UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

March 23, 2000

EA 00-061

Otto L. Maynard, President and
Chief Executive Officer
Wolf Creek Nuclear Operating Corporation
P.O. Box 411
Burlington, Kansas 66839

SUBJECT: NRC INSPECTION REPORT NO. 50-482/00-03

Dear Mr. Maynard:

This refers to the safety system engineering inspection conducted on January 10 through February 4, 2000, at the Wolf Creek Generating Station facility. Additional review and inspection were performed in the Region IV Office until February 10, 2000. A supplemental telephonic exit meeting was held on March 21, 2000. The enclosed report presents the results of this inspection.

During this inspection, we examined your control of design and testing of the containment structure, containment spray system, containment cooling system, containment isolation system, and the hydrogen control system. In addition, we assessed your program controls for performing operability determinations, safety evaluations, temporary modifications, and your updated safety analysis review and update program.

Based on the results of this inspection, the NRC has determined that four Severity Level IV violations of NRC requirements occurred. The violations are being treated as noncited violations, consistent with Section VII.B.1.a of the Enforcement Policy. These noncited violations are described in the subject inspection report. If you contest the violations or severity level of the noncited violations, 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, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011, the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Wolf Creek Generating Station facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice,"a copy of this letter and its enclosure will be placed in the NRC Public Document Room (PDR).

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

original signed by

Dr. Dale A. Powers, Acting Chief
Engineering and Maintenance Branch
Division of Reactor Safety

Docket No.: 50-482
License No.: NPF-42

Enclosure:
NRC Inspection Report No.
50-482/00-03

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	50-482
License No.:	NPF-42
Report No.:	50-482/00-03
Licensee:	Wolf Creek Nuclear Operating Corporation
Facility:	Wolf Creek Generating Station
Location:	1550 Oxen Lane, NE Burlington, Kansas
Dates:	January 10 through February 4, with additional inoffice inspection until February 10, 2000
Team Leader:	L. Ellershaw, Senior Reactor Inspector Engineering and Maintenance Branch
Inspectors:	C. Clark, Reactor Inspector Engineering and Maintenance Branch
	W. McNeill, Reactor Inspector Engineering and Maintenance Branch
	J. Whittemore, Senior Reactor Inspector Engineering and Maintenance Branch
Accompanying Personnel:	R. Deese, Reactor Inspector Engineering and Maintenance Branch
	F. Baxter, Contractor Beckman & Associates, Inc.
	R. Quirk, Contractor Beckman & Associates, Inc.
Approved By:	Dr. Dale A. Powers, Acting Chief Engineering and Maintenance Branch Division of Reactor Safety

ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Wolf Creek Generating Station
NRC Inspection Report No. 50-482/00-03

This report documents the performance of two core inspections that were performed by four region-based inspectors with two consultants during two weeks onsite. Inoffice review and inspection was performed by all inspection personnel during the two weeks between the onsite weeks. Additional inoffice review and inspection were performed by the team leader following the onsite inspection.

Engineering

- The containment tendon surveillance program was being satisfactorily administered and was in accordance with the requirements of Draft Revision 3 of Regulatory Guide 1.35 (Section E1.1).

- The licensee had adequately evaluated the containment spray system in accordance with Information Notice 97-90 concerns and determined that the prescribed containment spray pumps inservice testing limits should assure the design basis flow would be achieved in an accident (Section E1.2.1).

- The licensee failed to verify the design basis of unit auxiliary Transformer XMA02, in that no calculation or analysis was available to support Section 8.3.1.1.1.2 in the Updated Safety Analysis Report, which stated that the transformer had the capacity to supply both non-Class 1E and both Class 1E load groups simultaneously. This failure constituted a violation of Criterion III of Appendix B to 10 CFR Part 50, which requires verification or checking of design adequacy. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee's corrective action program under Performance Improvement Request 2000-0300. Operating procedures to perform the lineup from the unit auxiliary transformer to the Class 1E buses had not been developed; thus, there were no safety implications (Section E1.2.2).

- Vendor calculation identified as Drawing M-018-0389-01, "Analysis of Load Table and Predictions of Voltage Dip and Frequency Excursions at the Various Load Step Conditions," dated March 14, 1980, did not demonstrate that the diesel generator was capable of maintaining voltages within the Updated Safety Analysis Report stated limits during load sequencing. The calculation had not been updated to reflect the changes in loads (approximately 60 kW) and starting sequences made to the Updated Safety Analysis Report, Figure 8.3-2. Additionally, the calculation contained significant errors in that the first sequence step occurred at 20 seconds instead of 12 seconds as required by Updated Safety Analysis Report, Figure 8.3-2. This failure to have adequate design control measures to verify and check the adequacy of the design constituted a second example of a violation of Criterion III of Appendix B to 10 CFR Part 50. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee's corrective action program under Performance Improvement

Request 2000-0318. The team concluded that the additional 60 kW random load was unlikely to impose an obstacle to the diesel generator sequential loading and voltage recovery (Section E1.2.2).

- A violation of Technical Specification SR 3.6.7.2. was identified in which the actual volume of NaOH solution in the spray additive tank was approximately 120 gallons less than the required minimum volume. Existing plant surveillance procedures relied on miscalibrated electronic instrument loops rather than the sight glass. Based on plant computer data provided by the licensee, it appeared that actual volume had probably been less than the minimum acceptable volume since 1994. The failure to maintain the minimum volume in the spray additive tank was a violation of Technical Specification SR 3.6.7.2. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee's corrective action program under Performance Improvement Request 2000-0405. Subsequent to the inspection, the licensee determined that the spray additive tank was capable of performing its intended function (Section E1.2.2).

- While Plant Modification Request 3714 did not result in improper installation of any containment pressure transmitters, it was technically inadequate as it failed to ensure the replacement pressure transmitters would operate properly. Licensee personnel recognized this inadequacy during the installation of one transmitter and took appropriate steps to install it correctly. However, licensee personnel failed to assure that the identified, incorrect change package requirements were corrected (Section 1.3.1).

- The team identified a violation of Criterion V of Appendix B to 10 CFR Part 50 in which licensee personnel failed to follow their motor-operated valve program procedure, and inappropriately removed two active, safety-related, hydrogen purge containment isolation valves from their motor-operated valve program. The team verified, however, that all automatic, motor-operated, containment isolation valves were being appropriately tested in the licensee's inservice and Appendix J testing programs. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee's corrective action program under Performance Improvement Request 2000-0332 (Section E1.4).

- Rather than establish performance measures for the hydrogen analyzers, which are a key component of the hydrogen control system and are used to initiate the balance of the engineered safety feature hydrogen control system, (i.e., recombiners and hydrogen purge), the licensee inappropriately applied a "run-to-failure" criterion. Since failures of the hydrogen analyzers would not be considered maintenance preventable functional failures under a "run-to-failure" criterion, the licensee failed to demonstrate that the performance or condition of the hydrogen control system was effectively controlled through the performance of appropriate preventive maintenance, as required by 10 CFR 50.65(a)(2) (the Maintenance Rule). This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the Enforcement Policy. This violation (EA 00-061) was placed in the licensee's corrective action program as Performance Improvement Request 000313. The hydrogen control system has low risk significance and was not considered in the licensee's probability risk analysis (Section E1.4).

- Licensee procedures provided sufficient guidance to perform equipment operability determinations. The team evaluated three operability determinations and concluded them to be appropriate and thorough (Section E2.1).

- The licensee had carried out an effective program for the sampled 10 CFR 50.59 evaluations. The selected 10 CFR 50.59 evaluations, with one exception, were generally comprehensive, of good quality, and technically adequate. In addition, the engineers who performed the 10 CFR 50.59 safety evaluations were properly qualified (Section E2.2).

- During the past 3 years, the licensee's temporary modification program had been appropriately implemented (Section E2.3).

- All of the automatic, power-operated, containment isolation valves in the selected systems were appropriately included in the applicable surveillance test procedures for stroke-time and leak rate testing. The licensee's 1997, 1998, and 1999 stroke-time and leak rate testing of the reviewed containment isolation valves was acceptable (Section E2.4).

- During the last 3 years, the licensee has effectively managed the engineering backlog and those items that impact engineering resources. Significant improvement had been made in this area (Section E8.1).

- The licensee's Updated Safety Analysis Report program review was effective in identifying discrepancies and initiating license document change requests to validate and correct the Updated Safety Analysis Report. The licensee's Updated Safety Analysis Report review and revision program was a strong program (Section E8.2).

Report Details

III. Engineering

E1 Conduct of Engineering

E1.1 Containment Structure

E1.1.1 Containment Structure Design Review

a. Inspection Scope (93809)

The team reviewed the licensee's program for maintaining the containment structure. This included a review of the licensee's procedures, test results, performance improvement requests, and quality assurance audits of the program.

b. Observations and Findings

The team determined that for maintaining the containment structure, the licensee was committed to Draft Revision 3 to Regulatory Guide 1.35, "Inservice Inspection of Ungrouped Tendons in Prestressed Concrete Constrainments." This regulatory guide sets forth the guidance for ensuring the containment tendons are operable, as well as, inspecting the exterior surfaces of the containment structure itself. The licensee implemented the guidance of this regulatory guide through Procedures TSS MT-044, "Containment Tendon Inspection," and AP 29D-001, "UHS Monitoring & Reactor Building Tendon Inspection Programs." These procedures instruct the licensee's staff to perform Specification C-158(Q), "Technical Specification for Containment Tendon Surveillance," Revision 8.

Specification C-158(Q) gave specific guidance on containment tendon sampling and testing. The team found that the implementing procedures for proper prestressing force measurement, visual tendon inspection, sheathing filter grease sampling and inventory, anchorage assembly hardware inspection, and containment vessel external surface inspection tests met the intent of Regulatory Guide 1.35.

The team also found that the licensee was preparing for their next containment tendon inspection in April 2000. This will be the 15-year inspection. The last inspection, which was performed in September 1994, was the 10-year inspection, and was documented in WCNOC-114, "Tenth Year Physical Surveillance of the Wolf Creek Unit 1 Containment Building Post-Tensioning Surveillance Report," Revision 0. The results of all tests were found to be satisfactory and the team found the planned upcoming sample populations to be appropriate.

The team reviewed Purchase Order O705347, Revision 0, dated October 5, 1999, which ordered equipment and labor from the vendor (Precision Surveillance Corporation), for the upcoming April 2000 containment tendon inspection. This purchase order was found to be specific and adequate in the incorporation of the requirements of Specification C-158(Q).

The team also reviewed all of the performance improvement requests generated against the containment tendon surveillance program over the past 2 years. Only three were generated and none dealt with technical inadequacies or concerns of the program.

