May 20, 2003

Mr. Joseph Solymossy
Site Vice-President
Prairie Island Nuclear Generating Plant
Nuclear Management Company, LLC
1717 Wakonade Drive East
Welch, MN 55089

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2
NRC SAFETY SYSTEM DESIGN AND PERFORMANCE CAPABILITY
INSPECTION REPORT 50-282/03-03(DRS) AND 50-306/03-03(DRS)

Dear Mr. Solymossy:

On April 11, 2003, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Prairie Island Nuclear Generating Plant, Units 1 and 2. The enclosed safety system design and performance capability inspection report documents the inspection findings, which were discussed on April 11, 2003, with you and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission’s rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. Specifically, this inspection focused on the design and performance capability of the residual heat removal system, safety injection system and selected portions of the chemical and volume control system to ensure that they were capable of performing their required safety related functions.

Based on the results of this inspection, the inspectors identified three findings of very low safety significance (Green), all of which were determined to involve violations of NRC requirements. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating these three findings as non-cited violations (NCVs) consistent with Section VI.A of the NRC Enforcement Policy. If you contest any NCV in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator Region III; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Prairie Island Nuclear Generating Plant, Units 1 and 2.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publically 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/

Julio Lara, Chief
Electrical Engineering Branch
Division of Reactor Safety

Docket Nos: 50-282; 50-306
License Nos: DPR-42; DPR-60

Enclosure: Inspection Report 50-282, 306/03-03(DRS)
w/Attachment: Supplemental Information

cc w/encl: Plant Manager, Prairie Island
R. Anderson, Executive Vice President
Mano K. Nazar, Senior Vice President
John Paul Cowan, Chief Nuclear Officer
Manager, Regulatory Affairs
Jonathan Rogoff, Esquire General Counsel
Nuclear Asset Manager
Commissioner, Minnesota
Department of Health
State Liaison Officer, State of Wisconsin
Tribal Council, Prairie Island Indian Community
Adonis A. Neblett, Assistant Attorney General
Office of the Attorney General
Administrator, Goodhue County Courthouse
Commissioner, Minnesota Department
of Commerce
Gene Wilson Commissioner, Minnesota Department
of Commerce

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).

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-282; 50-306
License Nos:	DPR-42; DPR-60
Report Nos:	50-282/03-03(DRS) and 50-306/03-03(DRS)
Licensee:	Nuclear Management Company, LLC
Facility:	Prairie Island Nuclear Generating Plant, Units 1 and 2
Location:	1717 Wakonade Drive East Welch, MN 55089
Dates:	March 24, 2003 - April 11, 2003
Inspectors:	G. Hausman, Engineering Inspector, Lead J. Neurauter, Engineering Inspector, Mechanical S. Sheldon, Engineering Inspector, I&C N. Valos, Operator Licensing Examiner, Observer R. Winter, Engineering Inspector, Electrical C. Baron, Contractor, Mechanical S. Spiegelman, Contractor, Mechanical
Approved by:	Julio Lara, Chief Electrical Engineering Branch Division of Reactor Safety

Enclosure

CONTENTS

SUMMARY OF FINDINGS

IR 05000282/2003-003(DRS), 05000306/2003-003(DRS); 03/24/2003 - 04/11/2003; Prairie Island Nuclear Generating Plant, Units 1 and 2; Safety System Design and Performance Capability Inspection.

The report covered a three week period of inspection by regional engineering specialists with mechanical engineering consultant assistance. The inspection focused on the design and performance capability of the residual heat removal system, safety injection system and selected portions of the chemical and volume control system to ensure that they were capable of performing their required safety related functions. Three Green non-cited violations (NCVs) of very low safety significance were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 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. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspection team identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in that, the design bases for the Units 1 and 2 residual heat removal (RHR) discharge overpressure interlock removal modification was not correctly translated into specifications, procedures, and instructions. Specifically, the modification's safety evaluation took credit for local operator action to manually open the RHR heat exchanger to safety injection pump suction valves during the transfer to recirculation in both units' emergency operating procedures (EOPs). However, on March 14, 2003, local operator action to manually open the valves was removed from the EOPs.

  This finding was greater than minor because the lack of coordination between the modification's design requirements and EOP procedural guidance affected the mitigating systems' cornerstone objective. The cornerstone's objective of ensuring the availability, reliability, and capability of the emergency core cooling system to respond to initiating events was affected. The finding was of very low safety significance because it did not represent an actual loss of a safety function. (Section 1R21.2b.1)

- Green. The inspection team identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in that, the design bases for the residual heat removal (RHR) system was not correctly maintained in accordance with regulatory requirements. Specifically, a safety evaluation was written for the change in classification from safety related to non-safety related for the Units 1 and 2 RHR heat exchanger flow control valves' positioners, hand controllers and signal converters. However, the safety evaluation failed to consider all credible failures in evaluating the single failure criterion. For example, if a required open valve's hand controller were to fail high, the valve would close and block the emergency core cooling system (ECCS) flow path.

This finding was greater than minor because the change in classification from safety related to non-safety related for the Units 1 and 2 RHR heat exchanger flow control valve components affected the mitigating systems' cornerstone objective. The cornerstone's objective of ensuring the availability, reliability, and capability of the ECCS to respond to initiating events was affected. The finding was of very low safety significance because it did not represent an actual loss of a safety function. (Section 1R21.2b.2)

- Green. The inspection team identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," due to the licensee's failure to maintain the design basis configuration of the residual heat removal (RHR) pit covers. Specifically, the Units 1 and 2 auxiliary building's RHR pit covers were designed to be closed during plant operation to limit the radiological dose rates to vital plant areas during accident conditions. However, prior to April 4, 2003, the Units 1 and 2 RHR pit covers were maintained in an open position during plant operation.

  This finding was greater than minor because the potential to affect the safety injection and RHR systems' design basis functions (i.e., degradation of long term heat removal) affected the mitigating systems' cornerstone objective. Specifically, local operator actions in the auxiliary building (e.g., area around the RHR pits) were required to transfer the emergency core cooling system (ECCS) to the recirculation mode. If the operator was prevented from performing the local operator actions during accident conditions due to high dose rates, then both trains of ECCS could be degraded. As a result, the cornerstone's objective of ensuring the availability, reliability, and capability of the ECCS to respond to initiating events was affected. The finding was of very low safety significance because it did not represent an actual loss of a safety function.
  (Section 1R21.2b.3)

B. Licensee-Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstone: Mitigating Systems

1R21 Safety System Design and Performance Capability (71111.21)

Introduction

Inspection of safety system design and performance verifies the initial design and subsequent modifications and provides monitoring of the capability of the selected systems to perform design bases functions. As plants age, the design bases may be lost and important design features may be altered or disabled. The plant's risk assessment model was based on the capability of the as-built safety system to perform the intended safety functions successfully. This inspectable area verifies aspects of the mitigating systems cornerstone for which there are no indicators to measure performance.

The objective of the safety system design and performance capability inspection was to assess the adequacy of calculations, analyses, other engineering documents, and operational and testing practices that were used to support the performance of the selected systems during normal, abnormal, and accident conditions.

The systems and components selected were the residual heat removal (RHR) system, safety injection (SI) system and selected portions of the chemical and volume control system (CVCS). These systems were selected for review based upon:

- having a high probabilistic risk analysis ranking;
- having had recent significant issues;
- not having received recent NRC review; and
- being interacting systems.

The criteria used to determine the acceptability of the system's performance was found in documents such as:

- applicable technical specifications;
- applicable updated safety analysis report (USAR) sections; and
- the systems' design documents.

The following system and component attributes were reviewed in detail:

System Requirements

Process Medium - water, air, electrical signal
Energy Source - electrical power, steam, air
Control Systems - initiation, control, and shutdown actions
Operator Actions - initiation, monitoring, control, and shutdown
Heat Removal - cooling water and ventilation

System Condition and Capability

Installed Configuration - elevation and flow path operation
Operation - system alignments and operator actions
Design - calculations and procedures
Testing - level, flow rate, pressure, temperature, voltage, and current

Component Level

Equipment/Environmental Qualification - temperature and radiation
Equipment Protection - fire, flood, missile, high energy line breaks (HELBs), freezing, heating, ventilation and air conditioning

.1 System Requirements

a. Inspection Scope

The inspectors reviewed the USAR, technical specifications, system descriptions, drawings and available design basis information to determine the performance requirements of the RHR system, SI system and selected portions of the CVCS. The reviewed system attributes included process medium, energy sources, control systems, operator actions and heat removal. The rationale for reviewing each of the attributes was:

Process Medium: This attribute required review to ensure that the selected systems' flow paths would be available and unimpeded during/following design basis events. To achieve this function, the inspectors verified that the systems would be aligned and maintained in an operable condition as described in the plant's USAR, technical specifications and design bases.

