operability of the cables.

.4 Operating Experience

a. Inspection Scope

The team reviewed six operating experience issues (6 samples) to ensure these issues, either NRC generic concerns or identified at other facilities, had been adequately evaluated and addressed by the licensee. The operating experience issues listed below were reviewed as part of this inspection effort:

- DAEC OE 001223 - HFA Relay Coil Spool Cracking, dated January 15,2004;
- DAEC OE 004043 - Loss of Startup Transformer Offsite Power Source, dated March 3, 2005;
- DAEC OE 001658 - Molded Case Circuit Breaker Failures Identified During Testing, dated October 28, 2004;
- DAEC OE 003945 - Safety related Battery Charger Degraded Output Voltage, dated March 1, 2005;

- DAEC CAP027849 - 1D25 (120VAC Instrument Power Supply) Tripped on Output Undervoltage, dated April 20, 2004; and

- NRC IN 98-40 - Design Deficiencies Can Lead to Reduced ECCS Pump Net Positive Suction Head during Design-Basis Accidents , dated December 14,1998.

b. Findings

Failure to Establish and Perform a Testing Program for Molded Case Circuit Breakers (MCCBs)

Introduction: The team identified an NCV of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," having a very low safety significance (Green), for the licensee's failure to establish a MCCB testing program, in accordance with written test procedures, and perform the required testing, to ensure that the installed molded-case circuit breakers (MCCBs) would perform satisfactorily in service.

Description: The team reviewed the licensee's evaluation of industry operating experience OE001658, "MCCB Failures Identified During Testing at ANO 1 [Arkansas Nuclear One]," dated July 30, 2004. This external operating experience detailed how four MCCBs failed to trip within the prescribed acceptance criteria. All of the failures were 480 Vac, 3-phase, type HFB MCCBs manufactured by Westinghouse. The external OE documented that an additional 13 (17 total of 120) breakers subsequently failed the testing acceptance criteria. The cause of the failures was attributed to "failed/inadequate lubricant." Westinghouse issued Technical Bulletin TB-04-13 in response to the ANO 1 breaker failures. In TB-04-13, Westinghouse established a "design life" of 20 years for type HFB MCCBs. Additionally, this type of breaker was no longer manufactured or supported by Westinghouse and was therefore obsolete. The purpose of OE001658 was to assess the possible impact of TB-04-13 on the plant.

The team noted that additional industry experience was available regarding MCCBs including NRC Information Notices (INs) 93-026 and 93-064 which identified generic concerns with ageing MCCBs. In particular, IN 93-64, "Periodic Testing and Preventive Maintenance of Molded Case Circuit Breakers," stated:

> Detecting or assessing degradation could only be accomplished through appropriate periodic testing and monitoring. Certain MCCB tests (such as individual pole resistance, 300-percent thermal overload, and instantaneous magnetic trip tests) performed periodically were found to be effective along with the additional techniques of infrared temperature measurement and vibration testing.

The team noted that the licensee's evaluation acknowledged that MCCBs were subject to potential age-related degradation which could result in a failure to trip in accordance with the published time-current characteristic curves due to various factors such as grease hardening. In addition, trip set-point drifts has been exhibited in such breakers. The evaluation also documented that the majority of over 700 safety related HFB MCCBs installed in the plant were original equipment and were over 30 years old. The licensee

concluded that the problem was associated with obsolescence of the MCCBs and no further actions were taken. In addition, on September 9, 2005, the Manager of Systems Engineering issued a memo reiterating that DAEC remained committed to IEEE 308-1971 which did not require any over-current testing of MCCBs.

The inspectors had the following concerns with the licensee's evaluation and approach to this industry experience:

- The engineering department concluded that the problem was only associated with obsolescence and did not consider operability of the aged MCCBs – without consulting with the operations department.

- The licensee did not address the design life of 20 years which was documented in TB-04-13. A potential common-mode failure mechanism (due to MCCB aging) existed in multiple systems. In fact, there was no method to track MCCB location or a program to replace MCCBs at the end of the manufacturer's recommended lifetime.

- Although recommended by industry and NRC information, the licensee had not established an MCCB testing program for periodic inspection and testing of circuit breakers in their as-found condition to demonstrate the functional operability of the breaker and to detect degradation.

- The licensee did not evaluate actual MCCB failures ("failed-to-close," "weakened springs," etc.) due to the apparent decision that only a "failure-to-trip" was an "actual failure." Therefore, when MCCBs failed to close or exhibited other failures attributable to hardened grease, the licensee wrote corrective work orders (CWOs) to replace the defective MCCBs and did not initiate a CAP. When asked how many MCCBs had been replaced using CWOs in the last 5 years, the licensee had difficulty in retrieving the information. After 3 days, a list of 24 MCCBs that had been replaced without any as-found testing or failure analysis was produced. The licensee initiated CAP041420, "Evaluate Current Practices re CAP entries of WRC Items," in response to the team concerns about not writing CAPs for failed MCCBs.

- There was no trending program for MCCB performance with which to evaluate the condition of the rest of the installed MCCBs.

In response to the team's concerns about the status of the installed MCCBs, the licensee initiated CAP041363, "Westinghouse Molded Case Circuit Breaker Qualified Life Issue," on April 4, 2006, and completed an operability determination, OPR000325, on April 7, 2006. In the evaluation, the licensee concluded that the MCCBs do not meet their full qualification basis since the testing recommended by the OEM [original equipment manufacturer] was not being performed. The licensee also stated that the MCCBs may not open on a fault condition within the published time-current curves which would compromise the isolation function of these MCCBs. The licensee considered the MCCBs to be operable but non-conforming until the requirements of the Westinghouse Technical Bulletin have been satisfied. The team reviewed the operability determination and had no further questions pending results of future MCCB testing.

Analysis: The team concluded that the failure to adequately evaluate this operating experience and develop an appropriate MCCB testing program was a performance deficiency and a finding warranting a significance evaluation. The team determined that the finding was more than minor in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Disposition Screening," because the finding was associated with the Mitigating Systems cornerstone attribute of equipment performance and affected the cornerstone objective of ensuring the reliability of systems that respond to initiating events. Specifically, the installed MCCBs were not adequately exercised or tested and were beyond the manufacturer's design life. This condition could effect breaker coordination, over-current protection, fire prevention, and multiple other safety related and important to safety functions.