The team reviewed Procedures TSS MT-044 and AP 29D-001 for quality assurance surveillance requirements. The team reviewed the surveillance report from the last inspection in 1994 and found the surveillances to be thorough and the requirements to have been met.

c. Conclusions

The team concluded that the containment tendon surveillance program was being satisfactorily administered and was meeting all of the requirements of Draft Revision 3 of Regulatory Guide 1.35.

E1.1.2 Containment Penetrations Design Review - Electrical and Instrumentation and Control

a. Inspection Scope (93809)

The inspection of the electrical penetrations focused on a review of various documents that discussed their intended functions. The documents reviewed included the Updated Safety Analysis Report, technical specifications, drawings, calculations, and procurement specifications.

Specification E-035, “Technical Specification for Electrical Penetration Assemblies for the Standardized Nuclear Unit Power Plant System (SNUPPS),” Revision 8, Specification E-035B, “Technical Specification for Electrical Penetration Module Assemblies for the Standardized Nuclear Unit Power Plant System (SNUPPS),” Revision 3, and Specification E-035E, “Design Specification Wolf Creek Generating Station Fiber Optic Penetrations,” Revision 1, were reviewed to assure that technical and environmental parameters were consistent with Updated Safety Analysis Report requirements.

b. Observations and Findings

b.1 Environmental and Technical Parameters

The team verified that the technical and environmental parameters were consistent with the Updated Safety Analysis Report requirements.

b.2 Capability to Withstand Short Circuits

Regulatory Guide 1.63, “Electrical Penetration Assemblies in Containment Structures for Light-Water-Cooled Nuclear Power Plants,” Revision 2, requires that electrical penetrations be designed to withstand the maximum short-circuit versus time conditions that could occur given single random failures of circuit overload protection devices. The team determined that the licensee was committed to this regulatory guide.

The team reviewed Calculation XX-E-006, “AC System Analysis,” Revision 4, to obtain the maximum short-circuit currents that could be seen by the power feeder penetrations.

Calculation A-6-W, “Thermal Capability of Electrical Penetration Assemblies versus Dual Short-Circuit Protection to Satisfy Regulatory Guide 1.63,” Revision W2, was reviewed and found to assure that the time-current plots demonstrated adequate thermal capability of the penetrations to withstand external short-circuits, assuming failure of the primary interrupting devices.

c Conclusions

The team identified no concerns with the environmental and technical parameters, or the capability to withstand short-circuits of the electric penetration assemblies.

E1.2 Containment Spray System

E1.2.1 Containment Spray System Design Review - Mechanical

a. Inspection Scope (93809)

The team reviewed and compared the inservice testing limits for Containment Spray Pump B to the required design basis flow prescribed in the Updated Safety Analysis Report to determine if the design basis flow would be assured in the event of an accident.

b. Observations and Findings

NRC Information Notice 97-90, “Use of Non-Conservative Acceptance Criteria in Safety-Related Pump Surveillance Tests,” alerted licensees to the problem of setting ASME inservice testing bounds lower than the Updated Safety Analysis Report design basis flow. The team reviewed containment spray system documentation for the possibility of this problem.

The team found that the licensee had conducted an Information Notice 97-90 analysis for the containment spray system as part of Performance Improvement Request 98-0219, dated January 29, 1998. The team discovered that only Containment Spray Pump B was evaluated. The licensee considered Containment Spray Pump B to be bounding, in that Containment Spray Pump A demonstrated its ability to deliver more flow than Containment Spray Pump B at all conditions during the initial startup pump runs used to establish baseline inservice testing limits. As a result, the licensee determined that Containment Spray Pump B would always be more limiting (i.e., have a lower inservice testing acceptance limit) than Containment Spray Pump A and, therefore, be the bounding pump when compared to the required design basis flow. The team agreed with this determination.

Since a full-flow test would require actual spray of the containment and complicated cleanup, the licensee performed a flow test for inservice testing purposes using a recirculation loop as allowed by the ASME code. This test was accomplished at 300 gpm, or approximately one tenth the design system flow; therefore, an actual Information Notice 97-90 full-flow comparison was not performed. In order to evaluate the containment spray pumps for Information Notice 97-90 concerns, the actual designed and measured pump flow curve from initial startup pump testing was plotted. Inservice testing allowances required by the ASME code were applied to this curve. The calculated system resistance curve for full flow was then applied against the inservice testing minimum required flow curve. This analysis for Containment Spray Pump B showed that the intersection was over 200 gpm higher than required safety analysis flow; thus, the intersection for Containment Spray Pump A would be even higher.

The team reviewed this analysis and found it to be satisfactory and representative in assuring design basis flow would be delivered by the containment spray pumps if they tested satisfactorily in the inservice testing program.

c. <u>Conclusions</u>

The team determined that the licensee had adequately evaluated the containment spray system in accordance with Information Notice 97-90 and that the prescribed containment spray pumps inservice testing limits would assure assumed design basis flow would be achieved in an accident.

E1.2.2 <u>Containment Spray System Design Review - Electrical and Instrumentation and Control</u>

a. <u>Inspection Scope (93809)</u>

The team reviewed the Updated Safety Analysis Report, technical specifications, drawings, calculations, system description, total plant setpoint document, calibration procedures, surveillance procedures, and emergency operating procedures; safety evaluations, and plant modifications related to the containment spray system as a means to assess the licensee’s engineering effectiveness in maintaining the licensing and design bases.

In addition, the diesel generator loading and voltage recovery calculations were reviewed to verify that the diesel generators were capable of starting, accelerating, and running all required loads, including the containment spray pumps and their associated motor-operated valves.

b. Observations and Findings

b.1 Offsite Power

General Design Criterion 17 requires that an offsite electric power system be provided to permit functioning of structures, systems, and components important to safety. The offsite power circuits from the switchyard to the safety-related buses were reviewed to ensure that all configurations identified in the licensing bases were supported by an analysis, and to show that they were capable of providing adequate power to the connected equipment. The applicable operating procedures were also reviewed to ensure that they supported the licensing basis.

Updated Safety Analysis Report, Section 8.3.1.1.1.2, states, “The unit auxiliary and startup transformer each have the capacity to supply both non-Class 1E and both Class 1E load groups simultaneously.”

Scenario L6 of Calculation XX E-006 demonstrated the capacity to feed Buses NB01 and NB02 simultaneously from startup Transformer XMR01; however, no analysis existed to show that unit auxiliary Transformer XMA02 had the capacity to supply both non-Class 1E and both Class 1E load groups simultaneously. Additionally, no operating procedures existed to perform the lineup between the unit auxiliary transformer and the Class 1E buses.

The licensee’s representative acknowledged the discrepancy, and issued Performance Improvement Request 2000-0300 to determine whether the Updated Safety Analysis Report should be corrected, or whether additional analyses and procedures should be developed to validate and comply with the Updated Safety Analysis Report requirement.

Criterion III in Appendix B to 10 CFR Part 50, requires, in part, that measures shall be established to assure that applicable design bases are verified or checked for adequacy. The team determined that the licensee failed to verify the adequacy of the design basis, in that, no analysis was available to demonstrate that unit auxiliary Transformer XMA02 had the capacity to supply both non-Class 1E and both Class 1E load groups simultaneously. This failure constituted a violation of Criterion III of Appendix B to 10 CFR Part 50. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee’s corrective action program under Performance Improvement Request 2000-0300 (50-482/0003-01). Operating procedures to perform the lineup from the unit auxiliary transformer to the Class 1E buses had not been developed; thus, there were no safety implications.

b.2 Short-Circuit Potential and Voltage

The team determined that, under worst-case conditions, adequate voltage was available to all equipment, including the containment spray pumps, and that calculated short-circuit levels were within the switchgear, penetration, and cable ratings. The team verified that the licensee had included all licensing basis commitments, and had considered the worst-case scenarios in their analyses.

With the exception of the lineup from the unit auxiliary transformer to the Class 1E buses, which had not been analyzed in Calculation XX E-006 for voltage or short-circuit adequacy, the team found that all conclusions of the calculation were acceptable.

b.3 Diesel Generator

The voltage and frequency limits imposed on the diesel generator during load sequencing were stated in Updated Safety Analysis Report Sections 8.1.4.3 and 8.3.1.1.3.

Section 8.1.4.3 stated, "The Diesel Generators are designed as follows:

"a. To start and accelerate to rated speed, in the sequence shown in Figure 8.3-2, all the needed engineering safety features and emergency hot shutdown loads.

"b. So that at no time during the loading sequence do the frequency and voltage decrease to less than 95 percent of 60 Hz and 75 percent of 4.16 kV, respectively.

"c. To recover from transients caused by step-load increases or resulting from the disconnection of full load so that the speed does not cause damage to moving parts. During recovery, the speed of the diesel generator will not exceed 75 percent of the difference between the nominal speed and the overspeed trip set point, or 115 percent of nominal, whichever is lower. Voltage is restored to within 10 percent of nominal and frequency within 2 percent of nominal in less than 60 percent of each load sequence interval. A greater percentage of time interval may be used if it can be justified by engineering analysis."

Updated Safety Analysis Report, Section 8.3.1.1.3, stated, "Momentary voltage and frequency dips will not exceed a maximum of 25 percent below nominal rating (4.16 kV) for voltage and 5 percent for frequency."

The team identified, however, that the existing calculation (vendor calculation identified as Drawing M-018-0389-01, "Analysis of Load Table and Predictions of Voltage Dip and Frequency Excursions at the Various Load Step Conditions," dated March 14, 1980) did not demonstrate that the diesel generator was capable of maintaining voltages within these Updated Safety Analysis Report stated limits during load sequencing. In addition, the vendor calculation had not been updated to reflect the changes in loads and starting sequences shown in Updated Safety Analysis Report, Figure 8.3-2.

Procedures AP 05-005, “Design, Implementation and Configuration Control of Modifications,” Revision 4; AP 05-002, “Dispositions and Change Packages,” Revision 3; AP 05-010, “Design Drawings,” Revision 0; and AP 05D-001, “Calculations,” Revision 4, required that the drawing be identified and updated. Additionally, the calculation contained significant errors in that the first sequence step occurred at 20 seconds instead of 12 seconds as required by Updated Safety Analysis Report, Figure 8.3-2, and the application of random loads was not consistent. Based on the above, the team determined that Drawing M-018-0389-01 could not be considered a document that adequately supported the licensing and design basis. The licensee issued Performance Improvement Request 2000-0318 to evaluate why Drawing M-018-0389-01 was not updated in accordance with the procedures.

This failure to have adequate design control measures to verify and check the adequacy of the design constituted a violation of Criterion III of Appendix B to 10 CFR Part 50. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee’s corrective action program under Performance Improvement Request 2000-0318, and constitutes a second example of a Criterion III violation (50-482/0003-01).