Energy Sources: This attribute required review to ensure that the selected systems motive/electrical source would be available/adequate and unimpeded during/following design basis events, that appropriate valves and system control functions would have sufficient power to change state when required. To achieve this function, the inspectors verified that the interactions between the systems and their support systems were appropriate such that all components would operate properly when required.

Controls: This attribute required review to ensure that the automatic controls for operating the systems and associated systems were properly established and maintained. Additionally, review of alarms and indicators was necessary to ensure that operator actions would be accomplished in accordance with design requirements.

Operations: This attribute was reviewed because the operators perform a number of actions during normal, abnormal and emergency operating conditions that have the potential to affect the selected systems operation. In addition, the emergency operating procedures (EOPs) require the operators to manually realign the systems flow paths during and following design basis events. Therefore, operator actions play an important role in the ability of the selected systems to achieve their safety related functions.

Heat Removal: This attribute was reviewed to ensure that there was adequate and sufficient heat removal capability for the selected systems.

b. Findings

No findings of significance were identified.

.2 System Condition and Capability

a. Inspection Scope

The inspectors reviewed design basis documents and plant drawings, abnormal and emergency operating procedures, requirements, and commitments identified in the USAR and technical specifications. The inspectors compared the information in these documents to applicable electrical, instrumentation and control, and mechanical calculations, setpoint changes and plant modifications. The inspectors also reviewed operational procedures to verify that instructions to operators were consistent with design assumptions.

The inspectors reviewed information to verify that the actual system condition and tested capability was consistent with the identified design bases. Specifically, the inspectors reviewed the installed configuration, the system operation, the detailed design, and the system testing, as described below.

Installed Configuration: The inspectors confirmed that the installed configuration of the RHR system, SI system and selected portions of the CVCS met the design basis by performing detailed system walkdowns. The walkdowns focused on the installation and configuration of piping, components, and instruments; the placement of protective barriers and systems; the susceptibility to flooding, fire, or other environmental concerns; physical separation; provisions for seismic and other pressure transient concerns; and the conformance of the currently installed configuration of the systems with the design and licensing bases.

Operation: The inspectors performed procedure walk-throughs of selected manual operator actions to confirm that the operators had the knowledge and tools necessary to accomplish actions credited in the design basis.

Design: The inspectors reviewed the mechanical, electrical and instrumentation design of the RHR system, SI system and selected portions of the CVCS to verify that the systems and subsystems would function as required under accident conditions. The review included a review of the design basis, design changes, design assumptions, calculations, boundary conditions, and models as well as a review of selected modification packages. Instrumentation was reviewed to verify appropriateness of applications and set-points based on the required equipment function. Additionally, the inspectors performed limited analyses in several areas to verify the appropriateness of the design values.

Testing: The inspectors reviewed records of selected periodic testing and calibration procedures and results to verify that the design requirements of calculations, drawings, and procedures were incorporated in the system and were adequately demonstrated by test results. Test results were also reviewed to ensure automatic initiations occurred within required times and that testing was consistent with design basis information.

b. Findings

.1 RHR Discharge Overpressure Interlock

Introduction: The inspectors identified a Green non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” in that, the design bases for the Units 1 and 2 RHR discharge overpressure interlock removal modification was not correctly translated into specifications, procedures, and instructions. Specifically, the modification’s safety evaluation took credit for local operator action to manually open the RHR heat exchanger to SI pump suction valves during the transfer to recirculation in both units’ EOPs. However, on March 14, 2003, local operator action to manually open the valves was removed from the EOPs.

Description: The inspectors reviewed a corrective action program (CAP) document (GEN20001718), which was written on June 2, 2000, that identified a lack of isolation between safety related and non-safety related instrumentation associated with the RHR discharge overpressure interlock. The purpose of this interlock was to prevent opening the RHR heat exchanger to SI pump suction valves (i.e., MV-32206, 32207, 32208 and 32209) from the control room, if RHR discharge pressure exceeded the allowable pressure for the SI pump suction piping. The equipment was determined to be “operable but degraded” with corrective action projected for completion in 2001.

The licensee had initiated a modification, 01RH01, “RHR Disch Press Loop 1E/Non-1E Separation,” to address this non-conformance. The safety evaluation prepared for this modification established that the design basis for this loop was non-safety related with credit taken for local operator action to manually open the valve. Having taken credit for local operator action to manually open the valve, the RHR system was considered “operable” by the licensee.

On March 14, 2003, the inspectors noted that local operator action to manually open these valves had been removed from the EOPs 1ES-1.2, “Unit 1 Transfer to Recirculation,” and 1ES-1.3, “Unit 1 Transfer to Recirculation With One Safeguard Train Out of Service.” As a result, the licensee initiated CAP029269 and revised the EOPs to open the valves locally if they did not open from the control room. Additionally, the licensee initiated CAP029598 to track removal of the reliance on local operator manual action.

Analysis: Evaluation of this issue concluded that it was a design control deficiency resulting in a finding of very low safety significance (Green). The design control deficiency was due to the licensee removing steps from the EOPs that implemented a design basis requirement. The mitigating systems cornerstone was affected since the unqualified interlock could prevent the emergency core cooling system (ECCS) from performing a safety related function. No other cornerstones were determined to be degraded as a result of this issue.

This finding was greater than minor because the lack of coordination between the modification’s design requirements and EOP procedural guidance affected the mitigating systems’ cornerstone objective. The cornerstone’s objective of ensuring the availability, reliability, and capability of the ECCS to respond to initiating events was affected.

The issue was assessed through Phase I of the significance determination process. The inspectors agreed with the licensee's position that, notwithstanding the reliance on procedural guidance and the lack of coordination with design requirements, the system would perform its safety function. Therefore, the inspectors concluded that the finding was a design deficiency that did not represent an actual loss of a safety function and the finding screened out as having very low safety significance or Green.

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

Contrary to the above, as of March 14, 2003, the design basis for the Units 1 and 2 RHR discharge overpressure interlock removal modification was not correctly translated into specifications, procedures, and instructions. Specifically, the modification's safety evaluation took credit for local operator action to manually open the RHR heat exchanger to SI pump suction valves during the transfer to recirculation in both units' EOPs. However, on March 14, 2003, local operator action to manually open the valves was removed from the EOPs. Because failure to correctly translate/maintain the RHR discharge overpressure interlock removal modification's design basis was of very low safety significance and has been entered into the corrective action program (CAP029269 and CAP029598), this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-282, 306/03-03-01(DRS), Failure to Correctly Translate/Maintain the RHR Discharge Overpressure Interlock Removal Modification's Design Basis.

.2 RHR Heat Exchanger Flow Control Valves

Introduction: The inspectors identified a Green non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," in that, the design bases for the RHR system was not correctly maintained in accordance with regulatory requirements. Specifically, a safety evaluation was written for the change in classification from safety related to non-safety related for the Units 1 and 2 RHR heat exchanger flow control valves' positioners, hand controllers and signal converters. However, the safety evaluation failed to consider all credible failures in evaluating the single failure criterion. For example, if a required open valve's hand controller were to fail high the valve would close and block the ECCS flow path.

Description: The inspectors reviewed safety evaluation 311 that was written to justify the change in classification of the valve positioners, hand controllers and signal converters for the RHR heat exchanger flow control valves (i.e., CV-31235, CV-31236, CV-31238, and CV-31239) from safety related to non-safety related. The valves were in the ECCS flow path and were required to remain open during a design basis event. The safety evaluation failed to consider all credible failures in evaluating the effect on compliance with the single failure criterion.

The licensee committed to following IEEE Standard 279-1971, "Criteria for Protection System for Nuclear Power Generating Stations," in meeting the single failure criterion. IEEE Standard 279-1971 defines credible failures of non-safety related components to include application of the maximum credible direct current (dc) potential. If a hand controller were to fail high, producing a 50ma dc signal, the valve would close and block the ECCS flow path. As a result, the licensee initiated CAP029616 to correct the noncompliance.