The team evaluated the finding using IMC 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," Phase 1 and determined that the finding screened as Green because the licensee determined the issue was a qualification deficiency confirmed not to result in loss of operability per "Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment."

The cause of the finding was related to the cross-cutting aspect of problem identification and resolution. Specifically, the licensee did not appropriately assess operating experience and other industry information available within the last two years regarding concerns with MCCB performance.

Enforcement: 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," states, in part, that a test program shall be established to assure that all testing required to demonstrate that components will perform satisfactorily in service is identified and performed in accordance with written test procedures. The results shall be documented and evaluated to assure that test requirements have been satisfied.

Contrary to this, the licensee failed to establish and maintain a testing program for safety related MCCBs. Subsequently, over 700 installed safety related MCCBs were not properly tested for operability although industry experience indicated potential common mode failures and component age concerns. However, because this violation is of very low safety significance and because the finding has been captured in the licensee's corrective action program (CAP041363), this violation is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy (NCV 05000331/2006007-08 (DRS)). As part of its corrective actions for this finding, the licensee planned to institute a MCCB testing program, starting with a statistically valid sample and continuing until all safety related and important-to-safety MCCBs have been tested.

.5 Modifications

a. Inspection Scope

The team reviewed six permanent plant modifications related to the selected risk significant components to verify that the design bases, licensing bases, and performance capability of the components have not been degraded through modifications. The modifications listed below were reviewed as part of this inspection effort:

- DCR 1040, “RCIC Auto-Suction Switchover from the CST to the Suppression Pool,” dated April 21, 1981;

- MM 0278, “EDG Air Start System Improvements,” dated September 8,1989;

- EMA A50996, “1D1 125 VDC Div 1 Battery & 1D2 125 VDC Div. 2 Battery Replacement,” dated January 21, 2003;

- DDC 2985, “Correction of SP relay wiring on startup transformer 1X003," dated November 5,1995;

- EMA A53500, “OC relay coordination for fdrs to swgr 1A1 & 1A2,” dated April 27, 2001; and

- DCP 1322, “SLC System temperature indication heat trace,” dated September 23,1986.

b. Findings

No findings of significance were identified.

.6 Risk Significant Operator Actions

a. Inspection Scope

The team performed a margin assessment and detailed review of five risk significant, time critical operator actions (5 samples). These actions were selected from the licensee’s PRA rankings of human action importance based on risk achievement worth and Birnbaum values. Where possible, margins were determined by the review of the assumed design basis and USAR response times and performance times documented by job performance measures results. For the selected operator actions, the team performed a walk through of associated procedures with an appropriate plant operator to assess operator knowledge level, adequacy of procedures, and availability of special equipment where required. The following operator actions were reviewed:

- Responses to station blackout (SBO);
- Actions to restore the switchyard after SBO;
- Failing to establish room cooling without essential service water (ESW);
- Failing to start and control residual heat removal (RHR); and
- Failing to start and control RCIC without ESW.

b. Findings

Simulation of Operator Response during an SBO event)

Introduction: The team identified an NCV of 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, having very low safety significance (Green), for failing to maintain adequate procedures/instructions to establish emergency ventilation within a minimum time after the onset of an SBO event.

Description: The team noted that the "Operators Fail to Ventilate HPCI and RCIC Rooms" was the fourth highest human interaction ranked by Risk Achievement Worth (RAW). The team identified that this risk significant operator action was required in response to a station blackout condition; therefore, selected the SBO procedure for review. Section 15.3.2 of the UFSAR stated that credit may be taken for non-safety related equipment and operator actions (within the first 10 minutes) in responding to an SBO, provided there are written procedures and training to implement them. Plant Abnormal Operating Procedure (AOP) 301.1, "Station Blackout," Revision 30, detailed the immediate and follow-up actions to be taken during an SBO event. The team noted that AOP 301.1 contained a "Caution" statement that emergency ventilation of the HPCI and RCIC rooms is required in 30 minutes. However, the steps to perform this manual action were not considered immediate actions. In addition, the team noted that steps to establish alternate ventilation to the essential switchgear rooms and the main control room were contained in Attachments 1 and 4 respectively, despite the requirement to establish emergency ventilation within 30 minutes of the onset of an SBO event.

The team reviewed AOP 301.1 and concluded that there was a high probability that establishing emergency ventilation would not be started immediately after the onset of an SBO event due to the control room operators attention being focused on the immediate and automatic actions detailed in the procedure. Although establishing alternate ventilation (opening doors to the RCIC and HPCI rooms) is a relatively simple set of actions, the composite time to accomplish the actions included the time from the SBO onset until an operator was assigned the actions and the time to complete the actions. The same type of delay existed for starting Attachment 1 and 4. Therefore, the team requested a demonstration of AOP 301.1, specifically for the total time to establish alternate ventilation for the HPCI and RCIC rooms, essential switch gear rooms, and the control room from the time that the SBO event was simulated to start. In response to the request, the licensee developed a job performance measure (JPM), "Establish Control Room Ventilation during Station Blackout (SBO)," Revision 0, dated March 30, 2006, which would test a mock control room crew and the actual on-shift crew external to the control room (no actual change in plant status) to go through all the responses to an SBO event and develop composite times to establish alternate ventilation. On April 5, 2006, the team witnessed the licensee's performance of this JPM. As anticipated, the mock control room operators did not get into the follow-up actions and dispatch anyone to establish HPCI and RCIC room alternate ventilation until about 24 minutes into the drill and completed the task within 37 minutes. In addition, 32 minutes into the drill, two operators began performing steps to establish alternate control room ventilation and due to problems with setting up and starting the ventilation gear, completed the task about 30 minutes later (total time about one hour).