Random loads are those loads that are controlled by process signals such as temperature, level, pressure, or flow. Because of their very nature, random loads may start at any time. Since the starting of random loads may coincide with diesel generator sequential loading steps, they may affect the diesel generator’s ability to accept and recover from the sequential step loading; therefore, the effect of random loads must be included to ensure that the worst-case sequential load has been considered. Updated Safety Analysis Report, Figure 8.3-2, did not treat random loads appropriately or consistently. Some random loads had been included in the first starting sequence at 12 seconds, while others were designated to start or stop automatically from pressure and temperature signals, when required. However, no evaluation was available to determine their effect on diesel generator voltage recovery. Moreover, as the licensee identified during their initial performance improvement request evaluation, other random loads were either not conservative or had not been included in Figure 8.3-2, or had been designated as manual loads. As a result, Updated Safety Analysis Report, Figure 8.3-2, was determined to be neither representative nor bounding with respect to random loads.

In response to the team’s finding, the licensee initiated Performance Improvement Request 2000-0141 and 2000-0330. Performance Improvement Request 2000-0141 suggested that Surveillance Test STSK-J001A/B should be compared against worst-case sequential loading, and the margins which were believed to exist between the testing and worst-case loading should be validated. If margin was found to exist, then the testing could be considered to be bounding, and would be a substitute for not having a calculation.

Performance Improvement Request 2000-0330 identified errors, inconsistencies, and questionable methodology in Updated Safety Analysis Report, Figure 8.3-2 (identified as Drawing E-11005, “List of Loads Supplied By Emergency Diesel Generator,” Revision 21). Based on the licensee’s initial review, it was estimated that there would be an increase of approximately 60 kW of random load. The performance improvement request also suggested the licensee perform a major review to improve the overall method of handling diesel generator loading, including the treatment of random and manual loads, and their documentation and evaluation.

The team concluded that the additional 60 kW random load was not likely to impose an obstacle to the diesel generator sequential loading and voltage recovery.

b.4 Automatic Valve Operation

The team determined by review of Drawing E-13EN03, “Containment Spray Nozzles Isolation Valve Schematic,” Revision 1, that Containment Spray Nozzle Isolation Valves ENHV-6 and ENHV-12 opened on a containment spray actuation signal and remained open until operator action shut them.

The team also determined from a review of Drawing E-13EN04, “Spray Additive Tank Isolation Valves Schematic,” that Valves ENHV-15 and ENHV-16 opened on a containment spray actuation signal. The valves can be closed upon receipt of a spray additive tank low-level signal, and automatically close upon the receipt of a low-low spray additive tank level signal.

The team verified the control power to these motor-operated valves was safety-related Class 1E.

b.5 Spray Additive Tank Level

Technical Specification SR 3.6.7.2 requires a spray additive tank volume $\geq$4340 and $\leq$4540 gallons. The nitrogen-blanketed tank is required by Technical Specification SR 3.6.7.3 to contain $\geq$28 and $\leq$31 percent by weight sodium hydroxide (NaOH) concentration. The technical specification bases does not provide guidance on why there is an upper volume limit, but addresses the minimum volume by stating, “Since the RWST [refueling water storage tank] contents are normally acidic, the volume of the spray additive tank must provide a sufficient volume of spray additive to adjust pH of all water injected.” Updated Safety Analysis Report, Section 6.5.2.3, required the spray solution to have a pH between 9.0 and 11.0 to remove the elemental iodine, and the final containment sump inventory (i.e., after the completion of spray addition) to have a minimum pH of 8.5 to retain iodine.

The spray additive tank had two wide-range level transmitters (ENLT0017 and ENLT0019), two narrow-range level transmitters (ENLT0015 and ENLT0016), and a wide-range level sight glass. The sight glass is normally isolated because it is not seismically qualified; therefore, plant operators relied on the wide-range instrument loop for routine and surveillance test level monitoring.

The wide-range level instruments, used during technical specification surveillance testing, were calibrated based on assumptions regarding different temperatures and NaOH concentrations in the tank and the level reference leg that were unlikely to exist during either normal or accident conditions. This methodology was established to conservatively meet the original design function of the tank low-level switch setting, which was to prohibit isolating the spray additive tank prior to injecting sufficient NaOH. The team noted that this design function was no longer included in the plant emergency operating procedures; in fact, the plant emergency operating procedures relied on the low-low tank level associated with narrow range Transmitters ENLT0015 and ENLT0016. While the licensee had a method available to them in which they could validate the wide-range level instruments by comparing with the sight glass, they chose not to do so. The team noted that this could have been accomplished at any time while the plant was shut down (attempting to do so while the plant was operating would have required entry into a limiting condition for operation).

During review of the two applicable engineering documents, which calculated tank volume as a function of level (i.e., WCRE-03 “Wolf Creek Tank Document,” Revision 20, Sheet 38, and Calculation J-L-EN02, Revision 2), the team identified several inconsistencies within and between them. These inconsistencies related to tank level percentages, tank volumes, inconsistent mathematical methodology associated with fluid volumes in the upper and lower hemispherical sections of the tank, green banding the control room instruments to reflect acceptable tank levels that were beyond the technical specification allowed limits, and arithmetic errors. These conditions created a situation in which the control room instruments were unreliable for technical specification validation. In acknowledgment to these findings, license personnel initiated Performance Improvement Requests 2000-0333 and 2000-0394 to address the issues.

The team also identified that Section A.2 in Surveillance Procedure TSS ML-01, "Monthly Surveillance Log,” Revision 29, used to verify Technical Specification SR 3.6.7.2 specified volumes, required the use of control room wide-range level instrument loop Indicators EN LI-17 and EN LI-19 rather than the sight glass. However the wider acceptance criteria associated with the sight glass were specified in Procedure TSS ML-01, rather than the acceptance limits associated with the wide-range instruments.

As a result of these errors, and depending on whether the sight glass or instrument loop indicators were observed, the team concluded that different volume indications would exist. The team determined that the conservative assumptions used when scaling the wide-range loops resulted in actual level being less than technical specification minimum volume. Based on plant computer data provided by the licensee, it appeared that actual volume had probably been less than the minimum acceptable volume since 1994. On February 10, 2000, the licensee returned to service the sight glass and determined the actual volume of NaOH solution was approximately 100 gallons less than the technical specification required minimum volume. The licensee immediately initiated Performance Improvement Request 2000-0405 on February 10, 2000, to evaluate this condition.

Their evaluation confirmed that the actual volume was approximately 100 gallons less than the technical specification required minimum volume, thus, on February 10, 2000, the licensee made a 10 CFR 50.72(b)(1)(ii)(B) notification to NRC about this condition.

Based on plant emergency operating procedures, which do not stop the spray additive tank flow until the tank low-low level setpoint is reached, the team did not identify any significant safety problem with the technical specification violation.

The failure to maintain the minimum volume in the spray additive tank was a violation of Technical Specification SR 3.6.7.2. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee's corrective action program under Performance Improvement Request 2000-0405 (50-482/0003-02).

c. Conclusions

The team identified two examples of a noncited violation associated with the electrical distribution systems required to support the containment spray system.

The licensee failed to verify the design basis of unit auxiliary Transformer XMA02, in that no calculation or analysis was available to support Section 8.3.1.1.1.2 in the Updated Safety Analysis Report, which stated that the transformer had the capacity to supply both non-Class 1E and both Class 1E load groups simultaneously. This failure constituted a violation of Criterion III of Appendix B to 10 CFR Part 50, which requires verification or checking of design adequacy. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee's corrective action program under Performance Improvement Request 2000-0316.

Calculation (vendor calculation identified as Drawing M-018-0389-01, "Analysis of Load Table and Predictions of Voltage Dip and Frequency Excursions at the Various Load Step Conditions," dated March 14, 1980) did not demonstrate that the diesel generator was capable of maintaining voltages within the Updated Safety Analysis Report stated limits during load sequencing. The calculation had not been updated to reflect the changes in loads and starting sequences made to the Updated Safety Analysis Report, Figure 8.3-2. Additionally, the calculation contained significant errors in that the first sequence step occurred at 20 seconds instead of 12 seconds as required by Updated Safety Analysis Report, Figure 8.3-2. This failure to have an adequate design control measures to verify and check the adequacy of the design constituted a second example of a violation of Criterion III of Appendix B to 10 CFR Part 50. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee's corrective action program under Performance Improvement Request 2000-0318.

A violation of Technical Specification SR 3.6.7.2. was identified in which the actual volume of NaOH solution in the spray additive tank was approximately 100 gallons less than the required minimum volume. Based on plant computer data provided by the licensee, it appeared that actual volume had probably been less than the minimum acceptable volume since 1994. The failure to maintain the minimum volume in the spray additive tank was a violation of Technical Specification SR 3.6.7.2. (50-482/0003-02). This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee's corrective action program under Performance Improvement Request 2000-0405.

E1.3 Containment Cooling System

E1.3.1 Containment Cooling System Design Review - Instrumentation and Controls

a. Inspection Scope (93809)

The team reviewed the Updated Safety Analysis Report, technical specifications, drawings, calculations, system description, total plant setpoint document, calibration procedures, surveillance procedures, emergency operating procedures, and plant modifications related to the containment cooling system. Specific issues reviewed included the automatic operation of fans and compliance with technical specification requirements for containment pressure and temperature.

b. Observations and Findings

Plant Modification Request (PMR) 3714, "Containment Pressure Transmitter Changeout," Revision 1, was issued in 1993 to replace the six Barton Model 752 containment pressure transmitters (GNPT934, GNPT935, GNPT936, GNPT937, GNPT938, and GNPT939) with Rosemount Model 1153 pressure transmitters. The sealed Barton pressure sensing elements were to be replaced with similar equipment, evacuated, and filled before using them with the new transmitters. Transmitters GNPT935, GNPT936, GNPT937, in conjunction with GNPT934 are used by the engineered safety feature actuation signal for initiation of various safety-related systems. Transmitters GNPT938 and GNPT939 are wide range pressure instruments used for post-accident monitoring, and have no direct control function. The team was informed that, as of the date of the inspection, just one transmitter (GNPT934) had been replaced.

During review of the PMR, the team identified that it contained incorrect guidance and was technically inadequate for filling the sealed sensor assemblies. If the guidance had been followed during installation, it would have resulted in a failure to accurately monitor and measure containment pressure. The team concluded the pressure detected by the transmitters would be significantly less than actual containment pressure.

In response to the team's interest in this finding, the licensee provided Work Request 00364-93, which implemented the PMR during replacement of Transmitter GNPT934. The team noted that the sensor evacuation and filling guidance contained in the work request was technically correct, but different from that in the PMR. Although there were several field change requests associated with the installation of Transmitter GNPT934, none of these identified the inconsistency between the correct work request and the incorrect PMR.