Analysis: Evaluation of this issue concluded that it was a design control deficiency resulting in a finding of very low safety significance (Green). The design control deficiency was due to the licensee changing the components' safety related classification to non-safety related, which eliminated the requirement for the licensee to meet the single failure criterion, that placed the plant in noncompliance with regulatory requirements. The mitigating systems cornerstone was affected since an unqualified valve control loop could prevent the ECCS from performing a safety related function. No other cornerstones were determined to be degraded as a result of this finding.

This finding was greater than minor because the change in classification from safety related to non-safety related for the Units 1 and 2 RHR heat exchanger flow control valve components affected the mitigating systems' cornerstone objective. The cornerstone's objective of ensuring the availability, reliability, and capability of the ECCS to respond to initiating events was affected.

The finding was assessed through Phase I of the significance determination process. The inspectors agreed with the licensee's position that there was reasonable assurance that the system would perform its safety function. Therefore, the inspectors concluded that the finding was a design deficiency that did not represent an actual loss of a safety function and the finding screened out as having very low safety significance or Green.

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

Contrary to the above, as of March 19, 1992, the licensee incorrectly changed the classification of safety related components to non-safety related which created a conflict between the regulatory requirements and the design basis. Specifically, a safety evaluation was written for the change in classification from safety related to non-safety related for the Units 1 and 2 RHR heat exchanger flow control valves' positioners, hand controllers and signal converters. However, the safety evaluation failed to consider all credible failures in evaluating the single failure criterion. For example, if a required open valve's hand controller were to fail high the valve would close and block the ECCS flow path. Because failure to consider all credible failures during the change in classification of the RHR heat exchanger outlet control valve components was of very low safety significance and has been entered into the CAP (CAP029616), this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-282, 306/03-03-02(DRS), Failure to Consider All Credible Failures During the Change in Classification of the RHR Heat Exchanger Outlet Control Valve Components.

.3 RHR Pit Covers

Introduction: The inspectors identified a Green non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," due to the licensee's failure to maintain the design basis configuration of the RHR pit covers. Specifically, the Units 1 and 2 auxiliary building's RHR pit covers were designed to be closed during plant operation to limit the radiological dose rates to vital plant areas during accident conditions. However, prior to April 4, 2003, the Units 1 and 2 RHR pit covers were maintained in an open position during plant operation.

Description: During the inspection walkdown, the inspectors observed that the RHR system pumps and associated heat exchangers/valves/piping were contained in RHR pits in the auxiliary building. The entrances to the two RHR pits were initially designed with heavy steel covers placed over the RHR pits. The RHR pit covers were subsequently modified with rollers allowing each of them to be opened/closed locally by an operator. The modification installed a control switch adjacent to each RHR pit, which controlled an electric motor that was used to open/close the RHR pit cover. During normal plant operation the RHR pit covers were maintained in the open position to allow for temporary ventilation into the RHR pits, thereby, permitting the licensee normal ingress/egress without having to establish the RHR pits as a confined space entry. In addition, the inspectors noted that EOPs 1ES-1.2 (2ES-1.2), “Transfer to Recirculation,” Revision 16, included a step for local operator action to close the RHR pit covers during accident conditions (Attachment K, Step 5).

The inspectors asked if the RHR pit covers were provided with safety related electrical power to ensure their capability to be closed after an accident. The licensee stated that they were supplied with a non-safety related electrical power supply and could not be closed by the operator if the power supply was lost.

The inspectors reviewed applicable portions of NUREG-0737, Item II.B.2, Prairie Island Shielding Study, dated January 1981. The objective of this study was to identify if vital plant areas, requiring personnel occupancy under post-accident conditions, could have high dose rates due to systems containing highly radioactive fluids. The study identified corrective actions required to limit the dose to an operator to 5 Rem whole body, or equivalent. The ECCS alignment area (i.e., the area around the RHR pits) was identified as a vital area requiring infrequent access. Post-accident dose rates from the RHR, SI, and containment spray systems were calculated based on the assumption that 100 percent of the core equilibrium Noble Gas inventory and 50 percent of the core equilibrium radioactive Halogen inventory had been diluted into the combined volume of the reactor coolant system and the refueling water storage tank. This radioactive fluid could be contained in the RHR and SI systems during the ECCS’s recirculation mode of operation. One of the corrective actions identified by the study stated, “RHR pit covers to be redesigned so that they may be left in place except when maintenance or inspection is going on in the pits.”

The inspectors also reviewed Design Change No. 80Y103, “RHR Pit Cover Access Fix.” This design change added the rollers and electric motors to the RHR pit covers. Based on the description included in the modification package, the RHR pit covers were intended to remain closed, except when access to the pits was required. In addition, the modification package indicated that the motor assembly was purchased as non-safety related.

At the time of the inspection the licensee had not determined how long the RHR pit covers had been left open. However, the licensee stated that a step to close the RHR pit covers during a design basis accident was first included in a previous EOP, dated July 8, 1982.

On April 3, 2003, in response to the inspectors concerns, the licensee initiated CAP029501, “RHR Pit Covers Powered from Non-Safety Related Power Supplies,” dated April 3, 2003. The CAP stated that the dose received by an operator performing EOP local operator actions could exceed the assumed values and that documentation could not be found to support the RHR pit covers being open. The CAP recommended that the RHR pit covers be maintained in a closed position. On April 4, 2003, to ensure operability, the licensee closed the RHR pit covers and tagged-out the power supply to assure the covers remain closed. The licensee also issued form PINGP 1224, “Crew Meeting Review of Noteworthy Event/Near Miss/Change - RHR Pit Covers to Remain Closed,” to inform operating personnel of the issue.

The licensee had not completed their review of this condition for past operability and potential reportability during the inspection period. The licensee stated that this review would address the potential impact of the open RHR pit covers on post-accident access to vital areas, as well as the potential impact on the environmental qualification of electrical equipment in the area. In addition, the licensee stated that they would determine the appropriate controls associated with opening the RHR pit covers as required during plant operation. These activities would be tracked by CAP029501.

Analysis: Evaluation of this issue concluded that it was a licensee performance deficiency resulting in a finding of very low safety significance (Green). The performance deficiency was due to the licensee’s failure to maintain the design basis configuration of the RHR pit covers. The mitigating systems cornerstone was affected due to the potential of long term heat removal being degraded by this condition.

This finding was greater than minor because the potential to affect the SI and RHR systems’ design basis functions (i.e., degradation of long term heat removal) affected the mitigating systems’ cornerstone objective. Specifically, local operator actions in the auxiliary building (e.g., area around the RHR pits) were required to transfer the ECCS to the recirculation mode. The local operator actions were included in both of the units’ EOPs 1ES-1.2 and 2ES-1.2, “Transfer to Recirculation,” Attachment K. The required local operator actions included closing the breakers for the RHR to SI pump suction valves (i.e., MV-32206 & MV-32207 and MV-32208 & MV-32209). These valves were required to be repositioned to establish high head safety injection recirculation flow. If the operator was prevented from performing the local operator actions during accident conditions due to high dose rates, then both trains of ECCS could be degraded. As a result, the cornerstone’s objective of ensuring the availability, reliability, and capability of the ECCS to respond to initiating events was affected.

The finding was assessed through Phase I of the significance determination process. The inspectors agreed with the licensee’s position that with the RHR pit covers in the closed position that the system would perform its safety function. The specific accident conditions that could have challenged these systems have not existed and the systems have not been operated under these operating modes. Therefore, the inspectors concluded that the finding was a performance deficiency that did not represent an actual loss of a safety function and the finding screened out as having very low safety significance or Green.

Enforcement: 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” states, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions.

Contrary to the above, prior to April 4, 2003, the design basis of the Units 1 and 2 auxiliary building's RHR pit covers was not correctly maintained, in that, the position of the RHR pit covers was not effectively controlled. Although the design basis for personnel access to vital areas during accident conditions was based on the RHR pit covers being closed during plant operation, the covers were maintained in an open position prior to April 4, 2003. As a result, the potential existed for safety system operability concerns during post-accident conditions. The licensee implemented appropriate corrective actions to address this finding. Because failure to maintain the RHR pit covers' design basis configuration was of very low safety significance and has been entered into the CAP (CAP029501), this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy: NCV 50-282, 306/03-03-03(DRS), Failure to Maintain the RHR Pit Covers' Design Basis Configuration.

.3 Components

a. Inspection Scope

The inspectors examined the RHR, SI and selected portions of the CVCS systems' associated pumps, heat exchangers and instrumentation to ensure that component level attributes were satisfied.