The licensee promptly informed the team that the issue concerning "Abnormal Operating Procedure (AOP) for Station Blackout Could Not Be Performed in Specified Time Period" was a reportable event and an unanalyzed condition that significantly degraded plant safety pursuant to 10 CFR 50.72(b)(3)(ii) reportability notification. The licensee also generated CAP041379, "Failure To Meet Ventilation Time Requirements of AOP 301.1," to document taking about 60 minutes to establish control room alternate cooling and exceeding 30 minutes for all other areas during the time validation demonstration. On April 6, 2006, the licensee issued Revision 31 of AOP 301.1 which moved the time-critical ventilation actions to the immediate action section, had the entire fire brigade

report to the control room at the start of an SBO event, and immediately establish alternate ventilation to all areas. Additionally, the emergency ventilation gear was relocated to outside the control room, a “Hot Item” was issued to the operators stressing the changes, emphasizing that the 30 minute time to establish ventilation starts at the advent of the SBO event, and changing the location for the air suction to within the glassed-in portion of the control room (to comply with the design calculations). On April 9, 2006, the licensee held another drill and accomplished the time critical ventilation in about 12.5 minutes from the start of the SBO event.

The team noted that the licensee identified a similar issue during the licensee’s pre-inspection assessment. On December 6, 2005, the licensee initiated CAP039203, “Ability to complete AOP 301.1 (SBO) Attachment 1 in 30 minutes not verified,”and had revised AOP 301.1 to move the HPCI/RCIC room ventilation steps from an Attachment to the followup section of the procedure. On January 5, 2006, the licensee also initiated corrective action (CA) 041820, “Ability to complete AOP 301.1 (SBO) Attachment 1 in 30 minutes not verified,” which requested a time validation for establishing alternate HPCI and RCIC room ventilation. On February 18, 2006, the licensee performed the time validation using AOP 301.1, Revision 28 (the current revision on that date). A time of 13 minutes was established from the time that the security force was notified of the need to establish alternate ventilation until the security members reported completion of the assigned task. The licensee concluded that the entire task would easily be completed within the 30 minute time frame. However, the team considered this conclusion to be weak as the time was not a composite time. It did not include the time from SBO onset until security was notified to report to the control room. The team also noted that no attempt had been made to time validate Attachments 1 and 4 of AOP 301.1 and concluded that the licensee narrowly assessed the previous HPCI/RCIC ventilation issue.

Analysis: The team determined that the failure to validate a time-sensitive procedure for establishing alternate ventilation within 30 minutes of the advent of an SBO event was a performance deficiency and a finding. The team determined that the finding was more than minor in accordance with IMC 0612, Appendix B, “Issue Dispositioning Screening,” because it was associated with the attribute of procedure quality, which affected the Mitigating Systems cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences associated with an SBO. Specifically, failure to establish alternate ventilation within the analyzed time limit could result in excessive temperatures in the rooms and impact the performance of equipment.

The team evaluated the finding using IMC 0609, “Significance Determination Process,” Appendix A, “Significance Determination of Reactor Inspection Findings for At-Power Situations,” Phase 1 screening, and determined that the finding screened as (Green) because it was not a design issue resulting in loss of function per Part 9900, Technical Guidance, did not represent an actual loss of a system’s safety function, did not result in exceeding a TS allowed outage time, and did not affect external event mitigation.

The cause of the finding is related to the cross-cutting aspect of problem identification and resolution, in that, the licensee had prior opportunity during a pre-inspection

assessment to identify the lack of procedure time-validation and to take corrective actions.

Enforcement: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions. Abnormal Operating Procedure 301.1, "Station Blackout," Revision 30, contained a "Caution" statement which required emergency ventilation for the HPCI and RCIC rooms, essential switchgear rooms, and the main control room be established within 30 minutes.

Contrary to the above, up to April 5, 2006, AOP 301.1, Station Blackout, Revision 30, was inadequate, in that, the licensee was unable to establish the alternate time-dependent ventilation for the HPCI/RCIC and main control room within 30 minutes from the advent of an SBO event. Because this violation was determined to be of very low safety significance and it was entered into the licensee's corrective action program, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy (NCV 05000331/2006007-09 (DRS)). The licensee entered the finding into their corrective action program as CAP 041379 to assess the affected documents.

4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution

.1 Review of Condition Reports

a. Inspection Scope

The team reviewed a sample of the selected component problems that were identified by the licensee and entered into the corrective action program. The team reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions related to design issues. The specific corrective action documents that were sampled and reviewed by the team are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exits

.1 Exit Meeting Summary

The team presented the inspection results to Mr. G. Middlesworth and other members of licensee management at the conclusion of the inspection on April 21, 2006. Proprietary information was reviewed during the inspection and was be handled in accordance with NRC policy.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee
D. Curtrand, Plant Manager
J. Bjorseth, Site Director
G. Van Middlesworth, Site Vice President
D. Tomaszewski, Director of Engineering
R. Bierman, Design Engineer Manager (Acting)
G. Holt, Configuration Control Supervisor
S. Catron, Licensing Manager
K. Putnam, Inspection Team Leader
L. Swenzinski, Licensing Engineer
K. Steimer, Work Control Center Manager
G. Hawkins, Manager, System Engineer
G. Pry, Maintenance Manager
M. Fairchild, Electrical Engineer
N. Sikka, Electrical Engineer
D. Pint, Electrical Engineer
W. Simmons, Nuclear Training, Project Manager
K. Schneider, Performance Improvement Manager
S. Haller, Engineering Director

Nuclear Regulatory Commission
A. Boland, Deputy Director, DRS
A. M. Stone, Chief, Engineering Branch 2, DRS
G. Wilson, Senior Resident Inspector
R. Baker, Resident Inspector

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened/Closed

05000331/2006007-01	NCV	Calculation Deficiency for Potential Vortexing in CST (Section 1R21.3.b.1)
05000331/2006007-02	NCV	RCIC Pump Suction Valves Automatic Control Logic (Section 1R21.3.b.2)
05000331/2006007-03	NCV	Inadequate Torquing of 250Vdc, 125Vdc and 48Vdc Batteries Electrical Connections (Section 1R21.3.b.3)
05000331/2006007-04	NCV	Electrical Components Downgraded from SR to NSR Without Appropriate Isolation Devices (Section 1R21.3.b.4)
05000331/2006007-05	NCV	UFSAR Table 8.2-1 Had No Documented Basis (Section 1R21.3.b.5)
05000331/2006007-06	NCV	Non-Safety Related Charger Used to Charge a Cell of a 125Vdc SR Battery Without Electrical Isolation (Section 1R21.3.b.6)
05000331/2006007-08	NCV	Failure to Establish a Testing Program for Molded Case Circuit Breakers (MCCBs)) (Section 1R21.4)
05000331/2006007-09	NCV	Simulation of Operator response to an SBO event (Section 1R21.6)

Opened

05000331/2006007-07	URI	Potential Design Deficiency Concerning Cable Separation (Section 1R21.3.b.7)

LIST OF DOCUMENTS REVIEWED

The following is a list of licensee documents reviewed during the inspection, including documents prepared by others for the licensee. Inclusion on this list does not imply that NRC inspectors reviewed the documents in their entirety, but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document in this list does not imply NRC acceptance of the document, unless specifically stated in the inspection report.