The team verified that the PMR was still open, and that the replacement of the remaining pressure transmitters, specifically GNPT935, GNPT936, GNPT937, GNPT938, and GNPT939 using the incorrect evacuation and fill procedure contained in the PMR, was still planned.

Procedure AP 05-005, Section 6.3.1, requires the implementation coordinator to plan the change "based on the change package requirements." Had the implementation coordinator planned the work request based on the change package requirements, the replaced transmitter would have contained an incorrectly evacuated and filled pressure sensing element. The coordinator recognized that the PMR was not correct and planned the work request accordingly. However, the coordinator did not take appropriate steps to have the faulty PMR corrected. The team noted that the failure of Transmitters GNPT935, GNPT936, GNPT937 would prevent a safety injection, main steam line isolation, and containment spray actuation signal at Containment Pressure HI-1, HI-2, and HI-3 setpoints.

In response to the team's finding, licensee personnel initiated Performance Improvement Request 2000-0327 to address this issue.

c. Conclusions

The team concluded PMR 3714 was technically inadequate as it failed to ensure the replacement pressure transmitters would operate properly. Cognizant licensee personnel recognized this inadequacy, but failed to assure that the identified, incorrect change package requirements were corrected.

E1.4 Hydrogen Control System

a. Scope of Inspection (93809)

The hydrogen control system was reviewed in detail. The review included confirming the adequacy of the design, testing, and fidelity of the Updated Safety Analysis Report and other design documents. Documents reviewed included the Updated Safety Analysis Report, applicable technical specification, and system description. In addition, design calculations, configuration control packages, program and testing procedures, work orders, and performance improvement requests were reviewed.

b. Observations and Findings

b.1 Overall Review

The team reviewed a sample of 3 calculations and 6 surveillance test procedures, 4 configuration change packages, 13 performance improvement requests, and 9 work orders. These documents were found to be consistent with the Updated Safety Analysis Report and the system description.

b.2 Hydrogen Purge Containment Isolation Valves

On June 28, 1989, the NRC issued Generic Letter 89-10, **"**Safety-Related Motor-Operated Valve Testing and Surveillance**,"** that requested licensees to establish a program to ensure (through testing) that switch settings for safety-related motor-operated valves were selected, set, and maintained properly. Procedure AP 23D-001, "Motor Operated Valve Program," was subsequently developed to implement the requested program on February 10, 1995. Section 2.1 in Revision 1 to the procedure, required the program to be applicable to active safety-related motor-operated valves defined in Generic Letter 89-10. Any excluded valves were to be determined to have no active safety-related function based on documented justification and engineering review. Included in the program were Hydrogen Purge Containment Isolation Valves GSHV0020 and GSHV0021 (active safety-related motor-operated valves). These valves (Fisher butterfly valves equipped with Limitorque actuators) are the inner and outer containment isolation valves for Penetration P-65. The safety function is to close automatically when the engineered safety features actuation signal (containment isolation Phase A) is received. In addition, these valves are opened and closed to allow containment purge operation to maintain hydrogen concentration or pressure in containment. The hydrogen purge subsystem is a backup system to the hydrogen recombiners and the normal containment mini-purge system.

Configuration Change Package 05622, approved December 31, 1994, removed Valves GSHV0020 and GSHV0021 from the Generic Letter 89-10 program prior to completion of the internally-committed actions. The logic used for removal was that "the required torque . . . is nothing more than the amount of torque required to open and close the valves under static, not dynamic, loading conditions. This in combination with the discussions previously stated . . . more than adequately justify the removal of these valves from the Generic Letter 89-10 program. . . . " As a result, no testing was performed to ensure that switch settings for these safety-related motor-operated valves were selected, set, and maintained properly.

There was no licensee determination available to show that these valves had no active safety-related function; therefore, in accordance with Procedure AP 23D-001, they were required to be in the program. The team considered the licensee's failure to follow their motor-operated valve program procedure to be a violation of Criterion V in Appendix B to 10 CFR Part 50, which requires that activities affecting quality shall be prescribed by, and accomplished in accordance with, documented instructions, procedures, or drawings. The team, however, did not find this deletion to be an operability issue, in that an excess of torque margin existed (only 12 percent of available torque was needed for valve seating). In addition, as discussed in Section E2.6 of this report, all automatic, motor-operated, containment isolation valves were verified to be tested in the licensee's inservice and Appendix J testing programs. On February 3, 2000, the licensee issued Performance Improvement Request 2000-0332 to evaluate this issue. As part of this issue, and from a generic perspective, the licensee conducted a review of 17 other valves removed from the program and determined that all had a sound technical basis for removal.

This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee's corrective action program under Performance Improvement Request 2000-0332 (50-482/0003-03).

b.3 Hydrogen Analyzers

The hydrogen control system is an engineered safety feature that serves to control combustible gas concentrations in the containment building. Hydrogen control subsystems consist of redundant hydrogen recombiners, a redundant hydrogen monitoring subsystem and a backup hydrogen purge subsystem. The safety function of the hydrogen monitoring system is to provide data on hydrogen concentration levels inside containment. The key component of the hydrogen monitoring system is the hydrogen analyzer that may be operated periodically to sample normal containment atmosphere, and is automatically isolated following a loss-of-coolant accident. The hydrogen analyzer, which is manually initiated, helps to ensure that containment integrity and safeguards operation will not be jeopardized.

The NRC, in Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," endorsed Nuclear Management and Resources Council (NUMARC) 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," which provided guidance for licensees to comply with 10 CFR 50.65 (The Maintenance Rule). The licensee committed to the use of NUMARC 93-01 in their Maintenance Rule program. Sections 9.2, 9.3.3, and 10.2 in NUMARC 93-01 state that systems, structures, and components "that provide little or no contribution to system safety function could be allowed to 'run to failure'. . . ." Section 4.1.5 in Procedure AP 23M-001, "WCGS Maintenance Rule Program," Revision 3, defines "run to failure" as systems, structures, and components "that (have) been determined to provide little or no contribution to the system function, and the consequence of failure is acceptable." Section 2.1 in Procedure AP 23M-001 states that the procedure implements the requirements of 10 CFR 50.65 and addresses establishing performance measures. Section 6.1.3 in Procedure AP 23M-001 addresses establishing appropriate performance measures to evaluate the effectiveness of the preventive maintenance program to provide reasonable assurance that the plant and scoped systems, structures, and components will perform intended functions.

The licensee's Maintenance Rule data base identified a function of the hydrogen control system to be hydrogen analysis, which was specified as "run to failure." As a result, licensee personnel did not establish performance measures for the hydrogen analyzers and, therefore, failures would not be considered maintenance preventable functional failures. The licensee's Maintenance Rule expert panel made the decision to designate this function as "run to failure" at the time of implementation of the Maintenance Rule on July 10, 1996, because of a history of frequent failures of the hydrogen analyzers (Performance Improvement Request 941201 documented the occurrence of four monthly surveillance test failures during a 1-year period). The logic of the Maintenance Rule expert panel, which was documented in the Maintenance Rule data base, stated that ". . . hydrogen analyzers may be allowed to run to failure based on the fact that the analyzers are considered low risk significant by the Maintenance Rule expert panel, they are not considered in the PRA and alternate methods are available to sample for hydrogen concentration in the containment in the event of an accident. The cost associated with increasing the PM program (2 to 3 times more maintenance) is not justified compared to the safety significance of the system."

The team reviewed 33 performance improvement requests that were written on the hydrogen control system during the last 3 years (1997-1999). During this review, the team found 6 performance improvement requests that identified monthly surveillance failures and stated an evaluation was required to determine if a Maintenance Rule functional failure existed. Licensee personnel determined that there was no need for a functional failure evaluation because the components had previously been identified as "run to failure."

10 CFR 50.65(a)(1) states, in part, that a holder of an operating license shall monitor the performance or condition of structures, systems, and components as defined by 10 CFR 50.65(b), against licensee-established goals, in a manner sufficient to provide reasonable assurance that such structures, systems, and components are capable of fulfilling their intended functions. Such goals shall be established commensurate with safety and, where practical, take into account industry-wide operating experience. When the performance or condition of a structure, system, or component does not meet established goals, appropriate corrective actions shall be taken. 10 CFR 50.65(c) states that the requirements of this section shall be implemented by each licensee no later than July 10, 1996. 10 CFR 50.65(a)(2) states, in part, that monitoring as specified in 10 CFR 50.65(a)(1) is not required where it has been demonstrated that the performance of appropriate preventive maintenance, such that the structure, system, or component remains capable of performing its intended function.

The licensee elected to not monitor the performance or condition of the hydrogen control system against established goals, pursuant to the requirements of Section (a)(1), from July 10, 1996, and continuing through the end of this inspection. Therefore, the licensee failed to demonstrate the performance or condition of the hydrogen control system had been effectively controlled through the performance of appropriate preventive maintenance such that the system remained capable of performing its intended function. This was a violation of 10 CFR 50.65(a)(2). In response to the team’s finding, licensee personnel initiated Performance Improvement Request 000313 on February 2, 2000, to evaluate this condition.

This Severity Level IV violation (EA 00-061) is being treated as a noncited violation, consistent with Section VII.B.1.a of the Enforcement Policy. This violation was placed in the licensee’s corrective action program as Performance Improvement Request 000313 (50-482/0003-04).

c. Conclusion

The team identified a violation of Criterion V of Appendix B to 10 CFR Part 50 in which licensee personnel failed to follow their motor-operated valve program procedure, and inappropriately removed two active, safety-related, hydrogen purge containment isolation valves from their motor-operated valve program. The team verified, however, that all automatic, motor-operated, containment isolation valves were being appropriately tested in the licensee’s inservice and Appendix J testing programs. This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the NRC Enforcement Policy. This violation was placed in the licensee’s corrective action program under Performance Improvement Request 2000-0332.

Rather than establish performance measures for the hydrogen analyzers, which are a key component of the hydrogen control system and are used to initiate the balance of the engineered safety feature hydrogen control system, (i.e., recombiners and hydrogen purge), the licensee inappropriately applied a “run-to-failure” criterion. Since failures would not be considered maintenance preventable functional failures under a “run-to-failure” criterion, the licensee has not appropriately monitored the effectiveness of the preventive maintenance program as required by 10 CFR 50.65(a)(2) (the Maintenance Rule). This Severity Level IV violation is being treated as a noncited violation, consistent with Section VII.B.1.a of the Enforcement Policy. This violation was placed in the licensee’s corrective action program as Performance Improvement Request 000313. The hydrogen control system has low risk significance and was not considered in the licensee’s probability risk analysis.

E1.5 Containment Hydrogen Control System and Containment Spray System Walkdown

Team members conducted a walkdown of the accessible portions of the containment hydrogen control system and the containment spray system, including major mechanical, electrical, and instrumentation and control components. In addition, the team observed instrumentation and indication in the main control room and remote shutdown panel for both systems. In general, the team found that the areas observed were adequately maintained and were consistent with design documents. Housekeeping appeared to be very good.