Equipment/Environmental Qualification: This attribute verifies that the equipment was qualified to operate under the environment in which it was expected to be subjected to under normal and accident conditions. The inspectors reviewed design information, specifications, and documentation to ensure that the RHR system, SI system and selected portions of the CVCS were qualified to operate within the temperatures and radiation fields specified in the environmental qualification documentation.

Equipment Protection: This attribute verifies that the RHR system, SI system and selected portions of CVCS were adequately protected from natural phenomenon and other hazards, such as HELBs, floods or missiles. The inspectors reviewed design information, specifications, and documentation to ensure that the systems were adequately protected from those hazards identified in the USAR, which could impact the systems ability to perform their safety function.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution (PI&R)

.1 Review of Condition Reports

a. Inspection Scope

The inspectors reviewed a sample of problems associated with the RHR system, SI system and selected portions of the CVCS that were identified and entered into the CAP by the licensee. The inspectors reviewed these issues to verify an appropriate threshold for identifying issues and to evaluate the effectiveness of corrective actions related to design issues. In addition, condition reports written on issues identified during the inspection were reviewed to verify adequate problem identification and incorporation of the problem into the corrective action system. 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 Exit

Exit Meeting

On April 11, 2003, the inspectors presented the inspection results to Mr. J. Solymossy and other members of his staff. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. Proprietary information was reviewed during the inspection, as documented in the list of documents. The inspectors confirmed that the proprietary material had been returned and discussed the likely content of the inspection report. The licensee did not indicate any potential conflicts with information presented.

ATTACHMENT: SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

<u>Licensee</u>
J. Solymossy, Site Vice President
S. Northard, Director - Engineering
M. Wadley, Senior Vice President Operations Support
S. Cook, Manager NOS
B. Alexander, Corporate Engineering
J. Kivi, Senior Regulatory Compliance Engineer
G. Eckholt, Regulatory Affairs Manager
E. Weinkam, Director Regulatory Services
T. Verbout, I&C/Electrical Design Supervisor
D. Anderson, Response Team Technical Leader
S. Thomas, Design Engineering
B. Rogers, Design Engineering
R. Pond, Design Engineering
T. Lillehei, Design Engineering
B. Peterson, Engineering
L. Johnson, System Engineering
G. Thoraldson, System Engineering
D. Molback, System Engineering
D. Price, System Engineering
J. Kapitz, System Engineering
R. Wirkkala, System Engineering
D. Smith, Shift Manager Operations
R. Williston, Programs Engineering
C. Mundt, Planning Manager
A. Johnson, Rad. Protection and Chemistry Manager

<u>Nuclear Regulatory Commission</u>
J. Adams, Senior Resident Inspector
D. Karjala, Resident Inspector
C. Pederson, Director, Division of Reactor Safety

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

NONE

Opened and Closed

50-282, 306/03-03-01(DRS)	NCV	Failure to Correctly Translate/Maintain the RHR Discharge Overpressure Interlock Removal Modification’s Design Basis (Section 1R21.2b.1)
50-282, 306/03-03-02(DRS)	NCV	Failure to Consider All Credible Failures During the Change in Classification of the RHR Heat Exchanger Outlet Control Valve Components (Section 1R21.2b.2)
50-282, 306/03-03-03(DRS)	NCV	Failure to Maintain the RHR Pit Covers’ Design Basis Configuration (Section 1R21.2b.3)

Closed

NONE

Discussed

NONE

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.

CALCULATIONS

Number	Description	Revision/Date
12911.6249-E-002	MCC 120Vac Control Circuit Voltage Drop Calculation	1
12911.6249-E-003	Eval of MCC Breakers for Cal 12911.6249-E-002	1
12911.6256-E-001	MCC Load Calculation	0
194401-2.3-008	120/230Vac System Coordination Study	0
194401-2.3-009	125Vdc System Coordination Study	0
216197	SI and RHR System Pipe Break Study	August 23, 1972
89L115-2	Attached to SPC-SI-0013	0
90XEDS-0227	125Vdc Voltage Adequacy Study	April 16, 1993
91-02-12	Battery 12 Calculation	0
E-385-EA-021	480Vac Switchgear Branch Breaker Settings	2
E-385-EA-9	Relay Settings and Coordination	2
E-415-EA-3	Degraded Voltage Relay Drop-Out	1
E-H6-1	Voltage Drop Motor Operated Valve Terminal	5
ENG-CS-080	Acceptable Thread Engagement	January 1, 1900
ENG-EE-018	DG Sequence Loading Calculations - SI w/LOOP	4
ENG-EE-021	DG Steady State Loading Calculations - SI w/LOOP	2
ENG-EE-045	DG Steady State Loading Calculations for LOOP Coincident with SBO	3
ENG-EE-061	Unit 1 4kVac Bus Minimum Voltage	0
ENG-ME-005	Analysis of Available NPSH to the RHR Pumps from the Containment Sump	2
ENG-ME-046	MOV Target Thrust/Torque Calculations (MOV# 32075, 32076, 32077, & 32078)	3
ENG-ME-083	Justification for Installation of Bonnet Vents on RHR Motor Valves	0
ENG-ME-088	Required Opening Thrust for Containment Sump B to RHR Valves under Pressure Locking Conditions	1
ENG-ME-130	Containment Isolation Evaluation	5
ENG-ME-170	Auxiliary Building 695' Heat-up Evaluation	0
ENG-ME-177	RHR Pit Heat-up Analysis	1
ENG-ME-206	RHR Pump Switchover to Long Term Recirculation Time Determination	4
ENG-ME-271	RCS Leak Basis	0
ENG-ME-285	Liquid Volume at Zero Level in the #11 & #21 Volume Control Tanks Available for Suction	0
ENG-ME-293	Safety Related Tank Usable Volume Evaluation	2
ENG-ME-299	Piping Internal Pressurization	2
ENG-ME-332	RHR Pump Testing Operability Limits	0

CALCULATIONS

Number	Description	Revision/Date
ENG-ME-360	Addenda 3, Appendix I, HELB Required Equipment Selection (for deletion of BAST Instruments)	0
ENG-ME-383	Minimum RWST Level Required to Assure Adequate NPSH for Charging Pumps	0
ENG-ME-456	RHR Suction Relief Valve and SI Accumulator Relief Valve Capacity	0
ENG-ME-501	Calorimetric Error Induced by a 10°F Change in VCT Temperature	0
ENG-ME-526	RHR and CC Hx Capability During Post-LOCA Recirculation	0
M-834532-ZC-002	Prairie Island Off-Site and Control Room Habitability LOCA Dose for Vantage Plus Fuel (Fluor Daniel)	April 7, 1995
NUREG-0737, Item II.B.2	Design Review of Plant Shielding and Environmental Qualification of Equipment for Spaces/Systems Which May Be Used in Post-Accident Operations [Prairie Island Shielding Study]	January 1981
PI-P-090	Evaluation of Reduced Wall Thickness in Charging Line 2-2VC-27	0
PI-P-092	Operability Evaluation of 2" Charging Line 2-2VC-27	0
SPC-EA-006	4160V Safeguards Degraded Bus Voltage Setpoint	1
SPC-EA-007	4160V Safeguards Bus UV & Loss-of-Voltage Setpoint	1
SPC-RH-001	RHR Pump Mini Recirc Flow Total Developed Head Uncertainty and Flow Uncertainty	0
SPC-SI-002	Total Discharge Head Uncertainty & Flow Uncertainties of the SI Pump Reactor Vessel SI Flow	1
SPC-SI-003	Total Discharge Head Uncertainty & Flow Uncertainties of the SI Pump Cold Leg SI Flow	1
SPC-SI-013	Accumulator Level Accuracy for SP 1031/2031	1
SPCEP051	U1 RHR Flow Control Rm Indication Loop 1F-626 Uncertainty	0
SPCEP51A	U1 RHR Flow Control Rm Indication Loop 1F-626 dp Uncertainty	1
SPCEP51B	U1 RHR Flow Control Rm Indication Loop 1F-626 Rack & Indicator Uncertainty	1
SPCEP059	U1 Containment Narrow Range Sump Level Control Rm Indication Loop 1L-725 Uncertainty	0
SPCEP060	U1 Containment Narrow Range Sump Level Control Rm Indication Loop 1L-725 Uncertainty	0
SPCEP065	U1 RWST Level Control Rm Indication Loop 1L-920 Uncertainty	0
SPCEP075	Prairie Island U1 RCS Pressure EOP Setpoints	0
SPCEP093	Prairie Island U1 Flow Parameter EOP Setpoints	0
SPCEP094	Prairie Island U2 Flow Parameter EOP Setpoints	0
SPCEP095	Prairie Island U1 RWST Level EOP Setpoints	0
SPCEP096	Prairie Island U2 RWST Level EOP Setpoints	0