1R21 Component Design Bases Inspection

Calculations

Number	Title	Revision
CAL-E00-001	Study of the Electrical Power System for the DAEC Power Uprate Project	3
CAL-E02-003	Single Standby Diesel Generator Static Loading for a Loss of Coolant Accident plus a Loss of Offsite Power	1
CAL-E02-006	Analysis of the 1A3 Essential Electrical Power Distribution	1
CAL-E02-007	Analysis of the 1A4 Essential Electrical Power Distribution System	1
CAL-E04-002	Auxiliary System Performance with New Condensate Pump Motors	1
CAL-E79-1	Diesel Generators 1G21 and 1G31 Loading and Response	1
CAL-E88-005	Limiting Power Circuit Current for DC MOVs	5
CAL-E91-002	MOV Torque Switch Setting	22,30
CAL-E92-007	1D1 Battery Load and Margin Calculation	7
CAL-E92-020	AC Motor Operated Valve Degraded Voltage Condition Calculation	10
CAL-M92-032	Maximum Expected DP for RCIC MOVs	0
CAL-E93-010	Reactor Low Pressure Injection Valves Permissive PS4529, PS4530, PS4545, and PS4548	2
CAL-E93-027	Condensate Storage Tank Low Level LS5218 and LS5219	3
CAL-E93-031	Temperature Transient Evaluation for Control Room during Station Blackout	1
CAL-E93-032	Temperature Transient Evaluation for HPCI Room During Station Blackout	1

Calculations

Number	Title	Revision
CAL-E93-033	Temperature Transient Evaluation for RCIC Room During Station Blackout	1
CAL-E95-006	4.16kV Essential Bus Degraded Voltage Setpoint Calculation	3
CAL-E98-001	4.16kV Essential Bus Undervoltage Relay Setpoint Calc	1
CAL-E99-003	125Vdc Electrical Distribution System Short Circuit Calculation	2
CAL-IELP-M79-19	RHRSW & ESW System Self Cleaning Strainers, Sizing of Accumulator for Backwash Valves	4
CAL-IELP-M92-15	Thermal Transient for Station Blackout - Steam Tunnel, HPCI/RCIC Rooms, East Switchgear Room	6
CAL-M05-003	RCIC Emergency Room Cooler Heat Transfer Calculation	1
CAL-M05-004	HPCI Emergency Room Cooler Heat Transfer Calculation	1
CAL-M05-027	Emergency Diesel Generator Heat Exchanger Heat Transfer Calculation	4
CAL-M06-003	ECCS Pump Emergency Room Cooler Heat Transfer	1
CAL-M79-20	RHRSW, ESW Strainers Backwash Orifices	0
CAL-M91-005	Emergency Service Water Pump TDH Analysis	2
CAL-M91-007	Maximum Expected DP for RHR MOVs	4
CAL-M91-011	Recommended Discharge Pressure for RCIC Main Pump Test	0
CAL-M91-014	Standby Diesel Generator 7 Day Fuel Oil Requirement	1, 2
CAL-M93-028	Weak Link Analysis, MOV 2512	2
CAL-M93-055	Weak Link Analysis, MOV 2321	2
CAL-M93-066	Weak Link Analysis, MOV 2030	2
CAL-M93-078	ESW/RHRSW Pit Pumpdown Times	1
CAL-M97-009	RCIC NPSH Calculation	1
CAL-M98-058	ADS Accumulator Size Verification	1
CAL -M80-12	Diesel Generator Intake Pipe (Duct) Losses	0
243-001	ADS Accumulator Size Verification	1
452-002	Check Valve Operating Conditions	1

Calculations

Number	Title	Revision
452-004	Check Valve Summary Calculation	1
466-002	Performance Study for RHR Room Coolers (1V-AC-11 & 1V-AC-12)	0
466-003	ESW Heat Loads	2
466-004	RHR Pump Seal Water Cooler Performance	1
466-005	Performance Study for RCIC Room Coolers (1V-AC-15A & 1V-AC-15B)	0
466-006	Performance Study for HPCI Room Coolers (1V-AC-14A & 1V-AC-14B)	0
466-007	Chiller Performance	0
466-008	Control Building Control Room Heating and Ventilation	0
702-001	ADS SRV Accumulator System Check Valve Allowable Leakage Rate	0
702-005	Depletion of Nitrogen Tanks from ADS Valve Actuation	0
Bechtel 13A-Z-2	Tornado Design	1
Bechtel 466-001	Diesel Generator Cooler Performance	1
Bechtel 466-009	Diesel Generator Coolers Thermal Performance-Determination of ESW Flow	1

Condition Reports Generated During the Inspection

CAP No.	Title	Date
040842	RCIC System Health Report Not Updated per ACP-1201.1	3/10/06
040881	Inadequate Documentation of Electrical Protective Device Coord.	3/13/06
040922	Issue with SBO Procedure and PRA for Opening RCIC Doors	3/15/06
040924	Superseded SBO Calculation Remain in Active Status in MDL	3/15/06
040973	Vortex Limit for HPCI Transfer From CST to Torus Improved Documentation	3/16/06
041007	Design Process and Document Deficiencies for Maximum RCIC Exhaust Press Limit	3/17/06
041064	Superseded CAL-MC-013B Remains Active in MDL	3/21/06
041068	DCP1489 microfilm Package has 2 Wrong Sheets in the Index	3/21/06