E2 Engineering Support of Facilities and Equipment

E2.1 Equipment Operability Determinations

a. Inspection Scope

The team reviewed all engineering evaluations, including calculations used to support equipment operability determinations associated with the hydrogen analyzers, containment coolers, and containment isolation system from the past 3 years. The team also reviewed the applicable operability determination procedures.

b. Observations and Findings

The team reviewed Procedures AP 28-001, "Evaluation of Nonconforming Conditions of Installed Plant Equipment," Revision 7, and AP 26C-004, "Technical Specification Operability," Revision 3, and determined that they provided the necessary guidance for licensee personnel to perform equipment operability determinations.

Discussions with licensee personnel, in conjunction with records review, determined that only three equipment operability determination evaluations had been performed for the systems within the scope of this inspection in the last 3 years. The team evaluated the three operability determinations and noted that licensee personnel had been appropriately thorough in performing their evaluations. The team agreed with the operability determination evaluation conclusions.

c. Conclusions

Licensee procedures provided sufficient guidance to perform equipment operability determinations. The team evaluated three operability determinations and concluded them to be appropriate and thorough.

E2.2 10 CFR 50.59 Safety Evaluations

a. Inspection Scope (37001)

The team performed a review of the licensee's safety evaluation program to determine if recent changes made under this program were in accordance with the requirements of 10 CFR 50.59. The team reviewed Procedure AP 26A-003, "Screening and Evaluating Changes, Tests, and Experiments," Revision 5; several 10 CFR 50.59 engineering screening documents; several 10 CFR 50.59 safety evaluations; and the training and qualification of personnel who performed the 10 CFR 50.59 safety screening and evaluative tasks.

b. Observations and Findings

The team reviewed the training program and qualification requirements for licensee personnel qualified to perform and review the 10 CFR 50.59 program screening and safety evaluation tasks, and verified that adequate training and certification requirements were in place. The team determined that the safety evaluation program was supported by a good training and qualification program.

During the inspection team's detailed review of a sample of safety screens and evaluations, the team determined that, with the exception of the safety evaluation for Configuration Change Package 09194, Unresolved Safety Question Determination 59 99-150, all of the screening activities and unresolved safety question determinations (safety evaluations) were performed in accordance with the program requirements by qualified personnel.

The licensee, during periodic surveillance testing in previous outages, identified that Essential Service Water Valve EFHV-049 (an outside containment isolation valve) leaked excessively. The cause analysis revealed that this 14-inch motor-operated butterfly valve had been used as a throttle to control essential service water flow through the Train A Containment Fan Cooling Units and had resulted in excessive valve disk and seat wear. To correct the excessive wear condition, the licensee initiated Configuration Change Package 09194. This change allowed Valve EFHV-049 to be positioned fully opened. The essential service water flow through each of the two Train A coolers was then controlled by individual Train A cooler return valves (GN-V001 and GN-V003, 10-inch manually-operated butterfly valves). The modification was implemented by establishing full essential service water flow through both Train A coolers with all valves fully open and then equally closing Valves GN-V001 and GN-V003 until a total flow of about 2400 GPM through the common outlet header was obtained. The licensee planned to implement this change on the Train B Containment Fan Cooling Units at a later date.

The licensee performed Unreviewed Safety Question Determination 59 99-150 and determined that the change could be made under the provisions of 10 CFR 50.59. The team noted that the evaluation assumed that the essential service water flow would be balanced between the 2 containment fan coolers of the train.

Updated Safety Analysis Report, Table 6.2.2-2, showed the design accident flow rate as 1000 GPM for each cooler. The team noted that individual cooler flow rates had not been determined following implementation of the modification. The licensee's representative stated it was valid to assume that each train cooler would have at least 1000 GPM with a total flow of 2400 GPM. The team requested the licensee's representative to provide or demonstrate a basis for the assumption. The team's concern was twofold:

- Could undetected heat exchanger fouling occur in one cooler such that flow would be degraded or challenge the accident analysis?

- If degradation occurred in one heat exchanger, could flow be accelerated through the unaffected heat exchanger and cause excessive erosion degradation?

In 1994, prior to the modification, the licensee developed Procedure TMP-EN-171, “ESW Train A Post-LOCA Flow Balance,” to assure that the essential service water system flow was properly balanced. The team reviewed the flow test data collected for the Train A coolers. With Valve EFHV-049 throttled to 21 percent open and Valves GN-V001 and GN-V003 fully open, an indicated flow of 2470 GPM through the 14-inch common cooler outlet was achieved. The smaller 10-inch cooler outlets indicated 1022 and 1100 GPM (2122 GPM total). This was the last flow data collected for essential service water system flow through the Train A. The team noted that the total of the individual leg flows indicated a 14 percent decrease in flow rate as compared to the common cooler outlet. Also, there was a 7.1 percent difference in the indicated flow rates between the two separate 10-inch pipe legs.

The team further noted that the cooler with lower indicated flow only provided a margin of 2 percent above minimum design specified flow. The team requested the licensee’s representative to provide information about the test flow rate measuring and test equipment. The licensee’s representative provided the purchase order and vendor (Controlotron Corp.) calibration flow data for the portable sonic flow measuring device, which was certified to be accurate to 0.05 percent for 10- and 14-inch pipes. This accuracy specification assumed a large section of uninterrupted pipe run without bends and components. According to remarks on the Procedure TMP-EN-171 test package, the large error between the two separate 10-inch pipes and the common 14-inch pipe indicated flows was due to pipe configuration of the 10-inch lines, but the accuracy or uncertainty was not quantified. Therefore, with the large difference in the measured flows between the combined two 10- and 14-inch pipes, the 1994 flow balance testing did not provide confidence that the individual cooler flows would enable the design accident flow rate of 1000 GPM each. Furthermore, individual cooler outlet flows had not been measured in the present modified train configuration, and the evaluation had not addressed or determined if throttling the smaller valves would affect the indicated flow accuracy of the larger common cooler outlet line.

Discussion with licensee personnel revealed that a cooler with degraded flow could be identified by control room instrumentation that provided individual containment cooler air discharge temperature. Additional discussion revealed that earlier in the life of the facility, the essential service water flow through the containment coolers had been reduced by about 50 percent to alleviate potential erosion of the cooler tubes. The team, in conjunction with a senior reactor analyst, determined that flow degradation in containment cooling system would not significantly contribute to an early containment failure. Therefore, the team did not have a safety concern regarding minimum accident train flow rate.

The team observed that the licensee's evaluative process did not address the potential for degraded cooler flow and excessive flow-induced erosion. As a result, the team determined that licensee personnel had not rigorously performed the response to Unresolved Safety Question Determination 59 99-150 regarding identification or the potential consequences of unbalanced flow between the Train A coolers.

c. Conclusions

The team concluded that, with one exception, the licensee had carried out an effective program for the sampled 10 CFR 50.59 evaluations. The selected 10 CFR 50.59 evaluations were generally comprehensive, of good quality and technically adequate. In addition, the team determined that the engineers who performed the 10 CFR 50.59 safety evaluations were properly qualified.

E2.3 Temporary Modifications

a. Inspection Scope (93809)

The team reviewed Procedure AP 21I-001, "Temporary Modifications," Revision 3, and the sample of open and closed temporary modifications listed in the Attachment to assess the licensee's temporary modification program. This assessment included verifying that the licensee's configuration control process was effectively implemented for these temporary modifications to ensure that the impact of temporary modifications on surveillance test procedures and the design bases was considered.

b Observations and Findings

The team's review of program implementing Procedure AP 21I-001 revealed that the procedure assigned responsibilities associated with implementation and restoration of temporary modifications to specific employee positions. These responsibilities included:

- Maintenance of proper design
- Adequate testing
- Adequate regulatory screening and evaluation
- Review of all analysis and evaluation associated with a temporary modification
- Authorization of extensions
- Maintaining the log and a file of all active temporary modifications

Additionally, the process assigned a responsible engineer for each temporary modification as the modification owner for monitoring the system(s) affected by the in-place temporary modification. The procedure stated that temporary modifications should be limited to 6-months duration. The responsible engineer could extend the temporary modifications up to one cycle duration, but only the plant manager could authorize extensions of modifications longer than one cycle upon receipt of correspondence requesting the extension. The team found the procedure to be satisfactory for implementing, evaluating, extending, and restoring temporary modifications.

The team requested a list of all temporary modifications initiated since January 1997 and any installed temporary modifications that were currently open, regardless of installation date. The team found that 52 temporary modifications had been initiated since January 1997, but only 8 remained open, of which the oldest had been installed on February 13, 1998.

The team reviewed a sample of open and closed temporary modification packages and determined the condition of the existing installations. In addition, the team verified that current temporary modification package information and the temporary modification log were maintained up to date in the database. For those packages reviewed, the team verified that:

- Screening and, if necessary, unresolved safety question determinations were performed.
- Required engineering and hazards analyses were performed.
- Required preinstallation reviews were performed.
- Duration of installation was determined and logged.
- Required tests and/or inspections were performed for the duration of installed temporary modifications.
- Packages required beyond the original duration were granted formal extensions, reevaluated, and revised in accordance with the procedure.

c. Conclusions

The team concluded that during the past 3 years, the licensee's temporary modification program had been appropriately implemented.

E2.4 Surveillance Testing

a. Inspection Scope (93809)

The team reviewed the licensee's surveillance test procedures to assure that automatic power-operated containment isolation valves in the selected systems (containment cooling system, containment spray system, and containment hydrogen control system) had been included for stroke-time and leak testing in accordance with technical specification requirements. In addition, the team reviewed completed surveillance test documentation for the containment spray pumps and the containment isolation valves.

b. Observations and Findings

Technical Specification Surveillance Requirement 3.6.3.5 required that the isolation time/closure stroke-time of each automatic power-operated containment isolation valve be verified within acceptable limits, and at a test frequency in accordance with the inservice testing program. The team's review found that all Updated Safety Analysis Report-identified containment isolation valves requiring stroke-time testing were contained in the applicable surveillance test procedures. Each reviewed surveillance procedure specified acceptance limits and test frequency.

The team reviewed documentation of the 1997, 1998, and 1999 test data for opening and closing stroke-times of the power-operated containment isolation valves in the selected systems. The team found that approximately four valves had failed their stroke-time tests. In addition, the team reviewed the 1997, 1998, and 1999 containment penetration/isolation valve local leak rate test results for the Type C testing performed in accordance with Appendix J to 10 CFR Part 50, "Primary Reactor Containment Leakage Testing for Water Cooled Power Reactors." The team found that approximately seven valves had not met their leakage acceptance criteria.