CORRECTIVE ACTION PROGRAM DOCUMENTS ISSUED DURING INSPECTION

Number	Description	Revision/Date
CA005028	Evaluate Assumed RCS Volumes Used in ENG-ME-005 [Q114]	April 8, 2003
CA005046	ENG-ME-293, Rev. 2, Bases Static Head on Atmospheric Pressure at Sea Level [Q161]	April 9, 2003
CAP029229	Revise Procedures Relating to 8-1/2 hour RHR Requirement [Q5]	March 25, 2003
CAP029269	Post-LOCA Transfer to High-Head-Recirculation [Q61]	March 26, 2003
CAP029351	Incorrect Environmental Condition Assumption in Calcs SPCEP51A and SPCEP52A [Q65]	March 28, 2003
CAP029355	Historical Vendor Data for Rosemount 1154HP5RC Transmitters Can Not Be Located [Q65]	March 28, 2003
CAP029362	Eliminate Local Operation of MOV During Transfer to High-Head Recirc [Q88]	March 28, 2003
CAP029415	Oxygen Lines Are Not Addressed in FHA [Q80]	April 1, 2003
CAP029416	Stress Analysis of Line 2-RH-17 Fails to Consider Weight of Insulation [Q51]	April 1, 2003
CAP029429	Establish Multi-Discipline Evaluation Team for EOP Changes [Q85]	April 1, 2003
CAP029439	Establish Multi-Discipline Evaluation Team for EOP Changes [Q86]	April 1, 2003
CAP029475	Classification of Pressure Indicators Pi-628 & 629 in Regards to Reg Guide 1.97 [Q85]	April 3, 2003
CAP029494	Drawing and Champs Errors for Racks 1SA and 2SA and Various Panels [Q91]	April 1, 2003
CAP029495	Evaluate Cable Routing Leaving Unit 1 MCB Meters PI-628 and PI-629 [Q91]	April 1, 2003
CAP029501	RHR Pit Covers Powered from Non-Safety Related Power Supplies [Q117]	April 3, 2003
CAP029507	Containment Sump Liquid Temperature Curve [Q122]	April 4, 2003
CAP029516	Containment Spray Operating Time [Q129]	April 4, 2003
CAP029534	Weakness in Calc ENG-CS-080, “Acceptable Thread Engagement” [Q140]	April 6, 2003
CAP029543	Evaluate Assumed RCS Volumes Used in ENG-ME-005 [Q123]	April 7, 2003
CAP029575	RHR to SI Motor Valve Pressure Locking Concern [Q144]	April 8, 2003
CAP029576	ENG-ME-293, Rev. 2, Bases Static Head on Atmosphere Pressure at Sea Level [Q115]	April 8, 2003
CAP029583	Control of Design Input Provided to External Organizations [Q69]	April 8, 2003
CAP029598	RHR Discharge Pressure Loops [Q86]	April 9, 2003
CAP029603	Determine Implications of T.S. 3.5.3 Basis Change [Q152]	April 9, 2003
CAP029605	QA Type Designation of RHR Heat Exchanger Bypass Line [Q126 & Q152]	April 9, 2003
CAP029607	SI Check Valves Have Unidentified Safety Function [Q165]	April 9, 2003

CORRECTIVE ACTION PROGRAM DOCUMENTS ISSUED DURING INSPECTION

Number	Description	Revision/Date
CAP029609	Calculation ENG-ME-046 and ENG-ME-417 have Different Assumptions [Q164]	April 9, 2003
CAP029611	Section 2 of Calculation E-H6-1 was not Updated to Latest Results [Q98]	April 9, 2003
CAP029615	SI Pump - Strong Pump/Weak Pump Interaction [Q106]	April 9, 2003
CAP029616	RHR Flow Control Valve Instrument Loop Q-List Down Grade per SE 311 Not Correct [Q92]	April 9, 2003
CAP029628	Potential RHR Pump Runout Concern [Q167]	April 10, 2003
CAP029636	ENG-ME-383 Accounts for Capacity of Only One Charging Pump [Q168]	April 10, 2003

CORRECTIVE ACTION PROGRAM DOCUMENTS ISSUED PRIOR TO INSPECTION

Number	Description	Revision/Date
20014263	Evaluate LOCA Analysis for any Impact of Current Method of Transferring to Recirc and RWST Bypass to Sump B	May 14, 2001
20014646	QA-3 Part Used in QA-1 Device	May 29, 2001
20014885	Circuit Breaker Lubricants Have Been Changed w/o SPCE	June 6, 2001
20014917	USAR Describes the RHR Pump Seal as a Zero Leakage Seal	June 7, 2001
200186163	LB LOCA Accumulator Pressure Assumptions Are Not Consistent with Tech Specs	November 16, 2001
200200645	Perform a Focused Self Assessment of the 50.59 Process as Per 5AWI 1.10.5	January 23, 2002
ACE008253	Missed Surveillance Procedure During BA Reduction	April 8, 2002
ACE008305	Charging Pump Packing Assembled Incorrectly Causing Rework	April 19, 2002
ACE008362	Vibration and Wear on the Unit 2 Seal Injection Line	May 6, 2002
ACE008438	SI Pump Motor Seeking Magnetic Center	June 19, 2002
ACE008474	Tag out for 22 Charging Pump Unit Cooler Also Would Take Out 21 RHR Pump Unit Cooler	July 11, 2002
ACE008531	Containment Integrity, Charging Pump Suction Valves, SP-1366 (2366)	August 16, 2002
ACE008601	RHR Flow Rate in LBLOCA Discrepancy	November 13, 2002
ACE008606	Evaluation of the Effect of an SI Signal While Transferring	November 16, 2002
ACE008649	Evaluate Effect of Installed Vent Plug on 2VC-25-2	February 14, 2003
CAP023320	Vibration and Wear on the Unit 2 Seal Injection Line	April 30, 2002
CAP023370	Design Basis Information, Lack of Single Reliable Source That Is Easy to Use	May 4, 2002
CAP025410	22 SI Pump Suction Flange Bolts Do Not Meet D63 Engagement Requirements	September 24, 2002
CAP028255	Evaluate Effect of Installed Vent Plug on 2VC-25-2	February 12, 2003
CAP028310	Tank Book for RWST Appears to Be Incorrect	February 14, 2003

CORRECTIVE ACTION PROGRAM DOCUMENTS ISSUED PRIOR TO INSPECTION

Number	Description	Revision/Date
CAP028756	Review of Calculation ENG-ME-293 Notes Minor Concerns	March 5, 2003
CAP028936	Calculation ENG-525 Not Suitable for Future Use	March 13, 2003
CAP029038	Review of Calculation ENG-ME-005 Rev 2 Notes Minor	March 18, 2003
CAP029064	Owner Reviews of Contractor Analyses	March 18, 2003
CAP029076	Letdown Line Classification Inconsistencies	March 19, 2003
CAP029085	Review of Calculation ME-332 Notes Concerns	March 19, 2003
CAP029122	Containment Spray Pump Available NPSH	March 20, 2003
CAP029158	In Preparation of SSDI, Calculation ENG-ME-023 Was Reviewed and Some Minor Inconsistencies Were Noted	March 21, 2003
CAP029160	Apparent Discrepancy in Calculation ENG-ME-383, Min RWST Level for Charging Pump	March 21, 2003
CAP029162	Discrepancy Between Two Results Statements in Calculations SPCEP051, Revision 0 & SPCEP052, Revision 0	March 21, 2003
CAP029209	Minor Reference Errors Found in Calculations SPCEP071, Revision 0 & SPCEP072, Revision 0	March 24, 2003
CAP029346	Basis of Set Point for CC Low Flow Alarm	February 17, 2003
CE000516	CAP 000321, OTH 1353, OTH 00781:	March 24, 2002
EWR001318	Vibration and Wear on the Unit 2 Seal Injection Line Determine Options Available and If Further Action Is Required	June 5, 2002
EWR024907	Engineering Work Request for SSDI Mechanical Review	March 3, 2003
EWR024909	Engineering Work Request for SSDI Mechanical Calculation Review	March 3, 2003
GEN20001718	Lack of Isolation of Control Board Indicator	June 2, 2000
GEN200186163	LB LOCA Accumulator Pressure Assumptions Are Not Consistent with Tech Spec	January 16, 2002
GEN200200126	Arc Strike Found on Unit 2 SI Line	March 1, 2002
GEN200200241	Equipment Safety Compromised Radiological Barrier	January 9, 2002
GEN200200492	IST Requirements for Check Valve Were Not Being Fully Met	May 2, 2002
GEN200200678	Review of Discrepancies in System Downgrade Project	N/A
Issue Tracking Report 028346	Report and Attached Notebook - regarding the Overpressure of SI Test Line During EBLOCA	N/A
OTH001045	Vibration and Wear on the Unit 2 Seal Injection Line System Engineer to Examine Pipe to Determine Adverse Trend in Wear Between Hanger and Line	May 3, 2002
OTH002401	Vibration and Wear on the Unit 2 Seal Injection Line Inspect Pipe to Determine Wear Rate	September 27, 2002
RCE000052	Inadvertent U2 SI Occurred During the Performance of SP2378 Test of the Reactor Trip Bypass Breakers (CR 200202013)	