Condition Reports Generated During the Inspection

CAP No.	Title	Date
041088	Inadequate Management and Staffing Support for NRC CDBI	3/21/06
041096	Inadequate Tracking of Corrective Action	3/22/06
041099	Single Cell Charging for 1D1 Issue	3/22/06
041100	Evaluate Impact of AOP-301.1, AOP-913 and AOP 915 (Vital doors remaining open on security plan)	3/22/06
041103	CAL-E93-027, rev. 3 not Entered in MDL (vortexing)	3/22/06
041105	Inadequate Operability Statement	3/22/06
041107	No Extended Condition Performed for CAP030637	3/22/06
041111	Error Discovered on Drawing BECH-E--6-1	3/22/06
041114	Deviation of Commitment to NUREG-0737, item II.K.3.22	3/22/06
041126	1D10 Panel Missing a Significant Number of Screws	3/23/06
041156	Battery Intercell Connector Torque Discrepancy	3/24/06
041358	Action Request Process Procedure – Allows Site Personnel with “Appropriate Privileges” to Update an CAP Action Request	4/04/06
041363	Westinghouse Molded case Circuit Breaker Qualified Life Issue	4/04/06
041364	Existence of Back Draft Damper not Considered in Natural Circulation Calculation for RCIC Room	4/04/06
041379	Failure to Meet Ventilation Time Requirements of AOP 301.0	4/05/06
041395	Basis for UFSAR Table 8.2-1	4/06/06
041398	Revise BECH-E200 to Reflect CAL-E88-05 Degraded Amp Values	4/06/06
041417	Add Fault and Operating Currents to Acceptance Criteria for PSCA Calculations	4/07/06
041420	Evaluate Current Practices re CAP Entries of WCC Items	4/07/06
041422	Stainless Steel Bolt Connector Torque Tolerances on Safety related Batteries	4/07/06
041425	Appendix R Fuse Coordination	4/07/06
041463	Lessons Learned Areas for Improvements From Station Blackout Drill	4/10/06
041465	Improve the Interim Equipment for CR Ventilation During SBO	4/10/06
041624	Revise TS Bases B3.3.5.1 to Correctly Describe 450 Psig Permissive for CS/LPCI	4/17/06

Condition Reports Generated During the Inspection

CAP No.	Title	Date
041684	RHRSW/ESW Isolation to RW Dilution Line V42-0012	4/19/06
041692	UFSAR Table 8.2-1 Inadvertently Added to UFSAR After Removal	4/19/06
041698	Task Card to Test Manway Sumps not Issued or Performed	4/19/06
041729	Evaluate the frequency and Procedural Control Requirements for Manhole Sumps	4/20/06
041731	Separation of Safety and Non-Safety Electrical Features not Always Evaluated	4/20/06
041732	Underground Cabling Issue not Resolved in a Timely Manner	4/20/06
041734	BATTRY-C173-01 Battery Maintenance Procedure	4/20/06
041735	Consider Including NRC Inspection Reports in the OE Screening Process	4/20/06
041745	Sump Pump in Man Hole 209 (MH209) Does not Operate	4/21/06
042616	Develop a Plan for Safety Related Cables and Track to Completion	2/23/06
031811 (reopened)	125Vdc Grounds Found out of Spec Without Alarm	5/28/04

Condition Reports/ Other Corrective Action Documents Reviewed

CAPs	Title	Date
002390	Document Operational Decision Making for A EDG Operability	3/13/05
003604	Spurious Alarms Received in Control Room During Post-Maintenance Testing on MO2321	3/24/99
005208	GE SIL-623	11/1/99
005454	Diesel Fuel Failed Spec	3/31/95
006379	Diesel Fuel Delivery on 4-4-95 Didn't Pass on Flash Point	4/13/95
007715	SBDG Fuel Oil Delivery Failed on Flash Point per Vendor Lab Results	6/05/95
019350	1P099B(Emergency Service Water Pump) Tripped on Thermal Overload During Surveillance	6/23/02
019447	Spare Motor for ESW Pumps	8/21/02
025258	Evaluate Usability of the Fuel for the Diesel Generators Transferred to 1T34	1/21/03

Condition Reports/ Other Corrective Action Documents Reviewed

CAPs	Title	Date
025607	Investigate Lack of Selective Coordination on the Instrument AC System	2/13/03
029168	LPCI Swing Bus 1B34A/1B44A tripped: Tie Brkr 1B4402 Found Tripped	9/25/03
030637	River Water Supply Emergency Makeup Solenoids Installed on Wrong Division	2/06/04
030703	CAPs Not Written for CAQs Discovered During Self Assessment	2/12/04
031904	Manhole 1MH111 Found With ~ 4 Feet of Water in it	6/08/04
034148	Track Corrective Actions Associated with the 2003 Triennial Fire Protection Inspection	2/07/04
035236	A SBDG As-Found Frequency OOS During STP 3.8.1-06	3/11/05
035425	1G-31, A SBDG Failed STP 3.8.1-04 IS on High Frequency	3/26/05
036538	Offsite Lab. Analysis Indicate that Fuel Oil Delivery of 5/4 Does not Meet Spec	5/20/05
037459	Adequacy of CAL-E93-027 (LS5218 & LS5219 Setpoint Calculation)	3/17/04
038827	Concern About the Possibility of Overloading the Startup Transformer	11/10/05
039101	Error Discovered in CAL-E02-006	12/01/05
039165	Revise CAL-E02-004 thru -007 to Show LOCA Bus Voltages	12/05/05
039203	Ability to Complete AOP 301.1 (SBO) Attachment 1 in 30 Minutes Not Verified	12/06/05
039228	Lack of Design Basis for DG Load Values	12/07/05
039229	Calculation CAL-E02-003 Shows DG Voltage Dips Less than UFSAR/RG 1.9 Required	12/07/05
039336	Capability of 1P099-M(Spare) to Operate at 70% Rated Not Demonstrated	2/14/05
039366	UFSAR Table Voltages Indicate Plant Transfer to DG	12/15/05
039370	Document Basis for Setpoint of 4.16kV Emergency Transformer Supply Undervoltage	12/15/05
040005	Extent of Condition not Completed for CAP025607	1/26/06
040243	Thermogrophy Anomaly on 1B4509 Steam Tunnel Cooling Unit	2/07/06