The team noted that the licensee had implemented corrective actions for all valves that failed stroke-time and leak rate testing. The team further noted that the average combined Type B and C maximum pathway leakage for all penetrations tested during 1997, 1998, and 1999 was approximately 1/3 of the acceptable total leakage rate of $0.6L_a$ (250,000 SCCM). The acceptable total leakage rate of $0.6L_a$ (250,000 SCCM) is the value permitted by Technical Specification SR 3.6.1, "Containment," and Appendix J to 10 CFR Part 50.

The team's review of the containment spray pump surveillance test procedures and selected results did not identify any discrepancies.

c. Conclusions

The team found that all of the automatic power-operated containment isolation valves in the selected systems were appropriately included in the applicable surveillance test procedures for stroke-time and leak rate testing. The team concluded that the licensee's 1997, 1998, and 1999 stroke-time and leak rate testing of the reviewed containment isolation valves was acceptable.

E8 Miscellaneous Engineering Issues

E8.1 Engineering Backlog

a. Inspection Scope (93809)

The team reviewed the backlog of work assigned to the engineering organization. The major items in the backlog that were reviewed included performance improvement request production statistics, temporary modification statistics, work order and corrective maintenance backlog trends, Updated Safety Analysis Report fidelity, performance improvement request backlog reduction numbers, and the plant modification reduction curve. The team also reviewed the manner in which the backlog was being trended and tracked.

b. Observations and Findings

The team noted that in a previous inspection in October 1996, the backlog was being managed by a single individual with no assigned backup. The team discovered the level of backlog trending and tracking had grown such that numerous personnel were tracking many more items and in much more in-depth than before. One example of note was performance improvement request tracking and trending, where a group of individuals was now responsible.

The team interviewed the manager of engineering performance who was the cognizant licensee contact for the performance improvement request program. The team questioned the unusually high number of performance improvement requests when compared to the number tracked 4 years earlier. In January 1997, approximately 290 performance improvement requests were noted to exist, and the latest statistics in December 1999 indicated 530 performance improvement requests were open. The licensee's representative stated that several in-house reviews (most notably the Updated Safety Analysis Report fidelity review, auxiliary feedwater self-assessment, and essential service water self-assessment) had elevated the number of performance improvement requests. Additionally, the licensee's representative noted that the growth was also due to a new lower threshold for issuing performance improvement requests, stating that items such as drawing errors were now being documented on performance improvement requests.

In addition, the team noted that the licensee was tracking performance improvement requests such that significance and age of the performance improvement requests were being tracked. The licensee's representative flagged the number of performance improvement requests older than 2-years old, and the team found this number to be low (33). Also, the number of performance improvement requests assigned as significant was found to be less than 5 percent of the total number. The licensee's representative stated that these two figures received specific attention from the vice president of engineering.

The team found that the licensee had adopted a managed resource approach to lowering the performance improvement request backlog. The licensee was tracking monthly performance improvement request opening and closure rates along with the total number of performance improvement requests. The closure rate figure had a performance indicator, based on historical closure rates, to ensure proper resources were being allocated to performance improvement request closure. This approach was working, as noted by the reduction in most other backlog indicators such as open temporary modifications, corrective maintenance work orders, plant modification work, and a noticeable reduction in the number of performance improvement requests from a peak of around 630 in October 1998. The overall trend for all backlog indicators combined reflected a balanced approach to the reduction, leading the team to conclude that the licensee's backlog was being well managed.

c. Conclusions

The team concluded that during the last 3 years, the licensee has effectively managed the engineering backlog and those items that impact engineering resources. Significant improvement had been made in this area.

E8.2 Updated Final Safety Analysis Report Review and Update Program

a. Inspection Scope (93809)

The team reviewed the licensee's program for reviewing, revising, and maintaining the Updated Safety Analysis Report current and accurate. The team's effort included a review of Procedure AP26B-003, "Revisions to the Updated Safety Analysis Report," Revision 2; Self Assessment Plan SEL 97-044, "WCGS Updated Safety Analysis Report Fidelity Review," Revision 1; and the Report of Self Assessment 97-044, dated October 30, 1998. The team also reviewed a sample of Updated Safety Analysis Report change requests and determined the recent level of effort expended to update and maintain the Updated Safety Analysis Report.

b. Observations and Findings

During the inspection, team members observed that the licensee staff perceived that the Updated Safety Analysis Report was the primary document that described the facility, presented the design basis and the limits on operation, and presented the integrated safety analysis of the whole facility. The team found that licensee's program and procedures contained sufficient guidance to identify and control changes to the Updated Safety Analysis Report, such that the design basis of the facility would be preserved.

Partly in response to a letter dated October 9, 1996, from the NRC requesting information pursuant to 10 CFR 50.54(f) regarding the adequacy and availability of design bases information, the licensee initiated an extensive fidelity review of the Updated Safety Analysis Report. The stated purpose of the review in Self Assessment Plan SEL-97-044 was to establish a conclusion that the document was accurate and complete, identify historical material that does not require updating, identify unneeded material that could be deleted, and create a cross-reference between Updated Safety Analysis Report sections and technical specifications, systems, procedures, and drawings.

The team's review of the Self Assessment Plan SEL 97-044, which served both as a charter and the detailed review procedure, revealed that the licensee's effort had assembled an assessment team of 32 individuals, 25 licensee personnel and 7 contractor personnel. During the course of review which lasted just over 12 months, licensee team members worked part time on their specific review assignments, while contractors worked full time. The document contained detailed fidelity review instructions supplemented by a review process flow chart. This flow charted process was noteworthy in that it contained decision blocks to determine if the reviewer was qualified and if previously unidentified functions existed. Additionally, there were requirements for team members to update the database with new information, and determine and propose corrective action to address identified discrepancies.

The team's review of the self-assessment report, a sample of Updated Safety Analysis Report change requests, and the relative quantity of the recent annual Updated Safety Analysis Report update change requests to the NRC, provided the information needed to assess the effectiveness of the licensee's fidelity review. The report identified in excess of 2300 potential discrepancies that resulted in the generation of 620 performance improvement requests to address discrepancies. The licensee categorized the discrepancies as existing since initial start up, caused by design modification, or caused by changes to procedures or administrative requirements. About one third of the potential discrepancies were editorial in nature and overlapped all categories. The sample of Updated Safety Analysis Report change requests reviewed by the team all contained the required verification, unresolved safety question screening and determination, and management and appropriate committee review and approval. None of the errors identified by the team during this inspection, as discussed above, and during the team's review of the licensee's program implementation, posed an operability concern.

The team requested and received historical information regarding relative size of annual update packages from 1994 to the present time. This included six previously completed update packages, and the present update package that was being prepared for submittal on March 11, 2000. The information represented a distinct upward trend both in the number of change requests and the sheer volume (number of pages) in the update submittals. The data indicated a higher trend rate that appeared to result from the fidelity review.

Finally, the team observed that the licensee was proactive in familiarizing employees with the regulatory environment in which the Wolf Creek facility operated. The regulatory services organization, with the support and assistance of the training organization, had developed and implemented formal regulatory awareness training. This training was now administered to technical personnel in engineering, maintenance, operations, and quality assurance on a continuing basis. In addition, the regulatory services organization published and distributed a site-wide newsletter informing personnel of changes and new information in the regulatory area.

c. Conclusions

The team found that the licensee's Updated Safety Analysis Report program review was effective in identifying discrepancies and initiating license document change requests to validate and correct the Updated Safety Analysis Report. The team concluded that the licensee's Updated Safety Analysis Report review and revision program was a strong program.

E8.3 (Closed) Licensee Event Report 50-482/98-001-01: Pressurizer Code Safety Valves Outside of Technical Specification Allowances.

The licensee documented this event in Licensee Event Report 98-001, Revision 1, and in their corrective action program as Performance Improvement Request 98-0743. The root-cause analysis of the event determined that the pressurizer safety valves were not capable of consistently meeting a technical specification tolerance of ±1 percent of valve test pressure with currently available industry test methodology and equipment. Test records indicate, however, that the valves' performance have been repeatable within a tolerance of ±2 percent for the past three refueling outage as-found tests.

The licensee took the following corrective actions: (1) adjusted the set pressures, retested the valves, and certified that the as-left set pressures were within technical specification tolerance; and (2) initiated pursuit of a change to the technical specification set point tolerance for the pressurizer safety valves.

The Limiting Condition for Operation for Technical Specification 3.4.10, required all three pressurizer safety valves to be operable with lift settings ≥2461 psig and ≤2509 psig. The proposed change would reduce the limit for the nominal lift setting to allow opening pressures of ≥2411 psig and ≤2509 psig. Following testing, the required lift setting will be within ±1 percent of the nominal value. No change was proposed to the maximum allowed lift setting of 2509 psig.

The team reviewed the licensee's application for amendment to the technical specification, including an attached safety evaluation. This package was submitted to the NRC under cover letter identified as ET 99-0025 dated October 21, 1999. NRC approval had not been received as of the date of this inspection.

E8.3 (Closed) Licensee Event Report 50-482/00-001-00: Surveillance Method Results in Low NaOH Level in the Spray Additive Tank.

The licensee documented this event in Licensee Event Report 00-001, Revision 0, and in their corrective action program as Performance Improvement Request 00-0405. The evaluation of the event determined that a 1985 engineering recommendation providing guidance for the use of a sight glass for NaOH tank level determination rather than the control room instrumentation (due to the non-conservative effects of temperature and density on transmitter span adjustments) was not incorporated into operating procedures. The root-cause analysis of not incorporating the guidance was indeterminate due to the historical nature of the problem.

The licensee took the following corrective actions: (1) restored the spray additive tank volume to above the minimum technical specification surveillance value; and (2) initiated development of a new procedure to specify the use of the sight glass for level verification, until more accurate calibration methods are developed to allow use of the level indicators.

The actions taken by the licensee were appropriate to the circumstances. This subject is discussed in detail in Section E1.2.2.b.5

V. Management Meetings

X1 Exit Meeting Summary

The team presented the preliminary inspection results in an exit meeting to members of licensee management on February 4, 2000. Licensee management acknowledged the findings presented.

Subsequent to the exit meeting, inoffice inspection continued until February 10, 2000. During the inoffice portion of the inspection, discussions were held concerning the licensee's resolution to the spray additive tank issue. A supplemental telephonic exit meeting was held on March 21, 2000.