DRAWINGS

Number	Description	Revision/Date
NE-40006, Sh 48	11 Safety Injection Pump	AG
NE-40006, Sh 63	12 Safety Injection Pump	ZB
NE-40008, Sh 37	Schematic Diagram MV 32202 & MV 32083	BS
NE-40008, Sh 38	Schematic Diagram MV 32079 & MV 32162	BS
NE-40008, Sh 39	Schematic Diagram MV 32075 & MV 32077	BU
NE-40008, Sh 40	Schematic Diagram MV 32084 & MV 32206	BU
NE-40008, Sh 47	Schematic Diagram MV 32081 & MV 32144	BT
NE-40008, Sh 64	Schematic Diagram MV 32070 & MV 32071	BX
NE-40008, Sh 65	Schematic Diagram MV 32064 & MV 32073	BS
NE-40008, Sh 106	Schematic Diagram MV 32082 & MV 32080	BR
NE-40008, Sh 107	Schematic Diagram MV 32163 & MV 32076	BV
NE-40008, Sh 108	Schematic Diagram MV 32078 & MV 32207	BU
NE-40008, Sh 127	Schematic Diagram MV 32068 & MV 32069	BT
NE-40008, Sh 128	Schematic Diagram MV 32072 & MV 32065	BX
NE-40009, Sh 108	Schematic Diagram MV 32202 & MV 32083	BS
NE-40406, Sh 43	Schematic Diagram MV 32167 & MV 32176	AF
NE-40406, Sh 73	Schematic Diagram MV 32185 & MV 32183	AE
NE-40406, Sh 22	Schematic Diagram MV 32204 & MV 32186	AF
NE-40406, Sh 24	Schematic Diagram MV 32178 & MV 32180	AB
NE-40406, Sh 25	Schematic Diagram MV 32187 & MV 32208	AH
NE-40406, Sh 42	Schematic Diagram MV 32173 & MV 32174	AJ
NE-40406, Sh 76	Schematic Diagram MV 32205 & MV 32116	AG
NE-40406, Sh 74	Schematic Diagram MV 32191 & MV 32179	AH
NE-116785, Sh 20	21 Safety Injection Pump	A
NE-116786, Sh 23	22 Safety Injection Pump	B
NF-40287-2	External Wiring Diagram Process Control Instrument Rack 1SD Steam Dump	W
NF-40294-5	External Wiring Diagram Process Control Instrument Racks 1SA, 1PLP, 1FW & 1SD	AE
NF-40782-1	Interlock Logic Diagram RHR System	M
NF-40782-4	Interlock Logic Diagram RHR System	H
NF-40783-1	Interlock Logic Diagram Safety Injection System	Q
NF-40783-2.1	Interlock Logic Diagram Safety Injection System	G
NF-40783-2.2	Interlock Logic Diagram Safety Injection System	E
NF-40783-3	Interlock Logic Diagram Safety Injection System	M
NF-40783-5	Interlock Logic Diagram Safety Injection System	Q
NF-74590-1	Unit 1 RMU-111 Rear Panel Connection Diagram	K
NF-94831-11	Unit 1 & Unit 2 Reactor Sump B Level Indicators	A
NF-94831-12	Unit 1 & Unit 2 Reactor Sump B Level Indicators	A
NX-19833-36	Control Bd Indication Interconnection Wiring Diagram	E
NX-19833-38	Rack EM-AI Wiring Diagram	C
X-HIAW-1-31	Flow Diagram Residual Heat Removal System	M
X-HIAW-1-44	Flow Diagram Safety Injection System	T
X-HIAW-1-45	Flow Diagram Safety Injection System	AB
X-HIAW-1-505	Rack Number 1SD	D
X-HIAW-1-587	Interconnection Wiring Diagram Rack Number 1SD	D
X-HIAW-1-990	Safeguards System	B

DRAWINGS

Number	Description	Revision/Date
X-HIAW-1001-4	Flow Diagram Chemical & Volume Control System	T
X-HIAW-1001-5	Flow Diagram Chemical & Volume Control System	X
X-HIAW-1001-6	Flow Diagram Safety Injection System	V
X-HIAW-1001-7	Flow Diagram Safety Injection System	V & W
X-HIAW-1001-8	Flow Diagram Residual Heat Removal System	N
X-HIAW-1001-38	Flow Diagram Chemical & Volume Control System	S
X-HIAW-1001-39	Flow Diagram Chemical & Volume Control System	AL
X-HIAW-1001-40	Flow Diagram Chemical & Volume Control System	X
X-HIAW-1001-41	Flow Diagram Chemical & Volume Control System	U
X-HIAW-1001-814-3	Interconnection Wiring Diagram Rack No. 1SD/2SD	D
X-HIAW-1106-1226	CCW Pipe Support Hanger Mark No. CCH-109	B
X-HIAW-1106-3548	CVCS Line No. 2-2VC-33A & 3/4-2VC-33A	A
X-HIAW-1106-4546	Charging Line No. 2-2VC-27 Isometric	A

MODIFICATIONS

Number	Description	Revision/Date
75L021	Change RHR System Relief Valve Setpoint from 600 psig to 500 psig	January 28, 1974
76L185	Add Non Comp Quick Trip Overload	May 4, 1978
80Y103	RHR Pit Cover Access Fix	January 20, 1988
84L816	RWST Level	October 3, 1985
85Y586	Control Board Modifications	0
88L067	Resizing of SI Mini-Line Flow and Orifice	Addenda 0 and 1
89L155	Unit 1 Accumulator Level Transmitter Replacement	0
90L213	RHR and SI Flow Transmitter Upgrade to EQ	0
91A202	RHR Hx Outlet CV Limit Switch Contact Changes	January 9, 1996
92L361	Separate Relay Circuits	0
94L436	RHR Motor Valve Pressure Lock Prevention	1
99SI01	SI Test Line Orifice Installation	0
99S102	Repower RHR Sump B Suction Valves	January 29, 2002
00SI01	Design Change 00SI01 Rev 1 - Boric Acid Reduction Design Change - Project Description / Safety Assessment	1
01RH01	RHR Disch Press Loop 1E/Non-1E Separation	1

OPERABILITY RECOMMENDATIONS

Number	Description	Revision/Date
1C18	Engineered Safeguards System Unit 1	11
CAP029362	Operability Evaluation Form - Transfer to High Head Recirculation	0
GEN20018471	Containment Isolation Valves 2VC-8-4 and 2VC-8-5 Installed Vertically with Downward Flow	October 12, 2001
OPR000311	Vibration and Wear on the Unit 2 Seal Injection Line	May 2, 2002