Condition Reports/ Other Corrective Action Documents Reviewed

CAPs	Title	Date
040290	Coordination needed for Main Transformer Coolers	2/09/06
040320	Inadequate Documentation of 125Vdc Coordination	2/10/06
040710	Test frequency for MO2030 was exceeded	3/3/06
040805	74-K4207A CR120 Relay Hot	3/08/06
041005	ASME Check Valve Failure During STP	3/17/06
041132	Diesel Air Flask Check Valve STP Failure	3/23/06
041141	Failure of SBDG Air Start System Check Valves	3/23/06
041142	Testing Method of Fuel Oil Transfer Pumps Discharge Check Valves	3/23/06
041208	1T-115B Inop Due to V32-0054 Leak-by	3/28/06
041215	Suspect this V32-45 Will Fail during Testing per STP 3.8.1-11	3/28/06
041692	UFSAR Table 8.2-1 Inadvertently Added to UFSAR After Removal	4/19/06
041696	SBDG - UFSAR Table 8.3-1 Needs Updated	12/15/05
CAs		
CA039928	A SBDG As-found Frequency OOS During STP 3.8.1-06	3/13/05
CA039990	Replace 1G031/GOV and 1G021/GOV Prior to S/U From RFO20	3/23/05
CA039991	Initiate Measurement and Trending of EDG Governor EGB Null Voltage	3/23/05
CA040228	1G021 Compensatory Measures From ACE001440	5/13/05
CA040229	Initiate a Tech Spec Change Request to Revise EDG Startup Freq Criteria	5/13/05
CA041816	Ability to Complete AOP 301.1 (SBO) Attachment 1 in 30 Minutes Not Verified	1/05/06
CA041820	Ability to Complete AOP 301.1 (SBO) Attachment 1 in 30 Minutes Not Verified	1/05/06
OTHs		
OTH004181	Review Fact Finding Meeting With Affected Departments Regarding Incorrect Jumper	4/23/99
OTH007149	SBDG Fuel Oil Test Failed	4/13/95
OTH009495	Provide New Power Uprate Pressure Information for MOVs	3/12/02

Condition Reports/ Other Corrective Action Documents Reviewed

CAPs	Title	Date
OTH026191	Evaluate Usability of the Fuel for the Diesel Generators Transferred to 1T34	1/22/03
OTH037080	Snapshot Self Assessment (SSA): HPCI/RCIC Systems	2/02/04
OTH037968	Adequacy of CAL-E93-027 (LS5218 & LS5219 Setpoint Calculation)	5/17/04
OTH038404	Develop a Systematic Approach to Electrical Cable Aging	7/07/04

Drawings

Number	Title	Revision
729E627CA	High Pressure Coolant Injection System	8
729E630CA	Residual Heat Removal System	10
APED-B21-018<2>	Auto Depressurization System	21
APED-B21-018<3>	Auto Depressurization System	25
APED-B21-018<3A>	Auto Depressurization System	2
BECH-E001<1>	Single Line Diagram Station Connections	29
BECH-E004 BECH-E004-WIP	Single Line Meter & Relay Diagram - Generator & 4160 System	24 24A
BECH-E005 BECH-E005-WIP	Single Line Meter & Relay Diagram - 4160 System Essential Switchgear 1A3 & 1A4	13 13B
BECH-E006<1>	Single Line Meter & Relay Diagram - 480V System	27
BECH-E024	Schematic Meter & Relay Diagram 480V Load Center System	28
BECH-E027	Single Line Meter & Relay Diagram - 125Vdc System	24
BECH-E028	Single Line Meter & Relay Diagram - 250Vdc System	22
BECH-E029, SH 1	Instrument AC Uninterruptible AC & RPS AC Distribution System	20
BECH-E029, SH 2`	Instrument AC Uninterruptible AC & RPS AC	6
BECH-E104, SH 3G	4160V & 480V System Control and Protection	0

Drawings

Number	Title	Revision
BECH-E104, SH 17	4160V & 480V System Control & Protection	3
BECH-E104, SH 17A	4160V & 480V System Control & Protection	3
BECH-E104<026>	4160V & 480V System Control & Protection	18
BECH-E104<026A>	4160V & 480V System Control & Protection	5
BECH-E112, SH33	Alternate Shutdown Capability System	4
BECH-E121<002F>	Reactor Core Cooling System	1
BECH-E121<023>	Reactor Core Cooling Systems	9
BECH-E121<051>	Reactor Core Cooling Systems	4
BECH-E200<2512>	Motor Operated Valve Data List	11
BECH-E350<1>	Underground Duct Bank Layout	2
BECH-E351<1>	Manhole Details	1
BECH-E511<006>	Protective Relay Settings 151, 151N, & 132 - 4kV Swgr 1A1, 1A2, 1A3, & 1A4	2
BECH-E511<007>	Protective Relay Settings 4kV Bus UV and Diesel Gen 151, 159, & 187	3
BECH-E511<012A>	Protective Relay Coordination Curves 4.16kV System Ground Relays 150G & 151N	2
BECH-E511<012C>	Protective Relay Coordination Curves 4.16kV Essential Bus (1A3 & 1A4) OC Relays 150/151 & 151	2
BECH-E511<012L>	Protective Relay Coordination Curves Diesel Generator (DG1 & DG2) OC Relays 151 & 151V	1
BECH-M120	Residual Heat Removal System	61
BECH-M123, SH 2	High Pressure Coolant Injection System (HPCI) Water Side	40
E009-282	BKR 52-3401 Cubicle BKR. Mechanism Wiring Diagram	4

Drawings

Number	Title	Revision
APED-E51-003	Reactor Core Isolation Coolant System	5
BECH-M113	P&ID RHR Service Water & Emergency Service Water Systems	60
BECH-M119	P&ID Residual Heat Removal System	78
BECH-M120	P&ID Residual Heat Removal System	61
BECH-M121	P&ID Core Spray System	36
BECH-M122	P&ID High Pressure Coolant Isolation System (HPCI) Steam Side	58
BECH-M123	P&ID High Pressure Coolant Isolation System (HPCI) Water Side	40
BECH-M124	P&ID Reactor Core Isolation Cooling System (RCIC) Steam Side	53
BECH-M125	P&ID Reactor Core Isolation Cooling System (RCIC) Water Side	33
BECH-M132(1)	P&ID Diesel Generator Systems	9
BECH-M132(2)	P&ID 1G031 Standby Diesel Generator	11
BECH-M132(3)	P&ID 1G021 Standby Diesel Generator	13
BECH-M146	P&ID Service Water System Pumphouse	77
BECH-M170	P&ID Heating Vent & Air Conditioner Misc. Control Systems	36