The team leader asked whether any materials examined during the inspection should be considered proprietary. Licensee's management stated that no proprietary information was reviewed by the team.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

D. Fehr, Manager, Information Services
T. Harris, Superintendent, Licensing
D. Hooper, Regulatory Specialist
D. Knox, Manager, Maintenance
S. Koenig, Manager, Performance and Improvement
O. Maynard, President and Chief Operating Officer
R. Muench, Vice President, Engineering and Information Services
W. Norton, Manager, Design Engineering
R. Sims, Manager, System Engineering
C. Younie, Manager, Operations

NRC

F. Brush, Senior Resident Inspector
J. Dyke, Resident Inspector
D. Powers, Chief, Engineering and Maintenance Branch

INSPECTION PROCEDURES USED

93809	Safety System Engineering Inspection
37001	10 CFR 50.59 Safety Evaluation Program
92903	Followup - Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

50-482/0003-01: first example	NCV	The licensee failed to verify the adequacy of the design basis, in that, no analysis existed to demonstrate that unit auxiliary Transformer XMA02 had the capacity to supply both non-Class 1E and both Class 1E load groups simultaneously (Section E1.2.2).

50-482-0003-01: second example	NCV	The existing calculation (Drawing M-018-0389-01 dated March 14, 1980) did not demonstrate that the diesel generator was capable of maintaining voltages within the Updated Safety Analysis Report stated limits during load sequencing. In addition, the vendor calculation had not been updated to reflect the changes in loads and starting sequences shown in Updated Safety Analysis Report, Figure 8.3-2 (Section E1.2.2).
50-482/0003-02	NCV	The failure to maintain the minimum volume in the spray additive tank was a violation of Technical Specification SR 3.6.7.2 (Section E1.2.2).
50-482/0003-03	NCV	The licensee failed to follow their motor-operated valve program procedure by inappropriately removing two safety-related hydrogen purge containment isolation valves from the program (Section E1.4).
50-482/0003-04	NCV	The licensee failed to appropriately establish performance measures for the hydrogen analyzers to evaluate the effectiveness of the preventive maintenance program as required by 10 CFR 50.65 (Section E1.4).

Closed

50-482/98-001-01	LER	Pressurizer code safety valves outside of technical specification allowances (Section E8.3).
50-482/00-001-00	LER	Surveillance method results in low NaOH level in the spray additive tank (Section E8.4).

LIST OF DOCUMENTS REVIEWED

PROCEDURES

NUMBER	DESCRIPTION	REVISION
AP 05-002	Dispositions and Change Packages	3
AP 05-010	Design Drawings	0
AP 05D-001	Calulations	4
AP 21G-001	Control of Locked Component Status	15

NUMBER	DESCRIPTION	REVISION
AP 21I-001	Temporary Modifications	3
AP 23D-001	Motor Operated Valve Program	1
AP 23M-001	WCGS Maintenance Rule Program	3
AP 26A-003	Screening and Evaluating Changes, Tests, and Experiments	5
AP 26C-004	Technical Specification Operability	3
AP 28A-001	Performance Improvement Request	15
AP 28-001	Evaluation of Nonconforming Conditions of Installed Plant Equipment	7
AP 26B-003	Revisions to the Updated Safety Analysis Report	2
AP 29D-001	UHS Monitoring and Reactor Building Tendon Inspection Program	
AP 29E-001	Containment Leakage Rate Testing Program	5
EMG ES-12	Transfer to Cold Leg Recirculation	12
TMP EN-171	ESW Train A Post-LOCA Flow Balance	0
TSS EF-201	Essential Service Water System Valve Testing	15
TSS EF-201A	Essential Service Water System Train A Inservice Valve Test	6
TSS EF-201B	Essential Service Water System Train B Inservice Valve Test	5
TSS EN-100A	Containment Spray Pump A Inservice Pump Test	13
TSS EN-100B	Containment Spray Pump B Inservice Pump Test	14
TSS EN-201	Containment Spray System Inservice Valve Test	6
TSS EN-201A	Train A Containment Spray System Inservice Valve Test	0
TSS EN-201B	Train B Containment Spray System Inservice Valve Test	0
TSS EN-206	Containment Spray System Inservice Valve Test	8
TSS EN-206A	Train A Containment Spray Inservice Valve Test	0
TSS EN-206B	Train B Containment Spray Inservice Valve Test	0
TSS GS-201	Containment H2 System Inservice Valve Test	9

NUMBER	DESCRIPTION	REVISION
TSS GS-201A	Containment H2 System Train A Inservice Valve Test	3
TSS GS-201B	Containment H2 System Train B Inservice Valve Test	3
TSS GS-202	Containment H2 System Position Indication Test	8
TSS GS-203	Containment PASS and Atmospheric Rad Monitor Inservice Valve Test	2
TSS GS-203A	Train A PASS and Containment Atmospheric Rad Monitor Inservice Valve Test	0
TSS GS-203B	Train B PASS and Containment Atmospheric Rad Monitor Inservice Valve Test	0
TSS ML-01	Monthly Surveillance Log	29
TSS MT-044	Containment Tendon Inspection	
TSS PE-017	Local Leak Rate Test	12
TSS PE-128	Local Leak Rate Test Valve Lineup For Penetrations 28 & 29	1
TSS PE-156	Local Leak Rate Test Valve Lineup For Penetration 56	1
TSS PE-165	Local Leak Rate Test Valve Lineup For Penetration 65	1
TSS PE-171	Local Leak Rate Test Valve Lineup For Penetrations 71 & 73	2
TSS PE-197	Local Leak Rate Test Valve Lineup For Penetration 97	1
TSS PE-199	Local Leak Rate Test Valve Lineup For Penetration 99	1
TSS PE-201	Local Leak Rate Test Valve Lineup For Penetration 101	1
TSS PE-251	Local Leak Rate Test for the Fiber Optics Penetration	1
TSS KJ-001A	Integrated D/G and Safeguards Actuation Test - Train A	21
TSS KJ-001B	Integrated D/G and Safeguards Actuation Test - Train B	21
TSS KJ-005B	Manual/Auto Start, Synchronization & Loading of EDG NEO2	35
STS MT-044	Containment Tendon Inspection	6
STS KJ-001A/B	Surveillance Test	
HNC C-1001	Calibration of Switches	8

OPERATING PROCEDURES

NUMBER	DESCRIPTION	REVISION
SYS NB-132	Energizing NB Buses from Alternate Power Supply	14
SYS NB-200	Transferring XNB01 Supply Between SL7 and #7 Transformer	8
SYS NB-201	Transferring NB01 Power Sources	25
SYS NB-202	Transferring NB02 Power Sources	24
SYS NB-331	Deenergizing NB Buses	10

CALCULATIONS

NUMBER	DESCRIPTION	REVISION
AI 05-006	Electrical Load Growth	0
AP 05-005	Design, Implementation and Configuration Control of Modifications	4
AP 05D-001	Calculations	4
AP 26B-003	Revisions to the Updated Safety Analysis Report	2
AP 28-001	Evaluations of Nonconforming Conditions of Installed Plant Equipment	1/30/97
AP 28-001	Evaluations of Nonconforming Conditions of Installed Plant Equipment	8/29/97
AP 29-001	UHS Monitoring and Reactor Building Tendon Inspection Programs	0
AP 90-056	Reactor Protection System Engineered Safety Features Actuation System Channel Error Allowances	0
A-W-6	Thermal Capability of Electrical Penetration Assemblies Versus Dual Short-Circuit Protection to Satisfy Regulatory Guide 1.63	W2
EN-M-007	Post LOCA Containment Sump PH	0
TR-89-0001	WCNOC Nuclear safety Analysis Setpoint Methodology for the Reactor Protection System	7/27/89
J-L-EN02	Spray Additive Tank Volume	1
J-J-K-EN02	Spray Additive level Loop Uncertainties Loops -17 and 19	4

NUMBER	DESCRIPTION	REVISION
J-K-EN01	Spray Additive level Loop Uncertainties Loops -15 and 16	1
J-L-EN-1	Instrument Calibration for EN-LT-15, 16, 17, and 19	0
J-K-EN02	Control Systems-Provide Instrument Uncertainty Estimate and Safety Related Setpoints for System “EN” Instruments	4
J-L-EN03	Transmitters Ranges for EN-LT-17 and 19	0
AN 98-001	Uncertainty for RWST Level Lo-Lo-1 Automatic Switchover Setpoint and Technical Specification Changes	0
XX-C-024	Thermal Overpressurization Evaluation Per NRC Generic Letter 96-06	1
XX-E-006	AC System Analysis	4
XX-S-002	Stress-Provide ESW and CCW Below Ambient Condition Stress Evaluation: Methods and Results	2

DESIGN CHANGES

NUMBER	DESCRIPTION	REVISION
PMR 4478	Modify Containment Cooler ESW Valves	11
PMR 3714	Containment Pressure Transmitter Changeout	1
PMR 2911	Hydrogen Analyzer Sample TBG Heat Trace	8

SAFETY EVALUATIONS

NUMBER	NUMBER	NUMBER	NUMBER
59 1997-0073	59 1997-0079	59 1997-0086	59 1997-0175
59 1998-0030	59 1998-0038	59 1998-0098	59 1998-0111
59 1998-0150	59 1998-0158	59 1999-0051	59 1999-0077
59 1999-0115	59 1999-0150		

DESIGN BASIS DOCUMENTS

TYPE	TITLE/DESCRIPTION	REVISION
M-10EN	System Description Containment Spray System	2
M-10GN	System Description Containment Cooling System	4
M-10GS	System Description Containment Hydrogen Control	2
WCRE-09-EN	IST Design Basis Document-System: EN (Containment Spray System)	0
WCRE-09-GN	IST Design Basis Document-System: GN (Containment Cooling System)	0
WCRE-09-GS	IST Design Basis Document-System: GS (Containment Hydrogen Control)	0
E-035-0123	Design Qualification Report-Electrical Penetration Assemblies	3
E-035-0125	IEEE 344 Seismic Qualification Reports	2
E-035-0144	Addendum No. 1 to the Generic II Qualification Testing of Electrical Penetration Assemblies per Amphenol Test Plan 123-2200	3
E-035-0148	Addendum No. 1 to the Design Qualification Report for Electrical Penetration Assemblies Standardized Nuclear Unit Power Plants Bunker Ramo Report No. 123-2222, Rev. 4	2
E-035-0149	Environmental Qualification Test Report of Raychem WCSF-N Nuclear Inline Cable Splice Assemblies for Raychem Corporation	1
E-035B-001	Design Qualification Material Test Report for Materials Used in Conax Electric Penetration Assemblies and Electric Conductor Seal Assemblies	1
E-035B-0010	Design Qualification Report for Feedthrough/Adapter Module Assemblies for Amphenol SAMs Penetrations Standardized Nuclear Unit Power Plant System	4
E-035B-0012	Test Report Qualification of Instrumentation Service Classification Electric Penetration for Class 1E Service in BWR & PWR Containment Structures	1
E-035B-0013	Design Qualification Test Report of a Low Voltage Power and Control Service Classification Electric Penetration Assembly for Class 1E Service in BWR & PWR Containment Structures	1