OPERABILITY RECOMMENDATIONS

Number	Description	Revision/Date
OPR000328	Containment Integrity, Charging Pump Suction Valves, SP-1366 (2366)	August 14, 2002
OPR000332	Operability Evaluation Form - Found Body to Bonnet Leak on 2SI-16-5 in containment	September 4, 2002
OPR000353	RHR Flow Rate in LBLOCA Discrepancy	November 8, 2002
OPR000356	Evaluate Operations Use of Oil in Charging Pump Gear Reducers	November 12, 2002
OPR000371	1-CVCH 1680 Support Hanger for Unit 1 Charging Line, Double Bolt Pipe Clamp Missing Center Bolt	January 9, 2003
OPR000373	Operability Evaluation Form - Abnormal Sound During Coastdown of 12 SI Pump Following Run per TP 1087B	January 17, 2003
OPR000380	Evaluate Effect of Installed Vent Plug on 2VC-25-2	February 12, 2003
OPR000384	22 SI Pump has an Inboard Head Flange Leak	February 26, 2003
OPR000390	Post-LOCA Transfer to High Head Recirculation	March 26, 2003
OPR000393	Stress Analysis of Line 2-RH-17 Fails to Consider Weight of Insulation	April 1, 2003
SP 1750(2750)	Post Outage Containment Close-out Inspection	25

PROCEDURES

Number	Description	Revision/Date
1.2.3	Engineering Design Standard for Development of Design Calculations	5W
1C1.3 AOP1	U1 Shutdown from Outside the Control Room	7
1C1.3 AOP2	U1 Cooldown from Outside the Control Room	0
1C12.1	U1 Letdown, Charging, and Seal Water Injection	0
1C12.1 AOP1	Loss of RCP Seal Injection	0
1C12.1 AOP2	Loss of Charging Flow to the Regen Hx	0
1C12.1 AOP3	Loss of Letdown Flow to the VCT	0
1C12.1 AOP4	Alternate Letdown Flowpaths	0
1C15	Residual Heat Removal System	26
1C15 AOP1	RHR Flow Restoration	4
1C15 AOP2	Loss of Coolant Inventory with RHR in Operation	6
1C15 AOP3	RHR Operation without Control Room Instrumentation or Flow Control	6
1C15 AOP4	Loss of RHR Cooling Flow During RCP Seal Maintenance	0W
1C18	U1 Engineered Safeguards System	11
1C18 AOP1	Makeup or Boration of the RCS Using a SI Pump	0
1C18 AOP2	Inadvertent Safety Injection When Shutdown	1
1E-1	U1 Loss of Reactor or Secondary Coolant (Historical)	0
1E-1	U1 Loss of Reactor or Secondary Coolant	20
1E-3	U1 Steam Generator Tube Rupture	19
1ES-0.2	U1 SI Termination	20
1ES-0.3A	U1 Natural Circulation Cooldown w/CRDM Fans	12
1ES-0.3B	U1 Natural Circulation Cooldown w/CRDM Fans	9
1ES-0.4	U1 Natural Circulation Cooldown w/Steam Void in Vessel	9
1ES-1.1	U1 Post LOCA Cooldown and Depressurization	16

PROCEDURES

Number	Description	Revision/Date
1ES-1.2	U1 Transfer to Recirculation	16
1ES-1.3	U1 Transfer to Recirculation w/One Safeguard Train OOS	11
5AWI 3.12.4	Post-Maintenance Testing	10
5AWI 3.14.1	Setpoint Control	14
5AWI 3.14.2	Electrical Process and Protection Setpoint Control	9
5AWI 4.4.0	Drawing Control	10
5AWI 4.4.1	Controlled Drawing Files	12
5AWI 4.4.2	Site Controlled Drawings	10
5AWI 4.4.3	Transitional Drawing Files	11
5AWI 4.4.4	Drawing Additions, Revisions, and Deletions	13
5AWI 6.1.0	Design Change General	7
5AWI 6.1.1	Design Inputs	3
5AWI 6.1.2	Design Documents, Review, and Verification	5
5AWI 6.1.3	Design Change Package, Logs and Records	3
5AWI 6.1.4	Design Change Project Description/Safety Assessment	2
5AWI 6.1.5	Design Change Implementation Plans	3
5AWI 6.1.6	Design Change Review and Approval	6
5AWI 6.1.7	Design Change Work Orders	5
5AWI 6.1.8	Engineering Change Requests	2
5AWI 6.1.9	Design Change Turnover for Operation	5
5AWI 16.0.0	Action Request Process	3
C12.5	Boron Concentration Control	15
C12.5 AOP2	Malfunction of Automatic Makeup	8
C12.5 AOP1	Emergency Boration of the Reactor Coolant System	2W
F3-25	Reentry	8
H1	Quality List Classification Criteria	9
H9	Fuse Control Program	6W
H10.1	ASME IST Valve Test Program - Unit No. 1	14
H31	Radioactive Fluid Leakage Outside of Containment Reduction Program	1
PINGP 1017	Recovery Action Item Form	5
SWI 0-35	EOP Verification, Validation and Maintenance	2
SWI STE-10	Evaluation of Out of Tolerance Calibration Data in I&C Procedures	1

REFERENCES

Number	Description	Revision/Date
2.4.3	Engineering Design, Fabrication, and Installation Summary for Single Failure Criterion	2
3.3.4.1	Engineering Design Standard for Instrument Setpoint/ Uncertainty Calculations	0
18-550	Model 67HTG Manual Station	January 1967
18-551	Model 67HTG Manual Station	April 1967
29001	Bingham-Willamette Pump Curve - SI Pump	N/A
B12A	Chemical and Volume Control System Description	7

REFERENCES

Number	Description	Revision/Date
B15	Residual Heat Removal System	8
B18	Safety Injection System	5
B18A	Safety Injection System Description	5
DBD SYS-12A	Design Basis Document for the CVCS	2
DBD SYS-15	Design Basis Document for the RHR System	4
DBD SYS-18A	Design Basis Document for the Safety Injection System	4
DBD TOP-01	Design Basis Document for the Accident Analysis Topical DBD	1
DBD TOP-10	Design Basis Document for the MOVs Topic	2
F-N-1223	ECCS Actuation - Compliance with the Acceptance Criteria for ECCS for Light Water Nuclear Power Reactors (Fluor Pioneer, Inc.)	December 14, 1976
G-676257	Westinghouse Equipment Specification for Auxiliary Relief Valves	1
LA-UR-01-4083	GSI-191 Parametric Evaluation for Pressurized Water Reactor Recirculation Sump Performance	N/A
LA-UR-01-6882	Technical Letter Report to the NRC from the Los Alamos National Laboratory: GSI 191: Separate Effects Characterization of Debris Transport In Water	0
N/A	System Health Report - RHR System	March 3, 2003
N/A	System Health Report - Safety Injection System	March 3, 2003
N/A	International Association for Hydraulics, Selective Withdrawal from a Vertically Stratified Fluid Harleman, Morgan, Purple	September 1959
N/A	Summary of RHR System Test Results through January 29, 2003	January 29, 2003
NF-NS-02-70	Prairie Island Unit 1 Cycle ECEP Checklist	October 14, 2002
NMC Letter	To NRC for Corrections to ECCS Evaluation Models	March 15, 2001
NSAL-93-016	Containment Spray System Issues	
NSD-E-TAP-0085	Main Steam Line Break Allowable Leak Rate for PINGP	October 16, 1997
NSP-89-101	Maximum Time for System Realignment to Sump Recirculation Following a Small Break LOCA	January 5, 1989
NSP-89-146	Maximum SI Flow Interruption Time for Switchover to Sump Recirculation Following a Small Break LOCA	April 17, 1989
NSP-91-137	Preliminary Results of HHSI Performance Evaluation	April 15, 1991
NSP-93-513	Final Transmittal of Assumptions to Be Used for the Large and Small Break LOCA Analyses	July 7, 1993
NSP-02-38	SBLOCA Limited FSAR Update and Evaluation for Revised Auxiliary Feedwater Flow Rate	September 30, 2002
NSP-03-18	Safety Injection and Recirculation Flows for LOCA Mass and Energy Release and Containment Analyses	February 21, 2003
NSP-03-19	10CFR50.46 Annual Notification and Reporting	March 7, 2003
	Letter to Northern States Power Company Regarding Maximum SI Interruption Time for Switchover to Sump Recirculation Following a Small Break LOCA	April 17, 1989