Engineering Changes/Modifications

Number	Title	Date
DDC No. 2985	Document Design Change - Correction of Wiring Problem to Allow the Sudden Pressure Seal-in Relay to Operate Correctly	11/01/95
DCR No. 692	RHR Service Water Rupture Discs	4/04/78
DCR No. 1040	RCIC Auto-Suction Switchover From the CST to the Suppression Pool	4/21/81
EMA A50996	1D1 125 Vdc Div 1 Battery & 1D2 125 Vdc Div 2 Batteries Replacement	1/21/03
EMA-A53500	Engineered Maintenance Action - Bus 1A1 and 1A2 Feeder OC Relays (power uprate project-related modification)	4/27/01
EMA-A65013	Engineered Maintenance Action - Replacement of Cable 1B0901-B From 1MH110 Into the Intake Structure	6/09/04

Miscellaneous Documents

Number	Title	Revision/ Date
ACE001436	A SBDG As-Found Frequency OOS During STP 3.8.1-06	3/15/05
ACE001440	1G-31, A SBDG Failed STP 3.8.1-04 IS on High Frequency	3/29/05
C&D Technologies Manual RS-1475	Standby Battery Vented Cell Installation and Operating Instructions	2003
COM007410	SSDI Unresolved Item - Station Blackout Analysis for EPU	8/05/05
DCD-016	NUREG-0737, Item II.K.3.22, Automatic Switchover of Reactor Core Isolation Cooling System Suction	8/05/82
EOP Basis	EOP Curves and Limits	7
EOP Basis	RPV Flooding (RPV/F)	8
EOP 1 Basis	RPV Control Guideline	11
EOP 2 Basis	Primary Containment Control Guideline	10
GE-NE-A22-00100-07-01	Asset Enhancement Program, Task T0300, Nuclear Boiler System	0
GE-NE-A2200100-17-01	Asset Enhancement Program, Task T0310, Residual Heat Removal System	1
GE-NE-A22-00100-26-01	Asset Enhancement Program, Task T0404, High Pressure Coolant Injection System	0
GE-NE-A22-00100-52-01	Asset Enhancement Program, Task T0613, RHR Service Water and Emergency Service Water System	0
GE-NE-A22-00100-61-01	Asset Enhancement Program, Task T0903, Station Blackout	0
LDR-82-245	NUREG-0737, Item II.K.3.22, RCIC Switchover	9/14/82
MD 042	Bolting Practices	6
NG-05-0467	Technical Specification Change Request (TSCR-076): “Relaxation of Emergency Diesel Generator Testing Criterion”	9/16/05
NG-96-0078	Suitability of GBB-3 Piping for LPCI Run; In Support of Setpoint Calculation CAL-E93-010	1/09/96
PCR040218	Initiate Measurement and Trending of EDG Governor EGB Null Voltage	5/12/05
SA041398	DAEC Self Assessment Report – Preparation for Design Basis Inspection Based on 71111.21	1

Miscellaneous Documents

Number	Title	Revision/ Date
SD-149	Residual Heat Removal System	10
SD-152	High Pressure Coolant Injection System	6
SD-183.1	Automatic Depressurization System and Low-Low Set System	7
SD-304	Electrical Power Systems	8
SD-324	Standby Diesel Generator System	7
SD-410	River Water Supply System	5
SD-416	RHR Service Water System	5
SD-454	Emergency Service Water System	3
System 4.00	Health & Status Report 4160 V Safety Related Sw. Gear	3/06/06
System 5.00	Health & Status Report Class 1E 480Vac Power	3/06/06
System 6.00	Health & Status Report 480Vac MCCs	3/06/06
System 50.00	Health & Status Report Reactor Core Isolation Cooling	3/10/06
TB-04-13	Replacement solutions for Obsolete Classic Molded Case Circuit Breakers, UL Testing Issues, Breaker Design Life and Trip Band Adjustment	6/28/04
Various	Trending Information on Selected components	Various
Various	Thermography on Selected Componen	3/04 to 3/06
Various	Rework Evaluations for Selected Components	3/03 to 3/06
2005-001-1-022	Nuclear Oversight Observation Report of Emergent Assessment Program Health Reports	2/18/05

Operability Determinations/Engineering Condition Evaluations

Number	Title	Revision/ Date
OBD000245	A SBDG Frequency Found Track Resolution of EGA and EGB Issues	3/13/05
OPR 301, 302	Emergency Diesel Generator Loading Calculations and UFSAR Inputs	0
OPR 305	Switchyard Voltage	0

Operability Determinations/Engineering Condition Evaluations

Number	Title	Revision/ Date
CE000212	Determine the Consequences of Over-torquing of the Tie Rod During Battery Replacement	2/14/03
CE001206	MCC 1B34A Electrical Insulation Question	9/26/03
CE001704	125Vdc Grounds Found Out of Spec Without Alarm	6/03/04
CE003299	Ability to Complete AOP 301.1 (SBO) Attachment 1 in 30 Minutes Not Verified	12/8/05
CE003653	Failure of SBDG Air Start System Check Valves	3/27/06
CE003662	Battery Intercell Connector Torque Discrepancy	3/28/06
CE003659	Several Screws on the Center Metal Panel in 1D10, 1D20 and 1D40 are Missing	4/20/06

Operating Experience Reports

Number	Title	Date
OE 001223	HFA Relay Coil Spool Cracking	1/15/04
OE 001658	Molded Case Circuit Breaker Failures Identified During Testing	10/28/04
OE 003945	Safety related Battery Charger Degraded Output Voltage	3/01/05
OE 004043	Loss of Startup Transformer Offsite Power Source	3/16/05