TYPE	TITLE/DESCRIPTION	REVISION
E-035B-0019	Design Qualification Test Report for a Conax Low Voltage Service Classification Conductor Feedthrough Assembly	1
E-035B-0021	Test Report for Kulka Terminal Blocks Made with DI-30F Glass-Filled Diallylphthalate	1
E-035B-0036	Design Qualification Test Report for Kulka Terminal Blocks for Class 1E Service in Nuclear Power Plants	2
E-035B-0037	Design Qualification Test Plan for Kulka Terminal Blocks	1
E-035E-00001	Design Qualification Test Report for Fiber Optic Feedthrough Assemblies	W01
E-035E-00009	Design Report for Fiber Optic Penetration Assemblies	W02
E-035E-00010	Design Qualification Report for Fiber Optic Penetrations	W02

DESIGN CHANGES

NUMBER	TITLE	REVISION
03714	Change Package	1
05040	Change Package	0
05622	Change Package	0
05961	Change Package	3
07068	Change Package	1
07328	Change Package	0
07450	Change Package	0
07741	Change Package	0
07866	Change Package	0
09194	Change Package	0

DRAWINGS

NUMBER	DESCRIPTION	REVISION
M-12EN01	P & I Diagram Containment Spray System	3
M-12GN01	P & I Diagram Containment Cooling System	9
M-12GP01	P & I Diagram Containment Integrated Leak Rate Test	3
M-12GS01	P & I Diagram Containment Hydrogen Control System	3
M-12GN02	P & I Diagram Containment Cooling System	1
M-767-00185	Solid State Protection System Interconnection Diagram	2
E-11005	List of Loads Supplied By Emergency Diesel Generator	20 and 21
E-11001	Main Single Line Diagram	3
E-11NG01	Low Voltage System Class 1E 480V Single Line Meter & Relay	6
E-11NG02	Low Voltage System Class 1E 480V Single Line Meter & Relay	5
E-01NB01	Lower Medium Voltage System Class 1E 4.16kV Single Line	12
E-01NB02	Lower Medium Voltage System Class 1E 4.16kV Single Line Meter & Relay	12
E-11PG06	Low Voltage System Non-Class 1E 480V Single Line Meter & Relay	0
E-K1001	Single Line Diagram-Essential Service Water System	2
E-11NG20	Low Voltage System Class 1E Motor Control Center Summary	19
E-11006	Single Line and Schematic Drawing Standards, Notes & Symbols	3
M-018-0389-01	Analysis of Load Table and Predictions of Voltage Dip and Frequency Excursions at the Various Load Step Conditions	3/14/80
M-018-0391-02	Emergency and Voltage Excursion Predictions Program	App. E
E-11032	Substation & Plant Transformer Tap Settings	Sht 11&22
E-13EN01	Containment Spray Pump Schematic	0
E-13EN02	Containment Recirculation Sump Isolation Valves	2
E-13EN03	Containment Spray Nozzles Isolation Valves Schematic	1
E-13EN04	Spray Additive Tank Isolation Valves Schematic	1

NUMBER	DESCRIPTION	REVISION
J-104-0240	Load Shedding & Emergency Load Sequencing System	9
E-13GN01	Hydrogen Mixing Fans	2
E-13GN02	Containment Cooling Fans A & C	4
E-13GN02A	Containment Cooling Fans B & D	6
E-01PG07	Low Voltage Non-Class 1E 480V Single Line Meter & Relay	6
E-01PG08	Low Voltage Non-Class 1E 480V Single Line Meter & Relay	5
E-03EN05	Schematic Diagram Miscellaneous Instrumentation	8
E-03EN06	Schematic Diagram Annunciation	5
E-03GN07	Schematic Diagram Elevator Machine Room Exhaust Fan and Pressurizer Cooling Fan	3
E-03GS01A	Schematic Diagram CRDM Plenum Exhaust Dampers	4
E-03GS01A	Schematic Diagram Hydrogen Monitoring Subsyetm (Solenoid) CTMT Isolation Valves	2
E-03GS05	Schematic Diagram Thermal Hydrogen Recombiners	3
E-03GS06	Schematic Diagram Thermal Hydrogen Recombiners	4
E-03GS07	Schematic Diagram CIS Signal Multiplication Relay and Status	3
E-03GS08	Schematic Diagram Hydrogen Concentration Indication	4
E-03GS10	Schematic Diagram Containment Atmosphere Monitor Isolation Valves	3
E-03GS11	Schematic Diagram Containment Atmosphere Monitor Isolation Valves	3
E-03GS12	Schematic Diagram Post Accident Sampling System Isolation Valves	2
E-03GS14	Schematic Diagram CIS Signal Multiplication Relay and Status	2
E-13GN03	Schematic Diagram CRDM Cooling Fans and Discharge Dampers	1
E-13GN04	Schematic Diagram Reactor Cavity Cooling Fans	1
E-13GN05	Schematic Diagram Miscellaneous Instrumentation	0
E-13GN06	Schematic Diagram Miscellaneous Instrumentation	2

NUMBER	DESCRIPTION	REVISION
E-13GN09	Schematic Diagram Miscellaneous Fan Space Heaters	2
E-13GN10	Schematic Diagram Containment Cooler Fans Vibration Switches	0
E-13GP00	Containment Integrated Leak Rate Test Schematic Index Sheet	10
E-13GP01	Schematic Diagram Containment Integrated Leak Rate Test Instrumentation	5
E-13GP01A	Schematic Diagram Containment Building Temperature Monitoring	1
E-13GP02	Schematic Diagram Containment Integrated Leak Rate Test Valves	1
E-13GP04	Schematic Diagram Containment Integrated Leak Rate Test Instrumentation	2
E-13GS00	Containment Hydrogen Control System Schematic Index Sheet	4
E-13GS01B	Schematic Diagram Hydrogen Monitoring Subsystem (Solenoid) CTMT Isolation Valves	0
E-13GS02A	Schematic Diagram Hydrogen Monitoring Subsystem (Solenoid) CTMT Isolation Valves	1
E-13GS03	Schematic Diagram Hydrogen Purge Subsystem Isolation Valve	0
E-13GS04	Schematic Diagram Hydrogen Purge Subsystem Isolation Valve	0
E-13GS09	Schematic Diagram Hydrogen Analyzer	0
E-13GS13	Schematic Diagram Power Lockout Switch Multiplication Relays	0
EMG ES-12	Transfer to Cold Leg Recirculation	10
EN-03W	Mechanical - Evaluate Boron Concentration Level Increase	1
F-7	Minimum Cable Sizing	0
Figure 6.2.4-1	Containment Penetrations	11
EN-M-007	Post LOCA Containment Sump PH	0
J-104-00410	Wiring Diagram LSELS IE Relay Allocation	W09
J-104-0147	Wiring Diagram LSELS IE Relay Allocation	W04

NUMBER	DESCRIPTION	REVISION
KD-7496	One Line Diagram	21
List	Open Temporary Modifications	N/A
List	Updated Safety Analysis Report Sections	N/A
List	Technical Specification Section (TOC)	0
M-00GP	System Description - Containment Integrated Leak Rate Test System	0
J-T04-0240-09	Load Shedding & Emergency Load Sequencing System (LSELS) Block Diagram	3B
WCRE-01	Total Plant Setpoint Document	30

TEMPORARY MODIFICATIONS

NUMBER	NUMBER	NUMBER	NUMBER
TMOD 98-004-KC	TMOD 98-016-PQ	TMOD 98-018-HB	TMOD 99-006-WS
TMOD 99007-BB	TMOD 99-008-EB	TMOD 99-009-MB	TMOD 99-012-EF

WORK ORDERS AND WORK REQUESTS

NUMBER	NUMBER	NUMBER	NUMBER
WO 97121961-000	WO 97122640-000	WO 97127961-000	WO 98127340-001
WO 98127340-005	WO 98127810-001	WO 98128103-000	WO 98204464-002
WO 98204552-000	WO 99207509-000	WO 99209119-000	WO 99210725-001
WO 99207461-000	WR 00364-93		

PERFORMANCE IMPROVEMENT REQUEST

NUMBER	NUMBER	NUMBER	NUMBER
PIR 97-0712	PIR 97-0799	PIR 97-1298	PIR 97-1347
PIR 97-1429	PIR 97-2310	PIR 97-2388	PIR 97-2392
PIR 97-3974	PIR 97-4182	PIR 98-0009	PIR 98-0219
PIR 98-743	PIR 98-1697	PIR 98-2009	PIR 98-3130

PIR 98-3177	PIR 99-0090	PIR 99-0747	PIR 99-0899
PIR 99-0943	PIR 99-0976	PIR 99-1951	PIR 99-1978
PIR 99-2043	PIR 99-2081	PIR 99-2675	PIR 99-2773
PIR 99-3028	PIR 99-3051	PIR 99-3194	PIR 00-0300
PIR 00-0313	PIR 00-0316	PIR 00-0318	PIR 00-0136
PIR 00-0327	PIR 00-0141	PIR 00-0330	PIR 00-0205
PIR 00-0333	PIR 00-0394	PIR 00-0405	PIR 00-0332

MISCELLANEOUS DOCUMENTS

NUMBER	DESCRIPTION	REVISION/DATE
N/A	Post Outage Local Leak Rate Testing Report - Tenth Refueling Outage / Spring 1999	July 2, 1999
N/A	Post Outage Local Leak Rate Testing Report - Ninth Refueling Outage / Fall 1997	January 10, 1998
M-10GS	Containment Hydrogen Control System Description	2
E-10NF	Load Shedding and Emergency Load Sequencing System Description	1
SLNRC 84-0089	Response to SNUPPS Q&A	May 31, 1984
SCR GS-99-037	Containment Hydrogen Analyzer Heat Trace Setpoint Change Request	Nov. 3, 1999
SEL 97-037	Self Assessment Containment Leakage Rate Testing Program	September 22, 1997
SEL 97-044	WCGS Updated Safety Analysis Report Fidelity Review	1
	Report of Self Assessment 97-044	October 30, 1998
SPEC C-158(Q)	Technical Specification for Containment Tendon Surveillance	8
SPEC E-035	Technical Specification for Electrical Penetration Assemblies for the Standardized Nuclear Unit Power Plant System (SNUPPS)	8
SPEC E-035B	Technical Specification for Electrical Penetration Module Assemblies for the Standardized Nuclear Unit Power Plant System (SNUPPS)	3

NUMBER	DESCRIPTION	REVISION/DATE
SPEC E-035E	Design Specification Wolf Creek Generating Station Fiber Optic Penetrations	1
WCNOC-3	Configuration Identification Scheme Manual	11
WCNOC-114	Tenth Year Physical Surveillance of the Wolf Creek Unit 1 Containment Building Post-Tensioning Surveillance Report	0
GS 99-037	Setpoint Change Request	Novembe 4, 1999
0705347	Purchase Order	0