REFERENCES

Number	Description	Revision/Date
NSP Letter	Response to NRC Bulletin 93-02, “Debris Plugging of Emergency Core Cooling Suction Strainers”	June 8, 1993
NSP Letter	Response to Generic Letter 95-07, Pressure Locking and Thermal Binding of Safety Related Power-Operated Gate Valves	October 16, 1995
NSP Letter	Response to Generic Letter 96-06, Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions	January 28, 1997
NSP Letter	Response to Generic Letter 95-07, Pressure Locking and Thermal Binding of Safety Related Power-Operated Gate Valves	February 12, 1996
NSP Letter	Response to Request for Additional Information Regarding Generic Letter 95-07, Pressure Locking and Thermal Binding of Safety Related Power-Operated Gate Valves (TAC NOS. M93507 and M93508)	August 6, 1996
NSP Letter	Supplemental Response to Generic Letter 95-07, Pressure Locking and Thermal Binding of Safety Related Power-Operated Gate Valves	July 1, 1999
NSP Letter	Response to IN 96-27 Potential Clogging of High Pressure Safety	May 1, 1996
NSP Letter	ECCS Single Failure	December 1, 1981
NUREG/CR-2761 ARL-49-82 Sand82-7065	Results If Vortex Suppressor Tests, Single Outlet Tests and Miscellaneous Sensitivity Tests	N/A
OC.P1.2002.057	LOCA Input Assumptions and Confirmation Data for Prairie Island Unit 1 Cycle 22	September 6, 2002
OC.P1.2002.061	LOCA Input Assumptions and Confirmation Data for Prairie Island Unit 1 Cycle 22 Supplement	September 20, 2002
OC.PX.01.011	Updated Containment Pressure and Temperature Response Following a Large Break LOCA	March 6, 2001
OC.PX.2003.019	Post-LOCA Containment Response-CONTEMPT Case	March 20, 2003
OCPI2002057	LOCA Input Assumptions and Confirmation Data for Prairie Island Unit 1 Cycle 22	September 6, 2002
P8172L-001a	Chemical Volume Control System Lesson Plan	3
P8180L-003	Residual Heat Removal Lesson Plan	3
P8180L-004	Safety Injection System and Accumulators Lesson Plan	4
PI Engineering Manual	Engineering Design Standard for Specification for the Stress Analysis of Piping Systems (Section 3.2.1.1)	2W
PINGP 1224	Crew Meeting Review of Noteworthy Event/Near Miss/ Change for RHR Pit Cover to Remain Closed	April 4, 2003
PIP-W-1032	Pioneer Services and Engineering Company Letter to Westinghouse, Brennan to Santoro, SI Accumulator Level Set Point	September 11, 1972
RG 1.82	Water Sources for Long Term Recirculation Cooling Following a Loss-of-Coolant Accident	2
T-32037	Byron Jackson Pump Curve - #21 RHR Pump	5
Tech. Spec. 3.3	Engineered Safety Features (Historical)	Original Issue

REFERENCES

Number	Description	Revision/Date
Tech. Spec. 3.5	Emergency Core Cooling Systems (ECCS)	Amend 158 (U1) & 149 (Unit 2)
Tech. Spec. 3.5.3 Basis	Emergency Core Cooling Systems (ECCS) - Shutdown	Amend 158 (U1) & 149 (U2)
USAR Section 6.1	Engineered Safety Features Summary Description	22
USAR Section 6.2	Safety Injection System	24
USAR Section 6.7	Effects of Leakage from ESF Systems	23
USAR Figure K-18	Containment Pressure Following a LOCA	24
USAR Sect. 14.9	Environmental Consequences of a LOCA	20
USAR Sect. 14.10	Long Term Cooling Following a LOCA	21
WCAP 11925	An Evaluation of Long Term Cooling for Prairie Island	September 1988
WCAP 13919	Best Estimate Upper Plenum Injection Large Break Loss-of-Coolant Accident Analysis	Addendum 1
WCAP 13920	Small Break LOCA Engineering Company	November 1993

SAFETY EVALUATIONS

Number	Description	Revision/Date
Docket NOS 50-282 and 50-306	Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No 156 to Facility Operating License DPR-42 and Amendment 147 to Facility Operating License No DRP-60	April 16, 2001
SE 27	Remove Accumulator Pressure Transmitter Requirements from FSAR	August 8, 1978
SE 126	Safeguards Chillers for RHR Pits	Addendum 1
SE 289	Justification for Continued Operation (JCO) For Unqualified Flow Transmitters FT-626 and FT-928	November 15, 1990
SE 311	Justification for Downgrading RHR Heat Exchanger Outlet Control Valve Positioners	March 19, 1992
SE 351	Basis for Repositioning Low Head SI MOVs to Resolve PL/TB - Revised to Resolve 11/94 NRR Comments	1
SE 383	USAR Change: 6.2.3.5 Single Failure Analysis	1
SE 420	Regulatory Guide 1.97 Re-classification of SI Accumulator Level and Pressure Transmitters	December 7, 1995
SE 441	RCS Leak Basis	Addendum 0
SE 565	RHR Pump Pit Leak Detection	0

SAFETY SCREENS

Number	Description	Revision/Date
1767	10 CFR 50.59 Screening - Calc ENG-ME-334, Rev. 4, PCRs 20030662, 20030868, 20030664, 20030869, 20030688, 20030834, 20030835, 20030836, 20030810, 20030875, 20030876	0
1787	10 CFR 50.59 Screening - TCNs 20030293, 20030294, 20030295, 20030296	0

SURVEILLANCES

Number	Description	Revision/Date
SP1082	RHR System Leakage Test	24
SP1088A	Train A Safety Injection Quarterly Test	4
SP1092B	SI Check Valve Test (Head Off) Part B: RWST to RHR Flow Path Verification (Test Completed February 6 & 15, 2002, & November 21, 2002)	10
SP1092B	SI Check Valve Test (Head Off) Part B: RWST to RHR Flow Path Verification (Test Completed October 29, 1997, & February 2, 1997)	8
SP1092B	SI Check Valve Test (Head Off) Part B: RWST to RHR Flow Path Verification (Test Completed November 17, 1998, April 24, 1999, May 7, 2000, & January 26, 2001)	9
SP1137	Recirculation Mode Valve Functional CSD Test	24
SP1201A	Sampling System Leakage Test	9
SP1201B	Containment Spray and CA Systems Annual Leakage Test	10
SP1201C	CVCS Holdup Tank and Associated Piping Annual Leakage Test	5
SP1201D	Charging, Letdown & Seal Water Leakage Annual Test	13
SP1201E	High Head Safety Injection System Annual Leakage Test	7
SP1201F	Waste Gas System Leakage Evaluation	7
SP1223A	Event Monitoring Transmitters (Aux & Turb Bldg) Calibration/Inspection	16
SP1224	Event Monitoring Instrument Calibration	23

TEMPORARY PROCEDURE CHANGES

Number	Description	Revision/Date
TCN # 2003-0293	1ES-1.2 - Add RNO to “Locally Open Valve”	16
TCN # 2003-0293	1ES-1.2 Transfer to Recirculation	March 26, 2003
TCN # 2003-0294	1ES-1.3 - Add RNO to “Locally Open Valve”	11

WORK DOCUMENTS

Number	Description	Revision/Date
Work Order 0010666	Remove/Reinstall Valve Enclosure for MV-32076	March 8, 2001

LIST OF ACRONYMS

ADAMS	Agency-wide Document Access and Management System
ANSI	American Nuclear Standards Institute
ATTN	Attention
CAP	Corrective Action Program
CVCS	Chemical & Volume Control System
CFR	Code of Federal Regulations
DPR	Demonstration Power Reactor
DRS	Division of Reactor Safety
ECCS	Emergency Core Cooling System
EOP	Emergency Operating Procedure
EQ	Environmental Qualification
ESF	Engineered Safeguards Features
gov	Goverment
HELB	High Energy Line Break
html	Hypertext Markup Language
http	Hypertext Transfer Protocol
HVAC	Heating, Ventilation and Air Conditioning
HX	Heat Exchanger
I&C	Instrumentation and Control
IEEE	The Institute of Electrical and Electronics Engineers
IMC	Inspection Manual Chapter
IR	Inspection Report
LLC	Limited Liability Company
LOCA	Loss-of-Coolant Accident
LOOP	Loss of Offsite Power
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NFPA	National Fire Protection Association
NRC	Nuclear Regulatory Commission
NUREG	NRC Technical Report Designation
OOS	Out-of-Service
PARS	Publically Available Records System
PINGP	Prairie Island Nuclear Generating Plant
RG	Regulatory Guide
RHR	Residual Heat Removal
RM	Room
RMU	Remote Multiplexing Unit
RWST	Refueling Water Storage Tank
SBO	Station Black Out
SDP	Significance Determination Process
SI	Safety Injection
TCN	Temporary Change Notice
URI	Unresolved Item
USAR	Updated Safety Analysis Report
Vac	Volts alternating current
Vdc	Volts direct current
wpd	WordPerfect Document
www	World Wide Web