Procedures

Number	Title	Revision
ACP 103.0	Design Control Program	16
AOP 301.1,	Station Blackout	30
ACP 1201.2	Conduct of System / Plant Engineering	12
ACP 1203.21	Engineering Calculations	16
ACP 1203.31	Design Verification	10
ACP 1206.7	Control of Design Document Changes	17
AIP 401	Injection With RHRSW	6
BATTRY-C173-01	Equipment - Specific Maintenance Procedure BATTRY-C173-01 Batteries; Section A	21,22,28
NS160002	RHR Service Water Operability Test	13

Procedures

Number	Title	Revision
NS540002	Emergency Service Water Operability Test	22
NS590008	Pressure Isolation Valve Leak Tightness Test	8
NS830101	ADS Accumulator Check Valve Leak Tightness Test	8
OI 149	Residual Heat Removal System	95
OI 416	RHR Service Water System	44
OI 304304.2	4160V/480V Essential Electrical Distribution System	59
TRANSF-M175-01	McGraw Edison, Power Transformer (Startup Transformer 1X003) Eqpt-Specific Maintenance Procedure	13
TRANSF-W120-03	Westinghouse, Power Transformer (Standby Transformer 1X004) Equipment-Specific Maintenance Procedure	14
TSK 153	Inspect Duct-Bank Manhole Sump Pumps per Instructions	4/19/06

Surveillances (completed)

Number	Title	Dates performed/Rev.
STP 3.3.5.1-03	Functional Test of LPCI Loop Select - Reactor Vessel Water Level Low-Low Instrumentation	6
STP 3.3.5.1-15	RHR Logic System Functional Test	6
STP 3.3.5.1-19	LPCI Loop Select Recirculation Pump dP Instrument Channel Functional Test	4
STP 3.3.5.1-20	LPCI Loop Select Recirculation Pump dP Calibration	3
STP 3.3.5.1-36	LPCI Pump Discharge Flow - Low (Bypass) Instrument Channel Calibration	3
STP 3.5.1-04	LPCI Subsystem Simulated Automatic Operation	2, 19
STP 3.5.3-02	RCIC System Operability Test	11/12/03 through 2/3/06
STP 3.5.3-03	Low Pressure RCIC System Flow Rate Test	4/17/03, 5/2/05
STP 3.8.1-11	Standby Diesel Generator Air Compressor, Air Start Check Valve, and Fuel Oil Transfer Pump Tests	3
STP 3.8.4-01	Battery Pilot Cell Checks	3/08/05
STP 3.8.4-02	Battery Connected Cell Checks	1/22/03

Surveillances (completed)

Number	Title	Dates performed/Rev.
STP 3.8.4-03	Service Discharge Test of Batteries 1D1 and 1D2	4/02/05
STP 3.8.4-05	Battery Inspections	9/21/05
ETP WO A50996	Performance Discharge Test of Battery 1D1	4/19/02

Work Orders

Number	Title	Date/Rev.
A50996	125VDC Division 1 Battery	1/12/03
A53415	125VDC Division 2 Battery	1/26/03
A53416	250VDC Battery	4/01/03
A60595	Individually Charge 1D1 Cell # 53 (Jumpered Cell) to try to Recover Cell Parameters to CAT A/B Limits	10/14/02
A60657	Jumper Low Voltage Cell # 53 out of 1D1	9/30/02
A605971	Replace Cell # 53 and Cell # 56 with Selected Cells from 1D93	10/18/02
A63820	Thermography Indicates Loose Connection on 'A' Outgoing and 'C' Outgoing Phase of the Breaker (1A4 Essential Swgr)	5/11/04
A67565	Replace EG-A for the A Diesel Generator	4/19/05
A67565	Replace EG-B, Perform Set-up and Testing as Needed	4/1/05
A71501	250VDC Battery - Per CAP 41156 Torque Value for Intercell Connectors Do Not Meet Vendor Requirements. Re-Torque Connectors to Change Values of Battery C-173-01 (100-110 in-lbs)	0
A71502	125VDC Division 2 Battery - Per CAP 41156 Torque Value for Intercell Connectors Do Not Meet Vendor Requirements. Re-Torque Connectors to Change Values of Battery C-173-01 (100-110 in-lbs)	0
A71503	125VDC Division 1 Battery - Per CAP 41156 Torque Value for Intercell Connectors Do Not Meet Vendor Requirements. Re-Torque Connectors to Change Values of Battery C-173-01 (100-110 in-lbs)	0
A71797	48VDC Cardox Battery - Per CE 3662 Torque Value for Intercell Connectors Do Not Meet Vendor Requirements. Re-Torque Connectors to Change Values of Battery C-173-01 (100-110 in-lbs)	0
A72978	Adjust Null Voltage	3/13/05

LIST OF ACRONYMS USED

ac	Alternating Current
ADAMS	Agencywide Documents Access and Management System
ADS	Automatic Depressurization System
ASME	American Society of Mechanical Engineers
BWR	Boiling Water Reactor
CA	Corrective Action
CAP	Corrective Action Program
CDBI	Component Design Bases Inspection
CE	Condition Evaluation
CFR	Code of Federal Regulations
CST	Condensate Storage Tank
CWO	Corrective Work Order
dc	Direct Current
DCR	Design Change Request
DG	Diesel Generator
DRS	Division of Reactor Safety
ESW	Essential Service Water
GL	Generic Letter
gpm	gallons per minute
IEEE	Institute of Electrical and Electronics Engineers
IMC	Inspection Manual Chapter
IST	Inservice Testing
JPM	Job Performance Measure
kV	Kilovolt
LOCA	Loss of Coolant Accident
LOOP	Loss of Offsite Power
LPCI	Low Pressure Coolant Injection
MCCB	Molded Case Circuit Breaker
MOV	Motor-Operated Valve
NCV	Non-Cited Violation
NPSH	Net Positive Suction Head
NRC	Nuclear Regulatory Commission
OA	Other Activities
OE	Operating Experience
PARS	Publicly Available Records
PRA	Probabilistic Risk Assessment
psig	pounds per square inch gauge
psid	pounds per square inch differential
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
RPV	Reactor Pressure Vessel
RWS	River Water Supply
SBO	Station Blackout
SDP	Significance Determination Process
SPAR	Standardized Plant Analysis Risk
SRV	Safety Relief Valve
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report